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The Only Weekly Mining Paper in the Continent of Africa.

THE South African MINING AND ENGINEERING JOURNAL

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Published every Saturday



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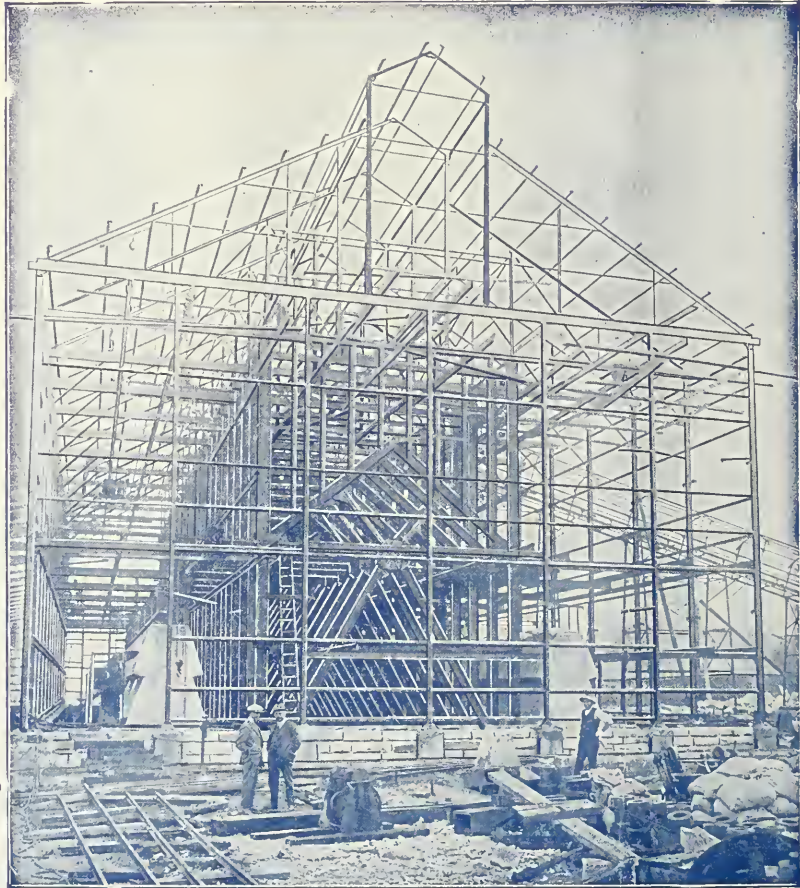
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The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, SEPTEMBER 10, 1921.

No. 1563

THE PRETORIA MINT.



Two Views of the New Mint, under construction at Pretoria. An article on the Mint appears elsewhere in this issue.

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The Outlook for the Hume Pipe Co.

PROFIT. £37,714—ADDITIONAL PRODUCTIVE CAPACITY—POINTS FROM ANNUAL REPORT.

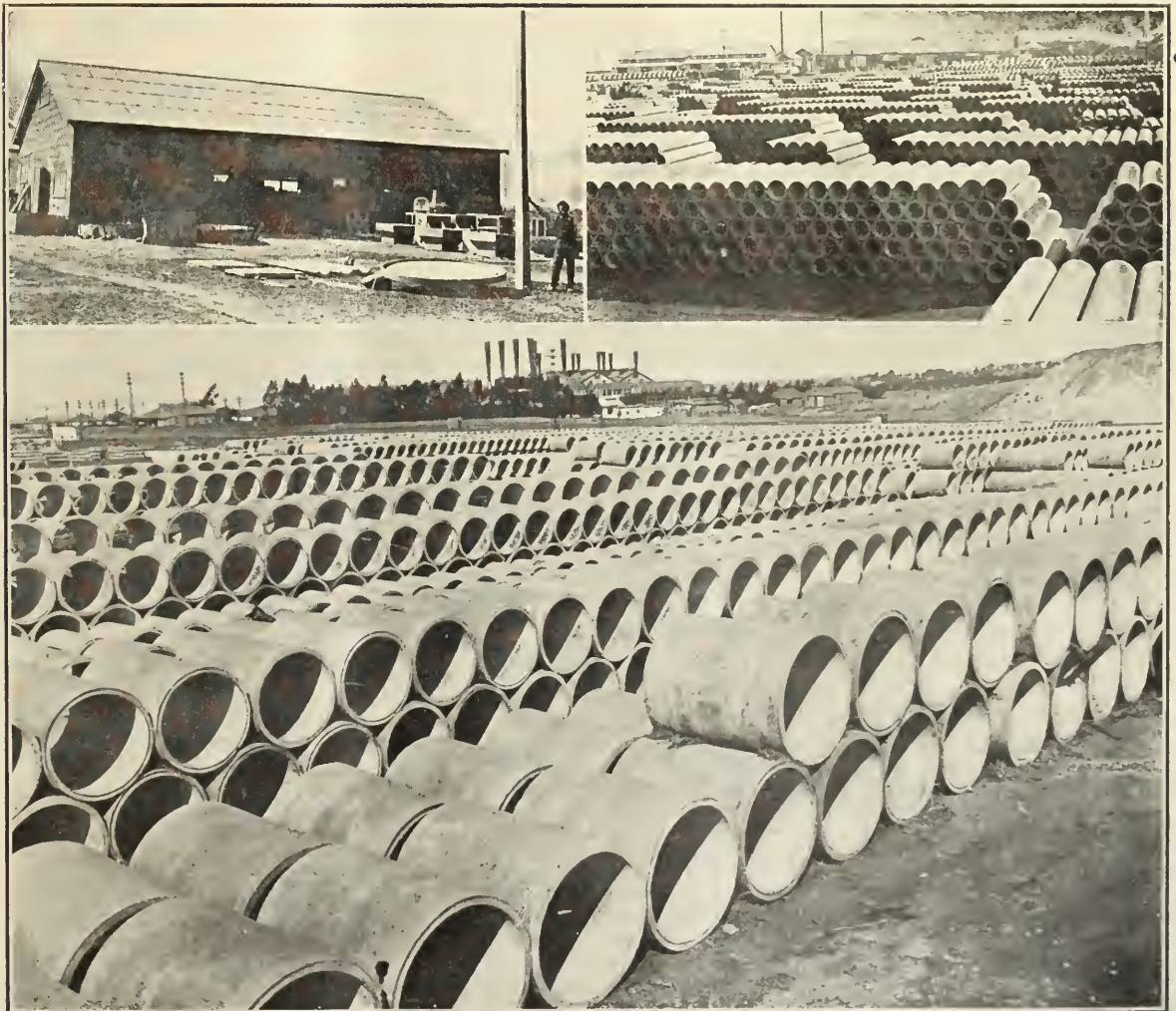
The annual meeting of the Hume Pipe Company, Ltd., will be held on September 14. The annual report, issued this week, shows that the profit for the year, after making provision for bad and doubtful debts and contingent liabilities in respect of maintenance periods under municipal and other contracts completed and in course of completion, amounted to £46,594 3s. 4d. From this has been deducted depreciation on property, buildings, machinery, plant, etc., provision for income tax, etc., leaving a net profit for the year of £37,714 4s. 5d. After deducting the debit balance brought forward from last year there remains to be carried forward a net balance of £23,525 15s. 5d. During the year, Mr. Robert Niven resigned his seat on the Board. Mr. M. C. Bird has been appointed a Director of the Company, and confirmation of this appointment will be asked for at the meeting. Messrs. E. G. Izod and T. W. Reynolds retire from the Board in accordance with the Company's Articles of Association, but are eligible and offer themselves for re-election. The Company's property holdings were increased during the year by the purchase of Stand No. 251 South Germiston Extension, and of three cottages close to the Germiston Factory. The greater portion of the extensions of the

Company's factory and plant at Germiston, referred to in the last directors' report, has been completed. The Hume Pipe Factory at Bellville, Cape Province, has been completed, and is in running order. The Company's buildings, machinery and plant at Germiston and Bellville, including the brick and tile works, have been maintained in excellent condition.

Wit. Deep: August Results.

The estimate of results for the month of August, 1921, is as under:—Tons milled, 31,060; gold recovered, 9423.274 czs.; average of stamps running, 180; stamps running time, 21,516 days; tube mills, 5. The working expenditure, including head office charges for the month, is £42,789 or 27s. 7d. per ton. The estimated working revenue based on an estimate of £5 11s. 6d. per fine oz. (less 1s. 6d. realisation charges) is £51,874 or 33s. 5d. per ton. The estimated working profit is £9,085 or 5s. 10d. per ton, from which is to be deducted the capital expenditure for the month of £1,689, leaving a surplus of £7,396.

VIEWS OF THE HUME PIPE WORKS, GERMISTON.



(1) Concrete Specials and Builders' Sundries Factory: Building of Concrete Blocks with Corrugated Concrete Roof. (2) Stocks Yard: Pressure Pipes. (3) Road Culvert Pipes: Order of Administrator of Transvaal, Road and Works Department.

Rand Mining Economics.

SUGGESTIONS TO IMPROVE EFFICIENCY AND LOWER WORKING COSTS IN AND ON THE MINES OF THE WITWATERSRAND.

By E. C. Ranson.

The making or marring of any mine depends to a great extent on what takes place underground, and this is where some improvement has got to come from to help keep the gold mining industry of the Witwatersrand going. The great trouble, if one might call it such, on these fields up to recent years has been too big a margin of profit, too much to play with, and too easily made. Now that wages are up, cost of materials up, deeper mining, and grade down, the old methods will not carry. The profits of any mine depend principally upon:—

- (1) The value of the ground mined; and
- (2) The cost of getting that ground to the mill.

I want to deal with points under each heading, and try to show where improvements can be made.

1. The amount of gold that a reef carries is determined by nature, but the value of the rock mined depends to a large extent upon the mining conditions in the stopes. The great aim ought to be to send out stuff as rich as possible from the stoping areas, and this, as everyone knows, can be regulated by varying the stoping widths. There is too much attention paid to "tally" underground on most mines. Everyone, from the trimmer up, seems to be obsessed with the idea that the holding of his job depends upon the number

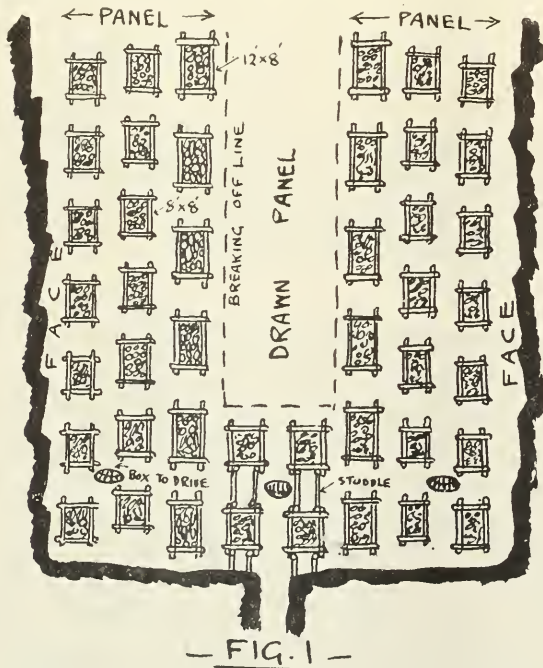
In this article I confine myself to the cost of materials and the general working in stopes, where the bulk of the producing is done.

On the Central Rand it must be patent to everyone employed in the area that during recent years there has been a great change in the conditions underground, especially in the stoping areas. Before the present depths were reached, it used to be an easy matter to keep the hanging up. At the present time, wherever ground is being stoped, the overlying strata seems to be "weighing" very considerably, and under present conditions, in order to win ground, it is necessary to practically fill a stope with pigstys and packs, and even then the hanging comes down. The system of supporting and keeping up huge back areas of worked out ground is not the ideal system of mining, although possibly until recent years the conditions here have not lent themselves to any other system. Under present conditions of heavy hanging, with a certain amount of movement and tendency to break easily, I think the ideal system in stoping areas where developing is done under the reef, would be to draw out back pigstys or supports systematically up to a solid prepared breaking off line, and allow the hanging to fall.

Under present conditions, by supporting and trying to keep up huge stoped out areas, the hanging is always on the move, weight is thrown where it is not wanted, and the places never get a chance to settle. If the hanging was allowed to fall up to a certain distance from the face systematically, the back areas would become choked and solid, and the working places safer; the supported hanging next to the face would become "winded," and the stope faces as pleasant to work in as they are now difficult.

Under present conditions it is possible, if back supports were taken out, to make the hanging break at any particular line, provided a good solid breaking off set was put in. Wherever skeleton pigstys are put in a stope, and the weight settles on them, the hanging soon "nieks" itself up at the solid face. The same thing would happen, and much more easily, if the back pigstys were taken out clean up to a good solid breaking off line.

Even if it were only a case of making the working places safer and more pleasant to work in (and as we increase in depth, conditions will not improve), the proposition would be attractive. When one comes to consider the number of pigstys that have to be put in a stope to-day, and each one is filled with the average product of these working places, the proposition becomes doubly attractive; 10 per cent. of the ground broken goes into pigstys, and owing to the number of supports in a stage, making clean lashing difficult, probably another 2½ per cent. is left behind and lost. Considering a stope, say, 50 inches wide, the whole value being carried in a reef channel of 20 inches or probably less; it is not difficult to see that much of that reef may, and probably does, go into pigstys, or is left behind, and low grade stuff trammed from the stope. To think that present working conditions result in an absolute loss of 12½ per cent. of the ground broken is, to say the least, startling. If a system such as that advocated were adopted, the saving would be very considerable; not only would all this ground be recovered, but the timber as well. All drawn timber would be carried forward, and most of it used again on the face. Timber is a very heavy item on mines these days. On a mine, say, hoisting 50,000 tons a month, the number of, say, 8 foot lagging poles which go down for stope timbering alone is not far short of 15,000 a month. If such a reclamation system were adopted, and the quantity of new timber needed was cut down by only 50 per cent., taking the cost to a mine of an average 8 ft. stick at 4s., the saving would be appreciable. To summarise, by the successful exploitation of this system of working, we would save, on a low estimate, seven or eight thousand lagging poles a month at an average of, say, 4s. each, and



— FIG. 1 —

of cars that he gets out, and naturally it concerns him little what the grade of the stuff is they carry so long as the tally is obtained. Too much attention is given to this kind of thing, and too little to economic mining. Let us in the first place be assured that the ground we are breaking and transporting to the mill is carrying the maximum amount of gold possible, and time and money is not being spent in dealing with dead stuff. Stopping widths should be brought down to the minimum necessary to win the whole of the value in the reef and to give comfortable working conditions. On the deep level mines of the Central Rand, where the reef body is not usually very wide, and the ground usually heavy, this calls for a more general use of the Jack hammer. I may casually mention here that the carrying of a narrow stope is also advantageous in a system of working I wish to advocate under heading 2.

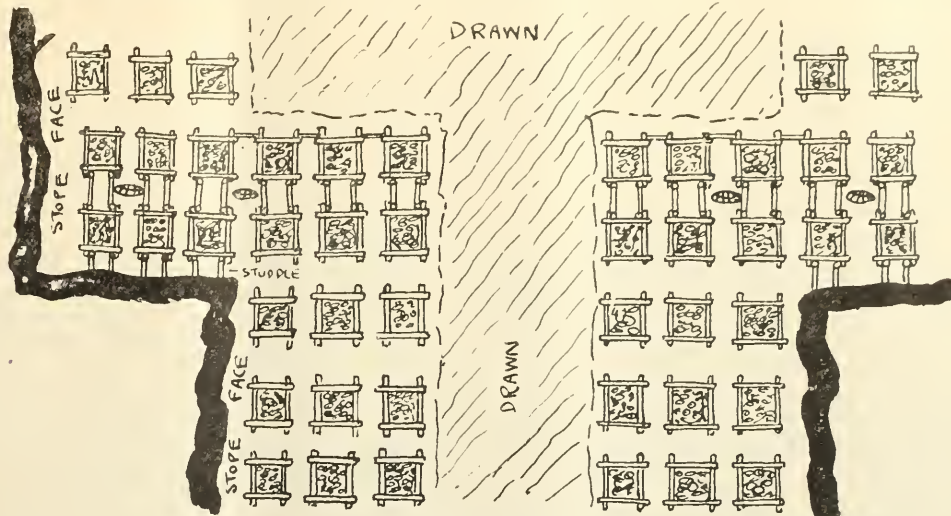
2. Although the cost of getting the rock to the mill depends upon the efficiency of many operations underground.

recover anything up to 6,000 tons of rock per month of the average grade of the mine for practically the cost of lashing and trammung.

The idea is to timber the stope faces in panels, the pigstys being put in systematically a certain distance apart on the strike and dip. Where necessary, they would be thoroughly filled and made solid. When one knows that all stuff in the pigstys will eventually be recovered, it matters little what quantity or how rich the stuff is stowed away. A panel would consist of a breaking off line of well-built solid

below, and maintain communication between the faces for travelling purposes and for ventilation. To make these pigstys as rigid as possible, they could be studded at the four corners and also studded on to the solid ground at the bottom of the stope as shown. As the panels in the lower stage were drawn, the few pigstys left immediately above in the old stope would be taken out systematically.

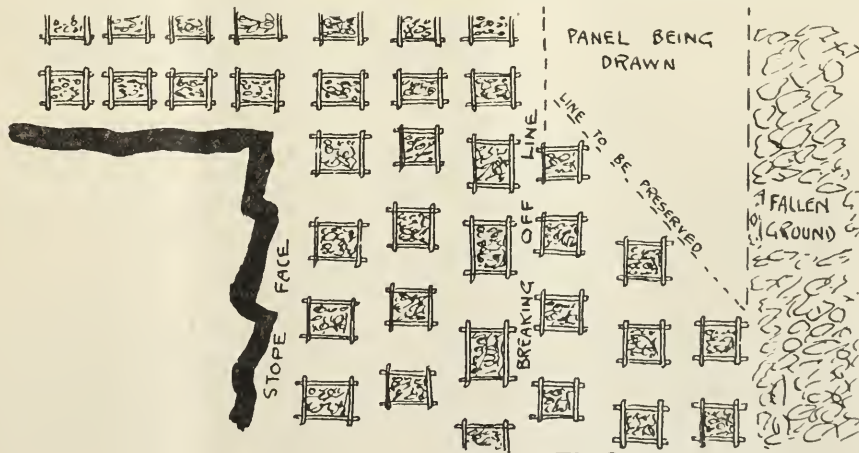
The drawing of the panels would be done on the night shift. One experienced timberman working each night would be able to do all the timber drawing in an average mine captain's section. A shift boss would report when he had a



— FIG. 2 —

pigstys, say, 12 ft. x 8 ft., and two intermediate lines of 8 ft. x 8 ft. pigstys. The distance apart of the packs would be, say, 8 feet on the dip and 4 feet on the strike. Fig. 1 shows a stope which has been opened up sufficiently to allow three complete panels to be put in. When a stope was in this condition it would be ready for the removal of the middle panel. There would always be a width of about 11 or 12 yards of supported hanging next the face. Being a new departure in mining practice, many will look upon it with suspicion and put it down as unworkable. To go into a stope, which has been worked for a few years, and 300 feet or more

panel ready for drawing, and the drawer would go from stope to stope as required. A pigsty would be readily unkeyed by stope as required. A pigsty would be readily unkeyed by knocking out the wedges and chopping out one of the sticks. A panel would be drawn from the top downwards and kept in a line as shown in Fig. 3, always preserving the chute ways for lashing. After unkeying and pulling down the pack, if necessary, all timber could be recovered from a place of safety between rigid pigstys by means of a "pout," a long-handled tool with a spike at one end. The lashing boys could also be provided with long rakes for pulling the



— FIG. 3 —

between the faces, and try to draw the packs, would be unwise. It must be commenced as soon as possible in a new stope before much weight has come on the place. Once the middle panel was drawn out in a new stope and the place had fallen, it would give little trouble afterwards. The hanging next the face would become "winded," and I question whether it would be necessary to fill more than half the pigstys outside the breaking off line.

When the panels were drawn it would be necessary to leave, say, a double line of filled pigstys along the solid ground at the bottom of the stope as shown in Fig. 2. This would allow the machines to get to work on the stope faces

reef into the chute ways, where it could be handled with a shovel.

By cutting down stoping widths to the minimum, thus producing stuff of maximum grade, and a system of reclamation as suggested, the outlook would be much brighter for some of our deep level, low grade propositions of the Central Rand.

There is just another point I would like to mention in which improvement might be made, although I believe more attention is paid to it now than used to be the case. That is the systematic recovery of all materials such as pipes, track, etc., when a place is worked out. There is still the desire to leave everything behind when a place is being started up and ask for new material when a place is being started up, as in the more prosperous days of the reef.

East Rand Mining Leases Inspector's Report.

POINTS FROM GOVERNMENT INSPECTOR'S REPORT ON SPRINGS, GOVERNMENT AREAS, NEW STATES, WEST SPRINGS AND BRAKPAN MINES.

The following extracts are taken from the latest official reports of the Government Inspector of Mining Leases on the Far East Mines, in which the Government has a direct interest. The reports deal with the quarter to June 30.

Spring Mines, Ltd.

The ore reserves as at the 30th June, 1921, are estimated by the company at 3,002,981 tons of an average value of 8.76 dwt. over a stoping width of 62.53 inches. This figure indicates an increase of 276,803 tons compared with the previous estimate as at the 31st December, 1920, when the value and width were 8.76 dwt. over 63.48 inches. Further particulars concerning these reserves will be given in my next report.

No. 3 Shaft.—During the quarter 711 feet of station headings have been accomplished, together with 841 feet of development, which latter footage is dealt with under the head "Development."

Work is proceeding in connection with additional surface plan consisting of hoisting engine, compressor, boilers, and permanent steel head-gear, etc.

No. 4 Shaft.—The erection of the permanent steel headgear has made good progress and is nearing completion. The winding engines and boilers are completed, and various buildings, including drill-shops and change-houses, are erected, and the surface equipment may be said to be practically completed, although it is not likely that a commencement of sinking operations will be immediately made.

Development.—A summary of the development work is as follows:—

Drives	...	...	1,010 ft.
Winzes and raises	...	...	1,384 "
Haulage ways	...	...	2,909 "
Crosscuts, etc.	...	...	12 "
Total	...	...	5,315 ft.

Footage on reef	...	...	3,850 ft.
Footage sampled	...	...	3,795 "
Footage payable	...	...	2,050 " = 54 per cent.
Average reef channel width payable footage	...	...	22 inches.
Average reef channel value payable footage	...	...	24.5 dwt.

Of the total footage developed, 841 feet were driven from the No. 3 Shaft, of which 265 feet were sampled, 96 per cent. being payable. The average value and width was 22 dwt. over 31 inches.

Compared with the previous quarter, there has been an increase of 351 feet in the footage developed, and 317 feet in the footage sampled. The payable percentage of the footage sampled fell from 56.8 to 54 and the average value from 630 inch dwt. to 546 inch dwt.

Mining.—The rock broken in the mine according to survey measurements amounted to 150,298 tons; in addition, 31,020 tons were dumped as waste.

The rock came from the following sources:—

	Tons.	Percentage.	Sampled value	Dwt.
Payable ore reserves	102,829	68.4	10.17	
Other than payable ore reserves	21,575	14.4	6.92	
Development	25,894	17.2	4.64	
Total	150,298	100.0	8.75	

Average stope width	...	...	60 inches.
Average reef channel width	...	...	26 inches.
Average stope width in payable reserves	...	...	60 inches.

Compared with the previous quarter, there has been an increase of 7,804 tons in the tonnage mined, and an increase of 0.27 dwt. in the value.

The average value and width of the ore mined from the payable reserves, according to data adopted in the estimation of reserves as at the 31st December, 1920, were 8.53 dwt. over 64.16 inches, whilst the payable reserves as a whole at that date average 8.76 dwt. over 63.48 inches.

The value of the ore mined from the payable reserves, after allowing for the difference in the stoping width, was 0.60 dwt. higher than the corresponding block estimate.

A very satisfactory decrease has taken place in the stoping width as, in comparison with the previous quarter, this width has been reduced by close on 5 inches.

Compared with the previous quarter, the mining costs, exclusive of development, show an increase of 7.14 pence per ton mined. The chief increases are 3.333 pence in "stopping" and 2.408 pence in "shovelling and tramming," the former principally due to the decrease in stoping width producing a smaller tonnage, and the latter to a considerable increase in the number of trucks underground.

Of the total revenue from gold, the sum of £57,088 11s. 2d. represents the estimated gold premium, being at the rate of slightly over 20 shillings per ounce, and equivalent to 8s. 11.545d. per ton milled. The estimated premium for the previous quarter was equivalent to 8s. 3.257d. per ton milled.

Exchange for the quarter, allowed for in the gold revenue, amounted to £1,933 12s. 9d., as compared with a credit of £353 1s. 6d. for the previous quarter.

The total working costs show a decrease of 1s. 7.508d. per ton milled, compared with the previous quarter, during which period the costs were adversely affected by the February strike.

The working profit, excluding the gold premium and exchange, shows an increase of 2s. 6.28d. per ton milled, but, including both the premium and exchange, the profit shows an increase of 2s. 10.05 per ton milled.

To the working profit of £107,065 4s. 10d. may be added the sum of £6,277 8s. 11d., representing the difference between the estimated premium and actual premium on gold for the three months ended 31st May.

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Considering the satisfactory condition of the payable ore reserves, it has been decided to increase the nominal crushing capacity of the plant from 40,000 tons to 50,000 tons per month by the addition of four tube mills. There will be no addition to the stamp mill, as recent experiments have shown that the necessary increase can be obtained by increasing the tube milling and coarse crushing plant only.

Government Gold Mining Areas (Modderfontein).

Development.—A summary of the development work is as follows:—

Drives	2,141 ft.
Winzes and raises	2,888 ,,
Haulage ways	644 ,,
Crosscuts, etc.	3,387 ,,
Total	9,060 ft.

Footage on reef	3,714 ft.
Footage sampled	3,860 ,,
Footage payable	2,070 ,, = 53.6 per cent.
Average reef channel width payable footage ...	53 inches.
Average reef channel value payable footage ...	13.6 dwt.

Compared with the previous quarter, there has been an increase in the total footage developed of 1,040 feet, and in the footage sampled of 90 feet.

The development for the quarter shows a slight increase in the percentage of payability from 52.4 per cent. to 53.6 per cent., but the value has decreased from 834 inch pennyweights to 723 inch pennyweights.

Compared with the previous quarter, there has been an increase of 19,000 tons in the tonnage milled and an increase of 8,040 ounces in the gold obtained. The percentage of sorting increased from 14.03 per cent. to 15.44 per cent.

The rate of milling for the quarter has been very satisfactory and is the highest so far reached, the daily average having been 182 tons above the nominal capacity of the plant, making a total of 14,000 tons for the quarter.

Of the total revenue from gold, the sum of £160,670 represents the estimated premium, being at the rate of practically 20 shillings per ounce and equivalent to 8.054 shillings per ton milled. The estimated premium for the previous quarter was 7.73 shillings per ton milled.

Compared with the previous quarter, the working profit shows an increase of 0.486 shilling per ton milled, but, excluding the gold premium and exchange, the working profit shows an increase of 0.55 shilling per ton milled.

The total working profit for the six months ended 30th June amounts to £780,937 18s. 10d., to which may be added the sum of £30,136 0s. 7d., representing the difference between the estimated and actual premium on gold for the five months ended 31st May, and a further sum of £667 8s. 6d. realised by the sale of by-products, bringing the total working profit for the six months to £811,741 7s. 11d.

New State Areas.

Development.—A summary of the development work is as follows:—

Drives	1,111 ft.
Raises	623 ,,
Winzes	174 ,,
Crosscuts, etc.	1,735 ,,
Total	3,643 ft.

**MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.**

OVERSEERS' CERTIFICATES (Metal).

Our Passes	Rest of S.A.
1920 (12 months) 66%	34%
1921 (6 months) 64%	36%

No failures for 6 months, 1921.

MANAGERS' CERTIFICATES.—Our record is 100% passes. 1912-20 we claimed 165 certificates; 40 in 1919-20; last 3 Exams., 29 certificates (total). 10 Coal Certificates in last 3 Exams.

TUITION (Metal or Coal) by class, correspondence or privately.

The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

**Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.**

Of this total 1,605 feet and 2,038 feet were accomplished at the North and South Shafts respectively

Footage on reef	412 ft.
Footage sampled	400 ,,
Footage payable	330 ,, = 82.5 per cent.
Average reef channel width payable footage ...	62 inches.
Average reef channel value payable footage ...	17.2 dwt.

The development sampled at each of the shafts were:—

Shaft.	Total feet.	Per-centage.	Channel Channel		
			able width payable.	value payable.	
	feet.	centage.	feet.	Inches.	Dwts.
North	70	17.5	—	—	—
South	330	82.5	330	100	62 17.2

Totals and averages	400	100.0	330	82.5	62	12.2
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Of the total footage developed, 1,352 feet were in connection with the lay-out of the shaft stations.

Compared with the total footage developed, including the footage in connection with the shaft station approaches, etc., during the previous quarter, there has been an increase of 2,481 feet.

A ventilating fan has been installed on the main station of each shaft and connected up with the various working faces by galvanized iron piping, and the working conditions are good.

Capital Expenditure.—The capital expenditure amounted to £73,268, made up as follows:—

Shafts and equipment	£14,957
Development and mine	43,779
Compressor plant	4,264
Additions to compounds	3,157
Other plant and surface works	7,111
Total	£73,268

General.—The thirty-drill air compressor was put into commission during the quarter, and the erection of the fifty-drill air compressor is nearing completion.

The new change-house for whites is completed, with the exception of some of the fittings.

West Springs, Limited.

No. 1 Shaft.—The footage sunk amounted to 213 feet and the footage timbered to 233 feet, the total depth of the shaft now completed being 4,105 feet, the whole of which is timbered.

Considerable progress has been made in connection with the lay-out of the stations and roadways. The main station and loading station have been cut, and 360 feet of roadways and cross-cuts have been driven; a temporary loading bin has also been installed.

No. 2 Shaft.—The footage sunk amounted to 350 feet and the footage timbered to 353 feet, the total depth of the shaft being 2,940 feet, of which 2,917 feet are timbered. At 2,590 feet and 2,680 feet reefs of the Kimberley Series were intersected, the values and widths being respectively 0.6 dwt. over 49 inches and 0.3 dwt. over 29 inches. A further reef was passed through at 2,784 feet, giving a trace over 61 inches.

In June the company notified the Government in terms of the mineral lease that it was resolved temporarily to suspend sinking operations in the No. 2 Shaft. At the end of May the shaft had been sunk 2,890 feet without encountering the Kimberley shales, it being then more than 700 feet below the point at which the shales were expected. This indicates considerable faulting and a much greater depth of shaft involving larger expenditure than was originally calculated. Sinking operations were stopped early in June, and diamond drilling was started from the shaft bottom to locate the shales and the amygdaloidal diabase. At the end of the quarter under report the drill had reached a depth of 3,272 feet below the collar of the shaft. At a depth of 3,222 feet the drill located the Kimberley shales. This makes these

shales about 1,000 feet deeper than was anticipated. In the course of drilling, three bodies of reef were passed through, their depths, values, and widths being:—At 2,941 feet, trace over 8 inches; at 3,044 feet, trace over 38 inches; at 3,085, 0.3 dwt. over 381 inches.

Development.—The following is a summary of the development work carried out from the Springs Mines property:—

Haulage ways	...	...	597 ft.
Footage on reef	...	...	312 ,,
Footage sampled	...	...	290 ,,
Footage payable	...	...	60 ,, = 21 per cent.
Average reef channel width payable footage	...	...	11 inches.
Average reef channel value payable footage	...	...	50.5 dwts.

Compared with the previous quarter there has been an increase of 80 feet in the footage developed. The payable percentage of the footage sampled has fallen from 58 per cent. to 21 per cent., but the value has increased from 371 inch pennyweights to 576 inch pennyweights. The payable reef channel width has decreased from 40 inches to 11 inches.

A second heading from the Springs Mines' property has entered the West Springs area, and was 51 feet over the boundary at the end of the quarter. This is approximately 2,600 feet to the north of the main east haulage, and is known as 8 haulage east.

Capital Expenditure.—The capital expenditure amounted to £93,173, made up as follows:—

Shafts and equipment	...	...	£49,869
Development	...	...	19,170
Buildings, surface works, etc.	...	...	17,985
General expenditure	...	...	6,149

General.—The concrete foundations for the two additional compressors at the No. 1 Shaft are completed, and good progress is being made with their erection.

The erection of two Babcock boilers at the No. 1 Shaft is completed, and the boiler house is well in hand.

The construction of the railway siding from Springs Mines to the coal bunkers of the No. 1 boiler plant is practically finished.

Brakpan Mines, Limited.

The ore reserves as at the 30th June, 1921, are estimated by the company at 2,549,625 tons of an average value of 8.77 dwt. over a stopping width of 69.78 inches. These figures indicate an increase of 23,108 tons, compared with the previous estimate as at the 31st December, 1920, when the value and width were 8.88 dwt. over 70.08 inches. Further particulars concerning these reserves will be given in my next report.

KROONSTAD COAL ESTATE COMPANY, LIMITED.

TENDERS

are invited and will be received by the Undersigned up to and including Saturday, 1st October, 1921, for the purchase of the **MACHINERY, PLANT, EQUIPMENT, MINE STORES, TOOLS, ETC.**, lying for disposal at the above Company's property at Vierfontein, O.F.S.

Tenders must be for the whole of the above, and the successful tenderer will be required to remove same at his own expense and risk within one month of the acceptance of the tender.

The highest or any tender not necessarily accepted. Lists and further particulars may be obtained from

SALISBURY, BEATON & RAYNHAM,

Secretaries,
Kimberley.

17th August, 1921.

Shafts.

No. 3 Circular Shaft.—The footage sunk amounted to 334 feet and the footage ringed to 345 feet, the total depth of the shaft being 4,530 feet, of which 4,506 feet are lined or ringed.

The main reef was passed through at a depth of 4,437 feet. Seven sections taken around the shaft gave an average assay value of 1.9 dwt. over an average width of 18 inches. The reef was lying on an interbedded quartz-porphry dyke 11 feet in thickness, with shale underlying it.

A loading station and winch-chamber have been cut, representing a footage of 36 feet.

No. 4 Circular Shaft.—During the quarter 304 feet of station roadways were driven, the whole of which footage, with the exception of 42 feet, was off reef. The reef exposure was sampled over a distance of 40 feet, but the average value was below the pay limit, being 4 dwt. over 37 inches.

Development.—A summary of the development work is as follows:—

Drives	...	...	1,897 ft.
Winzes and raises	...	...	1,105 ,,
Haulage ways	...	...	1,692 ,,
Crosscuts, etc.	...	...	501 ,,
Total	...	...	5,195 ft.

Footage on reef	...	...	3,457 ft.
Footage sampled	...	...	3,470 ,,
Footage payable	...	...	1,310 ,, = 38 per cent.
Average reef channel width payable footage	...	...	40 inches.
Average reef channel value payable footage	...	...	16.3 dwt.

Compared with the previous quarter, there has been an increase of 149 feet in the total footage developed and a decrease of 30 feet in the footage sampled. The payable percentage of the footage sampled has decreased from 43 per cent. to 38 per cent., but the average value has increased from 531 inch pennyweights to 655 inch pennyweights.

Of the total revenue from gold, the sum of £65,906 15s. 1d. represents the estimated gold premium, being at the rate of 19s. 10.79d. per ounce, and equivalent to 8s. 0.92d. per ton milled. The estimated premium for the previous quarter was equivalent to 8s. 0.48d. per ton milled.

Exchange for the quarter included in the gold revenue shows a debit of £2,204 17s. 6d. compared with a credit of £766 10s. 3d. for the previous quarter.

Compared with the previous quarter, the total working costs show a decrease of 4,779 pence per ton milled.

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The Discovery of the Kimberley Mine.

By W. P. Taylor.

As the train steams up from the Cape and passes the Modder River and the trenches where Boer and Briton met; as the line swerves away through low mimosa and kopjes, it nears huge mounds of debris and in the distance lies a scattered town. Along the roadsides are terrible tin huts, for pinned together are the sides of petrol tins and larger pieces on greater little houses; all quaint, and quaint still are the high cheek-boned yellow Griquas and Koranas that fill these squalors. In all these years there has been no evolution in the flotsam and jetsam of Kimberley. In the earliest days they were discovered with perhaps fewer rags, and now, with less of their old language of clicks, they hang on to ancient sites, clothing their abodes with collections from garbage heaps, and side by side with their white neighbours exist as a kind of their own, fringing the scene that leads you to where but yesterday greatness was more apparent.

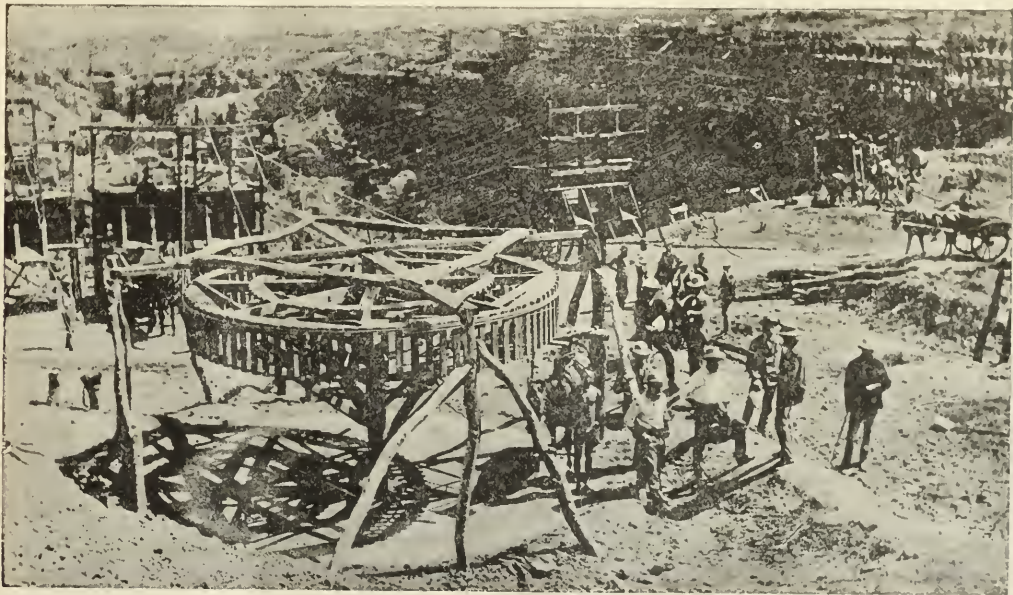
The Kimberley Mine.

Kimberley was named after Lord Kimberley ere he became the Earl of Carnarvon. It was under his administration that all the mines that group together, in that arid limestone and basalt, became British. Yes, fifty years ago last July. There were the mysterious movements of diggers and secret meetings. As the strange hum in the hive

Company have enough left in their mines to-day to supply the world for a hundred years or more. The first real treasure house of African romance was Kimberley. In the crisp winter days of July, 1871, the first holes were made, and under the shade of the camelthorn tree men rested and showed each other the first diamonds from this wonderful mine. The mine itself was a mound, a low mound; in places hard white limestone in great flat slabs, which protruded through soft red sand. The wild aardvark, or anteater, the porcupine and other strange denizens of the veld, had mined there long, long before man thought of invading their sanctuary, and it was in this red softness that a few men were sinking their prospecting holes just fifty years ago. Cawood and Rawstone were names I distinctly remember as the first to claim its discovery.

"The New Rush."

They named it Colesberg Kopje, but for a considerable time it was known to us all as the "New Rush." Most of the men who rushed to peg went from De Beers; the distance was about a mile and a half. Our party lived at De Beers for a long time and worked our claims, walking to them in the early morning and returning at night. When one hears of a new diamond mine to-day and that it contains 10 or 20 carats to the 100 loads, it causes quite a little flutter; but



Kimberley Mine, 1874.

proclaims the sovereign's nuptials, so the sound of something great preceded the discovery of this wonderful mine. Dutoitspan, Bultfontein and De Beers were all working, and there was too much mining ground and not enough diamonds. Diggers went for weeks without a find, and a curious conglomeration of poor farmers and Kafirs worked at the two former mines; in fact, Dutoitspan and Bultfontein were very poor class, in a way, and the knowing ones, the *bon ton* were out for something better. It is opportunity that makes the man, and although South Africa has furnished some men of great ability, I question very much their wonderful evolution without the mines of gold and diamonds. There is a peculiar aspect of concentration in the diamond part. It is not different to-day; no one knows, but I venture to think that if mankind will continue to buy diamonds the De Beers

O! ye Gods, what a mine Kimberley was! They literally picked them up, and in all sizes. In a week or two after its discovery, with just a sieve and a table, they sorted them out in hundreds of every size from half to over 100 carats in a single stone; great stones worth £5,000 apiece. I remember passing a man's table which was over full of gravel, and as I passed it a great yellow diamond rolled towards me. The man sorting never saw it. I picked it up and threw it over the gravel on to his hand. Unfortunately he was a mean man. Some six months afterwards he fumbled out a halfcrown and said he had almost forgotten to give me a present. Fortunately, for myself, I was not poor or dependent enough to accept it. He sold the stone for £2,000. It is curious how men listen and follow wrong ideas, for although they actually found diamonds in the lime-

stone capping, they would not break it up and sort it. Many thousands of tons of rich limestone were wheeled out and cast away, and many years afterwards it was put through rotary machines and returned hundreds of thousands of pounds to strangers. The mine, as it opened up, contained great long ribs of floating reef—a mass of shale that had been twisted and contorted with the boiling of the volcano. In this mass there were no diamonds, but under it and along its sides and in each crevice, where there was a rich pocket of "yellow," there the gems were found concentrated in masses. The eastern part of the mine produced a good glassy stone, the centre and the north and south sides yellows and cleavage, and the western part was all glassy and the smoky stone, the latter until then unknown. The western part of the Kimberley Mine had great depths of extremely light matter. It appeared burnt out, with many round rotten basalt pebbles as big as a tennis ball. Soon we knew where every class of diamond in the mine came from, and the smoky stone was something to shudder at. A beautiful octahedron, white and clear, with just a tiny tinge of smoke in one corner, and as if its modesty could not brook the sunlight, within a few hours of its advent into the world, it was a shattered mass of flaws and practically valueless.

Herbert Rhodes.

Amongst the men who pegged out the first claims was Herbert Rhodes. There was a number of men with him and several more Natalians. Henry Nourse was there, a lad

as issued licences. When we were merged into Crown Colony, the office went to Market Square. Mr. William Smith for many years issued our licences. Mr. Ortlepp returned to Bloemfontein, which was, I believe, Lady Phillips' home.

Old Time Conditions.

There were no nice burnt brick residences in those days. Water was sixpence a bucket. Everyone lived in his tent. The lucky ones sheltered under a great old camelthorn, and around their tents were reeds tightly laced into hedges to keep the cold gales and sand off. The elite had green baize linings and a canvas fly which kept off heat and rain. The sanitary arrangements were as Adam's, and yet the camp was clean and only soiled by red dust, which a cloth dispelled. Wagons from Natal, Port Elizabeth and Queens-town brought great loads of provisions and goods, and as time went on the inevitable corrugated iron. Then the early white softness gave way to metallic corrugations, the surveyor made straight lines, streets eventuated out of tortuous labyrinths, and gradually we became extremely rigid. Each digger's claim was 31 feet square, and these were cut up into quarters, eighths and sixteenths. I have known men secure all they desired and return to their homes from the returns of a 1-32nd of a claim. The ground my father and I made about £200 a month out of in No. 6 South, when the mine was discovered, was 8 ft. wide and 10 ft. long. We worked it for quite a time with four Kafirs. I think the whole mine was 440 claims. To-day it is a terribly deep, trumpet-



Kimberley Camp, 1872.

then. The Grays, Ghisling, Roos, Lings, Edwards, Stanfords, Zheasbys, were all names I remember. The *Diamond Fields Advertiser*, through the efforts of Mr. George Beet and Mr. R. H. Giddy, gives a list of the first men whose finds are recorded, and there are such names as Thackeray, Maeder, Battenhausen, Fleet, Cuming, Kuillen, Battleden, and others. I dare say I could enlarge on it in time, but these are some of the names of men who fifty years ago found and gave to the world the wonderful mine that once and for all settled the destinies of a country that was near starvation. Midway between Kimberley and De Beers a little mud room was built. It was clothed with reeds and plastered with red mud. A board announced that it was the Claim Registry Office and gave the hours of business. On entering one saw a handsome tall man with a great blonde beard, our first Claim Inspector, Mr. Ortlepp—the father of Lady Lionel Phillips—who settled disputes as well

shaped hole, whose sides become hard and ever narrowing, until at 3,000 feet it is but a small thing no bigger than some of the little outside mines that struggle for a reputation. But for all it was Kimberley, a spot where many lived the happiest days of their lives. It saw a great emergence. It gave one of the world's greatest men his opportunity. Yet, it is good to have lived and seen things grow out of nothing. I saw the first blush of this new life in diamonds, and I saw it in gold, and would that the human mind could trace relativity and know its effects, but as it is to-day, it is a city of shadows, and some of them great shadows. A vivid mind can picture back its days of sunshine and happiness, its days of stress and famine, the sound of guns booming distantly when General Cronje held up the great British Army at Magersfontein, and in a siege that meant touch and go, a great heart that never wavered and whose thoughts went out to one and all and made man feel that he was not alone, that he was resting on one of the great corner stones of an Empire.

Mozambique Portland Cement Works' Progress.

SLOW BUT SOLID FOUNDATION OF IMPORTANT INDUSTRY BEING LAID—A NUCLEUS FOR OTHER UNDERTAKINGS—QUESTION OF RAW MATERIALS—INTERVIEW WITH THE CONSULTING ENGINEER.

Through the courtesy of the directors of the company, a representative of this paper had an interview a few days ago with Captain Pooley, of the firm of Brown and Pooley, Consulting Engineers to the Mozambique Portland Cement Co., Ltd. Captain Pooley, who belongs to the well-known London firm of consulting engineers, who have specialised in Portland cement manufacture, has been on a visit to the works of the Mozambique Company at Delagoa Bay and he has made an exhaustive report to the directors of the company in regard to its general prospects.

Excellent Prospects.

Captain Pooley expressed himself as most favourably impressed with the prospects of the new concern. He made a thorough examination while at Delagoa Bay of all the factors, and though naturally a little disappointed at the inevitable delays attending the starting up of an ambitious undertaking of this sort under such conditions, he predicts a highly successful future for the industry. The anticipations regarding the date of supply and delivery of the machinery have not been fulfilled, and it is not considered likely that the actual work of production can commence before some nine or ten months. But a great deal has already been done. The railway siding has been completed, the foundations for the works laid, and the erection of substantial quarters for the employees completed. This last won the special approval of Captain Pooley, who is fully alive to the importance of the best possible housing accommodation as a factor in efficiency in a climate such as that of Delagoa Bay. The power plant to be provided will be of the safest type, reciprocating steam engines, with ample reserve plant, so that all risks of stoppage from this source will be obviated. The actual cement-making plant itself comes from Germany, the tenders from that country having proved so much lower than others that the directors considered themselves in duty bound to their shareholders to accept that which was lowest by so large a margin.

Raw Materials.

Captain Pooley made a very thorough examination of the raw materials available for the work of cement making. He visited and analysed the extensive lime and clay deposits belonging to the company, and he is satisfied that in point of quality and extent these leave nothing to be desired. The lime deposits are conveniently situated and may be described as for practical purposes inexhaustible. Coal is, of course, cheap, and easily transported by rail. The water supply is on the spot, and generally the position of the factory is ideal in regard to proximity to supplies of the necessary raw materials. Moreover, a large and ready market is available in the neighbourhood for the product of the works, and the requirements of Delagoa Bay alone will more than suffice to absorb the whole output. It will be necessary, of course, to provide for

extension to the productive capacity of the plant, and this contingency is not being overlooked. Captain Pooley declared himself as very much impressed by the possibilities of the undertaking and regards it as the nucleus of a whole host of other industries bound in time to spring up around it. The sympathy and assistance of the Government was assured owing to the considerable proportion of Portuguese capital interested in the undertaking, and the Administration had shown itself most helpful and encouraging in its attitude hitherto. In regard to the all-important matter of management and expert direction, the company has been fortunate enough to secure some of the best available brains, and since successful cement making is mainly a matter of chemical engineering science, the company has not hesitated to follow the advice of its consulting engineers in this matter, regardless of the expense. It will thus be seen that though shareholders may have to wait longer for returns than they had been led to believe, the delay is likely, in the long run, to have its compensating advantages. When production does start, it will be under the best possible conditions and under the best expert advice. The foundations of the new industry for Delagoa Bay are being laid with the utmost care and attention to detail. The success which seems assured is bound to result in the expansion of the industry as originally contemplated to much larger proportions and also to lead to the founding of new subsidiary industries in the vicinity. The shareholders of the undertaking are therefore not only laying the foundations of their own prosperity, but are also, indirectly, rendering a useful public service to the Province of Mozambique.

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GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), 15 Metal Certificates were granted in South Africa, and of this number our students secured 10 certificates. Previous examination we secured 7 certificates from 8 entries, and in two other recent examinations 15 passes from 19 entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured 3 certificates from 6 entries.

OVERSEAS EXAM.: 21 certificates secured 1920, and 14 certificates to date, 1921.

SURVEY EXAM.: We have secured practically all the certificates granted by the Mines Department during recent years and have obtained 60 certificates to date.

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The Labour Trouble at the Van Ryn Deep.

HISTORY OF THE AFFAIR—PROF. LAWN'S LETTER—MATTER SETTLED.

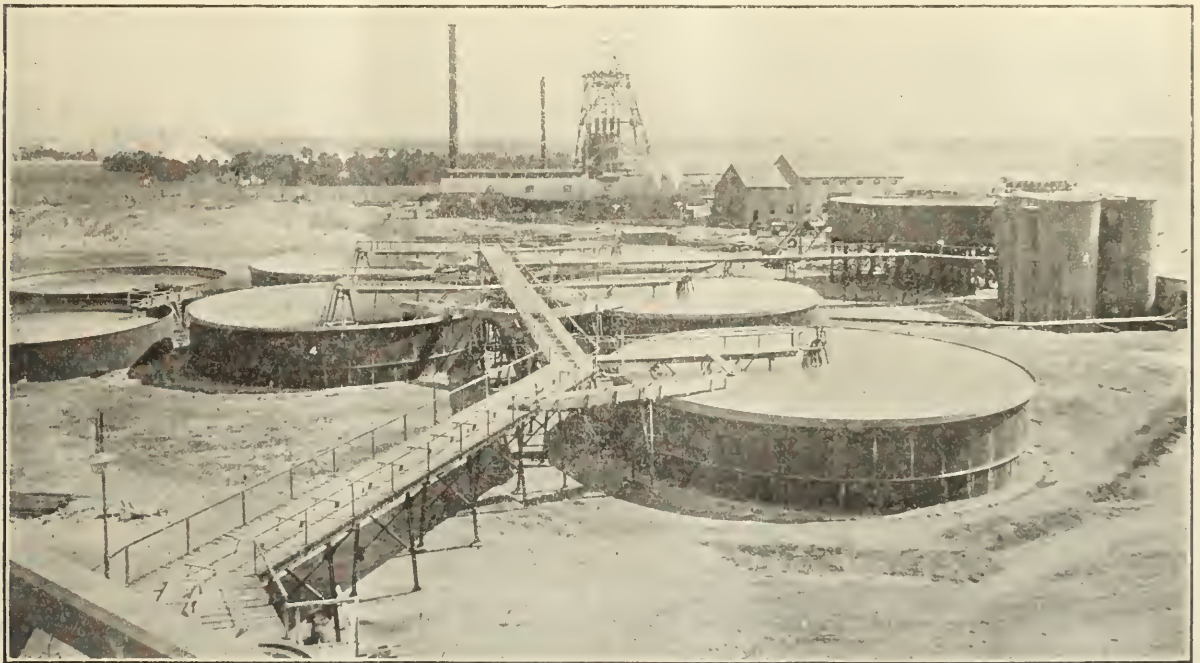
Trouble arose at the Van Ryn Deep last Sunday night owing to a difference between the management and the reduction workers. The Chamber of Mines considered the matter during the week and a settlement was reached on Thursday afternoon. As several *ex parte* statements have been made regarding the origin of the trouble, which are denied by the management, we print the following official explanation of the matter published by Professor Lawn, the joint managing director of the "J.C.I." group. Professor Lawn writes:—

"As certain statements have been published with regard to the strike of reduction workers at the Van Ryn Deep Mine, I shall be glad if you will publish the following:—

"It has been stated that owing to the longer time that the men would work on the plates if the reorganisation were

The suggestion of the Reduction Workers' Association was that there should be two full-time men in the mill on each shift, and that there should be four men in the plate house on the morning shift and only three during the afternoon and night shifts. This would clearly mean that the men on the afternoon and night shifts would spend more time on the mercury-covered plates than they do now. Further, it might be mentioned that the question of mercurial poisoning was not introduced in the earlier stages of this dispute.

"It is stated that a new battery manager about two years ago cut the staff by nearly half. This is not the case. Consequent upon the reorganisation three years ago there was no reduction whatever in the number of men employed; only three who were previously called shiftsmen were raised to the status of shift leaders. Since that reorganisation



Surface View of Van Ryn Deep.

carried out, the dispute has some connection with the question of mercurial poisoning. There is no wish to deny the importance of mercurial poisoning, and at the present time a committee with Dr. Orenstein as chairman is carefully investigating this question, and the Van Ryn Deep is prepared to fall in with any suggestions that this committee may make for improving conditions; but the dispute at the Van Ryn Deep has no bearing on mercurial poisoning. This is clearly demonstrated by the fact that neither of the two alternatives offered to the company by the shop steward would improve the position of the workmen with regard to the time they would spend on the plates. The one alternative was to leave things as they were. The other alternative was to put on an extra man who would work on the morning shift. It should be pointed out that there are no plates in the mill. The old arrangement was that there was one shiftman on each shift regularly in the mill, and that the shift leader looked in from time to time to help as necessary. There were four men in the plate house on each shift.

more men have been employed, because the number of battery plates was increased.

"It has also been stated that at five minutes before midnight on Sunday the manager of the mine was at the mill with his watch in hand telling the men that he would give them five minutes in which to start, otherwise there would be no start until they accepted the conditions laid down in his instruction. As a matter of fact, the manager did not see any of the men until after 12 o'clock. The mill at the Van Ryn Deep has always started work promptly, and seeing that it did not start as usual he went into the plate house soon after midnight. About ten minutes after twelve o'clock the shop steward approached him and asked him whether he would not concede one of the two alternatives offered. He said that it was not in his power to do so. He further asked the shop steward to reconsider the question of striking, and told him that if the mill started up in five minutes' time, the delay in starting would be overlooked. No threat of any kind was used."

Oil Shale Treatment Problems.

Assertions have been made somewhat frequently that shales will not yield a satisfactory commercial oil product. Those who make these assertions, when confronted by the proved success of the Scottish shale industry, maintain that the Scotch instance is one of the few exceptional cases where the shale is adapted for yielding a commercial product. Broadly, however, all oil shales yield products of the same type when retorted, the difference in the character of the shales calling for treatment not differing in principle but only in manipulative detail.

Treatment of oil shale comes under two main heads—(1) retorting and (2) refining. Of the two the retorting is perhaps the more important, because the refining process is largely influenced by the products yielded by the retorting, which will vary within fairly wide limits, depending upon the care and skill exercised in distilling the shale. Oil shale contains no oil as such; it is simply the raw material from which oil and other valuable products can be manufactured. The retort is the oil factory, and the products obtained from it depend upon the conditions maintained within this factory. Experience has proved that the application of heat to the retort and other conditions must be carefully controlled to obtain maximum quantities of oil of commercial grade. Scottish practice favours the use of superheated steam in the retorts. This is not so much to influence the oil yield (although it has a favourable effect) as to increase the ammonia yield, which is one of the principal sources of revenue. It is claimed that the use of steam trebles the ammonia yield, shortens the time of treatment, and thus permits a larger output.

Scottish practice is the result of many years of experience, and it might have been assumed that those now starting in the industry would desire to profit thereby. According to Professor George, this is not the case in the United States. Of 41 different processes being tried in that country by as many different companies, only two are on lines following Scottish experience. Probably many of these pioneers will suffer disappointment and loss, but it would be surprising if, out of these many attempts, there did not emerge some valuable points in connection with oil shale treatment, and the industry as a whole probably stands to gain by this display of American enterprise.

Problem of Treatment.

The problem of retorting oil shales may be briefly stated thus: (1) To convert as much as possible of the oil making part of the shale into oil; (2) to produce crude oil which

will yield the largest possible percentage of the most valuable products, such as motor spirit, paraffin, and lubricating oils; (3) to secure as large a yield of ammonia and other valuable by-products as possible without sacrificing more desirable results.

The refining of crude oil obtained by retorting oil shale is by no means a simple process, but experience gained in the petroleum refining and gas by-product industries is available to point the way, and these industries can also furnish the skilled operators for oil shale refining. The success obtained in refining Scottish shale oils shows that no insuperable difficulties are encountered. But with regard to shales yielding products comparatively high in sulphur, it is often stated that they have very little commercial value. This statement appears to have its origin in expressions of opinion made some years ago by certain oil technologists. These experts rightly maintained that the presence of considerable sulphur in the oil products largely discounted their commercial value. The objectionable odour imparted by the sulphur both to the oil before burning and to the products of its combustion would at least create a strong prejudice against its use.

It is, therefore, gratifying to know that the exclusion of sulphur in objectionable quantities from the refined oil products of shale is no longer difficult or costly. It is now only a question of deciding which of several processes, all-effective and inexpensive, is the most satisfactory in practice. Now that this difficulty has been solved it can be asserted with confidence that any other difficulties that might be experienced at the refining stage will be only those inseparable from the working of a complex chemical industry, and will not differ in character from those constantly being met in every oil-refining and gas by-product manufacturing plant.

Stienies Diamonds.

The Secretary of the Stienies Diamond Syndicate reports that further 14 loads washed yielded $4\frac{3}{4}$ carats. The largest stone weights $3\frac{1}{2}$ carats, and is of excellent quality.

Monteleo Diamonds.

The Manager of the Monteleo Diamonds, Ltd., reports that 3,638 loads of blue were mined, hauled and floored during the month of August, and that an excellent quality, good-shaped, fine white cleavage weighing $23\frac{3}{4}$ carats was found in picking. Washing operations were resumed on Friday last.

The Johannesburg Municipality has accepted the tender of Messrs. Hubert Davies & Co. for the supply and erection of a Patent Lightning Refuse Crusher, together with motive power and necessary building, for the sum of £2,624, plus £122 17s. 6d. for spare parts.

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The Real Value of Gold.

By S. J. Speak, A.R.S.M., M.Inst.M.M.

In the following important article Mr. Speak, a well-known authority, pleads that the appreciation of gold should be regularised, and that its price should be put at six guineas per ounce. In other words, Mr. Speak supports our proposal of last week.

Obviously where gold is the unit of currency its value in terms of money is constant, though its real value is its value in relationship to other commodities. The true value of any commodity is equal to the energy and sacrifice required to produce it, but its market value is subject to the varying effects of supply and demand. Gold differs from all other commodities except silver, in that the demand for it is almost entirely for money purposes, so that should it ever lose its place as the basis of currency the demand for it would be almost negligible, and its market value would be subject to the usual effects of supply and demand, which would result in the closing of nearly all gold mines.

Bankers are generally agreed that some basis unit for currency is essential, and that the most suitable one is gold. Its supposed suitability depends entirely on its past history, which has been that its production has not been subject to violent fluctuations. The discovery of a large and fabulously rich goldfield would destroy its value as a basis of currency.

Gold, therefore, is unlike most other commodities in that the demand for it is mainly of an artificial character. In this respect its position compares unfavourably with that, say, of diamonds, for possession of the latter is desired for their beauty, whereas few would hold gold on that account.

Even bankers desire to hold as little gold as possible, for without power to issue notes against the gold that they may have in their vaults, they can secure no interest upon it, and gold is, therefore, held by them only as an emergency precaution. Their aim is to hold as little of it as possible, in accordance with their own ideas of safety.

Thus gold is in the paradoxical position that the demand for it is of an artificial character, and no one in ordinary times wishes to hold it as a commodity.

The Paper and the Gold Pound.

The indifference displayed by our bankers to the dwindling gold output of the Empire shows that they regard gold mainly as an international token, and overlook the fact that gold takes much labour to produce, and that such labour has not since the War been as relatively well paid as labour in other industries. Of course, there is to be remembered the fact that a year's production of gold is only a small proportion of the world's stock of gold, and bankers may properly regard a temporary deficiency of new output as of small consequence; yet, on the other hand, currency has been considerably increased during the War, and deflation will have to be exceedingly drastic if the world's currency can ever have the same gold backing as before the War. The declared policy of our own nation, which is no doubt indicated by the bankers, is towards that end. The paper pound is, if possible, to be made equivalent to the old gold pound.

To achieve this end strong efforts are being made to reduce the price of other commodities. The attempt with coal has resulted in a strike which has cost a loss of national wealth of probably over £200,000,000. This was a real loss, which can never be regained, because it was labour being idle instead of productive. The only gain is in the direction of improving the value of our paper currency. Deflation is obviously going to be a very expensive process, and the patient may be killed by it instead of cured.

An alternative method is to recognize the existing inflation, and thereby avoid wage reductions, which we know our workmen will stupidly resist. In comparison with American currency, ours is inflated about 30 per cent., and it is recognized that American currency is also inflated, possibly 50 per cent.

America, as a creditor nation, having secured thereby large stocks of gold, will be able to deflate and probably at a much more rapid rate than we, and it may be expected that our exchange with America will go further against us.

Results of the Scheme.

Under these circumstances, if our country now recognized an inflation of 50 per cent. and adopted a free gold basis on such ratio, the immediate results would be somewhat as follows:—

- (1) Wages need be little disturbed for some time.
- (2) The Bank of England could purchase gold for internal requirements.
- (3) American exchange would fall to near 3-24.
- (4) Gold producers would receive nominally more English currency for their output.
- (5) Interest payments on internal national debt would be greatly relieved. This would not be equivalent to capital confiscation if, say, all loans, debentures, etc., raised before 1915 were allowed an increase of 50 per cent., because most of the money raised since that date was in inflated currency. Capitalists would suffer little damage, for they would benefit by the consequent reduced taxation.

(6) All present possessors of cash or bank deposits would suffer possibly to the extent of 15 per cent., which, anyway, is more equitable than that they should benefit to the extent of about 50 per cent. at the expense of the rest of the nation, which is what the present deflation policy aims to do.

Unfortunately such a scheme would probably hit the bankers more particularly than anybody else, and it is, therefore, to their supposed interest to avoid it. When, however, we witness the serious trade difficulties and unemployment, and compute what national loss that means, it would probably pay all capitalists in the end to take a possible loss now, a loss more apparent than real.

For the sake of brevity, no argument is offered to show the justice of a 50 per cent. premium on gold. Your readers, however, know the general conditions of mining throughout the world, and are aware how poorly the gold miners have been paid for their work as compared with the coal miners of England. Of course, this has arisen from the effects of supply and demand.

To Obviate Deflation.

What is now suggested amounts to legalising a 50 per cent. premium on gold with the object of avoiding the present painful and wasteful process of currency deflation. In such way we would more quickly attain a settled basis of currency, whereas the existing deflation process must take considerable time, and may never succeed, and, in the meantime, will be a constant embarrassment to trade.

The gold output of the world has fallen about 30 per cent. since the commencement of the War, and may fall further unless the principal nations return to a free gold basis at an early date. If Great Britain will require, as has been estimated, ten years to complete its present deflation policy, by that time gold will be relatively scarce, and it will be difficult to acquire sufficient gold backing for its currency. This aspect of the question appears to be overlooked by most financial experts, and the main object of this article is to draw attention to the fact that the matter of gold production has an important bearing on the currency question. The world is an expanding community, and unless gold output keeps pace, currency deflation will have to go beyond the pre-war basis. As the British Empire is now contributing 70 per cent. of the world's output, it is of particular interest to us to support that industry. During the War its product was commandeered at pre-war prices, a treatment served out to no other industry, and since then and is now suffering from lack of normal demand. Meanwhile, America is securing a stock of gold at a price below the fair cost of its production. The danger of the present system if continued is that when we do want gold we shall be required to pay dearly for it, whereas a bold stroke as above advocated would establish a stable currency which would enable the trade and commerce of the country to revive rapidly.—From the *Mining Magazine*.

United Asbestos African Agency,

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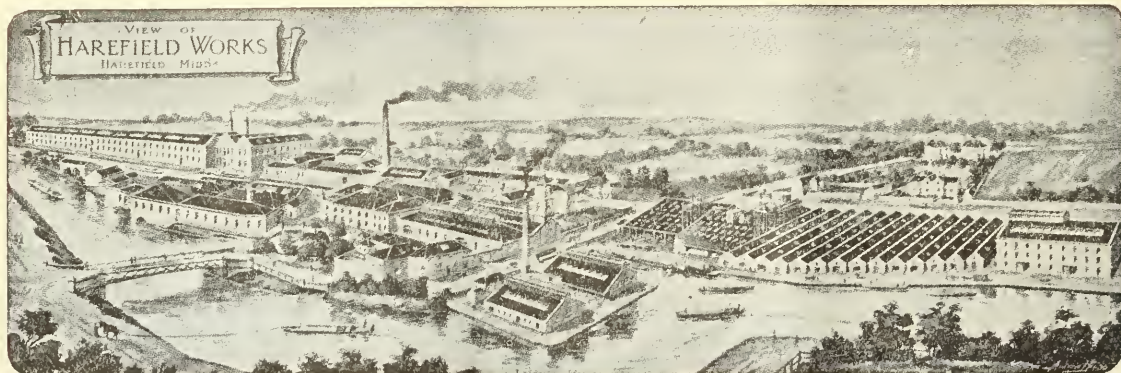
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The Great Wankie Coal Areas!

FOUR HUNDRED SQUARE MILES OF COAL—NEW COLLIERY BEING OPENED—POSSIBILITIES OF EXPORT.

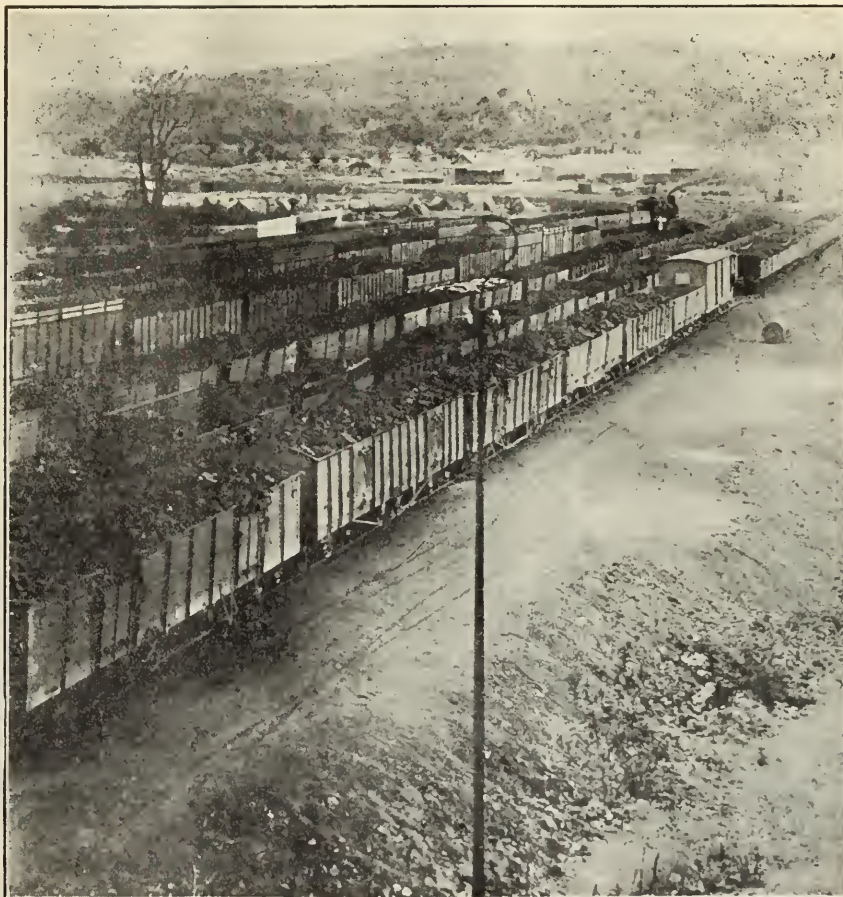
Several prominent Randites have recently visited the Wankie coalfield and all have been much impressed with its wonderful potentialities.

The Wankie area lies between Bulawayo and the Victoria Falls on the Northern Railway line. Wankie, the headquarters of the Wankie Colliery Co., is a station on the main line, 212 miles north of Bulawayo and 78 miles south of the Falls.

The area of the coal concession is approximately 400 square miles. Three seams of workable thickness exist in this area, but only one of these, known as the main coal, has been worked. In the present workings this seam varies from 6 feet to 12 feet in thickness, but recent borings to the west of the colliery have proved a gradual thickening of the

from the surface to the main coal as proved over an area of roughly 25 square miles varies from the outcrop to a depth of about 300 feet. The gradient of the seam averages about 1 in 30. Approximately one square mile has been worked up to the present, about 33½ per cent. of the coal being left in pillars, which will be subsequently worked out. The coal is of exceptionally good quality, as shown by the following average of 83 analyses recently made on samples taken from all parts of the existing workings. Analyses of the coal proved in boreholes show a continuation of this quality.

Moisture	...	...	...	...	...	...	0.95
Volatile and organic matter	...	...	...	...	...	...	23.62
Fixed carbon	...	...	...	...	...	...	66.90
Ash	...	...	...	...	...	...	8.52
Calories	...	...	...	...	...	...	7,159
B.T.U.	...	...	...	...	...	...	12,887
E.P. in lbs. H ₂ O	...	...	...	...	...	...	13.33



Part of the Yard at Wankie.

main seam up to nearly 40 feet in a distance of about five miles, while the other two seams have thinned down, and at this point are not of much value. The indications are that this gradual increase in thickness continues in a westerly direction. The greater portion of the area is remarkably free from faults of any size. The depth

Output Capacity.

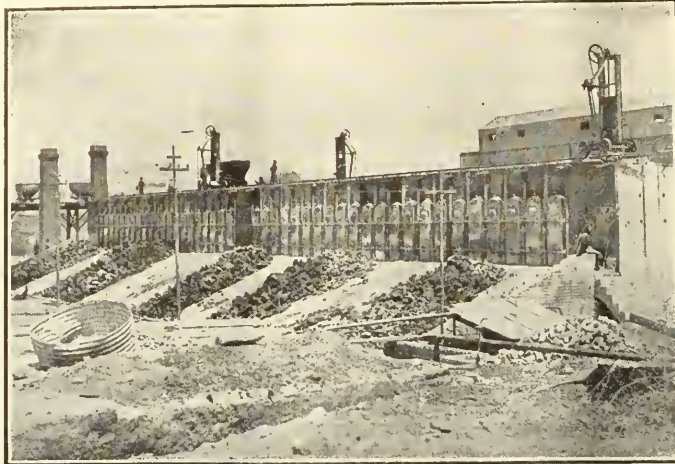
The coal output capacity at the present time is 60,000 tons per month, including coal for coke manufacture. The extensions now in hand will considerably increase this capacity. Large quantities of coke are sold to the Union

Minière, and Rhodesia Broken Hill. Estimated probable tonnage in area, 6,000,000,000 tons.

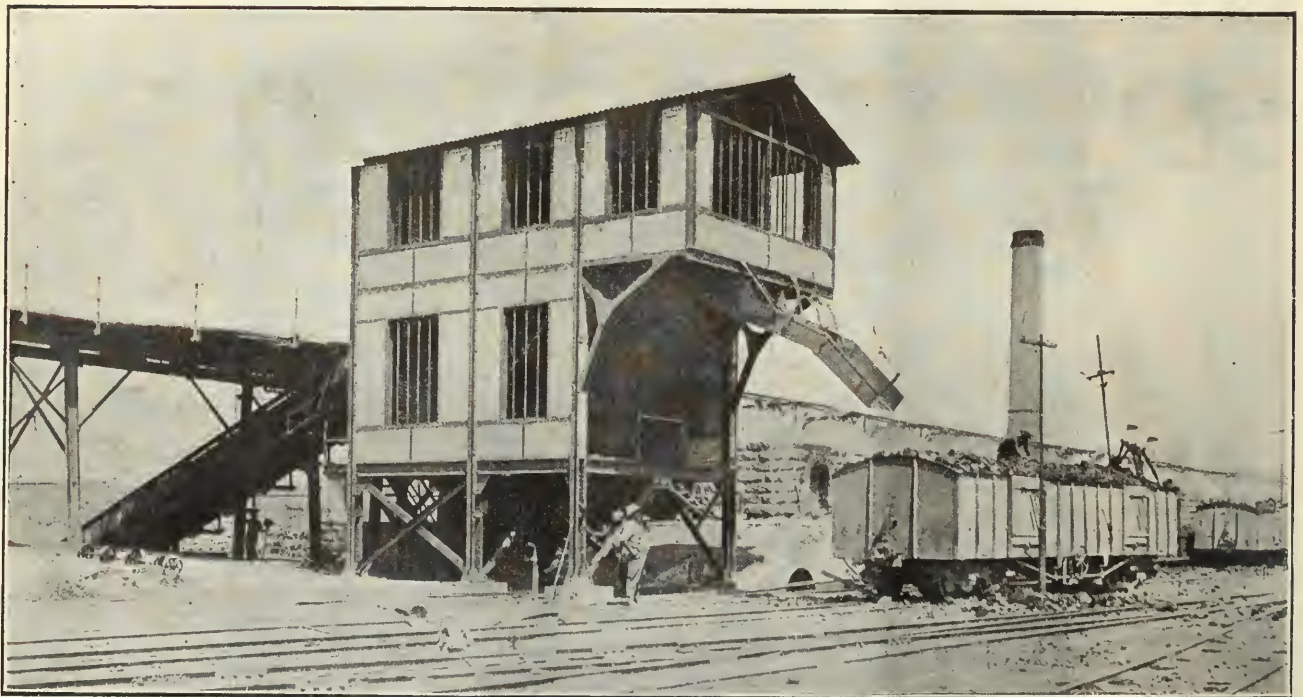
A deposit of fireclay—average thickness, 80 ft.—runs through the Concession, its position being immediately above the coal shales. From the fireclay in this deposit excellent refractory material is obtained and manufactured at the Colliery into such articles as bricks, special material for

Mine.

The width of coal mined in the mine now at work varies from 6 ft. to 12 ft. in thickness, and is worked on the pillar and stall system. The coal is reached by two incline shafts 600 ft. long with a grade of 1 in 7, one of these inclines being operated by a hauling engine, on which sets of twenty tubs each are manipulated, while on the other incline shaft



First 44 Ovens of 140 now in use at Wankie.



The Coke Plant at Wankie.—First 44 Ovens of 140 now in use.

coke oven construction, firebrick for furnace work, locomotive fire-box arches, material for muffle furnaces, crucibles, etc. In addition to fireclay, limestone and fair deposits of hematite iron exist.

The company owns twenty square miles of surface rights, on which cattle to supply the camp with milk are run. The camp is well built for a mining camp, in that excellent building stone and first-grade bricks are obtained locally.

an endless haulage is in operation; this second shaft is used as a standby only. At the point where these incline shafts intersect the coal three main roads radiate, one being a continuation of the shafts, while the other two are set off at an angle of 45 deg. to the right and left. Levels are set off every 300 ft. along the centre main road, while corresponding levels are set off from the east and west slants at 425 ft. apart to correspond with the levels on the main slant.

In the levels stentons are cut through every 66 ft., and in the extraction of the coal approximately 33 ft. of coal is taken out and 33 ft. left standing, while these pillars are again pierced by stentons at 66 ft., so that pillars 33 ft. x 66 ft. are left to support the roof. This practice is much varied, depending on conditions, and in some parts of the mine pillars larger than the size specified are left standing.

Coal-cutting machinery has been experimented with, but in no instance have the results equalled those obtained from hand labour. The coal is drilled with Elliott or Conqueror hand-drilling machines, two natives being able to

value exists and the unfavourable conditions mentioned as slips, etc., have not set up difficulties in mining, and are therefore an unimportant item in a coal deposit which has such immense possibilities.

New Mine.

As the present colliery site is congested, which makes further expansion difficult, it was some time ago decided to open a new colliery approximately four miles to the north-west of the present mine. The main coal at this point is 33 ft. 4 in. thick to 200 ft. below surface. The analysis of coal from the boreholes in this section shows even better



Wankie Collieries.—A General View.



Another View at Wankie.

drill sixteen holes to a depth of five feet comfortably for the shift's work. Roughly 5 ft. 6 in. of the seam is taken out in the first operation, and the top coal dropped down afterwards. The explosive used is 60 per cent. gelignite.

Some faults exist, especially in the eastern section of the mine, where the coal is thinner, one fault displacing the coal 16 ft. With the exception of this large fault, no faults over 8 ft. occur, some faults showing about a 2 ft. slip. The western section of the mine, where the coal is thicker, is free from this condition, the general condition underground being that a coal seam of excellent width and

results than are now being obtained at the present colliery. The incline shaft at the new colliery is now sunk to a depth of 600 ft., and excellent progress has been made with the stone walling in connection with banking arrangements on the surface.

The West Coast Scheme.

An important project at present merely under consideration, but which will probably be given effect to in the near future, is to construct a railway line from Wankie to Grootfontein, in South-West Africa, and to export coal from Swakopmund and Walvis Bay.

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FIG. W2471
FEDERAL BRASS
GATE VALVE



FIG. W3041
STANDARD BRASS
GLOBE VALVE



FIG. W2622
STANDARD
IRON BODY
GATE VALVE

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EDITORIAL.

THE NEW UNION MINT.

The photographs reproduced on our front page this week provide a pictorial reminder that the new Union Mint at Pretoria is rapidly approaching completion. In the two years that have elapsed since the project to establish a Union Mint was adopted by the Union Parliament, several events have occurred to overshadow its importance, and in some quarters there is a disposition to question the necessity for its completion, in view of the altered circumstances. Since it was decided upon, the market for gold in London has been made free, and the Union has embarked on the bold policy of establishing its own Reserve Bank, coupled with an embargo on the export of gold, and its withdrawal from currency. Within two years, of course, gold may come back into currency in the Union, under the provisions of the new currency and banking legislation, and then, doubtless, all the advantages claimed for a South African Mint will be realised, and its establishment thoroughly justified. It will be remembered that the controversy over the question of a site, in 1919, led to a compromise, the Mint being located at Pretoria and the Refinery—now also nearing

completion—at Germiston. The history of the project is not without other features of interest. It may be remembered by pioneers that the banks in this country opposed the idea when first mooted by President Kruger, in the pre-Boer War days, and that Sir Lewis Mitchell especially distinguished himself by demonstrating the shortcomings of the original scheme under the conditions then prevailing in South Africa. A Mint afterwards established at Pretoria never quite became a success, largely it was said by reason of its distance from the gold fields. Profiting by that experience, the Government decided upon the compromise—already mentioned, and with the examples of Canada, Australia, and India to guide it, there seemed, when the scheme was passed, little possibility of failure. Credit for keeping the idea before the industry and the Government must be given to Mr. Samuel Evans, who prepared for the Chamber of Mines an elaborate report on the whole question, which brought together all the available figures gleaned from other parts of the British Empire. Amongst the arguments for establishing a Mint, which still hold good, was the amount which was lost by importing silver currency. It appears that we obtained in one year £400,000 worth of silver coins from India which we might have struck off ourselves. Another argument was that every self-governing Dominion of the Empire, except New Zealand—which gets its gold cheaply minted in the adjoining Commonwealth—has its Mint or Mints. If it is economically sound for Australasia, with the maximum gold production (1903) of 18 millions sterling, to have three Mints, it seemed economically unsound for South Africa, with a production more than double this amount, to be without one. When the subject was somewhat perfunctorily discussed in the Union Parliament in 1912, the Finance Minister (then General Smuts) was inclined to look askance on the proposal on the grounds that the payability of a Mint was somewhat doubtful, and that the Imperial Government had specifically refused to share the profits on the coinage of silver and copper. Against that it was urged that there would seem to be no doubt that the Australian Mints were very profitable to the producer and not unprofitable to the Government. To illustrate the latter point it was proved that at the Perth Mint in 1912 the average amount charged for assaying, refining and coining was 2.73d. per ounce of deposit. In that year the amount treated was 1,479,079 ozs., consisting of 4,779 separate deposits. A profit was made equal to 1.5d. per ounce of deposit. The question of profit to the Government, however, was regarded as of far less importance than that of the gain to the industry. When the War broke out the Bank of England, on behalf of the British Government, agreed to buy the bullion in South Africa, the producers to defray all expenses up to the time of the delivery of refined gold to the Bank of England in London. On the other hand, the gold produced in Canada and Australia was refined and minted on the spot. This is to say, the gold mines of South Africa had to incur extra charges under the following heads as compared with gold producers in Australia and Canada: Packing for export, railage to the coast, freight from Capetown to London (or, as it was during the War, to Ottawa or Bombay), insurance, bank charges for handling the bullion at Johannesburg, Capetown and London, exchange, extra expenses on assaying and refining, and 1½d. per standard ounce to the Bank of England. In reference to the last item, it was stated that the Australians got 77s. 10½d. for their gold from the local Mints, while the South African producer got only 77s. 9d. per standard ounce for it, while Canadian and Australia producers, without incurring any risk or expense, got 77s. 10½d. per ounce for their gold in their own countries. The loss to the Rand industry and to South Africa during the War owing to the lack of a Mint was estimated to exceed £300,000 to £400,000 a year. During the War realisation charges, we believe, came to as much as 2s. per ounce. The moral is that though apart from the profit on silver and copper coinage, the new Mint may not be of much service to the country under present conditions, with the return of gold into circulation, under any of the schemes now mooted, its establishment is bound amply and ultimately to justify itself.

THE CURRENCY STABILISATION QUESTION.

It is gratifying to know that the article in our last issue dealing with the stabilisation of the currency has evoked widespread discussion and expressions of agreement with its main proposal from many quarters. It would seem that contemplation of the chaotic condition of the currencies of European countries has set many men thinking along very similar lines towards a solution of the difficulty. One London paper puts it thus: "Whether gold is to go back to its original value, or whether we are to continue to send the metal to the United States and live on paper in this country, is the chief financial problem of the day. The only orthodox way of bringing gold back to its par value is to cut wages and public expenditure in this country." In this issue we publish extracts from an article by Mr. S. J. Speak, who demonstrates the inability of the British Government and the financial authorities in London to effect this desirable reinstatement of the basic principle. Mr. Speak's opinion is that the appreciation of gold should be regularised, and that its price should be put to six guineas per ounce. In this way the relation of prices to values would be more easily revised without the working-classes being provided with a reason for strikes. In this connection, Barclays Bank's *Monthly Review* has the following suggestive passage: "It is important to remember that, although at the present time it is not possible for this country, or indeed most countries, to establish a standard of currency consisting of gold, or of paper backed by 100 per cent. of gold, yet a gold standard can be established by the maintenance of an adequate percentage of gold in support of any existing volume of currency. This method does not, of course, provide the same convertibility; but, properly regulated, it provides an efficient gold standard system." Prior to the War the leading countries of Europe were able to maintain the gold standard not by holding 100 per cent. in gold against their paper currency, but by maintaining a certain ratio of gold against it, this ratio being determined by experience over a number of years. The restoration of the gold standard in Europe is not now regarded as so remote a prospect as the idea of a 100 per cent. gold cover would suggest. It is of interest to note that this is also the opinion of Mr. Goodenough, the chairman of a group of British banks—"the big five"—controlling funds amounting to 1,500 million pounds. Writing on the currency question nearly two years ago in these columns, Mr. C. F. Tainton declared: "What is wanted as the first step in reform is a world conference to deal with standards of value. It may be of service to suggest that the present price for gold is an obsolete convention which is not in any sort of work-a-day relation to the value standard of to-day. . . . Let new values be put upon gold and silver values more in accordance with the realities of to-day than those antiquated metal estimates of Calonne in 1779 and of Peel in 1844, and let these values be standardized by the consent and laws of all the leading civilised nations." In a paper read eighteen years ago before the Institution of Mining and Metallurgy in London, the late Mr. Hennen Jennings suggested much the same idea, and there is a growing unanimity of opinion among thoughtful observers that some united action must be taken by the nations to readjust official currencies to the new conditions. It has been suggested to us that the forthcoming International Conference at Washington would furnish just the stage setting and opportunity for the discussion of this great world problem; and possibly some of the leaders of the gold mining industry may, in the interests equally of the Rand and of a currency-sick world, bring the matter to the attention of the powers that be

Notes & News.

The Diamond Outlook.

According to a London cable, London diamond merchants' opinion is that as the stocks confiscated by the Soviet are now practically exhausted, the legitimate trade has little to fear on the score of further Russian dumping, and the market

will gradually assume its normal appearance. It is estimated that the Soviet flooded Europe with 10 millions sterling worth of gems during the past 18 months.

The Deepest Mine.

The deepest mine in the world is apparently the St. John del Rey, which is now being worked to a depth of 6,426 ft. What should be a normal temperature of 117 degrees Fah. at this level is reduced to a comfortable working temperature by pumping down refrigerated compressed air. On the City Deep it is proposed to sink to an ultimate depth of 7,000 ft. Next in the list appears to be Village Deep, with operations a little over 6,000 feet in vertical depth.

The Transvaal Coal Trade.

The falling off in the export and bunkering trade at Delagoa Bay and accumulation of stocks resulted in restriction of the Transvaal output during June, but recent shipments have relieved the congestion and some improvement is expected. The following are the output figures in the Middelburg district for the month of June:—Number of collieries producing, 20; tons of coal mined, 492,560; tons of coal sold, 415,138; total value realised, £137,235; value per ton at pit's mouth, 6s. 7.28d.

Oil Shale.

Success has attended the initial trials of the Ironside oil shale reduction process, mentioned briefly in our last issue. Waiihoek cannel coal, which averages 28 gallons to the ton, but which was reported on by Mr. McKillop, of the Scottish Oils, as being unsuitable for Scottish retorts owing to its tendency to clinker, was treated by the Ironside method. A yield of approximately 30 gallons to the ton was obtained and with no clinking. A small test of Grenfell coal gave a yield of 25 gallons. The oil is produced within a minute. A representative of this paper will report upon the process for our next issue.

The Diamond Trade.

Exports during July (excluding the Premier Mine and South-West Africa) totalled 20,763 carats valued at £108,319. A certain amount of selling is reported on the Continent, but so far there is not much indication of an improvement in the American demand. It is stated that during the first three months of the year diamonds to the value of £2,100,000 were imported into America, practically the whole of which came from Bolshevik sources. Prices on the river diggings are improving, and the finest quality stones have appreciated by 20 per cent. to 25 per cent. during the past few weeks, but no general improvement in the industry is anticipated until America re-enters the market.

T.G.M.E.

At a meeting of shareholders of the Transvaal Gold Mining Estates, Ltd., held recently in London, Mr. Matthew T. Brown, who presided, said that the tonnage crushed in the past year, 194,560 tons, was the largest on record, but unfortunately the yield per ton milled was the lowest, being about $\frac{3}{4}$ dwt. less than in the previous year. This deficiency, however, was almost made up by the better price obtained for the gold, so that the average realised value per ton of ore treated, £1 17s. 1d., was only 4d. less. The working costs at £1 9s. 1.2d. were one-fifth of a penny less. This left a working profit of just under 8s. a ton, or one-half the average profit per ton earned during the twenty-five years life of the company. Under the circumstances, the net profit, £89,752, or £2,292 increase over the previous year, seemed not unsatisfactory, but if the gold had been sold at the old standard price, all but £400 of this profit would have disappeared. Dealing with the passing of the May dividend, he explained that the Board deemed it necessary to maintain a strong cash position until they saw their way a little more clearly ahead, or until there was a reduction in the high level of working costs, which would enable their large low-grade ore reserves to be treated at a profit without help from the uncertain and fluctuating gold premium. After some discussion an informal resolution was passed urging the directors to reconsider the position, with the view to paying a dividend at as early a date as possible.

Lonely Reef Mine.

The July development report of the Lonely Reef Gold Mining Company announces an exceptionally good strike at the lowest, the 24th level—namely, 60 ft. of ore, assaying 3½ ozs. of gold per ton. The previous 32 ft. had only averaged 13 dwts. over 29 ins. The cable reads:—"No. 24 level, north drive, 100 to 160 ft. averages 3 ozs. 10 dwts. over 40 ins. No. 23 level, north drive, 221 to 261 ft. averages 15 dwts. 19 grs. over 45 ins. No. 19 level, south drive, 997 to 1,014 ft. averages 2 dwts. 10 grs. over 9½ ins." The company's output for July is as follows: "Mill ran 704 hours, crushing 5,400 tons, yielding 5,180 ozs. of fine gold. On the basis of a net realisation price of 110s. per fine ounce the estimated profit is £16,467." The June yield was 5,280 ozs. and the estimated profit, taking gold at 107s. 6d. per ounce, £14,384.

* * * *

The Cinderella.

At a meeting addressed by General Smuts in Capetown last week, a questioner asked why for the last 12 years the Cinderella mine had been closed down. "The Cinderella Deep," replied the Prime Minister, "cannot find capital, and it has for years been trying to find further capital. It is a deep mine, and it has cost an enormous sum of money to bring it where it is. In order to develop it further capital is required, and there is no chance of raising it." The questioner: "Is it not possible to let this mine out on tribute to other mines on the Rand?" The Prime Minister: "The Government is at present making very serious efforts to see what can be done for the Cinderella by working it with other mines, and I suppose the Cinderella is a good mine, but it has proved very costly, and the Cinderella, as such, cannot be worked. The Government has now under consideration how it is possible to work the Cinderella."

* * * *

Rhodesia Broken Hill.

Mr. Edmund Davis, presiding at the annual meeting of Rhodesia Broken Hill Development Co., Ltd., said that the Board were advised that they had two lodes running through the property about 1,000 yards apart, the one outcropping on kopjes Nos. 1, 3 and 4, containing lead and zinc ores, and the other outcropping on kopje No. 2, containing essentially zinc. Borehole tests had given satisfactory results, and showed about 200,000 tons of ore, averaging 24 per cent. zinc and 2½ per cent. lead, and about 300,000 tons averaging 27 per cent. zinc and 10 per cent. lead. The problem of treating these reserves is receiving the serious attention of the management. During the past year 14,602 tons of lead have been produced, showing a satisfactory increase, whilst since the close of the financial year production has further improved. The transport rates have been slightly reduced by the Rhodesian railways; but, in view of the importance of the industry to the country, the Board is of opinion that a further concession should be made.

* * * *

Profit Sharing on Rand Mines?

The adoption of the principle of profit sharing in large industrial undertakings in South Africa has been expounded in theory, but no one has as yet had the courage to put it into practice. It is noteworthy that the General Mining and Finance Corporation held a meeting with representatives of all sections of the workers at the Roodepoort United last week in order to discuss the principle of the matter. The profit sharing procedure proposed was that the employees should forego one-half of the existing union rates of pay. Then the interest on the large amount of money which the company owed would be paid, and afterwards, before any profits went to the shareholders, a first charge on the further proceeds of running the mine should be the making-up of the wages to existing union standards. If, after this had been done, there still remained any surplus profits, the men should share in these with the shareholders. It appears that this experiment is being suggested in order to see if its adoption will in any way improve the efficiency of the workers, lack of which, of course, is at the root of all the troubles of the low-grade mines of the Rand.

The Grootfontein Borehole.

The Rhodesia Consolidated Company announces that the average values of the reef in the Grootfontein-Vogelstruis-bult borehole is 1 dwt. over 75 ins. The Van Ryn reef was struck in the above borehole at a depth of 3,340 ft., and the information obtained as to the regularity of the strata gone through by the drill and the width of the ore body encountered is of far greater importance than the assay value at the point of intersection. The rich chutes in the Eastern Rand are always separated from one another by larger or smaller stretches of poor reef. In the Springs Company's No. 3 shaft not far north of the above borehole the reef when first struck went only a third of a pennyweight over 61 ins. On the other hand, the New State Areas' first shaft was lucky enough to strike the reef in a rich chute, assays going all but 1½ ozs. of gold per ton over 19 ins.

* * * *

The World's Gold Reserves.

In the latest issue of the official *Monthly Bulletin of Statistics*, now transferred to the League of Nations, figures are given showing the total of gold reserves held by various national banks, or banks otherwise under Government control, together with the presently current note issues. As the statistics apply not only to Europe (excluding Russia), but to the British Dominions and India, and to the United States and Japan, they are of interest as throwing light on exchange problems. The total of gold reserves held, and to all intents for the present withdrawn from circulation, comes to £1,448,000,000. Of this total £498,500,000 is credited to the United States Federal Reserve Banks, while the Bank of England holds £128,300,000, the Bank of France £220,700,000, and the Italian banks £85,500,000. Together in the three countries the holding is £434,500,000. There is, however, a lock-up of £99,400,000 in the Bank of Spain. Germany's holding is £53,700,000, and that of Japan £114,700,000. On the other hand, the note circulation (again excluding Russia) has, taking the countries in the list, expanded to £11,962,515,000. Roundly, that is to say, it is eight times the gold reserve presumed to cover it. Of the total, however, considerably more than half, or the equivalent of £6,741,419,000, is represented by German and Austrian paper currencies. The balance, £5,221,096,000, has to be considered in relation to gold reserves of £1,394,300,000, leaving out the German holding, which reduces the ratio to gold, 100; notes, 375.

* * * *

Consolidated Mines Selection Group.

Mr. J. S. Wetzlar, the managing director in London of the Consolidated Mines Selection Co., Ltd., has just returned to London from a short visit to this country, in the course of which he naturally devoted most attention to the affairs of the prominent Eastern Rand Mines controlled by the group with which he is associated. In an interview with a representative of the *Financier*, Mr. Wetzlar said that outside mining circles, where there was, perhaps, some pessimism, the feeling of the commercial classes in South Africa was quietly optimistic, the common opinion being that although the country had had its troubles, yet it was recovering, and there was confidence that the enormous natural resources of South Africa would assist it to overcome any difficulties which the future might bring. As regards his own group, Mr. Wetzlar said that the Springs Mines had never looked better, while the Brakpan Mines might be said to have established its position. With regard to the Daggafontein Mines, there was no dissatisfaction with the developments. Financial reasons were the cause of the property being closed down, and it would be re-opened when the needful funds became available. The West Springs Mine was opening up quite satisfactorily, and he was satisfied with regard to its prospects. Reduction in working costs on the field was necessary, for the life of the Rand really depends upon the possibilities of successfully treating the enormous quantities of low-grade ore found in the rich as well as the poor mines. The new all-sliming process tried out at the Springs Mine was no longer an experiment but a proved success. A high percentage of extraction was possible and considerable savings would be effected in installation and running costs.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgy

The Ajaz-Wyatt Electric Furnace.—*The Engineer*, August 5, p. 139.

Submersible Electric Motors.—*The Iron and Coal Trades Review*, July 29, p. 132.

Overspeed Device for Electric Winders.—*The Iron and Coal Trades Review*, August 5, p. 169.

The Chuquicamata Enterprise III.—*Mining and Scientific Press*, July 23, p. 117.

Standardising Steel for Mining and Milling.—*Mining and Scientific Press*, July 30, p. 147.

Chloride Volatilization Process.—*Mining and Scientific Press*, July 30, p. 159.

Advances in Metallurgy during the War.—*Iron and Steel of Canada*, July, p. 175.

Flotation Practice at Mount Lyell.—*Mining and Scientific Press*, July 16, p. 87.

Economics.

Some After-War Trade Considerations.—*The Electrical Review*, July 29, p. 137.

Profit Sharing and Shipbuilding.—*The Iron and Coal Trades Review*, July 29, p. 143.

The Present Depression and its Causes.—*Mining and Scientific Press*, July 23, p. 131.

Factories and Workshop Inspection in 1920.—*The Colliery Guardian*, July 29, p. 309.

A Coal Purchase Specification.—*The Colliery Guardian*, July 29, p. 310.

Labour and Wages.—*The Colliery Guardian*, July 29, p. 313.

Coal and Fuel.

Purchasing Coal on a Thermal Basis.—*The Iron and Coal Trades Review*, July 29, p. 136.

New Coke-Oven and By-Product Plant at the Acklam Works.—*The Iron and Coal Trades Review*, August 5, p. 161.

Nitrogen Products.—*The Iron and Coal Trades Review*, August 5, p. 167.

Coke Breeze Mixtures for Steaming, II.—*Coal Trade Journal*, July 20, p. 845.

Hydraulic Flushing at a Manchurian Mine.—*The Colliery Guardian*, August 5, p. 381.

Powdered Coal Fuel.—*The Colliery Guardian*, August 5, p. 385.

The Carbonisation of Coal at Low Temperature.—*The Colliery Guardian*, August 12, p. 445.

French Coal Dust Experiments.—*The Colliery Guardian*, August 12, p. 451.

Spontaneous Combustion of Coal.—*The Colliery Guardian*, August 12, p. 453.

A New Method for Determining the Volatile Matter Yielded by Coals up to Various Temperatures.—*The Colliery Guardian*, August 12, p. 461.

Engineering.

Industrial Engineering in Europe and in America.—*The Electrical Review*, August 5, p. 170.

Submarine Cable Tests.—*The Electrical Review*, August 5, p. 172.

A 23,000-Volt Cable.—*The Electrical Review*, August 5, p. 189.

Grinding Gear Wheel Teeth.—*The Engineer*, July 29, p. 112.

The Haigh Alternating Stress Testing Machine.—*The Engineer*, July 29, p. 116.

The Electrification of Railways.—*The Engineer*, July 29, p. 122.

Vegetable Oils for Internal Combustion Engines.—*The Engineer*, August 5, p. 138.

Developments in Power Station Design.—*The Engineer*, August 5, p. 143.

The Hydracone Regainer.—*The Engineer*, August 5, p. 149.

Some Large American Boilers.—*The Engineer*, August 5, p. 151.

Practical Suggestions for the Economical Working of Boiler Plant.—*The Colliery Guardian*, August 12, p. 451.

Improvements in Methods for Fatigue Testing.—*The Engineer*, August 12, p. 159.

Friction Tests on Bearings.—*The Engineer*, August 12, p. 173.

Grease in Boiler Feed Water.—*The Colliery Guardian*, August 12, p. 447.

Latest London Market Report.

On the Stock Exchange last week the news from India and the perplexities of the Irish situation and Continental politics caused hesitation, while in the distance loom the probabilities of a general election. Industrial stocks revived under the influence of improving trade reports. Later the markets were more active and stronger, notably in investment stocks, due to a sudden ease in the money market in consequence of the disbursements of Government dividends amounting to twenty millions sterling, together with big German payments in connection with reparations. Kaffirs relapsed into comparative quietude, but afterwards rallied, helped by a revival of the bull tendency in Paris. Regarding the uneasiness felt in some quarters in connection with the possibilities of Germany selling Kaffirs on the official termination of the War, it is pointed out that inasmuch as large German holdings remained under the control of the public custodians, the question of stock coming on the market is obviated. The recent activity in Kaffirs, together with the revival of rumours hinting at the possibility of Rhodesia joining the Union, stimulated some buying in Rhodesians, mainly low-priced shares. Diamond shares advanced, chiefly on Paris buying.

Concerning Mines and Men.

Sir Lionel Phillips, Bart., has returned to the Rand.

Mr. Gibson, of the Anglo-Persian Oil Company, is on a professional visit to South Africa.

Mr. A. F. French, of the General Mining and Finance Corporation, will return to the Rand before the end of the month.

Mr. J. L. Siddall, London Secretary of the Central Mining and Investment Corporation, is paying a six months' visit to the Rand.



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S.A.R. & the Coal Trade.

According to the latest bulletin of the General Manager of the S.A.R., railway earnings for the week ended 20th August were £399,132, £35,770 below the estimate—an estimate framed in April, 1921, on what was then thought to be a conservative basis. The extent of the drop in railway earnings will be appreciated when it is mentioned that the figures for the week ended 20th August are less by £122,000 than those for the record week in December last.

The Administration's difficulty is that, while revenue is rapidly declining expenditure is not going down in proportion, notwithstanding the economies introduced. 187,485 tons of coal were shipped at Durban in July, compared with 210,037 tons in June, while 75,188 tons were shipped at Delagoa Bay in July, compared with 84,732 tons in June, but the number of vessels now in port and the estimated requirements for the near future indicate that South Africa will be able to retain a considerable proportion of the trade, notwithstanding the settlement of the British coal strike and the big drop in the price of bunker and export coal at British ports.

The detention of truckage at Durban still continues. Notwithstanding present difficulties large numbers of trucks are still detained at the port by the collieries for storage purposes. The supply of empties at the coal mines within the last few weeks has not been what the Administration would have wished, but though the requisitions have not been fully met a good supply of coal has been available at the ports for shipment.

Exception has been taken by a section of the public press to statements contained in Bulletin No. 21, to the effect that the Delagoa Bay coaling appliances had again broken down and were out of commission for 48 hours from 14th June, and that the coal trade at that port was by no means heavy at the time.

The statement made in the Bulletin was merely a statement of fact and had no other significance. The previous breakdown was mentioned in Bulletin No. 20.

The following figures, which speak for themselves, show the tonnages of coal bunkered at and exported through Delagoa Bay during the months of May and June last:—

	May. Tons.	June. Tons.	Decrease. Tons.
Bunkered	27,640	26,747	893
Exported overseas ...	78,377	57,985	20,392
Totals	106,017	84,732	21,285

The tonnage of coal railed from all Union collieries during June, 1921, shows a decrease of 4,969 tons compared with the corresponding month of the previous year. The tonnage from Transvaal collieries shows a decrease of 71,038 tons, but Natal and Orange Free State collieries show increases of 63,580 tons and 2,598 tons respectively.

The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

IV.

By Arthur Stenhouse.

On a moonlight night in 1886 I started from the camp of the Witwatersrand to ride across the trackless veld to Pretoria, in order to telegraph an urgent offer of some claims on the Main Reef to my principals in Kimberley. By midnight I had lost my way; off-saddling, I laid me down to rest beneath the starry sky, and in the stillness recalled

memories of a visit to the beautiful island of Barbadoes, with its white pebbly beach, and the coconut palms. Once more I wandered along the coral roads through "Fontabelle," the charming suburb of Bridgetown, with its neatly kept gardens of tropical trees and flowers. Again I watched the bright hued lizards lazily blinking in the blazing sunshine. . . .

At daybreak next morning I resumed my journey, and shortly afterwards approached Struben's mill and, to my discomfiture, discovered that I was entirely off the track to Pretoria! Re-directing my route, I resumed the journey, occasionally resting at a Boer farmer's homestead, where we conversed by symbols, and at eventide, dusty and weary, I arrived at my destination. At Pretoria, I "wired" to my principals about the claims and duly received a reply stating that they were not buying claims as they had no faith in the permanency of the Witwatersrand gold mines, and urging me to proceed to Barberton, where claims were booming.

In the silence of the night, beneath the outspanned wagons, at Ferreira's Camp, we watched the camp fires burning and listened to the crooning of the Kaffirs seated around the anthraps' purple flames. Life was not altogether a bed of roses, but optimism buoyed us up in our wanderings.

Looking back to those early days, though deprived of the charm of female society, we were entertained by men of every nationality who had arrived from the four corners of the globe. Intensely interesting were the yarns and experiences of these men from afar. Romance figured largely in many of their stories; some, however, had to be swallowed with a few grains of salt. Anticipation was our mainstay—the pleasures of hope are greater than the pleasures of memory, so we were universally happy in our primitive surroundings in those days of long ago. Sad, but sweet, are some of our remembrances.

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Allen, Wack & Shepherd, Ltd. Delagoa Bay Agency Co., Ltd.

AGENTS IN CAPE TOWN:
Mann, George & Co. (South Africa), Ltd.

August Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of August, 1921:—

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	90,000	37,664	£207,154	£73,568	29/ 8
Cons. Main Reef	48,000	18,058	97,732	18,008	33/ 2
Crown Mines ...	196,000	57,829	318,059	71,263	25/ 2
Dur. Road. Dp.	27,600	9,608	52,845	6,170	33/ 9
E.R.P.M.	126,500	33,390	183,494	18,057	26/ 1
Ferreira Deep ..	34,500	11,328	62,303	17,680	25/ 10
Geldenhuis Dp.	50,697	13,593	74,319	5,543	27/ 1
Knight Central.	29,200	7,228	39,757	5,486	23/ 5
Modder B.	60,000	31,452	172,987	97,269	25/ 2
Modder East ...	27,300	12,316	66,873	20,489	33/ 11
New Modder ...	100,000	48,144	264,793	153,174	22/ 3
Nourse Mines ...	45,000	14,688	80,661	9,535	31/ 7
Robinson	40,000	7,629	41,961	2,306	19/ 9
Rose Deep	56,200	13,441	73,924	15,293	20/ 10
Wolluter	32,300	8,217	45,195	7,184	23/ 6
Village Deep ...	50,000	16,496	90,728	17,296	29/ 4

Tls. & averages 1,013,297 341,081 1,872,785 538,321 26/ 4

Modder East.—Increased profit due to larger tonnage and abnormally high yield, which will not be maintained.

General Note.—The valuation of gold has been taken at £5 10s. net per fine oz.

BARNATO GROUP.

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte	44,000	£72,502
Government Areas	145,000	327,665
Langlaagte Estate	41,300	70,320
New Primrose	22,800	27,927
New Unified	11,500	13,892
Randfontein Central	135,500	218,405
Van Ryn Deep	55,300	165,428
Witwatersrand	41,300	58,779

Totals and averages 496,700 £954,918

July totals 470,100 £892,379

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ...	£51,658	23/481	£21,163
Government Areas	153,206	21/132	175,206
Langlaagte Estate	53,473	25/895	17,355
New Primrose	21,540	18/894	6,565
New Unified	11,619	20/207	2,329
Randfontein Central	179,730	26/528	40,039
Van Ryn Deep	71,524	25/868	95,008
Witwatersrand	45,875	22/215	14,832

Totals and averages £588,625 23/701 £372,497

July totals £566,125 24/085 £331,703

Note.—The above results are arrived at by calculating the gold at £5 11s. 6d. per fine oz.

Monthly Gross Profits.—January, £269,638; February, £187,423; March, £253,627; April, £261,506; May, £250,900; June, £281,801; July, £331,703; August, £372,497.

GENERAL MINING & FINANCE GROUP.

The August operations of the producing mines of this group were as follow:—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West ..	11,050	£14,778	26/75	£16,184	£1,406
Meyer & Charl.	14,500	18,483	25/49	45,720	27,237
New Goeh	17,500	19,980	22/83	21,530	1,550
Roodepoort Un.	23,000	26,819	23/32	25,182	*1,637
Van Ryn Est...	33,400	42,219	25/28	53,315	11,096
West Rand Cn.	32,500	44,996	27/69	50,263	5,267
	131,950	£167,275	25/35	£212,194	£46,556
				Less loss	1,637
					£44,919

* Loss.

In calculating the revenue, gold has been taken at a value of £5 11s. 6d. per fine oz., less estimated realisation charges.

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of August, 1921:—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	110	58,600	25/ 6/601
Springs Mines	80	41,500	28/ 6/872

Totals and averages 190 100,100 26/ 0/636

	Value of Gold declared.	Yield per Ton.	Working Profit based on standard value of Gold.	Working Profit per Ton.
Brakpan Mines	£95,185	32/ 5/838	£20,324	6/11/237
Springs Mines	76,765	36/11/944	17,477	8/ 5/072

Totals & averages £171,950 34/ 4/268 £37,801 7/ 6/632

	Estimated Premium taking Gold at £5 11s. 6d. per fine oz.	Total Estimated Profit.
Brakpan Mines	£28,075	£48,399
Springs Mines	23,091	40,568

Totals and averages £51,166 £88,967

Brakpan.—Placed to gold reserve, 2,624 fine ozs.

CONSOLIDATED GOLD FIELDS.

The following are particulars in regard to the outputs for the month of August, 1921, of the undermentioned companies of the Consolidated Gold Fields Group:—

Company.	Stamps Running.	Tube Mills.	Tons Crushed.	Gold declared, Fine ozs.	Profit.
Simmer and Jack ..	320	7	53,700	13,772	£14,020
Robinson Deep	160	10	61,600	17,871	21,199
Sub Nigel	30	2	10,200	5,491	6,903

Totals 510 19 125,500 37,134 £42,122

Gold in Reserve.—Simmer and Jack, 1,200 ozs.; Robinson Deep, 900 ozs.; Sub Nigel, 2,013 ozs.; total, 4,113 ozs.

The revenue derived from gold for the month of August is calculated at the rate of £5 11s. 6d. per fine oz., less estimated gold realisation and exchange charges of 1s. 6d., or a net figure of £5 10s. per fine oz.

Geology of Heidelberg—IV.

MR. BLELOCH'S REPLY TO DR. ROGERS—UNCONFORMABILITY OF THE VENTERSDORP SYSTEM.

A Fundamental Question.

I will now proceed to deal as briefly as possible with the other fundamental question—that of the Langerman's Kop and Reitfontein beds, which I have already touched upon. I find that in his paper entitled "Some Structural Features of the Witwatersrand System, read before this Society on the 30th March, 1911, Dr. Mellor, who has just told you that his views about the reefs has not changed, states (page 37): "To return to the beds associated with the Reitfontein reefs, of which I hope later to give a detailed description, it may be noted that many points of similarity with the Langerman's Kop beds have been pointed out by several geologists, and this is a matter upon which even those holding the most diverse views as to the geological position of the beds are agreed. The similarity is certainly as great as one would expect to find in a formation of coarse conglomerates, and therefore likely to show considerable difference in the composition of individual beds in different areas, and it seems extremely probable that the Reitfontein series must be ultimately grouped with the Langerman's Kop beds and other similar rocks already referred to. The disposition of the Langerman's Kop beds and the Reitfontein series apparently in conformity with the lower Witwatersrand beds certainly suggests an intimate relationship between the two."

So far as these statements go, I am in complete agreement with Dr. Mellor. I cite them as evidence from Dr. Mellor himself of the identity of the Reitfontein beds with those of Langerman's Kop and of the position of both in the lower Witwatersrand beds for which I have for many years contended, and as Dr. Mellor states, geologists—even those holding the most diverse views—are also in agreement in this matter. The facts are that near the north base of Langerman's Kop there are outcrops of gold-bearing reefs identical in character and appearance with the gold-bearing and payable reefs of Reitfontein. These reefs are known as the Buckshot Reef, the Pay Reef and the Carbon Leader. I have brought specimens of the Buckshot Reef here to-night, both from Langerman's Kop and Reitfontein, to which I will refer later. Lying to the south of the Reitfontein mine at Reitfontein there are outcrops of certain large pebble blanket reefs which have been called by several observers, including Dr. Hatch and Dr. Corstorphine and also Dr. Mellor—the South Reitfontein series. I have brought here to-night specimens of these South Reitfontein beds so that you can compare them with specimens of the large pebble blanket reefs which occur in the upper portion of Langerman's Kop in the same relative position to the Buckshot leader and the other reefs of the Reitfontein series which outcrop near the north base of the kop, as that of the South Reitfontein beds relative to the Reitfontein reefs at Reitfontein. I ask for the earnest attention of the members present to these specimens, and I think you will agree that Dr. Mellor was correct when he stated in 1911 that "It seems extremely probable that the Reitfontein series must be ultimately grouped with the Langerman's Kop beds (page 38, Trans. Geo. Soc. S.A., Vol. XIV.). At that time, as shown in the paper from which I have quoted, Dr. Mellor had come to the conclusion that both the Langerman's Kop and Reitfontein series "belong to a formation unconformable to the Witwatersrand system" (page 39). Although he goes on to say that more evidence, however, than that at present available as to the relationship of the diabase (Ventersdorp beds) to the sedimentary beds appears desirable before any close connection between the two can be said to be established" (Proceedings Geo. Soc., Vol. XV., page xlix.). Dr. Mellor says: "The Reitfontein area . . . is the one in connection with which the whole question of the conformity of the Reitfontein series arises."

Mr. C. B. Horwood.

In 1912 in discussing Dr. Mellor's paper of 1911 before this Society (Proceedings Geo. Soc. S.A., Vol. XV.), Mr. C. B. Horwood said that "He was technically connected with the Reitfontein mine in 1907 and 1908, and although he had studied the subject carefully he was unable to find any sufficient evidence to show that the Reitfontein series was unconformable. On the contrary, it appeared to be regularly interbedded in the lower Witwatersrand system." Mr. Horwood also cited strong evidence by Mr. F. Graham Bell, who mapped certain beds of quartzites admitted by Dr. Mellor to belong to the lower Witwatersrand beds and found that the windings of the Reitfontein reef in the levels of the mine followed the windings of these quartzites.

Mr. Graham Bell in 1920 wrote to me the following: "As the result of 2½ years' experience in development work on Government Areas mine—during which 70,000 ft. of development was done—I came to the conclusion that the Van Ryn series was the Reitfontein series and not the Main Reef series."

Dr. H. L. Krause stated (Trans. Geo. Soc. of S.A., Vol. XV., 1912): "In regard to the grouping of the Reitfontein bankets and their mineral association, I am persuaded that the Main Reef series in no part of the Rand where I have laboured present a parallel to them."

Mr. J. S. Olver, the author of "Faults and Dykes," in the same discussion referred to Dr. Mellor's opinions as a creed and said: "It has not been accepted by anything like the whole body of geologists—in fact no single article has been universally accepted as yet. Perhaps the most powerful body of dissentient opinion is that voiced by Mr. Bleloch." This heresy had been treated somewhat scornfully by the exponents of orthodox opinion, but a large number of the heretics are still unconverted. They hold that there is no duplication in the Bezuidenhout Valley and that the orthodox idea of the succession of the lower Witwatersrand beds is therefore wrong; that the Reitfontein reefs are an integral part of the lower Witwatersrand system, that the Kleifontein (Van Ryn) reefs are identical with those at Reitfontein and do not represent the Main Reef series." And again Mr. Olver said: "As to the disciples of Mr. Bleloch, the very basis of their creed is the identity of the Reitfontein and the Kleifontein (Van Ryn) reefs. I have already stated that this resemblance is so striking that it cannot be overlooked by any observer who is familiar with the reefs in both areas. My theory amply explains the likeness—in fact it establishes the basis of the Bleloch theory."

I think I should remark here that it was Mr. Olver who first put forward the idea that the Reitfontein reefs were a faulted portion of the Main Reef series, and it seems remarkable that Dr. Mellor and Dr. Rogers who have since adopted Mr. Olver's idea have not more definitely recognised him in their recent papers as a first exponent, although it is true that Dr. Mellor did say in 1912 that he saw no great improbability in Mr. Olver's view, but he could see no striking similarity between the Reitfontein reefs and the Main Reef series. It must be understood that I do not agree with Mr. Olver in correlating the Reitfontein reef with Main Reef, but as Mr. Olver correctly says, I believe it to be the same as the Van Ryn Reef, which in my opinion is much lower in the Witwatersrand system than the Main Reef series.

Randfontein, Reitfontein and Van Ryn the same Reef.

In the paper read before this Society, to which I have already referred, Mr. C. B. Horwood gave details showing similarity in physical character between the Reitfontein reefs and those of the Randfontein leader. In that valuable paper he described the Buckshot Reef, the Pay Reef, and

Carbon Leader of Reitfontein. Since that paper was read further abundant evidence has become available of the similarity of the beds of the Van Ryn series of reefs of the Far East Rand with those of Reitfontein. In these beds of the Far East Rand, too, there are to be found bodies identical with the Buckshot Reef, the Pay Reef, and the Carbon Leader of the Reitfontein series, and they occur in the same order of deposition. I have seen specimens of the Carbon Leader from the New Modder mine and from the Government Areas mine indistinguishable from the Carbon Leader at Reitfontein, and as I have already stated I am presenting for your inspection to-night specimens of the Buckshot Reef from (1) the north base of Langerman's Kop, (2) from the Reitfontein mine, and (3) from the farm Klippoortje adjoining the town lands of Heidelberg. This farm belonging to Houtpoort, Ltd., is one of the farms mentioned in the Government cables, and the specimen of the Buckshot Reef is from the outcrop of one of the reefs referred to in the cables. I have chosen the Buckshot Reef for your inspection of specimens from these several places because it is the most distinctive reef of the series. Although that rising young geologist, Mr. Pirow, may not be able to see in them either resemblance, distinction or difference, every prospector can do so and every prospector for the past thirty years knows the Buckshot Reef. I earnestly ask the members of this Society to examine closely the specimens of this very remarkable reef which I have brought here to-night from these three widely-separated places.

Dr. Mellor Changes Round.

I must now call your attention to what has happened since the statements about Reitfontein and Langerman's Kop were made by Dr. Mellor in 1911; the dogmatic change is wonderful and complete. In 1916 in the Knox Arbitration Case, a case in which the principal question was the existence or otherwise of payable banket reefs occurring at a lower horizon than the Van Ryn Reef of the Van Ryn and New Modder mines, it was contended by the Government side, for which Dr. Mellor gave evidence, that no payable gold reefs existed below the Van Ryn Reef in that area. In the course of his evidence on oath, Dr. Mellor said: "Reitfontein classified geologically, I am inclined to connect it with Main Reef series. Conclusion is from the succession on which it lies. The footwall of the reef is similar and assists conclusion. I don't know any respect in which it is not similar. To the south whole succession of strata up to Kimberley Reef . . . I have seen them. I could not say I have seen Elsberg. I have seen what I think is Bird." Question: "Have these Kimberley and Bird Reefs the same characteristics of the same south of Main Reef?" Answer: "All the essential characteristics; I account for this by the fault."

That is to say, Dr. Mellor's opinion as thus expressed in 1916 was completely different from Dr. Mellor's opinion in 1911 as expressed in the quotations I have made from his paper read in that year. By 1917 Dr. Mellor had adopted Mr. Olver's idea completely. In that year Dr. Mellor's Geological Map of the Witwatersrand Goldfields was published by the Government, and accompanying it there was issued a pamphlet by Dr. Mellor explaining the map. In the pamphlet Dr. Mellor says: "The reefs exploited at Reitfontein most probably belong to the Main Reef group" (page 22), and on page 35 he states that "on the farm Reitfontein No. 9 we have a considerable area of upper Witwatersrand beds usually referred to as Reitfontein series lying to the north of the fault." "These beds include the well-known Reitfontein series which were for many years successfully mined." After casually remarking that other views placed the Reitfontein reefs among the lower Witwatersrand beds, he goes on to say: "Another view based chiefly on the similarity of some of the coarse conglomerates associated with the Reitfontein series to the conglomerates of the Langerman's Kop is that the beds occurring at Reitfontein are of Elsberg age," and he then proceeds to back up his new reading of 1915 in the following words (page 35): "These coarse conglomerates (known as the South Reitfontein series) are, however, much like the Kimberley reefs in type, and in the writer's opinion belong to that group of reefs." An arresting conclusion!

The marked resemblance of these beds to those of Langerman's Kop, of which Dr. Mellor made a strong point in 1911, had evidently been weathered off in the meantime! Dr. Mellor goes on to say: "The correlation is greatly strengthened by the fact, either not generally known or universally overlooked, that the reefs in question are underlain by a considerable thickness of shales of the Kimberley type below which comes a series of quartzites and conglomerates closely comparable to the 'Main Bird' series of the Rand proper." For Dr. Rogers's information, seeing he admits he does not know these beds, I will state that similar shales in the same relative position outcrop on Langerman's Kop. These same beds in 1917 "comparable to the 'Main Bird' series of the Rand proper" were in 1911 found by Dr. Mellor "to lie outside the outcrop of the Witwatersrand formation and to belong with the Langerman's Kop beds to a formation unconformable to the Witwatersrand system." "The lowest of these reefs," goes on Dr. Mellor, "formerly worked at Reitfontein (North Reef) lies upon a 'slate' footwall in the same way as does the principal reef of the East Rand (the Main Reef Leader) and is almost certainly to be correlated with it. The principal 'Pay Reef' lies at a somewhat higher horizon." Wonderful transubstantiation of these reefs in the short space of six years. One wonders what will these Reitfontein beds be, according to Dr. Mellor, in, say, 1927. And Dr. Rogers says "Yes" to this, although when asked by me at the last meeting of the Society about the South Reitfontein reefs, whether they were the Kimberley reefs, as Dr. Mellor now states, or Elsberg reefs faulted down like those at Langerman's Kop as Dr. Mellor stated in 1911, Dr. Rogers replied that he had not examined these reefs, and he could not answer. Dr. Rogers swallowed the "Main Bird" camel, but strained at the South Reitfontein gnat.

Sir Robert Kotzé was more cautious, for he refused to swallow either! On the 30th January, 1917, while giving evidence before the State Mining Commission, the Government Mining Engineer, Sir Robert Kotzé, was asked whether he agreed with Dr. Mellor (Question 9,826) in identifying the Reitfontein reefs with the Main Reef Leaders. He replied: "I do not care to express an opinion, not knowing sufficient about the geological facts." Now, in all seriousness, I ask you, is it not remarkable that on a fundamental and crucial question in Rand geology like this of Reitfontein-Langerman's Kop, until I asked him about it at the last meeting of this Society, Dr. Rogers had never referred to it at all? Dr. Rogers admitted that he had not yet had sufficient experience to justify him in making dogmatic pronouncements on Rand geology before this Society or in the form of cables to the High Commissioner in London. Can anyone here justify geological dogmatism in that form?

Doctors in Conflict.

Mr. President and Gentlemen, what are the facts? I have shown you Dr. Mellor to be in conflict with Dr. Mellor on these very questions. Dr. Hatch and Dr. Corstorphine in conflict with Dr. Rogers; Dr. Carriek, Dr. Krause and Mr. Horwood in conflict with Dr. Mellor and Dr. Rogers; and Dr. Molengraaff—perhaps the most authoritative of all—in conflict with the whole school of the one-reef "Main Reef Leader" theorists, for he says that in his opinion the Main Reef cannot be present on a shallow basin like the Far East Rand. In this welter of conflicting, though learned, opinion, who, I ask, among you will justify dogmatism and least of all dogmatism by cable liable to being misunderstood and liable to do great damage to thousands of unoffending people?

We find Dr. Mellor describing in 1911 the close similarity of the Reitfontein reefs with those of Langerman's Kop. We have their close similarity with those of Randfontein described by Mr. Horwood. We have their close similarity with the Van Ryn reefs of the Far East described by Mr. Olver and Mr. Graham Bell. We have their equally close similarity, silently yet eloquently, witnessed by the specimens from Langerman's Kop and Reitfontein which I have brought here to-night, to compare with the specimens of

the Van Ryn reef of the Far East Rand and with the specimens of our gold-bearing blanket reefs at Heidelberg identified with certainty by us as the Van Ryn, and erroneously although dogmatically called Kimberley by Dr. Rogers. We have located and are opening up these reefs in the Southern Van Ryn mine, and on Tulipvale and Klippoortje for Houtpoort, Ltd., and on Boshfontein for the Nigel Transvaal Goldfields, Ltd., and Dr. Rogers calls this gold-bearing Buchshot Reef from there which I hold in my hand—Kimberley! Well, I will remind you that Dr. Mellor calls it Elsburg at Langerman's Kop and that he changed it from Elsburg to Main Reef at Reitfontein, and perhaps in six years or so Dr. Rogers may find that after all our reef bears a similar close resemblance to Van Ryn to that which six years later Dr. Mellor found Reitfontein to bear to that reef. For ourselves, we find that resemblance to-day, not by mere superficial looking but by practical work and practical tests. We have proved an unmistakable similarity in character of these Van Ryn Reef reefs which we have located and opened, and in the gold they carry and in their order of deposition at Heidelberg at the Southern Van Ryn, at the New Modder, at Reitfontein and Randfontein, and at all these places around the Rand where they are exposed—a distance of over 60 miles. Surely statements of facts like these are not to be treated as mere *assumptions*, least of all by one who, however learned he may be, has had only very brief experience of the Witwatersrand system and who admits that on the one main point of Rand geology he has not studied the evidence. As Mr. Olver said, on many points about which they scornfully dogmatise, Dr. Rogers and Dr. Mellor are unsupported by any single geologist of repute. Even the Government Mining Engineer has refused to commit himself on the Reitfontein question.

Conclusions regarding Reitfontein and Van Ryn Deep.

I submit that the reading which alone explains the facts, facts like the great similarity amounting to practically certain identity of Reitfontein with Langerman's Kop, as attested by Dr. Mellor himself, and with the Randfontein and Van Ryn Reefs as attested by everyone, is the simple one that the Randfontein Reefs of the West, the Langerman's Kop Reefs of the Centre, the Reitfontein Reefs of the East Rand, and the Van Ryn Reef of the Far East Rand, and our Van Ryn Reefs of Heidelberg belong to one and the same horizon of the Witwatersrand system and are totally distinct from and much older and far more valuable than the reefs of the Main Reef series of the Central Rand.

S.A. Mineral Springs.

Dr. Drennan, who is an authority on the chemical and medical aspects of mineral springs, made special reference to some of those in the course of a lecture in which he asserted that "South Africa possesses a number of hot springs which are unrivalled anywhere in the world. They are each possessed of special virtues which are of undoubted value to a large group of diseases. They are all deserving of much further investigation and development." This Dr. Drennan (who was addressing the University students at Capetown) proceeded to justify by quoting a list of South African springs which is really astonishing in length and in the qualities which are represented. To take only a few leading examples, the Zongala Geyser, in Northern Rhodesia, has a daily flow of 86,000 gallons at a temperature of 97 C. The Goa Geyser, near Choma Station, has a daily flow of 337,000 gallons. The sulphur springs between Louis Trichardt and Messina have not been tested. Some highly radio-active springs are to be found near Machadodorp. There are springs near Cradock and Graaff-Reinet, which are anti-rheumatic. Lochuivar, in Northern Rhodesia, and Weltevreden, at Beaufort West, are of the cold variety. At Rhodes' Drift there is a spring with strongly purgative water. At the junction of the Sanyati with the Zambesi, the Kapessa hot springs are supposed to have many virtues, and have also the credit for providing immediate relief from malaria.

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AND AT KIMBERLEY AND DURBAN.

ENGINEERING SECTION.

The Siemens-Martin Steel Making Process.

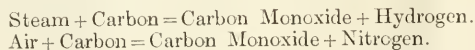
By Jonas Bethell, Messrs. Spear & Jackson, Ltd., Steel Makers, Sheffield.

The Siemens-Martin process depends upon producer gas as fuel, and before explaining the actual process I will describe how this gas is made.

Although ordinary coal gas would serve our purpose in every way, the cost of producing same is prohibitive. The system of gas production suitable for steel-making requirements was invented by Siemens, and his method has since been improved and modified by other inventors.

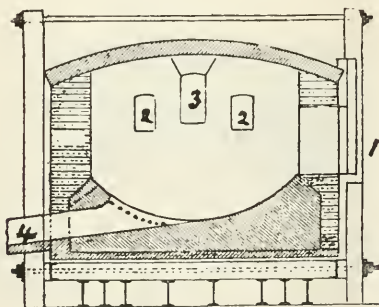
However, the general principles on which they have worked will suffice in my present article.

When a current of air and steam is blown over incandescent coke, the steam is decomposed, and the oxygen out of the air, together with the oxygen from the steam, combines with the carbon in the coke, simultaneously liberating hydrogen from the steam and nitrogen from the air.



Under certain conditions we find a certain quantity of Carbon-dioxide formed. As gaseous fuels, we have Carbon Monoxide and Hydrogen, which are approximately 40 per cent. of the producer gas, the remainder being Nitrogen and Carbon-dioxide, which are not fuels. This is the gas which together with air is admitted into the furnace, each having separate ports, the gas ports being lower than the air ports.

Diagram showing General Construction and Method of Tapping Metal.



(1) Charging Door. (2) Gas Ports. (3) Air Port.
(4) Tapping Spout.

The furnace itself is stationary and the method of tapping the metal out of the furnace has very often been a puzzle to the non-technical man. The diagram will fully explain this point and also give you a rough idea of the general furnace construction. Pig iron, scrap and iron ore are the materials used as base for this steel, and the pig and scrap are charged into the furnace first. As soon as this charging is finished, the charging doors are closed and the gas and air turned on. The charge soon melts and a slag is formed by the oxide of iron combining with the silica of the sand which is always found adhering to the pig iron, also perhaps with part of the silica from the furnace lining.

Five or six hours from the time of charging the material will be in the molten condition, and we now commence adding the iron ore, in small quantities and at short intervals, the whole charge being thoroughly mixed during these additions. The slag increases in quantity and very soon the "boil" commences. The boil is due to the formation of gases which find their way through the steel and the slag giving the appearance of boiling to the molten mass. Iron ore is still added and the boil subsides, after which samples of metal are taken from the furnace and rapid analyses made. These samples are very often fractured, and a skilled man is able to determine the percentage carbon present from the appearance of the grain. As soon as the carbon is low enough the steel is ready for tapping and the tap hole is opened by driving a crowbar through the furnace bed and the steel flows down into the ladle, being quickly followed by the slag, although only sufficient slag is allowed to run into the ladle to prevent the chilling of the molten steel. The Ferro-Manganese for the addition of the necessary carbon is usually added in the molten state into the ladle during the tapping of the steel. It also removes the gases in the steel, although the quantities of these are decidedly less than in the Bessemer. The impurities, Sulphur and Phosphorus, are practically the same after the steel is made as at the commencement in the raw material in the acid process, and therefore we have in Siemens-Martin steel comparatively high quantities of impurities which ought to be eliminated.

I explained in my last article that in the basic process the Phosphorus could be reduced, but in practice the results are almost the same for the base metal used in this process is usually 0.20 per cent. Phosphorus contents, and they remove perhaps 0.16 per cent., leaving 0.04 per cent. in the finished product. In the acid process low Phosphoric irons are used and the average analysis of the two processes are as follows:—

	Acid Process.	Basic Process.
Manganese ...	0.30 to 0.70 per cent.	0.30 to 0.70 per cent.
Silicon ...	0.05 to 0.20 "	0.05 to 0.20 "
Sulphur ...	0.03 to 0.05 "	0.03 to 0.05 "
Phosphorus ...	0.03 to 0.05 "	0.02 to 0.05 "

The capacities of the Siemens-Martin furnaces range from 25 to 100 tons and the cost of production is low. The casting ladle, which was invented by Bessemer, is the type still in use, and as I have mentioned the ladle and given a small diagram of same in my last article, I feel that a short description of this will be useful. The ladle is the distributor of the molten steel to the moulds and is of steel construction lined with refractory bricks. In the bottom of the ladle after each cast a new nozzle is put in, and it is through this nozzle that the steel flows. The flow can be regulated by the rod which is covered with silica sleeves and at the end of which is the plug which fits the nozzle. This rod is lowered and raised by means of a lever on the outside of the ladle. As a rough idea of the ladle, imagine a teacup with a small hole in the bottom, slightly away from the centre, into which a pencil would fit perfectly. By lifting or lowering the pencil any liquid in the cup could be allowed to flow out or be kept in the cup. Attached to the ladle is mechanism which will tip the ladle, pouring the steel in the same way as pouring tea out of a cup.

Economical Working of Boiler Plant.

The Fuel Economy Committee of the Federation of British Industries are engaged in extensive propaganda with a view to securing an increase in boiler efficiency throughout industry, and in this connection are publishing a series of Fuel Economy monographs, from No. 1 of which we give the subjoined particulars:—

The efficient working of boiler plant may be considered as consisting broadly:—(1) In utilising the heat of the fuel as completely as possible, and delivering it to the boiler heating surfaces in the form best suited for heat transmission. (2) In securing the best possible transmission of this heat through the plates or tubes of the boiler for the generation of steam. (3) In avoiding, as far as possible, losses of heat from the boiler plant; and (4) in using steam as economically as possible for the requirements of the boiler plant itself, in order to leave the maximum proportion available for external purposes.

In the following notes the boiler plant is generally considered to consist of Lancashire or water-tube boilers, hand-fired with bituminous coal and working on chimney draft. Many of the notes and suggestions may, however, be directly applied to boilers of other types or to other methods of firing.

that the spacing of the firebars should be as regular as possible and should be suited to the size and coking properties of the coal burned. When using the slice bar this should not be used to lift the clinker into the fire, but should only be run along the grate to break up the clinker and detach it from the bars. (2) Careless cleaning of the fires may result in large wastage of fuel, this being particularly likely to occur when the boilers are heavily forced. It is not good practice to burn down the fires too completely before cleaning, but reasonable care should be exercised to ensure that the fuel remaining is not discharged with the ash and clinker.

With reference to the production of smoke and incompletely burnt gases. The production of black smoke in abnormal quantity is usually an indication that the firing of the boiler is irregular and unsatisfactory. Smoke may be reduced to a minimum by careful firing of the coal in small quantities and by proper regulation of the draft. The method known as "side" firing or "right and left" firing is useful in maintaining high furnace temperature and promoting the complete combustion of the volatile matter. After a fresh charge of fuel, the air checks in the furnace doors should be opened, and then, as the volatile matter burns off, gradually closed.

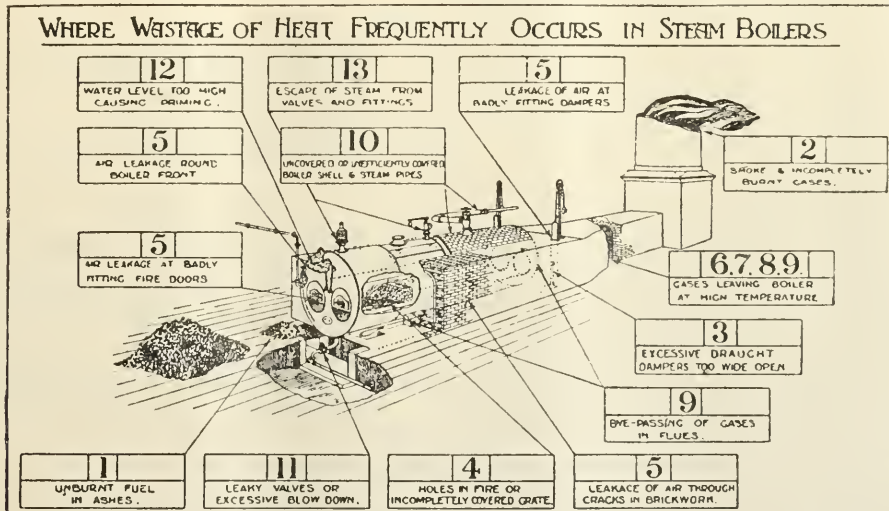


Diagram indicating the chief sources of Waste or Loss of Heat in Steam Raising (for guidance of Boiler House Staff).

To utilise the fuel as completely and effectively as possible complete combustion of coal must be secured by (a) avoiding wastage of coal or cinders in clinker and ashes; (b) avoiding the production of smoke or incompletely burnt gases. The most effective means of conveying this heat to the boiler surface results from (c) burning the coal in the furnace with the minimum excess of air; and (d) thereafter avoiding inleakage of air to the flues or setting.

These conditions may be considered in greater detail.

Regarding wastage of fuel in clinker and ashes, this loss is frequently large, and may amount to over 5 per cent. of the heat of the fuel. To obtain a rough idea of its magnitude, an average sample of ash and clinker should be quenched in water immediately after cleaning the fire and the pieces of coke picked out by hand—or the proportion may be more exactly ascertained by chemical analysis of average coal and ash respectively.

The more frequent causes of loss are:—(1) An abnormal wastage of cinders may occur through the firebars, due to these being too widely spaced for the fuel burned, or to the wrong method of using the slice bar. It will be obvious

It is impossible in practice to burn coal with the theoretical quantity of air, but large and unnecessary excesses are often used and cause serious wastage of fuel. Among the contributory causes may be mentioned:—(1) The draft may not be properly regulated by the dampers. (2) The grate area may be too large for the quantity of coal burned. (3) The grate may not be properly covered with a level fire. (4) The size of coal and/or depth of fire may be unsuitable.

The regulation of the draft and proportioning of grate area to the quantity, size and other properties of the coal burned are of the highest importance in reducing the amount of the excess air passing through the fire.

It is important to avoid dilution of the furnace gases with cold air as to burn the coal efficiently on the grate. In both instances, the object is to maintain high temperatures in the furnace, and to avoid the excessive loss of heat in the chimney gases which occurs when large quantities of air are heated to the chimney temperature. In practice it is frequently found that such heat loss may, on the one hand, amount to over 35 per cent. with careless firing and leaky

settings, whilst, on the other hand, it may be reduced to 20 per cent. or less by careful firing and proper attention to the brickwork.

As regards the best transmission of heat to the boiler, the conditions which enable the most effective heat transmission through the plates or tubes to be obtained are:— (a) That no bye-passing shall take place in the flues or through the baffles, and (b) that sufficient clean heat-transmitting surface shall be provided for the required evaporation.

Any "bye-passing" or "short-circuiting" of the gases in the flues or through the baffles allows a portion of the gases to leave the boiler at an unnecessarily high temperature, in consequence of incomplete contact with the heating surface. Bye-passing results in a higher outlet temperature in the flue gases than would otherwise be found, and may be located by a careful internal inspection of the flues and baffles. In Lancashire boilers such bye-passing often occurs either at the seating blocks or at the partition walls in the down-take flue. At the latter place the effect of repeated expansion and contraction in the boiler is, frequently, to cause cracks and spaces to develop in the brickwork.

It is obviously necessary under most favourable conditions for heat transmission, *i.e.*, with the heat-transmitting surfaces clean, that the areas provided must be proportioned to the quantity of heat to be transmitted, or in other words that the forcing of a boiler beyond a certain point reduces the efficiency. It is therefore advisable that the output from boilers shall not be increased above a certain efficient maximum, and the quantity of coal burned should obviously be limited by this consideration. Apart from forcing the presence of soot or scale on the heating surfaces prevents the easy passage of heat from the gases to the water. Whilst it is impossible to state in general terms how frequently boilers should be cleaned, the average thickness of scale should never be allowed to exceed 1.8 in., and, with hard scale, not more than 1.16 in.

Summary of Recommendations.

Furnace Conditions.—(1) Avoid unnecessary wastage of cinders in the ashes by cleaning the fires carefully and by providing suitable firebars. (2) Avoid the production of unnecessary smoke or incompletely burnt gases by regular and frequent firing of coal in small quantities, and by keeping a proper depth of fire. Open the air checks in the furnace doors only after firing, at other times keeping the checks closed. (3) Regulate the draft by the damper to burn the coal with a minimum excess of air. Try to obtain 12 per cent. CO₂ in the furnace gases, and, if necessary,

reduce the grate area to secure this result. (4) Keep the grate covered, the fires level and free from holes. Use the rake when necessary. (5) Carefully examine the setting and stop all inleakages of air.

Boiler Conditions.—(1) Keep the heating surfaces free from soot and fine dust. (2) Keep the internal surfaces free from scale. (3) Do not force the boilers unnecessarily. (4) Examine flues and baffles carefully. Repair when necessary to avoid bye-passing.

Heat Losses from Plant.—(1) Efficiently lag the boilers and steam pipes (including flanges). (2) Do not blow down the boilers unnecessarily. (3) Keep the boilers filled to the working level by a continuous and steady feed. (4) Avoid leakages of steam from boiler fittings, drains, etc.

Use of Steam.—(1) If steam is used in pumps or auxiliaries, use the exhaust for pre-heating the feed water. (2) If steam jet blowers are used, keep the jets in good condition by renewal as necessary and regulate the pressure on the jets to the minimum necessary for the load.

Efficiency.—(1) If economisers are provided record the temperature of water entering and leaving. (2) Make periodical measurements of CO₂ in, and temperature of, flue gases leaving the boiler under average conditions, to estimate the approximate boiler efficiency.

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Letters to the Editor.

THE STABILISATION OF THE CURRENCY.

Prof. Cassel's and Mr. D. C. Greig's Schemes Criticised.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Enclosed is a contribution to the discussion you have invited in your article "The Stabilisation of the Currency."

Gold is the fundamental money of the world, and as such never alters in value. This is the very essence of international finance. The so-called premium on gold is non-existent! America, as is reported with nearly every quotation, takes all the available supplies of gold from London, because she is the only country the currency of which is at par. The price she pays is fixed at the mint value—20.6714 dollars per ounce—less an amount varying little from one-half per cent. to cover charges, insurance and freight. When the gold is paid for in London the 20.6714 dollars is converted into British currency at the ruling rate of exchange. Thus, when the exchange rate is 3.65 dollars per £, an ounce of gold fetches £99½ per cent. of 20.6714 ÷ 3.65, or 112s. 9d. in paper—not sovereigns. The basis of the par rate of exchange is the amount of gold in the gold coinage of each country, and the value of the number of coins containing an ounce of gold in any country's currency is of exactly the same value as the number of coins containing an ounce of gold in any other country's currency.

Mr. Greig's scheme.

Mr. Greig suggests selling gold forward at say, 112s. 9d. per ounce. This really means that, to suit the gold mining industry, the rate of exchange must remain at 3.65 dollars per £ over a fixed period, despite the various factors, outside that industry, which govern the alterations of these rates. Mr Greig's chief concern is not to stabilise currency, but to obtain the greatest benefit for the gold mining industry, and his anxiety to sell forward is founded on the gradually increasing rate of exchange between Britain and America.

The same object can be attained by a much simpler method. There is now a reserve of roughly 2,000,000 ounces of gold held against gold certificates. The custodians seem unwilling to make any profit on this gold themselves, but if some of this gold were shipped to London, the mines could hand over their gold to the authorities here and an equal weight could be released in London for immediate sale. As no risk is run, the charge for this accommodation need be very small, and the industry would obtain a measure of relief in a falling market.

Prof. Cassel's Scheme.

From your article, Professor Cassel's scheme seems to be that the Mint should issue a new coin, the gold contents of which should be equivalent to the value of paper money. Again assuming that this value is 3.65 dollars per £, the gold value of paper would be 3.65 ÷ 4.8665 or 75 per cent. The gold contents of the sovereign would then be cut down by 25 per cent. and the new coin—worth 15s.—in gold—would come into common circulation. Remembering that gold is only necessary in international dealings and is not necessary to carry on a country's internal trade, what would happen if the rate of exchange fell below 3.65 dollars per £? The same position arose before, and all gold coinage was withdrawn from circulation. But in the more likely event of the rate rising above this figure, paper money would be of greater value than the new coinage. Can any country be expected to accept payment by means of these coins at their face value? The scheme does not, therefore, seem feasible, and the original question remains unanswered, "How are we to stabilise our currency on a gold basis?"

The Only Way.

The only way to do this is to raise the value of paper to the universal value of gold. Britain was on the high road to accomplishing this, for the exchange rate rose from 3.60 dollars on January 5th of this year to 4.00 dollars on May 13th, when the unfortunate coal strike took place and wiped out this increase, the rate falling to 3.56½ dollars on August 2nd. The only cure is in the hands of those self-same classes which won the War. The British labouring classes have never failed their country yet, and will save her again.

British manufactures must take their old place in the world's markets. The labouring classes must see that this comes about as quickly as possible, by increasing output, greater efficiency and lower costs of production, so that British goods through their quality will attract and hold foreign attention, and so that they can be sold at a price that will command sales and ensure further orders. Here lies the solution of the problem. Can you induce those who so much desire our currency to be stabilised on a gold basis to come forward with practical suggestions as to the best means of bringing home to the working classes the necessity of every shoulder being at the wheel? The first step seems to be to educate the leaders of trade unions and to convince them that it is their duty to avoid petty strikes and the fostering of 'canny' methods. The British workman is honest at heart and loyal to his country, and once he realizes the great issues involved he will be the first to demand the dismissal of those few parasites among his trade union leaders, whose aim in life is to keep themselves in the limelight and to line their own pockets.

Most employers would derive the utmost benefit from a liberal education on the same subject.

"X."

AN INTERNATIONAL CURRENCY CONFERENCE?

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Apropos of your article on the above in last week's issue, may I draw attention to the following from the last issue of the *Statist* to hand:—

"These considerations lead us to examine more carefully existing ideas concerning the welfare of the nations. In the first place, as regards the question of the gold standard, it has frequently been insisted upon by this Journal that while the restoration of a gold anchor for values is eminently desirable, yet any attempt to reintroduce it on the part of one country is useless unless equally vigorous measures to the same end are made by other nations. In other words, to have any practical value a gold standard, or indeed any other monetary standard, must be universal or nearly so, and sacrifices made by nations acting independently for the sake of a metallic standard of value are made in vain if the majority of other nations choose to continue under the régime of an inflated paper currency. The deflationist campaign pursued in this country as well as in the United States would have placed us in a healthier position if it had been accompanied by similar sacrifices elsewhere. As it happened, however, it has gained us nothing. It is true that the price level has been reduced by over 40 per cent., and to that extent we have approached nearer to "normalcy," but an unprecedented trade depression is the price paid for this mythical advantage. "Normalcy," in fact, which a year ago was regarded as the *summum bonum*, has proved the bugbear of national prosperity. Turning again to the United States, we find that part of the movement towards "normalcy" in that country consisted of a net import of gold during the past twelve months amounting to 512,000,000 dollars. This has, indeed, consolidated the financial system of the United States on a gold basis, but the gold standard there has proved unable to perform its most important function of stabilising prices, while the huge inflow of the metal has obviously made it more difficult for other countries to place their currencies on a gold basis.—Yours faithfully,

"INTERESTED."

AMERICAN versus BRITISH RAILWAY PRACTICE.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Your article of the 20-11-20 and 18-9-20, entitled "American and British Railway Practice," noted with much interest from many angles. The writer concludes that the discussions pro and con are a rehash of the battle of the gauges. You discuss the direct versus alternating current for heavy rail transportation, and the three-cornered fight between the machine tool builders, tool makers and electric drivers, each trying to "knock the other out," rather than co-operating. The Canadian and American (States) practice is designed to meet a "rough and tumble" condition inci-

dent to a new country similar to team and cart in a mining camp or on a farm. The States follow Canadian practice and can "vice versa." The writer has noticed that the British-owned roads of Brazil and Argentina are following Canadian practice as the best adapted for a pioneer road, and also are switching Australia and South Africa, notwithstanding that the practice here and in Canada have their defects, namely, the track is too light, rails loose on the sleepers. Running gear under freight equipment 50 years behind the times in view of the load and speed. Also the writer has been converted to plate frame, or what is known in Winnipeg as the "slab frame," of which the C.P.R. is the "beau ideal" and "joy forever" of the British Empire, and it will be noted that the Grand Trunk abandoned its English design in the forties. As to our adhering to the bar locomotive frame, a little digression may not be out of place. In pioneer days, when we had 20 miles of road to one locomotive, it was necessary to "take Mohammed to the mountain," i.e., make the locomotive flexible. It was found necessary to put equeasezers (compensators) connecting the spring between the rails or bars of the frame, combined with the links, straps, and eccentrics. However, the driving base was then short, and broken frames were found to increase with the increase of the driving wheels. The weakness of the bar frame is augmented by boring large bolt holes. The flanges riveted to the plate give it flexibility similar to the chords of a bridge which better enables it to resist lateral stress due to curvature of the track. Furthermore, the bar frame rendered itself to clamping and keying to the saddle better than the plate frame. Your mention of cylinder and half saddle cast in one piece has been diverted from the Penn. R.R. in that the saddle is cast in one piece with the cyl-bolted to the saddle, with the front end "slab" section of the frame sandwiched between. This recalls that the latest British practice has adopted the saddle on heavy locomotives.

The brick arch is a good investment, which is a "half brother" to the baffles in water tube boilers in stationary practice. The arch supports give the ideal circulation of the water, drawing the dead water from the bottom and "water leg." The baffling flame prevents unburned coal being shot out the stock and consumes the gases. If more baffling could be accomplished it would be a move in the right direction. Water heaters are a movement in the right direction. To pump cold water in the boiler is like "raising yellow dogs and shooting them" in wasting fuel, also setting up unequal stresses in the boiler. Superheaters speak for themselves. Power reverse gear is a necessity on heavy locomotives as much as in marine. Also it enables the driver to pump the water and wet steam out of the cylinder, giving the locomotive the power to start the train similar to the "wire engine." The electric headlight is, in the estimation of the writer, wasted effort on the part of the electric manufacturer, which should be outlawed. The driver that would keep an electric headlight burning through a yard should be indicted. The writer had a narrow escape from being killed on two occasions, due to lights being "drowned" on parallel tracks. Numerous wrecks occurred here due to the signal lights being drowned by electric headlights. The fact that they are a "fad" is shown by the fact that there are none on British railways. However, what is needed is more powerful signal lights and reinforced by reflectors, and lights of the same intensity; as is often the case, the farthest light can be seen before the nearer one. The electric headlight is due to the electric man "breaking into the railway game." Oil is the ideal fuel if it could be obtained. Some day it will be uncovered in South Africa. For compounding the French claim economy on long runs, but its utility is doubtful on short runs. Power sanders are essential; choking can be overcome by placing the box on top of the boiler and keeping the sand dry. All the above appliances are on the Canadian roads, of which the conditions are the same as in South Africa. The Canadian roads have to contend with snow. On the Cascade range on the Pacific side the wet snow slides down the mountains, bringing down trees, boulders and mud, so it can be seen, the writer trusts, equipment with "frills" would be out of place. The writer has noted South African roads contemplate wiring out of Cape Town and from Durban to Maritzburg, and the old question is creeping up as to what current and voltage, also the method of mounting the motors on the running gear, whether the locomotives will be designed on the line of exaggerated tram-cars, thereby counter-balancing any economy on fuel. Trusting the above

is comprehensive, otherwise I will be pleased to give further details.

JOHN FRANCIS.

New York.

THE OUTSIDE DISTRICTS.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In handing you my report on the Golden Valley Co. to peruse and publish, not only is it with the sanction of the owner of the property, who has it under offer abroad, and is slightly indifferent as to when it is disposed of to a company, as the value cannot disappear, but it is my earnest desire, as it always has been, to acquaint the world of the fact that South Africa is not dependent entirely on the bankets of the Witwatersrand geological age for its gold supply. For, as I have often written you, it has three other five-mile-thick auriferous ages to fall back upon. The one to which this report alludes is the most widespread of them all, and is common to the whole world. The others appear to be a special gift by Nature to this glorious country, to which she has also given the finest climate imaginable.—I am, etc.,

SCOTT ALEXANDER,
Rand Stratigraphist.

Johannesburg, August 29, 1921.

THE SOUTH AFRICAN RED CROSS SOCIETY.

Mine Ambulance Competitions.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—The ninth annual mine ambulance competitions for the surface and underground workers' shields (presented by the Chemical Metallurgical and Mining Society of S.A.) will be held on Sunday next, the 11th September. Both competitions will be held, by kind permission of the directors and Mr. W. C. Mossop, the manager, at the Wolhuter Gold Mine, Ltd. A Red Cross flag will fly from the nearest head-gear to denote the spot. Teams representing the following mines (the name of the captain being given against each) have qualified to compete in these final competitions:—Surface (holders: Village Deep): Wolhuter (Fletcher), Village Deep (Hand), Luipaardsvlei East (Emerton), Knight Central (Butler), E.R.P.M. (Berge), New Kleinfontein (Denneby), Modder B G.M. (Paterson); shield holders, Village Deep (Arkley). Underground (holders: Crown Mines): City Deep (Sinclair), Crown Mines (Walker), Consolidated Main Reef (Hippert), Luipaardsvlei Est. (Jackson), E.R.P.M. (Noake), E.R.P.M. (Love), Geduld Mines (Morgan), Brakpan Mines (Clark).

Notice to Competitors.—The competitions will commence at 8.30 a.m. sharp, and teams are requested to be on the property ready to start at 8.15 a.m., at which time captains of teams must report to the undersigned to draw for the order of competition. Suitable clothing to be worn by all teams. Underground teams must bring their own lamps. Competitors will not be permitted to see the work of other teams, and are reminded that *they will be disqualified should they have any communication with those who have already competed, or with persons who have seen the competition.* Each member of each team will find a copy of the rules enclosed, with which they must be familiar. One reserve man of each team will be required for the purpose of supervising one other team.

The management has kindly invited the officials and competitors to lunch, for which tickets will be supplied, the accommodation on the mine being very limited. For the convenience of others coming from a distance, it is notified that dinner can be obtained at the Manor House Hotel, within easy distance of the mine, at a charge of 2s. 6d., and those desiring dinner there are requested to telephone 'phone No. 2189 Central not later than Saturday to reserve accommodation.

Those interested in first-aid are cordially invited to be present, but only a limited number can be allowed underground. V.A.D. members are invited to witness the surface competition, at which there will be ample accommodation.—Yours faithfully,

FRED ROWLAND,
Secretary.

The Week in the Sharemarket.

INCREASED BUSINESS—QUOTATIONS LOWER—DIAMONDS BETTER.

The market has been disappointing this week owing to the recurrence of labour troubles on the Far East Rand, the lower gold premium, and the absence of any confirmatory announcement regarding ex-enemy shares. The trouble at the Van Ryn Deep was not settled until Thursday, and its prolongation caused some uneasiness. The August returns from the mines are, however, most satisfactory, and even if gold does not rise beyond its present figure the December dividend is promising. Something is always turning up to damp the hopes of those who are anticipating a good market. Taken individually, and analysed on their merits, shares of several Rand mining companies can be shown to stand at attractive levels. But the incidence of general or common factors, such as labour, cost of stores and explosives, and price of the product, cannot be left out of the reckoning, and they have a way of unexpectedly rendering all calculations futile. Mine "lives" and development and ore reserves remain, of course, considerations of cardinal importance, but they tend more and more to be overshadowed by the bigger questions indicated. The General Mining proposal to adopt a profit-sharing scheme to save the Roodepoort United will be watched with interest, though the shareholders seem to have small say in the matter. In the diamond market the tone is much better all round on slightly more favourable reports from London. Tin shares are quiet, but African Oils had a welcome spurt during the week.

	Fri. 2nd.	Sat. 3rd.	Mon. 5th.	Tues. 6th.	Wed. 7th.	Thur. 8th.
Rand Nucleus	1 2*	—	1 2*	1 2*	—	1 1*
Randfontein Centrals	13 0*	—	—	—	—	11 9*
Randfontein Ests.	19 3*	19 1*	18 10	18 9*	18 7*	18 4*
Roberts Victors	9 6*	9 0†	10 0	9 0*	9 6*	9 6*
Rooibergs	3 10*	3 10*	3 10*	—	3 11*	—
Ryan Nigels	3 3*	3 4*	—	—	—	3 3*
S.A. Breweries	27 0*	—	27 0*	27 6	27 6*	—
S.A. Lands	5 0	5 0†	4 9*	4 9*	4 9*	4 9*
Springs Mines	44 9	44 9*	43 9	44 0	43 9*	43 6*
Sub Nigels	12 6	12 9	12 0*	12 0*	12 0*	—
Swaziland Tins	10 0†	—	10 0*	10 0†	10 0†	10 6†
Trans. G.M. Ests.	9 0*	9 0*	9 0*	9 0*	9 0*	—
Van Ryn Deeps	75 0	75 0*	73 6*	75 0	73 6*	73 3
Van Ryn Estates	11 0*	—	—	10 6*	—	—
Village Deeps	9 9*	10 0*	—	10 0*	—	—
West Rand Cons.	—	—	—	—	—	2 6*
W. Rand Estates	4 2*	4 3	—	4 3*	4 3*	4 3*
Witbank Collieries	41 0*	—	40 0*	41 0*	—	—
Witwaters. Deeps	9 6*	9 6*	9 6*	10 0*	10 0†	8 6*
Wolhuters	4 3*	4 3	4 3*	4 2*	4 3*	4 1*
Zaaiplaats Tins	3 1*	3 1*	3 2*	3 2*	3 6*	3 6
Union 5 per cent.	£99½*	£99½*	£99½*	£99½*	£99 17	£99½
New States	24 3*	35 0*	25 0*	—	25 0	24 0*
Rouxvilles	2 0†	1 0*	1 6*	1 8*	1 6*	2 0†
S. van Ryn	2 10*	2 10	—	2 10*	—	—
S.A. Townships	11 6†	11 0*	—	11 3*	—	10 9*
S.A. Alkali	18 3	19 3*	17 6*	18 0*	17 9*	18 3
Trans. Silvers	24 9†	22 6*	22 3	22 0*	22 0*	22 3*
Tweefontn. Colls.	19 0†	—	19 0†	19 0†	19 0†	19 0†
West Springs	13 3	13 3	13 0	13 0	13 0*	13 1*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

	Fri. 2nd.	Sat. 3rd.	Mon. 5th.	Tues. 6th.	Wed. 7th.	Thur. 8th.
Anglo-Amer. Corp	25 3	25 0	24 10½*	25 0	24 9	24 6
Apex Mines	7 0*	7 0*	7 3*	7 3*	7 3*	7 3*
Bantjes Cons.	5 6*	5 0*	5 3*	5 6*	5 7*	5 5*
Brakpan Mines	55 0*	—	54 6*	—	55 3	55 0
Bushveld Tins	0 6*	0 6*	0 6*	—	0 6*	—
Cinderella Cons.	—	2 3*	2 6*	2 3*	2 0*	2 6
City & Suburbans	2 3*	2 6†	2 3*	2 3*	2 3*	—
City Deeps	51 3*	—	50 6*	51 0*	50 6*	50 6
Clydesdale Colls.	—	—	—	—	26 6*	—
Con. Diamonds	18 7½	19 0	19 4½	19 3	19 0	18 9
Con. Langlaagtes	—	—	16 0*	15 6†	16 0†	15 6†
Con. Main Reefs	12 3*	11 9*	11 9	11 6*	11 9	12 0
Con. Mines Select.	3 9*	—	19 0†	—	18 0†	—
Coronation Colls.	—	45 0†	—	40 0*	40 0*	—
Do. Freeholds	—	0 10*	0 10*	0 10*	0 10*	—
Do. Syndicates	7 3	7 0	6 9*	6 6*	6 6*	6 6*
Crown Diamonds	—	3 11	4 3	4 0*	4 3	4 0*
Crown Mines	44 0*	—	—	—	—	15 0*
Daggafont. Mines	3 1*	3 1*	3 1*	3 1*	3 1*	3 1*
E.R. Coals	2 0*	2 0*	2 0*	2 3†	2 0*	—
E.R. Deeps	0 9*	0 9*	—	—	0 8*	0 10
E.R. Props.	6 10*	6 6*	6 3*	6 4*	6 9*	6 4*
E.R. Debentures	—	£71*	£71*	£71*	£72*	£71*
Eastern Golds	0 6*	—	—	—	—	—
Ferreira Deeps	10 0*	—	—	—	—	—
Frank Smith Dmds	4 6	4 6*	4 9	4 9*	4 10	5 0
Geduld Props.	49 9	49 6	49 3	49 3*	49 0*	48 9*
Glencoe Colls.	—	13 0*	14 0†	14 0†	13 6*	—
Glynn's Lydenburgs	9 0†	—	9 6†	8 0*	9 6†	—
Government Areas	84 6*	84 0*	84 6*	84 0*	84 6*	83 6*
Jupiters	—	1 0*	—	—	—	—
Knights Centrals	4 11	4 10*	4 9*	4 10	4 10	4 7*
Leeuwpoot Tins	10 6*	11 0	10 3*	—	—	10 3*
Luipaardsvlei Est.	2 9*	2 9*	—	2 7*	3 6*	4 0
Lydenburg Farms	5 6*	5 6*	5 6*	5 6*	5 6*	5 9
Meyer & Charltons	80 0*	—	—	80 0*	—	—
Middelvlei Est.	—	—	—	—	1 3*	—
Modder B.'s	30 6	30 9	30 6	30 9	30 3	30 6
Modder Deeps	44 9*	45 0*	45 0	45 0a	44 6a	44 3*
Modder Easts	10 6	10 4½	10 6	10 6	10 3	10 3*
Hume Pipes	16 0†	15 0†	14 6*	15 0†	15 0	—
National Bank	£11½†	£11a	—	—	—	—
Natal Nav. Colls.	32 3	—	33 0†	33 0†	—	30 0*
New Elands	26 0*	25 0*	25 0*	25 3*	25 0*	—
New Eras	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
New Gedulds Deeps	—	1 4*	1 4	1 4*	—	1 4*
New Kleinfonteins	6 6*	7 3	6 9*	7 6†	6 6*	6 6*
New Modderfontn.	75 0*	75 0	74 0*	75 0	75 0a	73 3
Nigels	5 0*	—	—	—	—	—
Nourse Mines	10 3	10 9†	—	10 0	9 3*	—
Premier Defs.	106 3*	—	—	—	105 0*	105 0*
Pretoria Cements	46 0*	45 0*	44 0*	45 0	44 6	45 0*
Princess Estates	1 0*	—	1 0*	1 0*	1 0*	1 0*
Rand Collieries	0 10	—	—	—	—	—

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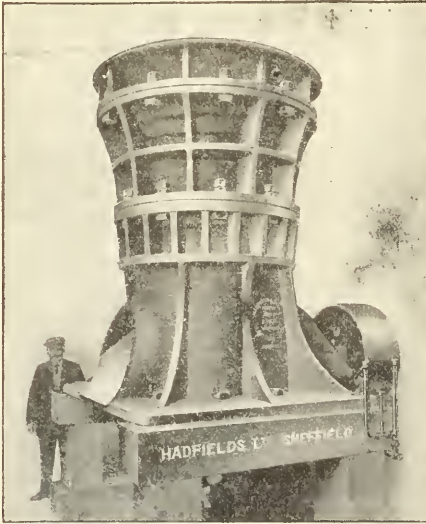
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TENDERS

are invited and will be received by the Undersigned up to and including Friday, the 30th day of September, 1921, for the purchase of the following Immovable Properties—

1. Certain piece of ground, being portion of freehold farm Kookfontein No. 57, called "HOPEFIELD," in extent 825 morgen 262 square roods.
2. Certain piece of ground, being portion of the freehold farm Kookfontein No. 57, called "SPRINGFIELD," in extent 2,229 morgen 258 square roods.
3. Certain piece of ground, being portion of the freehold farm Waldrift No. 92, called "BEACONSFIELD," in extent 1,305 morgen 511 square roods.
4. Certain piece of ground, being portion of the freehold farm Waldrift No. 92, called "GARFIELD," in extent 691 morgen 114 square roods.

The above are contiguous, and are situate in the District of Heidelberg, Transvaal, Ward Klip River.

The Farms are traversed by the main railway line to Johannesburg and by the Klip River. Water is brought on to lands by means of furrows.

The well-known Waldrift Coal Mine is situate on the farm "Springfield," the coal seam extending to the farm "Beaconsfield." Excellent clay deposits are also known to exist on the farms.

The farm "Beaconsfield" adjoins the Vereeniging Commonage, and the distance from Johannesburg by road is only about 35 miles.

With the exception of a small portion of the boundary, the farms are fully fenced, and some of them divided into paddocks.

There are three dwelling houses and the usual out-buildings on the farm "Springfield."

Tenders may be for any one or more portions of the above.

The highest or any tender not necessarily accepted.

Intending purchasers may inspect the properties on application to Mr. C. H. McKay, Kookfontein, P.O. Meyerton Station, Transvaal.

Further particulars may be obtained from

J. J. T. KING,

Secretary, Griqualand West Board of Executors, Trust and Agency Co., Ltd.

EUSTON B. BROWN, Executors Testamentary.

O. Box 334, Kimberley.

July 1921

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS SLIGHTLY BETTER—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—EXPLOSIVES—OILS AND COLOURS—UNION'S IMPORTS AND EXPORTS FOR JUNE AND FIRST HALF OF 1921—RAILWAY DEFICIT—COAL CONDITIONS IN BRITAIN—EUROPEAN TRADE CONDITIONS WITH AMERICA—METAL MARKET.

General Review.

Business this week has been of a more encouraging nature. The Commercial Exchange has exhibited more activity than has been witnessed for some time past, inquiries being much better and becoming more normal. Several lines are beginning to become scarce as compared with two or three months ago, and, although bigger losses are being made now than ever before, merchants are of opinion that normal levels are within measurable distance. Prices of materials remain much about the same, but there is a likelihood of corrugated iron advancing in price shortly, as quotations ruling recently have been well below replacement value on the Home markets, and prices will, it is expected, from now on show more and more a tendency to keep on a level with those obtaining oversea. This means, of course, that an advance in prices all round may soon be seen. As regards timber, there are good stocks in the country, and advices from the Baltic are not such as to warrant the expectation of any fall in prices for some time to come. As soon as our trouble in the matter of the building wages dispute has been removed—the consensus of opinion in commercial circles is that a satisfactory arrangement will be arrived at before the 16th inst.—the probability is that building materials will harden all round. The gold premium has declined again this week, but if no further great fall occurs between this and the end of the year the position of our lower-grade mining propositions seems to be assured for that period at least. It is as well to reiterate the fact that our gold shares are attracting more and more attention on the part of European investors and likely to increase in favour, which is bound to give an impetus to commercial activity generally by the influx of money badly needed for the opening up of very promising mining propositions. New mines want everything from A to Z and usually get their many requirements before starting.

Iron and Steel.

Business has been livelier during the past few days than for many weeks; inquiries are stronger, and everything points to the fact that the lowest depths have been reached and that we are now heading, slowly perhaps, but surely, towards higher levels. The Commercial Exchange during the week has shown unwonted activity.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; $\frac{1}{2}$ in. and 5-16 in. rounds, iron and steel, 45s.; $\frac{3}{8}$ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; $\frac{3}{4}$ in. iron, 37s. 6d.; steel, 39s. 6d.; $\frac{7}{8}$ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; $\frac{1}{4}$ in. square iron, 55s.; $\frac{3}{8}$ in., 47s.; $\frac{1}{2}$ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, $\frac{5}{8}$ in., 41s.; $1\frac{1}{2}$ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, $\frac{5}{8}$ in., 10 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 10d.; 1 in., 8d. to 9d.; $1\frac{1}{2}$ in. to 2 in., 7d. to 8d.; larger sizes, 8d.; steel plates, 1-16 in., 24s. to 25s.; $\frac{1}{8}$ in., 32s.; 3-16 in., 32s.; $\frac{1}{4}$ in., 21s. to 22s. in all sizes up to 8 x 4; 30s. to 32s. 6d. for the larger sizes; spring steel

flats, 8 $\frac{1}{2}$ d. to 9d. per lb.; bolts and nuts, $\frac{3}{8}$ in., 1s. to 1s. 2d. per lb.; $\frac{1}{2}$ in., 65s. per 100 lbs.; $\frac{5}{8}$ in., 62s. 6d.; $\frac{3}{4}$ in., 60s.; nuts, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 87s. 6d.; fish plates, bolts and nuts, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 8 $\frac{1}{2}$ d.; $\frac{1}{2}$ in., 6 $\frac{1}{2}$ d.; $\frac{5}{8}$ in., 6d.; $\frac{3}{4}$ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 1s. 3d. per lb.; $\frac{3}{8}$ in., 10d.; $\frac{1}{2}$ in., 50s.; $\frac{5}{8}$ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, $\frac{3}{8}$ in., round, 1s. 7d.; $\frac{1}{2}$ in., 1s. 5d.; $\frac{5}{8}$ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d. and 8d.; hollow, 9d.; $1\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black babing wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{8}$ to $1\frac{1}{2}$ in., 2s. 6d. per lb.; $1\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; $2\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; $3\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to $2\frac{1}{2}$ in., 2s. 2d. per lb.; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Second-hand Machinery.

The market this week has not been very strong in second-hand machinery; many of the smaller second-hand machinery dealers are very pushed and endeavouring very hard to get rid of their stocks, owing to want of cash, and are very anxious to dispose of their goods preparatory to a bigger drop. Many articles can be obtained from them on the bargain principle. The bigger dealers are not disposed to bargain, although selling in many instances under cost. The mines are not purchasing so freely as a few weeks ago, and are reducing economy to a very fine art. As, for instance, welding up all their short hand-power drills, machinery drills, and generally short lengths of bar iron. The great heaps which are accumulated are in many cases turned over daily with a view to economy. Years ago these articles were thrown into the tailing heap or buried, but to-day use is made of practically everything on the mines, such as old heads being converted into shoes and dies, the old broken cam shafts being converted into stems. Mine hammers are also being made from the residue or parts cut off of a head, this material being made of the best cast malleable steel. Tappets and small heads and worn-out shoes and dies are sent by the companies to Vereeniging or the Robinson Smelting Works and made into fresh shoes and dies. All this stuff was unusable years ago; thousands and thousands of tons of it were sent out of the country and eventually found its way to Hamburg, to be flung back at us afterwards in the shape of "Jack Johnsons," "Black Marias," etc. Old rails, instead of being thrown into the dump heap, as in the past,

are now being converted into grizzly bars and gratings. There is a use for everything except for broken castings, which are sold to foundries. Old truck wheels, which were previously buried, are now sent to Vereeniging and Dunswart by the thousand.

Engineering Shops.

The position of the engineering shops as a whole shows that things, although by no means booming, are still keeping going, and if people with a little capital, more particularly those in touch with the mining industry, would endeavour to realise that the liberation of a few thousand pounds would mean a lot to the engineering industry, business would run smoothly. Nobody expects to make money in these times, but everybody wants to keep going until things right themselves, and the lessening of conditions of stringency would enable works to go ahead and allow people to make money. One thing which would be of the greatest possible advantage to everyone concerned would be for the mining groups, railways, etc., to endeavour to have their requirements satisfied on more direct lines by establishing buying sample rooms. The great cry to-day is reduction of expenses in every direction. To take the mines as an example, it is costing them, said a well-known merchant, thousands of pounds per month in the shape of expensive motor cars, travellers, waste of time entailed upon their various staffs, etc. Of course the motor cars are the property of the individuals and firms catering for the mines, but indirectly the mines are paying for them. Surely, he said, samples, drawings, and sketches could be concentrated in some buying sample room, of free access to the public, at a purely nominal cost, and be assured of purchasers supplying goods on a competitive basis at lowest costs. At present, he said, John Smith, reef traveller, calls at the mines, buttonholing the manager, or whatever members of the mine staff he could lay hold of, talks sixteen to the dozen, books an order for £10 worth of

goods for £20, comes into town, chases round to two or three manufacturing places, secures his requirements for £7 10s., and so on it goes. No doubt one of the hardest worked individuals on the reef is such a traveller, but surely not a necessity for such a highly specialised industry as the mines. A sample room need not preclude the management of a mine from purchasing its requirements from John Smith if it wants to do so, but if it were made a standing order that a mine's requirements were duplicated and called for in a sample room, then such mine management would at least have the benefit of competitive prices. Vendors of new special goods, or any article suitable for the mining industry, could exhibit their products, no doubt gladly paying for the privilege. The Commercial Exchange, he said in conclusion, is a perfect institution for the merchant importer, but probably not so many South African manufacturers find it to their advantage to belong to it.

Further signs of revival of industry in Britain are shown in the announcement that Palmer's huge steel works, which were closed early in the coal stoppage, have restarted, while two more ironworks in the Cleveland district have restarted, involving the re-opening of the ironstone mine at Ayton.

The American representative of big financial interests, Mr. W. Ingram, who arrived here in June last, left for home last week, having inspected the whole of the Messina interests. He is understood to have expressed himself as thoroughly satisfied with the properties, and will arrange to work the financial part of the business on a large scale. It is much to be hoped that this will mean the beginning of vigorous development in the Messina district, which is so badly needed. The financial markets of the world have been in a stagnant state recently, and business men are now apparently on the look-out for good things, in which this country abounds. With a little encouragement to the prospector and the financier, this country's development is assured.

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Timber and Building Materials.

Timber maintains its price fairly well and there are no changes to report this week. 3 x 9 deals, 1s. 1d.; scantlings, 1s.; beaver board, 5d.; floorings, 7d. to 7½d.; ceilings, 5¼d. to 5½d.; Oregon, 7s.; pitch pine, 7s. 6d. to 8s.; corrugated iron, 9½d. to 10½d. Business remains fairly good, but there are signs that it will become very brisk as soon as the present building dispute has been settled. Consignments of timber are coming in freely from Europe. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality; 14s. 9d. for seconds at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at mills, Rhodesia; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 9d. per ft. of 1 x 12, here; American pine shelving, 1s. per ft. There is no change to report in bricks, which are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed, per 1,000 at yards; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp, course and roofing, 37s. 6d., 47s., 55s. 3d. for 1-3 ply.

Second-hand Iron and Timber Yards.

These are still in the doldrums pending a decision in the building trade dispute regarding wages; iron is unchanged at 5d. to 6d.; timber, 10d. to 1s.

Electrical Goods.

Business remains very quiet in town and country. Apart from tubing reported last week, there are no reductions to announce as yet, although a general fall in prices is not unexpected shortly. Consignments of electrical wares continue to arrive steadily from Britain, and more slowly from the Continent and America. Britain appears to control shipping arrangements as regards the Continent, for while shipments from England take as a rule about three weeks, these from Germany occupy from seven to eight weeks from date of drawing upon merchants here.

Explosives.

The British South African Explosives Co., Ltd., announce that the price of nitrate of lead has been reduced from £65 per ton less 5 per cent. to £60 per ton less 5 per cent., and that the price of detonators has been reduced by the Modderfontein factory from 57s. 6d. less 2½ per cent. to 55s. less 2½ per cent. There are still very large stocks of explosives in the country—amply sufficient for six months' supply—and these must of course be worked off before any benefit can be derived by the mines from lower costs of materials and falling freights.

Wakkerstroom Oils.

Mr. Arthur Pratt, presiding at the meeting of shareholders of the company on August 25th, stated that they had definite proof that in regard to Mavriestad, with an area of 3,127 morgen, they had an asset of remarkable value. According to their experts they had a seam of shale proved on the property varying from 4 ft. to 6 ft. 6 in. in width, carrying values exceeding 20 gallons to the ton, which seam in the opinion of their experts, contains an area of 6,000 acres, with upwards of 93,000,000 tons of shale containing oil, on a valuation basis of 3s. per gallon of a total value of £295,000,000. This, on an estimated total cost of recovery of £1 per ton, should leave a profit of some £187,000,000. The chairman anticipated satisfactory results would accrue from the prospecting operations now being conducted on their other properties. He personally was satisfied that the establishment of an oil shale industry in this country would come to pass in the near future.

Union's Imports and Exports for June and First Half-Year.

These show big decreases compared with last year, but June month shows more encouraging figures as regards exports. Imports in the first six months of the present year show a drop of nearly £12,000,000, the falling off in June being £1,700,000. The reaction this year is not surprising when the flood of imported goods last year is borne in mind. It may be assumed, in view of reduced stocks, that the second half of the year will see the figures mount again. Exports

for the six months showed a decrease of nearly £21,000,000 compared with last year. Diamonds fell over £6,000,000 and wool by nearly £11,000,000; coal, however, increased by £360,000, the total export for the half-year being £1,000,000. Food and drink showed an increase of £1,700,000 for the six months. June exports alone were valued at £4,879,812 drop of £620,000 as compared with June of last year. In June our wool export increased to 19½ million lbs. against 5½ million lbs. in the corresponding month of 1920. The general opinion is that the figures for the second half of the year will show a big improvement on the first.

Railway Deficit.

The gross expenditure on the railways and harbours has risen from over £14,000,000 in 1911 to over £28,000,000 in the last financial year. Wages and allowances which in the former year amounted to £5,821,096 have risen to £16,358,562. Revenue has of course risen owing to increases in rates and fares, but the limit in this direction appears to have been reached, and any further increase would only have the effect of curtailing development and frightening away new enterprises. But notwithstanding increases in rates, revenue falls much below expenditure, and the railways showed on July 31st last a deficit of £3,361,000. With such facts to face it is only reasonable to look upon the present retrenchment policy of the railways as not only necessary but right. The Premier, in his speech at Capetown last week, predicted a great recovery in the Union within the next five years. In view of this expected advance in expansion, the railways and harbours must be ready to handle the traffic. At the present time the General Manager reports a serious shortage of engine power, which would take a considerable time to restore to normal. The fact remains that the present equipment of the railways could not cope with any considerable increase in traffic, and in view of the predicted increase it is to be hoped that the activities of the railways will not be too drastically curtailed. To-day's efficiency must not be lowered in view of probable future demands.

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Coal Conditions in Britain.

During the last week of July 4,592,000 tons of coal were raised, compared with 4,277,200 tons during the week before the coal strike. During July 15, 223,500 tons were raised as compared with 179,000 tons during the three months' stoppage, which shows that the industry is about on pre-war footing. In South Wales house coal has been further reduced by 10s. a ton from September 1st, making a reduction of over 17s. in a month. The retail price is now 53s. 6d. per ton.

Germany's Foreign Trade.

The United States Secretary of Commerce, Mr. Hoover, states that German competition in the field of foreign trade is showing signs of weakening. Germany it seems is experiencing difficulty in handling orders obtained by cutting prices, and is unable to produce goods equal to pre-war quality. Lately the Germans have abandoned steel contracts owing to their inability to deliver the steel.

German Dyes.

It is announced that from September 1st the price of German dyes for silk piece goods has been advanced 300 per cent., making 1,200 per cent. over pre-war rates.

European Trade Conditions in Relation to America.

The tariff now being enacted by Congress, says a well-known American bank president, will prevent the importation of many goods needed there, and will hinder economic readjustment internationally, which foreign trade is the most direct and satisfactory way of hastening. If foreign goods are shut out of America, European countries, he said, would have no way of establishing a credit there. There was no question about America needing many of the things manufactured in foreign countries, and the latter in turn need credit, which shipment of their goods to America would set up. He stated that after a visit to Europe he was positive that France would "come back" all right, although the rehabilitation work is progressing very slowly. The devastated areas need, he said, between 200,000 and 300,000 new homes. Labour troubles, he stated, had left England in a bad plight, and he declared that all the nations must economise, reducing extravagance to the minimum and thus reducing the heavy burden on business.

Modder "B" Dispute.

The Modder "B" dispute has been settled by the reinstatement of the mine captain, and the strikers have resumed work.

Strike at Van Ryn Deep.

A long-standing dispute between the reduction workers and the management has culminated in a strike at the battery, impeding the operations on the mine very considerably. The dispute is in regard to the position of shift leaders in the battery. The matter is now being discussed between the Chamber of Mines and the South African Industrial Federation.

Financial.

The South African Reserve Bank's ratio of cash reserves to liabilities to the public on September 3rd was 80.6 per cent.

Metal Market.

The metal market has shown an improved tendency during the past week, due to the re-opening of works in Britain and to better financial relations obtaining in America. A revival in copper is expected shortly; tin and lead are also expected to advance. Latest quotations: Standard copper, £68 19s. 6d. cash, £69 11s. 3d. forward; electrolytic copper, £71 10s. cash, £73 10s. forward; Straits tin, £156 15s. cash, £159 2s. 6d. forward; English lead, £23 7s. 6d. cash, £22 15s. forward; bar silver, 38½d.; fine gold, 109s. 8d. per ounce.

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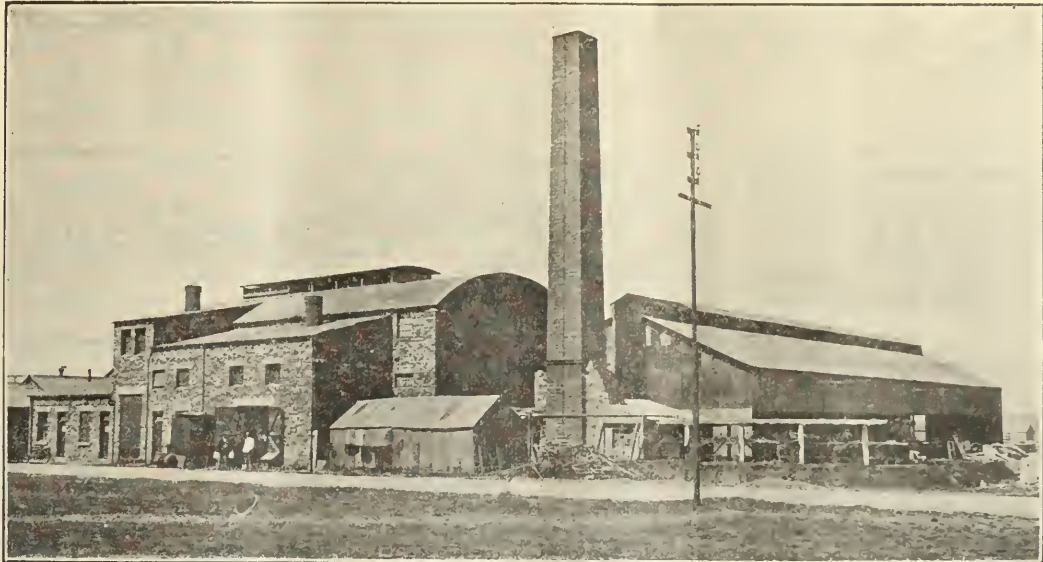
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JOHANNESBURG, TRANSVAAL, SATURDAY, SEPTEMBER 17, 1921.

No. 1564

GERMISTON AS AN INDUSTRIAL CENTRE.



Views of the Works of the East Rand Engineering Works (at foot) and S.A. Carbide Factory (top picture) on the Industrial Sites at Germiston.

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Year's Work of the Union Geological Survey.

DIRECTOR'S REVIEW OF PROGRESS DURING 1920.

The following is the annual report for 1920 of the Director of the Geological Survey (Dr. A. W. Rogers):—

Geological mapping was done in Heidelberg, the Olifants River valley, and near the Crocodile River in Rustenburg. A considerable portion of the time of the staff was taken up by the examination of mineral deposits of actual or potential economic value.

During the year the staff was increased by the appointment of Mr. Haughton, Dr. Krige and Mr. Nel, two of whom took up their work late in the year and one after its close.

Geological Museum.

The Geological Museum in Pretoria has been reopened after an interval of six years, during which the space destined for it was in the use of the Defence Department. Much of Mr. Hall's time was spent in preparing exhibits and in making the extensive changes required to bring the collections shown up to a condition as representative of the mineral resources of the country as possible with the material in the possession of the Survey. The stratigraphical collection and that of the intrusive rocks have also received very considerable attention.

The office accommodation in Pretoria and Cape Town is insufficient for the present staff. It is impossible so to arrange periods of field-work that some geologists occupy offices while others are in the field. The space required by one of the staff on returning from field-work must be sufficient to hold his maps and specimens so that he can refer to them without continual packing and unpacking. At present some officers have to be accommodated in the exhibition room and library, which entails unavoidable disturbance and loss of time.

Another matter which closely concerns expenses and the welfare of the staff is the want of proper accommodation for the wagons when they are not in actual use. The yard in which they are now stored in Pretoria does not protect the wagons from the weather nor from becoming verminous; the results are heavy repair bills and complaints from those who use the wagons for field-work.

Heidelberg Geology.

In the Heidelberg district the area lying north of the Sugarbush Fault was almost completed and a considerable amount of work was done south of that fault. It has been demonstrated that the thickness of each major subdivision of the Witwatersrand system is reduced as compared with the thickness of the same subdivision on the Rand, and no evidence of unconformity within the Kimberley-Elsburg series nor at the top of that series was found between the Klipriversberg and the Malans Kraal—Tweefontein escarpment. The importance of these results lies in the confirmation they afford of the mistake in correlating certain conglomerates in the Kimberley series in Heidelberg with the Van Ryn reef. The mistaken correlation has given rise to very greatly exaggerated expectations of profits to be got from mining certain reefs in Heidelberg. The results of the detailed geological survey of the Witwatersrand and Heidelberg districts made between the years 1910 and 1921 prove that the reefs in Heidelberg, which have been wrongly called "Van Ryn," are in the Kimberley series, and that the Nigel reef is on the horizon of the Van Ryn.

Coal in the North-West.

In September the Director made a journey in the north-western Transvaal with the Government Mining Engineer and the Inspector of Mines, Pretoria, for the purpose of seeing the country where coal has recently been discovered through boring operations of the Irrigation Department. The route lay north-westwards from the Rooiberg tin mines through Buffelshoek on the Crocodile River and across the Matlabas River into the wide sand-covered country north-

west of the Waterberg, where coal had been struck by percussion drill on the farms Hooi Kraal No. 1687, Grootgeluk No. 1360, Leeuwdrift No. 1370, and Enkelbult No. 1361 at various depths ranging from 30 to 330 feet. The results got by rotary drilling since our visit prove that the region contains coal seams that may be of considerable value in the future, though the extent and degree of continuity of the seams are at present a matter for conjecture. On the south side of the coal-bearing area the Karroo beds appear to rest upon pale and dark-striped grits of the Waterberg system, which crop out on Zontpan No. 1238, and are exposed in wells as far north as Kringatspruit; similar rocks occur on the Matlabas River lower down the river than the typical red grits of the Waterberg system, and this type of rock forms the lower beds of the same system in the hills fringing the northern edge of the Palala plateau on Kaffirboom No. 560 and adjacent farms. On the left bank of the Matlabas, near the police station, red Waterberg grits are separated from coarse red granite by aplite containing fragments of the grits. On the north side of the belt of Karroo beds, which is perhaps eighteen miles wide on the west side of the Pongola River, there is gneissose granite containing bands of altered limestone with abundant lime silicate minerals. The Karroo beds stretch from the western side of the Crocodile River to the Palala River, where only outliers remain. The base of the formation is seen to rest on coarse red granite on Buffels Kraal No. 401, Kroonstad No. 365, and Kaapsvlakte No. 368. At the base there is a thin conglomerate, not a tillite, though on the eastern side of the prominent tafelkop on the right bank of the Palala this conglomerate rests on a striated surface of the granite; the general direction of the striae is E. 30 N. The Karroo beds apparently form a wide syncline of which the axis is inclined westwards, so that the area they occupy widens towards Bechuanaland.

The red granite of the Bushveld type is in contact with the much older gneissose granite on Clermont No. 1109, but the actual contact was not seen. Eastwards, unaltered red Waterberg grits appear to rest upon the red granite on the farm Rietvley No. 783, and the grits are overlain by felsites on Goedgedacht No. 786 and Murchison No. 472; the felsites occasionally contain angular pieces of pale quartzite. The Waterberg quartzites which form the north edge of the Palala plateau apparently rest upon the felsites. There are dykes and sills of quartz-dolerite in the Waterberg beds of this area as well as along the Matlabas. Quartz-dolerite is also seen to be intrusive in the red granite on Hellem-Bricksteen No. 2102, where it becomes very fine grained at the contact with the coarse red granite. On Elandsfontein No. 594 there is a wide belt of rocks ranging from very dark norite to anorthosite, including bodies of magnetite-rock, though no pyroxenite was noticed, lying between coarse red granite on the west and the ancient gneiss of Matal's location on the east; the junction is near the eastern beacon of the location.

Mr. A. L. Hall's Work.

Mr. A. L. Hall, Assistant Director, spent the first half of the year in the preparation of comprehensive descriptions of the mica and corundum deposits of the Union, and several months on the establishment of the Geological Museum, a work which has been referred to in the preliminary remarks of this report, and which has been described at length in a recent number of the *Journal of Industries*. The steadily increasing number of inquiries about base metal resources made it necessary for Mr. Hall to visit a number of the deposits; the more important of these were the interesting nickel and tale deposits of the Scotia tale mine near Sheba Siding, and several mica and corundum deposits. Near the latter two valuable deposits of felspar were examined in detail and the material was submitted to technical tests, with satisfactory results. This information is an addition

to what has been already published, and its accumulation will enable the previous publications to be brought up to date when occasion demands it. The results of some of the work, together with information got in other ways, is being co-ordinated with a view to a comprehensive investigation of the clay and felspar resources of the Union.

Dr. Wagners' Activities.

Dr. P. A. Wagner was engaged on various deposits of economic importance, including those of the Olifants River tin fields, the iron ores of the Crocodile River and those near Pretoria, the Pretoria salt pan, vanadinite ores, lead ores, chromite, and fluor. He read papers on the origin of the salt pan, vanadinite of the Marico district, and the Crocodile River iron ores before the Geological Society of South Africa. His memoir on the Olifants River tin fields was sent to the printers on October 5th, but it has not yet been issued on account of delay in its return from the printers.

Mr. Wybergh examined limestones near Robertson, Hermanus and Malagas during the year, and the second volume of the Memoir on the "Limestone Resources of the Union" prepared by him was issued, but most of his time was occupied by an examination of the coalfields of the Transvaal and Orange Free State with the view of preparing a general report of coal resources.

Office Work.

The following publications were finished and published during the year:—

- Memoir No. 13 (Mica), in May.
- Memoir No. 11 (Limestones, II.), in November.
- Memoir No. 15 (Corundum), in December.
- Sheet No. 14 (Transvaal), in November.
- Sheet No. 15 (Transvaal), in November.
- Sheet No. 28 (Cape), in November.

Other work in progress was the preparation of the large-scale map of Heidelberg district; the Johannesburg Sheet No. 52, which was sent to the printers in November; Cape Sheet No. 35; Cape Sheet No. 5 (Laingsburg); Transvaal Sheet No. 19 (Barberton); Sheet No. 68 (Piet Retief) and Sheet No. 102 (Vryheid); Memoir No. 16 (Olifants River tin fields), sent to the printers in October.

Many labels and notices were prepared for the Museum.

A compilation of the published and unpublished analyses of South African rocks was commenced for convenience of reference.

Laboratory Work.

Mr. Gardthausen, Assistant Curator, made twelve analyses during the year for members of the staff, twenty-nine assays, 275 determinations of minerals sent in by the public, and many rock sections and determinations for the staff.

Several analyses of rocks and minerals were made for the staff by the Government Analyst.

The staff of the Survey is the following:

Director, A. W. Rogers, Sc.D., F.R.S.; assistant director, A. L. Hall, B.A., F.G.S.; senior geologists, S. H. Houghton, B.A., F.G.S., and L. J. Krige, Ph.D., M.A.; junior geologist, L. T. Nel, M.Sc.; curator, the Assistant Director; chief clerk, L. B. Yardley; chief draughtsman, E. H. Banks; assistant draughtsman, L. S. Goldsmith, M.C.; assistant curator, C. C. Gardthausen, F.C.S.

Temporary Officers.—Geologist for Mineral Survey, P. A. Wagner, D.Eng., B.Sc., F.G.S.; geologist, W. Wybergh; field assistant, A. K. Parrott; clerical assistant, Miss Scott.

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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

V.

By Arthur Stenhouse.

In 1886, across the barren veld daily I tramped, prospecting for gold and gathering specimens of quartz by the way; and in the evenings, dusty and tired, arrived at my solitary tent on the Witwatersrand. After a simple meal I panned the specimens, many of which gave excellent results. At sunset I laid myself down to rest, lazily watching the Kafir boy cook his "mealie pap" on one of the numerous ant-heaps.

Pioneering was not all beer and skittles, but during the daytime I lived in hope, and at night recalled memories of the days of 1883-4 in Western Canada, the home of the beaver and the bear, the moose and the elk, when I dwelt in a one-roomed framed house on the prairie, and ploughed the land, reaped the hay, fed the pigs, and tended to the cattle. I also recalled memories of other days spent in the City of Winnipeg, in the almost arctic winter time, often 30 to 40 deg. below zero, when the earth was covered with a mantle of snow, and the charming girls, cosily wrapped in their sealskins and furs, drove in their sleighs, with jingling bells, through the freezing, sunlit air. These memories kept me company on the Witwatersrand, beneath the starlit sky.

To-day, 1921, the refining influences of ladies' society in Johannesburg is not half appreciated. In 1886 there were no angelic beings to soften and elevate the lives of the early pioneers. Later on a lady appeared, "Coekney Liz," and naturally she had a very good time.

In 1887 I was fortunate in obtaining accommodation at "Heights"—the first hotel erected on the Witwatersrand, a building composed of sundried bricks, with an iron roof; thin wooden partitions sub-divided the bedrooms, the partition in my room consisted of canvas only; but after a tedious journey on horseback I was thankful to obtain a "shake-down" anywhere. The late Mr. Height had a charming private residence at Doornfontein, and doubly I can recall the beautiful grounds with a miniature lake and willow trees in the foreground.

In 1888 the gold was not smelted, but retorted only, and the "puddings" of gold were deposited in the bank and were of all shapes and sizes. On one occasion the manager of the "Jumpers" Mine was dissatisfied with the appearance of the "pudding" from the battery, so placed it on a shovel and held it over the blacksmith's fire at the mine to get rid of the sulphurous fumes.

Before the advent of the railway, employees of all mines were paid in notes and gold and not by cheque; the banks charged 5 per cent. for silver coin and 1 per cent. for gold, to cover the cost of transport from the coast ports. Once a week I conveyed the gold from the "Jumpers" Mine to the bank and drew large sums for payment of wages. The Standard Bank (when Nitch and Gardner were general managers) overpaid me at various times, over £1,000 in gold. On one occasion the teller at first refused to take back £500 in gold which I returned next day, as his cash account balanced! However, I persuaded him to retain the money, and shortly afterwards the secretary of another mine called in and stated that he had been underpaid £500, so the matter was amicably settled.

In 1888 city life was very exciting, so in the words of the poet Pringle:

"Afar in the desert I love to ride,
With the silent bush-boy alone by my side."

The Need of Currency Stability.

"THE ONLY TRUE REMEDY"—PROFESSOR CASSEL'S PROPOSAL TO RE-ESTABLISH A CURRENCY SYSTEM BASED ON NEW RATIO OF GOLD.

At the recent Congress of the International Chamber of Commerce held in London, an important resolution was brought forward on behalf of the Finance Group Committee. This declared that "whereas the resumption of international commercial relations was hampered by the dislocation of the normal rates of exchange, and especially by their instability, Governments should pursue a strict policy in regard to taxation and to departmental economy: inflation of paper currency should be stopped and progressively decreased: a study should be made, and a plan of action decided on, with regard to the solution of the problems raised by the question of Inter-Allied debts: the disarmament laid down in treaties should be carried out in order to bring about a reduction of Budgetary expenses: the creation of national and international organisations for export credits should be actively undertaken by private enterprise, with the support of Governments: the Governments of countries with depreciated rates of exchange should avoid as far as possible contracting new external debts: and the greatest possible liberty should be granted in all commercial and financial transactions."

Commenting on this, "Barclay's Bank Review" says: "In many ways this resolution was strikingly reminiscent of the conclusions reached at the Brussels Conference and adopted by the representatives of thirty-nine different nations. Unfortunately, in only too many instances, the Governments concerned have been content with a theoretic rather than an actual adoption of certain of the principles agreed to, and this not only where these principles are in the nature of a counsel of perfection, but in cases well under their own control.

The Need of Stability.

"With regard to the question of deflation, Professor Cassel moved an amendment striking out the words 'and progressively decreased' in the sentence 'the inflation of paper currency should be stopped and progressively decreased.' He claimed that the only true remedy was to restore stability immediately, and he reminded the Conference that last year he had issued a special warning against deflation, principally in the United States. That warning had, he thought, been justified, for one of the main causes of the serious depression of trade and the unparalleled degree of unemployment, was the efforts which had been made to increase the internal value of money and to force prices down. In a period of inflation, credit should be restricted, and at a time like this, when prices were falling, every effort should be made to stop that movement and give confidence that bottom had been reached.

An Opposition View.

"Sir Felix Schuster disagreed with Professor Cassel and thought that the countries which had departed from their pre-war gold standard must aim at deflating their currency

gradually, so as to inflict the least injury, but with one object in view—a return as soon as possible to a pre-war gold standard. He admitted that this policy might be carried out too rapidly, but felt there could be no stability of exchanges, stability of trade and harmonious commercial relations until all currencies were regulated upon the basis of a common standard and that standard at present could only be gold.

"It is important to remember that, although at the present time it is not possible for this country, or indeed for most countries, to establish a standard of currency consisting of gold, or of paper backed by one hundred per cent. of gold, yet a gold standard can be established by the maintenance of an adequate percentage of gold in support of any existing volume of currency. This method does not, of course, provide the same convertibility, but properly regulated it provides an efficient gold standard system.

Too Drastic Deflation.

"Professor Cassel is probably right in his attributing some portion of the serious present depression in trade to too drastic attempts at monetary deflation, for the forcible pursuance of this policy in America compelled this and other countries to take similar steps in order to preserve a relative approximation of price levels. These efforts are no doubt in part responsible for the precipitate fall in prices, which in turn is responsible to a considerable extent for the prevailing lack of confidence. In reality it is more practicable to increase the ratio of value supporting existing currency and credit than to aim at substantial monetary deflation.

"Apart from deflation, however, there are other important factors, which, although difficult to measure, have yet exercised a considerable influence on the trade position. Amongst these are the lack of political stability on the Continent; the lack of a real peace; the lack of harmonious working between labour and capital and the inability of certain Governments of Europe to balance their Budgets and so avoid inflating their currency.

Sound Currency a Necessity!

"Professor Cassel has rendered a public service by emphasising the need for stability and the danger of too drastic deflation. The true position seems to be that there can be no stability of exchanges, stability of trade and harmonious commercial relations without sound currency. This does not necessarily involve the return to a pre-war gold parity—or to a hundred per cent. gold basis—in point of fact such a return would in many cases be impossible of achievement. It does, however, involve the restoration of political stability, the collection of taxation adequate to meet national needs without recourse to the printing press, an increase in productive capacity, and the establishment of a currency system regulated by value and based on a ratio of gold."

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Principles of Gold Refining.

The completion of the Gold Refinery at Germiston lends interest to the following brief review of the principles of gold refining, with special reference to the process in vogue at the London, Sydney, and the old Pretoria Mints.

The gold produced from mines in general is associated with a greater or smaller amount of impurities. These impurities are usually present on account of their existence in the ore from which the gold has been produced, but they are also included in the gold from external sources during the course of extraction. They usually consist of the precious metals: silver, platinum, and other members of the platinum group of metals, and the more common base metals such as copper, lead, bismuth, arsenic, etc. Rand gold is no exception to the rule, and we find that it is associated with about 10 per cent. of impurities in the case of mill gold, and even more in the case of cyanide gold.

Refining then has as its object the removal of these foreign substances, which so often have a very injurious effect upon the physical properties of the gold, and render it unsuitable for coinage and other uses.

Briefly, refining methods can be considered under three heads, namely, wet, electrolytic, and dry methods. Past

the gold and most of the other metals go into solution, but on account of the low current densities used, only gold is deposited on the pure gold cathodes, thereby producing gold which is seldom under 999.8 parts per 1,000 fine.

In the dry processes of refining the gold bullion is treated when in the molten state. The principle adopted aims at treating the bullion with some substance which only reacts with the impurities present, and leaves the gold unchanged excepting for slight mechanical losses. The number of substances which can be used to achieve this object are numerous, and attention will only be confined to one process which has been in use on gold approaching Rand gold in composition, and which will probably be adopted at the local refinery at Germiston. The process is called Parting by Chlorine Gas, or the Miller Process.

The process was proposed in 1838 by Lewis Thompson, but was not practically applied. In 1867 it was introduced by F. B. Miller with various important improvements at the Sidney Mint for refining and desilverising gold on the large scale. It has also been employed at the London Mint for gold refining, and was also in use from time to time at the Pretoria Mint in the time of the late Transvaal Republic.

The Miller process depends for its action on the property of chlorine gas of converting the silver as well as the base metals contained in the bullion into chloride, whilst not



Gold Refinery at Germiston nearing completion.

practice has chosen to call these methods by different names, such as inquartation, parting, and refining, but as they all have the same object in view ultimately, it will be sufficient to call them methods of refining in this account.

As the composition of gold produced from various parts of the world varies greatly, it follows that several methods of refining have resulted from this cause. The processes briefly treated here will be those which appear to be applicable to local conditions.

The wet processes can hardly be said to comply with the reason just stated, as it has been found that they work with greatest efficiency on bullion in which the ratio of gold to silver is much smaller than that in which it occurs in Rand or South African gold. Its adoption would entail the addition of much silver to the gold, a circumstance which can be avoided by adopting more applicable processes.

In the electrolytic process we have one which could readily be applied to Rand gold. It is suitable for treating gold alloys in which this metal is in large excess over the other constituents. It is a method which was developed at the North German Refinery in Hamburg. Briefly, the process is as follows: The anodes are made of sheets of the impure gold alloy or bullion, and the cathodes of pure sheet gold. The electrolyte is a solution of gold chloride mixed with an excess of hydrochloric acid, or a solution of any salt like sodium chloride (common salt) which forms double salts with gold chloride. The electrolyte is kept up to strength by the occasional addition of gold chloride. During electrolysis

attacking the gold. The base metal chlorides escape as a gas, as they easily volatilise, while the silver chloride collects as a liquid on the surface of the gold.

The refining is conducted in clay crucibles enclosed within graphite crucibles to avoid loss of metal in case of a crucible cracking. The clay crucible is glazed internally with borax to prevent the chloride of silver penetrating into it. Chlorine is passed into the molten gold by means of a clay pipe which passes through a loosely fitting clay cover. The chlorine is generated from oxide of manganese and hydrochloric acid in a stoneware vessel.

The refining process is conducted as follows: The gold is charged into previously heated crucibles, and when molten 2 to 3 ounces of borax added. The clay pipe, the end of which has been heated, is then lowered into the metal and chlorine admitted. The base metal chlorides are immediately given off as vapours, which disappear when these metals have been removed. The chlorine now combines with the silver present. When the silver has been removed a brownish deposit appears on the clay pipe, and the parting is completed. The crucible containing the gold is removed from the furnace and the gold allowed to solidify. The silver chloride still remains molten, and is poured off. The solid gold is cleaned and re-melted. Its fineness is now from 991 to 997 per 1,000. By repeating the operation more silver is removed. Of the gold present in the alloy, 98 per cent. is recovered, while 2 per cent. goes to the silver chloride removed. This loss is recovered from the chloride by subsequent treatment

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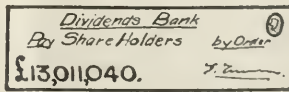
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Our Mineral Revenue and Expenditure.

SALIENT FEATURES OF THE UNION'S MINING INDUSTRY IN 1915 & 1920—LAST YEAR AND THE FIRST YEAR OF THE WAR CONTRASTED—STRIKING COMPARISONS GRAPHICALLY EXPRESSED.
(Specially drawn for the S.A.M. & E.J.)

<u>1915.</u>	<u>1920.</u>
<p style="text-align: center;">GOLD. £38,639,095.</p>	<p style="text-align: center;">GOLD. £34,654,922.</p>
<p><u>DIAMONDS.</u></p> <p style="text-align: center;"></p> <p>£399,810.</p>	<p><u>DIAMONDS.</u></p> <p style="text-align: center;"></p> <p>£14,762,899.</p>
<p style="text-align: center;"></p> <p>£2,142,479.</p>	<p style="text-align: center;"></p> <p>£4,534,670.</p>
<p><u>OTHER MINERALS.</u></p> <p style="text-align: center;"></p> <p>£2,349,625.</p>	<p><u>OTHER MINERALS.</u></p> <p style="text-align: center;"></p> <p>£1,428,644.</p>
<p><u>SALARIES & WAGES.</u></p> <p style="text-align: center;"></p> <p>£15,413,27</p>	<p><u>SALARIES & WAGES.</u></p> <p style="text-align: center;"></p> <p>£22,933,975</p>
<p><u>STORES.</u></p> <p style="text-align: center;"></p> <p>£11,834,48.</p>	<p><u>STORES.</u></p> <p style="text-align: center;"></p> <p>£17,843,310.</p>
<p><u>DIRECT TAXATION.</u></p> <p style="text-align: center;"></p> <p>£1,853,553.</p>	<p><u>DIRECT TAXATION.</u></p> <p style="text-align: center;"></p> <p>£5,966,856.</p>
<p><u>DIVIDENDS.</u></p> <p style="text-align: center;"></p>	<p><u>DIVIDENDS.</u></p> <p style="text-align: center;"></p>

Our Iron Industry.

A YEAR'S PROGRESS.

In the course of his annual report, the Government Mining Engineer reviews the iron and steel industry in 1920 as follows:—

The Union Steel Corporation (of South Africa), Ltd.—The works of this company produced during the year 12,245 tons of a total value of £323,604, comprising 9,903 tons of open-hearth steel from scrap, etc., the saleable value of this product being £253,026, and in addition the 3½-ton Heroult electric furnace had an output of 2,342 tons, of value £70,578. The average labour employed consisted of 190 white persons (including staff) and 340 coloured persons. A new 25-ton Siemens open-hearth furnace is now in course of construction and the works buildings are being extended.

The Transvaal Blast Furnace Co., Ltd., has ceased its experimental work at Vereeniging and has gone into liquidation.

The South African Iron and Steel Corporation, Ltd. (late Pretoria Iron Works).—The erection of the plant for this industry has not yet been started, the financial conditions not being favourable at present for raising the further capital required. Meanwhile the drawings for the lay-out and the construction of the plant are being proceeded with. The experimental blast furnace was working for six months of the year only. During this period 1,508 tons of pig, of value £15,080, were produced. The average labour employed was 22 whites and 105 natives.

The Dunsward Iron and Steel Works, Ltd., worked at full capacity for the whole year. The output of bar, rod, and angle iron was 7,034 tons, of value £175,850, and the labour employed averaged 40 whites and 240 coloured persons. Additional plant is now being installed.

The Witwatersrand Co-operative Smelting Works, Ltd.—No further additions have been made to plant during 1920. Since ferro-manganese, ferro-silicon, and ferro-chrome have been obtainable, a higher quality of steel is produced, while the total output of shoes and dies was over 1,200 tons. The life of the liners has also been increased, as much as 120 tons net of castings being obtained from one liner. The total output of shoes and dies was 1,201 tons, of value £24,020. The average labour employed was 3 whites and 31 natives.

The Newcastle Iron and Steel, Ltd.—The plant of this company is still under construction; its completion is anticipated by August next. An average of 30 whites and 150 coloured persons was employed.

Summarising the operations particularised above, it is found that 21,988 tons of iron and steel goods were produced in the Union during the year 1920, the value of the product being £538,554, as compared with 20,314 tons of value £405,798 during 1919. The industry gave employment to an average of 285 white persons and 866 coloured persons during the year.

Swazi Tin.

The following are the results of the operations of this Company for the month of August, 1921:—Concentrate recovered, 20 tons; estimated loss for the month (taking tin at £160 per ton), £168.

The East London City Council intend to borrow the sum of sixty thousand pounds (£60,000) to provide for the purchase and installation of the undermentioned machinery, etc., and work connected therewith, in the West Bank Electric Power Station:—One water tube boiler, complete with mechanical stoker, economiser induced draft plant and smoke stack; one 1,500 K.V.A. three-phase 6,600 volts steam turbo-alternator complete with condenser and auxiliaries; one 300 K.W. rotary converter; necessary E.H.T. three-phase switch gear for alternator feeders and rotary converter.

The World's Gold and Silver Output.

In a recent number (16th July) the *Commercial and Financial Chronicle* of New York gives its usual estimate of the production during 1920 of gold and silver throughout the world, with comparative figures for earlier years. The following statement reproduces the summary figures for both metals. In the case of gold the coining value is given, in the case of silver the commercial value in sterling currency:—

Year.	Gold.		Silver.	
	Quantity. Fine ounces.	Coining Value. £	Quantity. Fine ounces.	Commercial Value. £
Average of 1901-1905	15,628,111	66,385,090	167,449,613	18,181,731
Average of 1906-1910	20,981,757	89,126,308	197,587,326	21,797,930
1911	22,352,095	94,947,029	225,372,844	23,094,547
1912	22,565,697	95,854,568	224,310,654	26,198,781
1913	22,265,198	94,578,208	223,907,843	25,714,416
1914	21,413,701	91,021,119	160,626,019	16,941,026
1915	22,752,229	96,646,927	178,850,500	17,605,596
Average of 1911-1915	22,269,784	94,609,570	202,613,572	21,910,873
1916	21,895,494	93,007,679	161,177,900	21,029,686
1917	20,491,176	87,042,417	168,258,600	28,639,016
1918	18,563,016	78,851,979	197,537,637	39,112,452
1919	17,663,057	75,029,131	174,517,414	41,449,848
1920 (estimated)	16,790,367	71,022,121	175,714,504	47,589,282
Average of 1916-1920	19,080,622	80,990,665	175,441,211	35,564,057

The level of yearly production of gold had, before the war, reached somewhat over 22,000,000 ounces, and in 1920 the total fell below the pre-war average by about 25 per cent., and was 10 per cent. less than the 1919 total. The figures given by the *Chronicle* for the sterling equivalent of the gold whose weight is shown in the table represent, not the market value of the gold, but the number of sovereigns which could be struck from these quantities. As is shown in the interesting and instructive article from which the figures are taken, at the close of the year 1919 the market price of gold was 109s. 8½d. per ounce fine, and by 5th February it had risen to 127s. 4d., or a premium of slightly over 50 per cent. on the coining value of 84s. 11.45d. per ounce fine.

From this point a steady decline brought the price to 102s. 7d. on 2nd April, and an upward movement set in from that date. On 8th November the price stood at 122s. 4d., but dropped to 116s. 1d. by the close of the year. The average price for the year is given as 112s. 11.52d., making the market value of the year's production in sterling currency about £10,000,000 greater than the coining value stated in the table.

The movements of the price of silver, as traced by the *Chronicle*, are also important. From the opening at 76d. per ounce, the price advanced to 89½d. on 11th February, and from this, the highest price on record, the general tendency was downward. The lowest point of the year, 38½d., was touched in December, and at the close the price was 40½d. The year's average was 55d. per ounce.

It will be seen that the quantity of silver produced in 1920 was about equal to the average output of the last quinquennium, and about 49,000,000 ounces, or 22 per cent., less than the annual rate reached in the years immediately preceding the war. For 1920 the outputs of the principal producing countries differed little from those reported for 1919.

In the case of gold the United States was the country showing the greatest falling off from 1917 to 1920, the reduction being 524,000 ounces (18 per cent.) as compared with a reduction of 225,000 ounces (2.4 per cent.) in Africa (including West Africa) and 133,000 ounces (10.5 per cent.) in Australia.

Springs Mines.

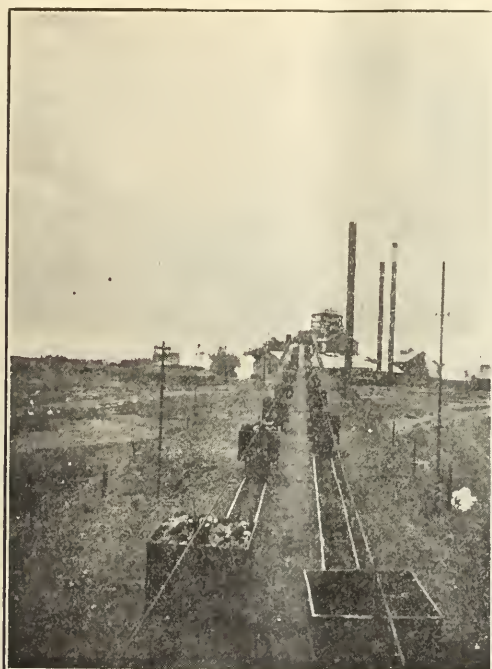
The following cable has been despatched to the London Office for publication:—"Owing to breakdowns of Rock Hoist No. 2 Shaft it is anticipated that the tonnage milled for the month will be reduced by 4,000 tons; repairs expected to be completed to-night (12th instant); publish immediately."

Sampling, Analysis and Classification of Coal.

The following is a summary of an article on the above subject appearing in a recent issue of the *Journal of the Chemical, Metallurgical and Mining Society of South Africa*:

Sampling.

The sampling of material, whether it consists of coal, ore, or any other product, is the most important feature in aiming at a true value of the material. In the case of coal which has been mined, one has an aggregate of coal, shale pyrite, and perhaps other impurities ranging in size from several inches down to particles of microscopic size. The breaking up of the coal and its impurities into these different sizes depends entirely upon the physical character of the



On a Transvaal Colliery.

various constituents which make up the aggregate. In the sampling of such a mass it is therefore important that each constituent be correctly represented in the sample. The bigger the range in size between the various pieces which make up the coal, the greater must be the sample in order that it shall be truly representative. The bulk of the sample cannot be reduced unless the size of the pieces is correspondingly reduced. Hence in order to reduce a sample to laboratory size, each quartering down must be preceded by a reduction in size of particles. The errors introduced by incorrect sampling are much greater than those possible by slip-shod chemical analysis.

Analysis.

The determinations usually made in the analysis of coal are: (1) Calorific value, (2) moisture, (3) volatile matter and fixed carbon, (4) ash, (5) sulphur.

In the determination of the calorific value various calorimeters are used, but the most reliable and useful is the Bomb Calorimeter.

The moisture present in coal can be grouped under four heads, namely, superficial moisture due to pit water on freshly mined coal, associated moisture which is included

in the coal substance, water composition or crystallisation, water of reaction due to combination of hydrogen of the coal with oxygen in burning.

Volatile matter is usually driven off coal by heating in a closed crucible at a temperature of about 900° C. The coal is weighed before and after the process and the loss repre-



A Scene on a Natal Colliery.

sents the volatile constituent. Ash is found by burning a previously weighed portion of powdered coal in an open crucible at about 750° C. till all carbon has been removed.

The sulphur determination consists in converting the sulphur present into a soluble sulphate which is afterwards precipitated by suitable re-agents and weighed. Attempts at classification have up to the present resulted in numerous systems, each of which is based on some or other chemical or physical property of the coal. Each system has its advantages when looked at from the point of view of its exponents, and can be put to useful purpose if viewed in the correct perspective.

Zaaipplaats Tin: August Results.

The Zaaipplaats results for the month of August were as follows:—Mill ran 4½ days; concentrates won, 11 long tons; capital expenditure, nil; estimated loss for August, 1921, excluding Government taxes and directors' fees, £300. The Manager reports: During August it was found that a certain belt of granite starting near the Power House and extending up the hill in the direction of No. 13 carried tin values from ¼ per cent. to 1½ per cent. over an area of roughly 300 feet long by 15 feet wide. The tin bearing granite passed under the track from the ore bin to No. 13. A small quarry was started on the side of the track where pannings showed values of ½ per cent. to ¾ per cent. black tin. By the 31st the quarry was 15 feet long by 6 feet wide by 4 feet deep. From 2 feet below the surface to a depth of 6 feet pannings have shown a steady 1 per cent. black tin. Two assays of an average of eight samples from a depth of about 7 feet were made, the results being 1.55 per cent. and 1.31 per cent. metallic tin respectively. The prospects of opening up a large body of 1 per cent. ore are hopeful.

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OVERSEERS' CERTIFICATES (Metal).

Our Passes	Rest of S.A.
1920 (12 months) 66%	34%
1921 (6 months) 64%	36%
No failures for 6 months, 1921.	

MANAGERS' CERTIFICATES.—Our record is 100% passes. 1912-20 we claimed 165 certificates; 40 in 1919-20; last 3 Exams., 29 certificates (total). 10 Coal Certificates in last 3 Exams.

TUITION (Metal or Coal) by class, correspondence or privately. The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

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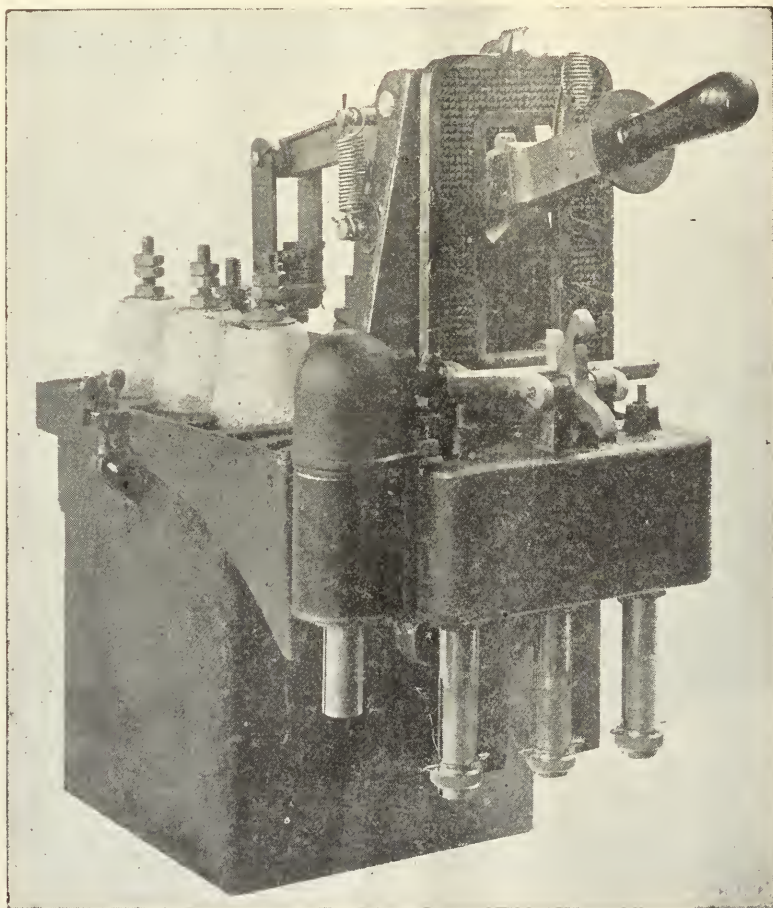
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The Failure of State Railway Control.

PROPOSAL TO HAND OVER THE S.A.R. TO PRIVATE ENTERPRISE—LABOUR'S IMPOSSIBLE DEMANDS—RAILWAYS RUN AT A BIG LOSS.

(From a Correspondent.)

Without trenching upon politics it is almost impossible to touch on any matter connected with the life of this country. Anyone advancing views that do not coincide with those of the people in control will at once be called archaic, but in face of the possibility of being called reactionary I will venture to picture certain conditions which appertain here and which if continued must according to the results being obtained here and in other countries lead to further trouble and confusion. Let me draw attention to the railways. It needs no words of mine to show the terrible condition this country is drifting into under the present Government's administration. Not only have the producers of this country been placed in an impossible position, but at the moment produce is being held up, and although men are invited to go on to the land, and officers of the State are busy in England picturing all the advantages of South Africa, yet the possibility of numbers of people buying land

hands, and the Portuguese port of Delagoa Bay with Hollander manipulation was the pawn that was played off against Natal and the Cape Colony.

The miner, the man of commerce, and the farmer are those most interested in the development of the country. The workman and others are more concerned in the welfare of themselves. The merging of all railway lines destroyed any hope of competition. Natal can no longer compete against East London or Delagoa Bay; and the Cape, a thousand miles away, with a long railway, only comes home on the game of averages. When all the systems were merged into the railways of the Union, citizens were led to believe economy and order under one administration would give them ideal transportation and would lead to untold developments. That, however, was not taking into consideration the unskilled labourer, the rights of white labour, and the demands that would curtail the use of Kaffir



This shows how the Coal Trade of the Country is hampered by the Railways. No Trucks at a Colliery—"Boys" idle.

and not being able to send their produce to market is dangerously apparent. The other matters in connection with our railways generally I will allude to later in this article.

Railway Beginnings.

When railways were first built in South Africa, their true purpose was to enable travellers and producers to overcome the difficulties of the slow and antiquated systems of transportation of the period. As the lines lengthened, their extensions served to open up the backveld for the farmer, the discovery of diamonds necessitated quicker communications, and ultimately the great gold field of the Rand, which was forced to use ox transportation in its earliest stages, demanded its connections with the various systems and the coast. It was not without considerable political misunderstandings that it was carried through. Each State had its own railways, there was a question of tariffs, and an *impasse* nearly brought about war as the last links neared their destination. The Transvaal has always been most concerned about its end. Built originally by Hollanders, it was at its inception completely in their

labour. The early demands for Government lines kept out joint stock companies. One or two small lines were built by companies, but the principle of having none other than State-run railroads has always been observed. This jealousy was at first purely political in its sentiment, but latterly was continued, fearing that private enterprise would benefit to the detriment of the State. It seems never to have occurred that by encouraging enterprise and competition a great benefit would accrue.

Anomalous Position To-day.

To-day one sees the spectacle of a country held in the thralls of continuous demands. The wheels of progress run at the dictates of white labour. Unfortunately, to-day they run disconcertedly. There does not seem to be a single section of the community that is satisfied with the working of the Union railways. It is unnecessary to ask farmers, merchants, coal miners, or any of the users of the various lines. Then there is the interminable delay and uncertainty of delivery. The machinery in the hands of a State should simplify and not complicate, and this leads one to consider whether the railways of this Union are not being run as a charitable institution for indigents and for the

benefit of white labour more than for the good of the State. The present financial condition shows that in order to meet labour demands, they are run at a serious loss. The sight of one of the most able controllers of labour struggling with all his wits to bring reason and economy to bear on impossible demands is what we see to-day, but having made it an institution for the relief of labour, skilled and unskilled, and with its years of conciliation-building, can the anomaly be rectified to-day? Will the huge loss on working on this system diminish, or, with the continuous demands of its labour, will it increase? Already the various proposed lines have all been relegated to a too distant future. Many of them may not have their demands considered for a generation. It is not always that trunk lines produce the most—sometimes a branch line develops and pays more than the great long trunks. The Witbank line, the Natal coal lines, and the suburban line at the Cape are all instances of this. The Free State line and the long line to the Cape are occupied to-day largely in carrying coal. I should like to know what the profits on those lines are? The trade of the Cape as a port of coal delivery has been made impossible. Years ago the late Mr. Francis Oats pointed out the profitable impossibility of conveying coal overland to the Cape. Again, I should like to know the profit and loss for coal consigned from the Transvaal to that port over the last ten years? If a mine finds its grade of ore too poor to pay, it leaves that ore in the mine, for it would be madness to work non-payable ore; but does the same businesslike attitude pertain to railways? Recently the Governments of Great Britain and America took over their railways, which, during the War time and after, for purposes of convenience and necessity, ran under Government aegis, but to-day they are being handed back to the companies, and we have still to hear with what results. Having seen the working of competitive railways on the great American continent, one's commonsense tells one that, without competition, rates would have constantly risen and travelling and goods conveyance become impossible.

Question of Capitalisation.

The development of whole States by irrigation schemes where millions of acres were placed under water—one alone in Alberta 300 millions of acres and ditches several hundreds of miles long, by private enterprise—shows the capitalisation of our railways need not frighten us. There are many companies in America alone that earn dividends equal to those of our gold and diamond industries combined; and a billion dollar capital is just a fair concern. It is a question of principle and a question of whether for some political reason we should run railways at a loss that most probably in the hands of companies would be run at 25 per cent. or 30 per cent. less than any Government can do it. It is a question whether coal that should be rushed to the nearest ports and conveyed to the Cape by sea should be dragged unnecessarily 1,000 miles overland, thereby using

up material necessary for the other purposes? It is a question whether the internal development of this great country is not at present being retarded through every branch line having to be set aside for financial purposes. The disposal of the railways to companies would almost free this country from debt. It would enable it to develop numberless industrial propositions vitally necessary. In the hands of companies numerous avenues of wealth would be opened up and new populations settled. It is to my mind a matter of regret that the coal interests of this country are not sufficiently advanced to take over the railways. I should like to see them run with the same energy and activity that has been devoted to some of our gold mines. I am sure it would be an object lesson to those who have muddled the railways so long in the past. Regarding the present hold up in coal, let me reiterate that instead of the Cape being placed in a most favoured position, it is made impossible. A very good object lesson for this Government is the case of Sir Richard Whittington, thrice Lord Mayor of London, and the most important thing in his success was his "cat." I may explain that his "cat" was the ship that brought coals *by water*, from Newcastle to London and thereby made Dick's fortune. This country wants a Dick Whittington; it wants many Dick Whittingtons. It wants competition in railways, systematic arrangement for running the coal by sea and saving friction on land. It wants release from unnecessary financial strangling. The realisation of assets that must continuously depreciate under political sentiment, and official mismanagement. To be more clear, officials in themselves are not to blame, but the vulnerability of a Government concern through the weakness of ministers makes it impossible to carry out the service the country demands from it. One looks back to the recent action of ministers when they virtually placed the citizens of Johannesburg in the hands of Labour agitators and forced its freedom to submit to demands that should have been fought out and perhaps never conceded; one sees men receiving wages that are out of all proportion to what the work can honestly be done for; when railways pay men about half the salaries of Ministers, and whilst all this rich wage developments proceeds, the farmer gets half for his produce and insolvencies become the order of the day. It is not surprising that there is discontent and that wherever one goes one hears nothing but continuous murmurs of disappointment. The various producers of the country have suffered in many ways. Then, if I am wrong in my conjectures, if the railways are not run on political or sentimental lines, if the object of this country is to run railways purely for their commercial value, then let me suggest that some 160 million pounds are involved, and the return is a loss of nearly four millions a year with the prospect of its being possibly ten or twenty million a year if the demands of labour keep on increasing in their past ratio.

Nationalise the Diamond Mines.

With this prospect in view, would it not be a better proposition to consider the nationalisation of the country's diamond mines? There at least is a far better commercial proposition. The capital would be vastly less and, viewing the world's capacity for buying diamonds, we see that one-half of the world the last three years has sold the other half its century-old accumulated store of cut diamonds, and the diamond retains its value. Would it not be wiser to

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nationalise all diamond mines and have every stone cut in Johannesburg? It would mean selling some 50 or 60 million pounds of cut diamonds, instead of only 10 or 12 millions of rough stones. It would mean that the Government of this country finds it is more dignified and profitable to carry out its development by controlling this solely, and that its policy is not to associate itself with diamond dealers. If the world's insistence upon buying cut diamonds is so great as the actual purchasing described recently indicates, if Sir Bernard Oppenheimer could cut with the returned soldiers in England, if the natives in the tropical forests of Borneo can mine and cut the produce of their diamond mines, surely the Dutch starving in this country have a right, their birthright, to demand as much as natives and soldiers can do outside this Union? Johannesburg selling 50 millions of cut diamonds and 30 millions of gold a year would become as important a city as many in Europe. The condition of things would change. The world would come to our doors to obtain the manufactured article. Am I not right in recommending the sale of the railways to companies and obtaining the return of all that capital that is losing interest and only being used to advance the interests of labour and making the railways more and more a haven for the destitute and a paradise for labour?

Broadening the Market.

Perhaps the most important point in the whole of this suggested programme of reconstruction would be the building up of new markets, markets which do not exist to-day. For instance, supposing that the railways were owned by joint stock companies, there would be some two hundred million of preferent and ordinary shares added to the share lists of this country. It might be said that there is that amount of Government stock to-day, but there is a vast difference in dealing in Government stock with about 1/3 commission and railway stock which at times would be extremely active and remunerative both to brokers, jobbers and arbitrage dealers. Besides there would always be a borrowing Government. For if the Government were to succeed in getting railways properly administered and its capital released, it would very soon be making State advances for internal development, and possibly there would be little loss to the markets in the exchange. As to the railway rates, they need disturb no one. If countries like England and America can arrange their rates, surely this country could. Lastly, it might be said that no body of financiers would dream of landing themselves with our railways. That, I think, is wrong. If shrewd business men can acquire a going concern that can be worked for perhaps one-third less, and if they are enabled to build all the new lines on fair margins of profit, it is not unreasonable to

expect business, not to-day perhaps but when money becomes easier and prospects brighter. In America investors always want to know whether the goods are there. Well this country has got the goods and plenty of them, but does it handle them rightly? They say in the States, "I come from Missouri and I want to know."

Swazi Tin.

A YEAR'S RESULTS.

In the course of the annual report, Mr. T. Kelly, the Manager of Swazi Tin, shows that the working profit for the year was £10,825 2s. 10d. The quantity and quality of the ground cut were practically the same as those of last year. A comparison of the year's results with those of the two previous years is as follows:—

	1920-21.	1919-20.	1918-19.
Cubic yards treated during year	916,787	957,906	1,091,531
Cubic yards treated, average per month	78,899	79,826	90,961
Lb. Concentrate recovered per cubic yard	0.710	0.695	0.75
Grade of Concentrate per cent, Metallic Tin ...	69.7	70.6	70.7
Lb. Metallic Tin per cubic yard	0.495	0.491	0.531
Average value realised per cubic yard	9.015d.	13.694d.	11.683d.
Average cost per cubic yard	6.271d.	8.700d.	8.254d.
Average profit per cubic yard	2.744d.	4.994d.	3.429d.
Average Metal price realised per ton	£186.607	£299.775	£241.055

(The costs given include all General Charges and Head Office Expenses.)

It will be noted that the working costs show the big reduction of 2.429d. per cubic yard. The year's cost is also 0.326d. lower per cubic yard than our previous best year, that of 1914-15, and £34 6s. 11d. per ton of dressed concentrate less than 1919-20. This big reduction is partly due to the fact that, having purchased the adjoining Indimba Concession, we controlled an ample supply of conveniently placed water under sufficient pressure to raise gravel the required height in our Lower Mbabane workings—the main workings this year—and thus substitute hydraulic for the three mechanical elevators in use last year.

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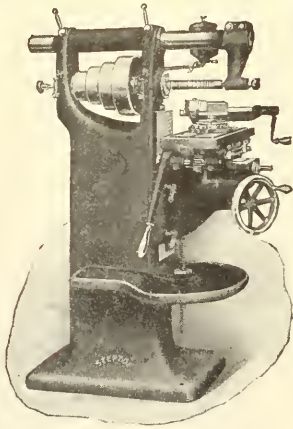
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Anomalous State of Labour Conditions on the Rand.

MR. M. FERGUSSON'S OUTSPOKEN VIEWS.

Mr. M. Fergusson, the Inspector of Mines, Krugersdorp District, is noted for the outspoken views he contributes each year in his annual report to the G.M.E. His report this year has the following noteworthy passages.

Most of the mines in this district are low-grade mines, and the majority of them have been on the verge of closing down for some time past on account of the increased costs, due largely to enhanced cost of stores, increased wages paid workmen, diminished output resulting from shortage of native labour and strikes, reduced hours worked, and general inefficiency.

These mines have just managed to keep going by reason of the inflated price of gold, the premium averaging about sufficient in value to offset the increased costs. Certain of them, however, have been forced to abandon development and are gradually working to a standstill. One great stumbling-block in the way of progress in these poor mines is the difficulty of adapting the white supervision to suit the requirements in connection with the employment of the native labour to the best advantage and at the same time keep within the letter of the law and avoid falling foul of the Unions.

Treatment of the Native Worker.

Under existing conditions the natives enter the mines between 5 and 7 a.m. and are all waiting to start work by the latter hour, the official time for commencing shift. The white men follow the natives, and before work proper is started certain preliminaries have to be observed, such as examination and making safe of working places. Consequently many natives, although they are in the mine at perhaps 5 o'clock, cannot get started until 11 or even later, thus losing over half the shift in idleness whilst awaiting permission from their white supervisor to commence. The native must be paid for his shift, so the only loser is the company employing him. At the same time the native would much rather be doing his job, which is often a set task, the completion of which releases him for the day. Any attempted relaxation of the regulations in order to enable the natives to start earlier is jealously resisted by the unions, who dread the least suspicion of a native being permitted to lift a hand without the formality of a white supervisor's authority. The Unions contend that certain work is skilled work and therefore must only be performed by white men, presumably on account of their superior knowledge, experience, and sense of responsibility, yet white youths who hold no certificate, and who have only been in the mines for a few months, are permitted to take control of gangs of natives on the night lashing shift, for instance, where the services of an experienced miner are particularly necessary in judging the safety of the ground in places where such gangs have to work. It does not appear logical that because a man is white he should be able to become a skilled miner within a few weeks or months, and if he is a black man a lifetime's experience in the mines does not enable him to gain sufficient knowledge to form an opinion as to the safety of himself and his fellow-workmen. If all the white men employed in responsible positions in the mines were qualified miners, capable of using their knowledge and experience to the best advantage in obtaining the highest results from the gangs under their charge, there might be a lot to be said in favour of the existing conditions of labour, but where large staffs of highly paid white men—many of whom are of no benefit to the company—have to be employed simply because the law or the unions demand it, many mines will be rendered unpayable which, if worked on a purely economical basis,

would continue for many years to carry on operations at a profit to the shareholders and to the benefit of large staffs of employees.

High Wages and High Working Costs.

High wages do not necessarily mean high working costs, as was proved in America before the war. In that country wages in many industries were higher than in any other part of the world, and yet by reason of the great efficiency of the workmen and the systematisation of the work, America was able to send her products abroad and compete with all foreign markets. In this country the high wages exist, but it is to be feared that to a very large extent the other factors mentioned are lacking. As has been pointed out on previous occasions, the white workmen on these fields may be divided into two classes: (a) the skilled workman, and (b) the unskilled or partially skilled workman. Those included in the first class know what is expected of them and know how to calculate the cost of their labour and the value of the product. Very little is ever heard of them. They perform their work in a thorough and conscientious manner and give satisfaction to themselves and their employers. Such men are naturally in great demand, and there is a tendency to secure their services by offering them substantial rewards for their labour in the form of big wages or highly remunerative contracts. Those included in class (b) are more difficult to deal with. They do not always understand the work, and in some cases do not attempt to learn it. Their whole object in coming to the mines is to obtain the highest wages possible without considering the value of the work which they give in return. Where these men are concerned it is

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frequently found that they are merely lookers on whilst the more intelligent natives amongst their gangs are doing the skilled part of their work. They see men included in class (a) drawing big cheques and they agitate for increase in pay, because they consider they are entitled to as much as anybody else. Certain duties become irksome because they do not understand how to perform them, and consequently they are inclined to dictate to the managements what work they shall do. Such men are extremely difficult to control, and where they have a difference of opinion with one of the officials they endeavour to use the whole weight and influence of their Union to obtain their individual ends. This is made easier for them by the fact that it is not always that class (a) men can be found to take office in the Unions' services, their time being generally too valuable to spend in listening to the numerous complaints which they would be required to investigate. It is generally accepted that there are a number of men working on the mines to-day who are neither experienced nor industrious; consequently it is surprising to find that any attempt on the part of the employers to get rid of such incompetent persons is often strenuously opposed by the body of workmen.

A One-sided Argument.

Several mines in this district have been faced with the alternative of closing down completely or retrenching a proportion of their white employees, and where such retrenchment has taken place strong representations have been made by the Unions, and acquiesced in by the heads of the industry, that every endeavour shall be made to absorb in other mines all those discharged. This agreement is difficult to understand, since one would naturally expect that the incompetent and unsatisfactory men would be the first to be dismissed, and the result of the above agreement is that some men who have proved themselves to be incompetent at one mine are given a guarantee of re-employment at another. There can be little doubt that numbers of men were attracted to the mines during the past few years by the high wages easily gained without the necessity for any preliminary knowledge or training. Such men are not like old miners who have spent their lives at the one occupation, and are consequently unable to adapt themselves to any other calling. Many of them have been mining for so few months that it would be no hardship to send them back to their original occupations. That the position is as here stated is proved by the fact that mines which have retrenched 20 per cent. or more of their white complement are producing just as great a total tonnage per month as formerly at a considerably less cost. It certainly seems unreasonable that because a man has once obtained an engagement in a mine he should expect to be clothed, housed, fed, and have his pockets kept filled with money for the rest of his life, irrespective of what he gives in return. Some of them seem to forget that there are two sides to every bargain, and since wages are standardised, and consequently must be paid in full, the employer must have the right to balance the account in some other way, such, for instance, as choosing his workmen.

At some of the mines attempts appear to have been made to force the management to agree to an arrangement whereby any vacancy occurring shall be filled by an employee of the mine engaged in a lower class of work. For instance,

if a stoper is required, the manager is not permitted to engage a stoper from outside, however good his record in that class of work may be. The vacancy must first be filled by some one working in the mine, say, a trammer. If that trammer has had no experience of stoping before, it makes no difference; he must be given the opportunity. Consequently he is put into the stope to show what he can do. If he gets the place into bad shape and proves himself incompetent, he may be removed, but must be replaced by the next in seniority, and so on. How anyone can expect efficiency under such conditions passes all comprehension.

Mine officials charged with the safety and control of workmen have not yet recovered from the shock which they sustained during a previous period when a conflict between themselves and a body of workmen almost invariably resulted in the discomfiture of the official, whatever the merits of the case. Consequently it frequently happens that one finds offenders against the rules of safety or health are not dealt with in a disciplinary manner, the official whose duty it is to note such often preferring to ignore the irregularity and risk the danger rather than face the possibility of being reported for officiousness by the Grievance Committee. This attitude is naturally reflected in the accident rate, which, as will be noted from the section dealing with accidents, shows a step backward.

TRANSVAAL GOLD MINING ESTATES.

The following are the particulars of the output for the month of August, 1921, in respect of the above company:—
Central Mines: Tons crushed, 12,000, yielding 3,583 fine ozs. Elandsdrift Mine: Tons crushed, 1,500, yielding 774 fine ozs. Vaalhoek Mine: Tons crushed, 1,800, yielding 625 fine ozs. Estimated value of month's output, £27,271; estimated profit for month, £5,414. The month's results are based on value of gold of £5 9s. 9d. net per fine oz.

UNION CORPORATION GROUP.

Particulars of operations on the producing mines of this group for the month of August, 1921:—

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Revenue (Including Sundry Rev.)	
				Total	Per ton
Geduld Proprietary.	100	44,500	15,621	£87,074	39/ 2
Modder Deep	70	44,400	24,818	136,767	61/ 7

Totals and Averages 170 88,900 40,439 £223,841 50/4

Company.	Total.	Costs Per Ton.	Profit (Incl. Sundry Rev.)	
			Total.	Per ton
Geduld Proprietary ...	£52,302	23/ 6	£34,772	15/ 8
Modder Deep	47,631	21/ 5	89,136	40/ 2

Totals and Averages £99,933 22/ 6 £123,908 27/10

Note.—The above results are arrived at by calculating the gold produced at £5 11s. 6d. per fine oz. Realisation charges in excess of normal are debited direct to revenue.

H.E. Proprietary.

With its report for 1920 the H.E. Proprietary (New), Ltd., is in the pleasing position of being able not only to make a start of dividends with a distribution of sixpence per 10s. share for the past year, but also to announce an interim payment of like amount for the current year. The profit and loss account shows a surplus of £18,230, against £12,450 for 1919, and after payment of the 1920 dividend of sixpence there will be £4,522 to be carried forward. The directors state that in their opinion the aggregate value of the assets on a conservative estimate exceeds the total of £324,000 appearing on the liabilities side of the balance-sheet in respect of share capital, creditors and balance of profit and loss account. Active development of the Farm Klippoortje on the Far Eastern Rand is postponed until conditions on that field have become more favourable, both as regards labour and working costs.

TO INVESTORS AND SPECULATORS.

An opportunity is offered to acquire an interest in an attractive Tin Proposition comprising 144 Claims in the Enterprise District, Mashonaland. Enquiries invited and particulars given by The Rhodesia Land & Estates Agency, P.O. 7 Box 410, Bulawayo, S. Rhodesia.

The Rise of the Trade Union in South Africa.

HISTORY OF THE GROWTH OF THE MOVEMENT DESPITE MANY SETBACKS.

An important volume of social and industrial statistics has been issued by Mr. C. W. Cousins, the Director of the Census. It provides a valuable survey of industrial organisation in South Africa and a record of real historic interest of the growth of the Trade Union movement in this country, particularly in connection with the mining industry. From the survey we take the following:—

Until comparatively recent years trade unionism did not figure largely in South African life and conditions. In an earlier period the organisation of labour on trade union lines was practically confined to carpenters and joiners, engine drivers and firemen, the engineering and printing trades and occupations on the Witwatersrand gold mines. The Amalgamated Society of Carpenters and Joiners was established in South Africa in 1881; the Iron Moulders' Society in 1896; and the S.A. Typographical Union and the S.A. Engine Drivers' and Firemen's Association in 1898. For some years prior to the constitution of the Union, organised workers on the Rand were represented by the Witwatersrand Trades and Labour Council. In 1911, the Transvaal Federation of Trades was established, and this organisation, to a large extent, assumed the function of the Council, eventually doing so entirely. Following on the industrial troubles of 1913 and 1914, the S.A. Industrial Federation was brought into being. Thus the growth of the trade union movement is reflected in a most interesting review published by the Government, in addition to the usual details concerning rents and the cost of living.

Federation Recognised.

In 1915, for the first time, the Chamber of Mines conceded practical recognition to the Federation on direct representation by the Minister of Mines and Industries. The Federation had much to do with the inauguration of the shop steward movement on the mines, in the power stations and railway workshops. In 1917 the first trade union congress held in this country was held in Johannesburg, being organised by the Federation. Smaller bodies, representative of various occupations, were then linked up, under the name of the S.A. Industrial Federation Industrial Union. As a result of the Labour Charter of Versailles, a reconstitution of the Federation took place under a system of National Industrial Departments. The recent tendency has been towards the affiliation of various organised bodies of workers with large industrial organisations.

132,000 Trade Unionists.

Figures of trade unions and other associations of employees show there are seven mining unions, with a membership of 22,516; seven State service unions, with 44,647 members; five teachers' services, with 4,912 members; eight engineering and metal working, with 11,369; and six building unions, with 9,404; or a total of 90 unions, with a membership of 132,784 as at December 31, 1920. In some cases, craftsmen and others are members of more than one union, and these duplications have not been accounted for in the above figures. Most skilled mechanics in the service of the Railway Administration are members of craft unions and not of railway unions. These are not included in "State Services." A glance down the list shows a great variety of trades included in the list of the 90 unions. A few statistics are also given with regard to employers' associations. These include the Transvaal Chamber of Mines, with 80 members; 61 chambers of commerce, with 2,878 members; and six manufacturers' associations, with 421 members.

Hours of Labour.

The hours of labour worked by Europeans in the Union in various branches of industry show, we are told, a tendency to uniformity, and during and since the War a ten-

dency to reduction. In the gold mining industry of the Rand the weekly hours worked by surface hands in 1896 and some ten years after were 56. By 1910 these had dropped to 51, while the 48-hour week was started in 1915. Underground employees on the gold mines were working a 60-hour week in 1896, 57 hours in 1910 and 48½ in 1918. Underground workers on coal mines were doing a 57-hour week in 1902. This was reduced to a 54-hour week early in 1920, and to 51 and 48 respectively later in that year. On the railways the principle of the 48-hour week was accepted as from December 26, 1919. In engineering trades a 54-hour week was the rule, a 48-hour week being introduced in some cases in 1916. In 1920 48 hours was the rule, with a few exceptions of 44 hours. In electrical trades 47½ hours is the average. In the building trade the 48-hour week, which had been in existence for some years, was reduced to 44 hours in 1919. In 1895 printing employees worked a 50-hour week. In 1914 this became a 48-hour week, except for typesetting machine operators on day work, who have worked a 45-hour week since 1910, and, on night work, a 42-hour week. The present working week consists of 46 hours for day workers (except typesetting machine operators, who work 43 hours) and 40 hours for night workers. The hours of labour in manufacturing industries, except for furniture makers and craftsmen in other woodworking trades, have been generally longer than those obtaining in the other skilled trades. Under the Union Factories Act, the maximum number of hours that may be performed by persons over 16 years is 50 hours per week. Shop hours vary from 48 to 50 hours. "In many occupations, e.g., clerical callings, and those of hotel employees and similar workers, the hours worked are so varied as to render it impossible to determine even an approximate average working week," says the report.

Wages in Building Trades.

A comparison of wages paid in the building trade in South Africa with those in other countries shows that at December, 1920, 16s. 9d. was paid in South Africa; 16s. 4d. in Canada, and 10s. 10d. in the United Kingdom, the purchasing power of the sovereign being 11s. 11d., 12s. 11d., and 14s. respectively, making the "real" wages 1011, 1121, and 728, and proving that Canada has a slight advantage, while Union conditions compare very favourably with those of the United Kingdom. Some figures as to the industrial disputes show that the first of any size was the strike on the Rand gold mines in 1907, which lasted six weeks, and cost £250,000 in wages. In 1910, conciliation boards were appointed under the Transvaal Industrial Disputes Act. After describing briefly the disputes of 1913 and 1914, the report states that two disputes occurred in 1915, 10 in 1916, 22 and 23 in 1917 and 1918 respectively, and 47 in 1919, involving 24,000 workers. The increase in the cost of living is assigned as a reason for this increase. A feature of the 1919 troubles was the number of coloured workers concerned. Thanks to the machinery provided for settlement, none of the disputes lasted long. The action of the Chamber of Mines in utilising boards of reference was also an important factor in maintaining industrial peace. In 1920, voluntary arbitration was applied in several important disputes, apart from the mining industry.

Willoughby's Consolidated.

How substantially the position of Willoughby's Consolidated has improved may be gathered from the following facts. On January 1, 1918, the debenture debt stood at £152,000; to-day it is £71,000. The cattle were valued at that date at £70,000; to-day the valuation is £100,000. At the end of 1917 the figure against creditors was £47,250; at the end of 1920 the figure is £7,500. The profit on land sales to be recovered by instalments on December 31, 1917, was £8,580; at the end of 1920, £16,376—practically double the amount—and in these three years the company has written down its shares in subsidiary companies by no less than £54,000.

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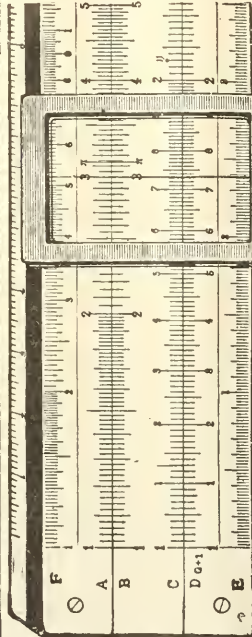
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Copies of this journal are obtainable at all Branches and Agencies of the Central News Agency, Ltd., at all News Agents and Railway Bookstalls throughout South Africa, and at the London Agency as above.

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EDITORIAL.

THE GOVERNMENT AND MINING DEVELOPMENT.

Some welcome signs of a more progressive spirit are traceable in the annual reports of the Secretary for Mines and Government Mining Engineer, issued this week. The latter report particularly is a monument to the Department's passionate zeal for statistics, but it is doubtful if the cost and trouble incidental to their compilation are justified. The average man will scan both reports mainly with the object of finding some practical evidence of special recognition of the need for encouraging the development of the mining industry of the Union. It is this often-forgotten aspect of the activities of the Mines Department that is, to our mind, of chief importance, and the whole tendency of events of late has been in the direction of emphasising this fact. Of course, allowance must be made for the unavoidable interval that must elapse between the actual writing of

the reports under review and their publication in book form. Against this must be set the fact that, in practice, the directions in which the public body, the Government, are rendering aid to the threatened gold mining industry are familiar, if not "hardy annuals," and the recent troubles of the industry have merely brought them more into the spotlight. We refer, of course, to such long-urged reforms as amendment to the Gold Law, reducing claim licences, and direct State encouragement to mining and prospecting. By their recognition of the need for these things, we purpose here to judge the reports of the heads of the Mines Department before us. It is a big step forward that Mr. Warrington Smyth, the Secretary for Mines, in his report, frankly admits the need for substantial amendment of the Gold Law. After all, the Secretary for Mines has the ear of his Minister and of the Government in regard to Parliamentary matters, and if he is satisfied that the Gold Law should be improved, he has the remedy almost in his own hands. "With the changing conditions on the Witwatersrand, due to the gradual exhaustion of the reef underlying proclaimed areas and the urgent need of such land for housing and industrial purposes as well as for small holdings, it has become apparent that considerable modifications of the provisions of the Gold Law have become necessary in order to meet the new conditions," he writes. "It became apparent during the year under review that these and other questions in regard to the use of the surface of proclaimed ground on the Witwatersrand were assuming considerable importance, and, as the whole subject is one of much complexity, affecting as it does the reversionary rights of the freehold owner, a Committee was appointed to enquire into these difficulties and to draft provisions amending the Gold Law in such a way as to meet the changing conditions on the Witwatersrand." We can but suggest that when the Gold Law is thus in the melting pot, advantage ought to be taken of the opportunity to make it a measure designed to encourage mining expansion in every possible manner. The inspectors of his own Department who have during the past year written such excellent articles on the "Ideal Mining Law" can furnish the Secretary for Mines with all the details necessary under this head. Indeed, under a section of his report dealing with "Minerals reserved to the Government," Mr. Warrington Smyth himself admires certain important reforms and mentions that the Departmental Committee has now submitted a Draft Bill for the consideration of the Government. The only comment we have to make regarding this is that it is a pity to tackle the matter in piecemeal fashion: The Gold Law, as a whole, should be amended in accordance with the spirit of the times, the crying needs of the country, and the opinions of the more progressive officers of the Mines Department itself. What those opinions are may be seen from the following extract from the report of Mr. Tudor Trevor, the Inspector of Mines for the Pretoria district, who has always been noted for his plain speaking. He writes: "As before stated, the mining industry in this district has, notwithstanding the setback due to the war period, advanced 67 per cent. in the past decade. I fancy that no such increase has taken place in any other inspectorate. Apart from the increase in the value of the coal and diamond output, I believe I can fully claim that this growth has been largely due to the assistance given by the Government through this Department and the Geological Survey. I would strongly submit that this assistance be continued and expanded, as has been constantly advised in other reports. The increase has been entirely due to the activity of small men, buoyed up by optimism, but usually extremely ignorant of their subject. They rely entirely for technical advice on the scientific brains of the Government Service, and that reliance has been justified, and the cost of those services is proving an excellent Government investment, although there is still room for great expansion." This, we submit, is the spirit that should pervade the whole Department, if it is going to be of real assistance to the cause of mining advancement. The attitude of the Government towards agriculture and the minor industries is one of wholehearted enthusiastic support, which we would like to see extended to mining. Too long has this last been the Cinderella of South African industries and the

Departmental attitude towards it a cross between that of a policeman and an unsympathetic big sister. Mining enterprise must be encouraged at least in the same generous measure as other industries are encouraged, and the restrictive provisions of the present Gold Law must all be removed with the least possible delay in order that the industry may realise its full possibilities.

Notes & News.

New Union Loan.

The fact that nothing has lately been heard of a Union loan has attracted comment. Sir Thomas Smartt threw light on the matter at an election meeting at Capetown last week. "There are great possibilities of industrial development in this country," declared the Minister, "but, however much you howl about it, you must have capital, and to get capital you must have a stable Government. I have reason to believe, from the position which South Africa now occupies, that we shall be able to float a loan shortly which will very materially assist us in the development of our industries."

Globe and Phoenix.

An official report from Rhodesia gives the estimated ore reserves of the Globe and Phoenix Gold Mining Co., Ltd., as at June 30 last, at 89,491 tons, containing 136,026 ozs. of gold, or an average of 30.39 dwts. per ton. This represents a further falling off from the figures at December 30 last, namely 93,852 tons, containing 145,321 ozs. of gold, or 30.9 dwts. per ton. Moreover, at that time—and no doubt it is still the case—nearly half the reserves, namely 46,472 tons, were locked-up in pillars and therefore not available for treatment until the levels these pillars support are abandoned. On the current basis of treatment the reserves are only about fifteen months ahead of the mill, but apart from the prospect of further discoveries on the ground the company is at present working, there is a good chance, as announced at the Rhodesia Exploration Company's meeting, of an arrangement being come to with the latter concern for the working of a number of claims which it owns in the vicinity of the Globe and Phoenix.

Inflation in Germany.

The London Daily Telegraph of August 17 contains the following:—There was another sensational fall in the sterling value of German marks, which at one time touched 342 to the £, and the closing rate of 332 only showed a moderate recovery. Early in March last year 365 was reached, which has been the record so far, but from that point there was a rapid improvement, until 120 was touched in May, 1920, when depreciation once more commenced. But there is a wide difference between the rate of 169, which was ruling about this time last year, and the present rate of 332. Reparation payments undoubtedly explain a good deal of the movement, in addition to which Germany has been making large purchases of wool, but over and above these causes there is the constant increase in the note issue, by which alone the national finances are made to balance. A comparison of some of the principal items in the returns of the Bank of Germany is instructive:—

	(000's Omitted.)	Aug. 6, 1921.	Aug. 7, 1919.
		M.	M.
Gold		1,091,554	1,108,010
Discounts and Treasury bills...		75,129,862	28,545,490
Note circulation		77,654,680	28,856,004
Private deposits		7,482,129	8,322,242

It will be seen that within the last two years the note circulation has risen by 49,000,000,000 marks, and has, in fact, more than kept pace with the increase in bills discounted, which are almost entirely Treasury bills. The country is therefore being run by the printing press, and the only question is how long the process can continue before the inevitable crash occurs.

A New Crusher.

Our representative was present at the trial run of a crushing machine of an entirely novel character which was shown by Mr. Stockman, one of its inventors, at Messrs. Wright and Boag's yard during the week. It will run again at the same place on Monday, the 19th, at 2.30 p.m. Messrs. Bleloch and Stockman extend an invitation to any one to attend there, who is interested in the reduction of ore, whether in a small or large way. This invention aims to do away entirely with the use of gravitation stamps and the effective crushing capacity of the small machine which was shown is most remarkable. A fuller description of it will appear in a later issue.

International Chamber of Commerce.

The first meeting in London during the past month of the new International Chamber of Commerce was an occasion of great interest and importance. In spite of the present unfortunate condition of international trade, we believe that no moment could be more propitious for such a gathering (says the "Empire Mail.") The more business men of all nations put their heads together to find some common plan for healing the economic wounds from which the world is suffering as a result of the War, the sooner will the vigour of financial and commercial health return to all countries alike. The late War taught us many lessons, but none more clearly than the need for international co-operation. In no department of life is that co-operation more necessary than in business. Trade in the modern sense is a world-embracing process, and nation depends on nation for the fulfilment of its needs and the enrichment of its coffers. Those who have been responsible for the organisation of the International Chamber of Commerce are fully aware of these things and they have determined that so far as in them lies they will foster common action in regard to the matters that intimately affect international trade. A perusal of some of the principal decisions arrived at by the Conference is in itself a proof of the immense value of such a body at a time like the present. If those decisions can be translated into practical measures for the alleviation of the world's existing financial and commercial troubles, no peoples will be more grateful than those of the British Empire.

Ex-Enemy Shares: Official Announcement.

Sir Walter Hamilton Fowle, K.B.E. (Custodian of Enemy Property), Mr Charles Pienaar (Government attorney) and Mr. S. Y. Eales (of the Custodian's Department) are proceeding to England on September 23 to discuss the ownership of enemy shares held by the Public Trustee in England and the Custodian of Enemy Property in South Africa, and to settle any doubtful points. An official announcement on the matter was issued this week. It says: "As the result of discussion in London between the Prime Minister of the Union and Imperial Government representatives in connection with ex-enemy mining shares in companies in which both the Custodian of Enemy Property and the Public Trustee have holdings, certain principles with regard to the allocation have been agreed upon, and it has also been agreed that arrangements should be made for dealing jointly with such shares. Representatives of the two Governments will meet at an early date in London to settle the jurisdiction under which certain of these enemy shares fall—the ownership of which is in doubt as the result of dual vesting, etc. This investigation will prevent possible over-lapping. The Union Government is well aware that in present circumstances the market cannot rapidly absorb large blocks of shares and that it would be difficult to raise the capital required to finance the carrying of such shares pending their absorption. Accordingly, in any arrangements which may be made for the joint disposal of the shares held by the Public Trustee in London and the Union Custodian, due regard will be given to this aspect of the question, and it is hoped as far as possible to avoid any action which may have the effect of unfairly depressing the values of these securities."

The Tin Position.

As in the case of copper, a drastic reduction in the world's output of tin has so far failed to bring supplies below the rate of consumption, which would naturally raise the price and start the desirable process of wiping out accumulated stocks. At the end of July the total visible supplies of the metal are estimated by one authority at 19,438 tons and by another at 19,852 tons, in both cases representing an increase of nearly 3,000 tons on the month. Since the Armistice the high level of visible supplies was nearly 24,000 tons in October, 1919. But whereas during the year ended July, 1920, the supplies which came forward totalled 95,500 tons, in the past twelve months they have been, according to Messrs. Ricard and Froivald, only 55,400 tons. The considerable stocks bought at high prices and held up by the Federated Malay States and Dutch East Indies Governments are not included in the statistics. The gradual restarting of the Welsh tinplate mills should help to improve the position, but there will not be a real revival until the United States is in a position to buy largely. Meantime only high-grade or exceptionally cheaply-worked tin mines can at present produce at a profit, and that is assuming they can sell the whole of their output regularly.

* * * *

Oil in Angola.

While there are many and varied mineral resources in the hill districts of Angola, the chief interest at the present time centres in the accessible oil area near the coast, where river, as well as railway, communications are available for transport to Lobito Bay, the port of shipment. The existence of oil in Angola is no new discovery, for Portuguese official reports as far back as 1844 referred to extensive deposits of petroleum, almost all of which were stated to be situated at points near the coast or near navigable rivers. But prospecting was slow, perfunctory and ill-directed, with the result that operations were carried on much too far to the north. There was a revival of prospecting by American, Belgian, and other capitalists prior to the war, but little was done in the way of systematic survey till the American Petroleum Company struck a very promising area just north of the Benguella Railway and started active exploitation. Till recently it had seemed that British enterprise was either indifferent or uninformed, but it is reported from London that an important concession, favourably reported on, has been acquired by British interests. It is a huge concession comprising an area of 107,000 square miles from the coast inland, with a coastal extension of 250 miles from the Benguella Railway southward to Port Alexandria.

* * * *

The Mining in the F.M.S.

Last year's export of tin from the Federated Malay States amounted to 34,935 tons, valued at £10,316,737, compared with 36,935 tons in 1919 valued at £8,736,474. In 1918 the exports amounted to 37,370 tons. In his annual report, Mr. A. R. Mynott, A.R.S.M., Acting Senior Warden of Mines, F.M.S., states that at the opening of the year the price of tin on the local market was 167.50 dollars per pikul, with the market rising. The rise continued rapidly, until at the end of February the unprecedented high price of 212 dollars was reached. Thereafter a reaction set in, and the price began to decline. With the exception of a slight rally about the middle of the year, the fall in price continued until, at the beginning of December, it stood at 90 dollars per pikul. The position at that time became so critical that to save a large number of the mines from closing down, and the consequent dislocation of labour that would ensue the Government decided to purchase. From December 14 the Government were purchasing at 110 dollars per pikul which price was raised on December 21 to 115 dollars and that was the position at the close of the year. The highest price reached was 46 dollars per pikul above that attained in 1919, and the lowest price touched was 10 dollars below the similar figure for the previous year.

The fluctuation was 122 dollars in the year under review, as compared with 66 dollars in 1919. On the London market the highest three months' price reached was £123 10s. per ton and the lowest £200. From March onwards, a rapid decline in price was experienced. The market eventually collapsing towards the end of the year, the average price for the year being £297 5s. 11d. The extraordinary rapid rise in the price at the beginning of the year was due chiefly to the operations of speculators, and the reckless buying was no doubt due to the erroneous deductions that a falling off in production was anticipated, with consequent reduction of supplies, that the Central European Powers would be in a position to assimilate amounts approximating their pre-war requirements, and that consumption in the United Kingdom and America would increase. The slump at the end of the year was due to a variety of causes, chief among which was the reduced consumption demand, the unexpected unloading of stocks of Dutch tin on the London market, liquidation of large stocks of Chinese tin which had been held up in Chinese ports owing to the high price of silver at the beginning of 1920, the disorganisation of the Welsh tinplate industry towards the end of the year, the instability of exchange, and the general labour unrest. The outlook at the end of the year was not encouraging, and general conditions were bad, and no improvement in the market could be anticipated while the depressing influences mentioned above were in evidence.

* * * *

The Banking Position.

The quarterly statements of the banks as at June 30th last show that the downward trend in deposits, which has been in evidence since the second quarter of 1920, still continues. The following table gives the totals for each quarter since the maximum was reached in March, 1920, and it will be noticed that the fall has been more rapid during the last quarter than in any previous period:—

Date.	Total Deposits.
March 31, 1920	£117,311,183
June 30, 1920	110,159,379
September 30, 1920	104,452,391
December 31, 1920	102,331,940
March 31, 1921	99,570,923
June 30, 1921	91,405,750

The total advances of the banks continued to increase until September, 1920, since when they have continuously declined, but the ratio of advances to deposits shows little change, and the high figure of approximately 87 per cent. is evidence of the efforts made by the banks to finance the country through difficult times. The totals since March, 1920, are as follow:—

Date.	Total Advances.	Percentage of Deposits.
31st March, 1920	£87,634,741	75
30th June, 1920	89,698,887	81
30th September, 1920	94,399,028	90
31st December, 1920	91,138,022	89
31st March, 1921	86,355,100	87
30th June, 1921	79,263,799	87

Bank notes in circulation at £8,978,869 show a reduction of £282,109 compared with March last, the decrease probably being due to the prevailing condition of trade. Cash on hand, which now includes gold certificates and the balances of the commercial banks with the Central Reserve Bank, totalled £14,144,680 at June 30th, as against £13,016,750 at the end of March. Under the Currency and Banking Act, passed last year, all banks in the Union are compelled to maintain with the Central Reserve Bank fixed percentages of their deposit liabilities and the total of the Commercial Bank balances with the Reserve Bank at the 30th June last was £5,697,100. Gold certificates held as part of the cash balances at the same date amounted to £3,967,259.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining

Gold Mining in Northern Ontario.—*The Canadian Mining Journal*, July 15, p. 252.

Operations of the Engels Copper Mining Company, II.—*Mining and Scientific Press*, August 6, p. 183

An Unusual Copper-Lead Deposit.—*Mining and Scientific Press*, August 6, p. 197.

Metal Mining in California.—*Mining and Scientific Press*, August 6, p. 201.

Combination Dip-Chart and Protractor.—*Mining and Scientific Press*, August 6, p. 201.

New Method of Measuring Ventilating Resistances.—*The Colliery Guardian*, August 19, p. 515.

Coal and Fuel.

The Carbonisation of Coal at Low Temperature.—*The Iron and Coal Trades Review*, August 12, p. 195.

Ferro-Concrete in Coke Oven Structure.—*The Iron and Coal Trades Review*, August 12, p. 197.

Steaming in Vertical Gas Retorts.—*The Iron and Coal Trades Review*, August 12, p. 201.

The Oxygen Content of Coals.—*The Colliery Guardian*, August 19, p. 516.

The Pictle Oven.—*The Colliery Guardian*, August 19, p. 518.

Spontaneous Combustion of Coal in Mines.—*Iron and Coal Trades Review*, August 19, p. 225.

The Present Position of Smokeless Fuels.—*Iron and Coal Trades Review*, August 19, p. 233.

Metallurgy.

More Uses of Copper.—*Mining and Scientific Press*, August 6, p. 179.

The Nickel Industry of Canada.—*The Engineer*, Aug. 19, p. 188.

Oil.

Where Oil Occurs.—*Scientific American*, August 6, p. 96.

Getting the Rest of the Oil.—*Scientific American*, August 13, p. 114.

Engineering.

Electric Arc Welding in the Manufacture of New Boilers.—*The Electrical Review*, August 12, p. 209.

The Engineering Conference.—*The Electrical Review*, August 12, p. 228.

Colliery Welding and Cutting Plant.—*The Colliery Guardian*, August 19, p. 520.

Running Mine Fans in Combination.—*Iron and Coal Trades Review*, August 19, p. 236.

Sawdust as Fuel.—*The Electrical Review*, August 19, p. 236.

Russia's Electrification.—*The Electrical Review*, August 19, p. 239.

Birkenhead's Alwen Water Supply.—*The Engineer*, August 19, p. 183.

Developments in Power Station Design.—*The Engineer*, August 19, p. 190.

Economics.

The Future of the Coal Trade.—*The Colliery Guardian*, August 19, p. 519.

Employment in July.—*Iron and Coal Trades Review*, August 19, p. 234.

Metal Market Report.

In the metal market last week's improved conditions continued until the middle of this week, when the markets became reactionary. Satisfaction is expressed at the trade returns for August, which show some improvement. The monetary conditions are easy. Trade reports from Germany are fairly satisfactory, but the violent speculation on the Berlin Bourse cannot fail to have a harmful effect. Copper was steady during the week. The recovery of American consumption had an important effect on the sentiment. German purchases contributed to the improvement, but the depreciation of the mark stopped buying from that quarter. Tin advanced on influential buying for Eastern smelters and the reluctance of sellers and on an increased demand from the Continent. However, the immediate outlook is not encouraging for the English tinplate industry. As regards lead, the general position is unchanged. The opinion is expressed that in view of the short shipments the revival of the home demand in the near future will quickly influence the market. The Continental offerings of spelter were very limited, and the demand was small. However, there are indications of an improvement in the galvanised iron trade.

* * * *

The ordinary general meeting of the Chemical Metallurgical and Mining Society of South Africa will be held in the Scientific and Technical Club, 100, Fox Street, Johannesburg, on Saturday, the 17th inst., at 7.45 p.m.

The Gold Law and Mining Areas.

"With the changing conditions on the Witwatersrand, due to the gradual exhaustion of the reef underlying proclaimed areas and the urgent need of such land for housing and industrial purposes as well as for small holdings," says the Secretary for Mines in his annual report, "it has become apparent that considerable modifications of the provisions of the gold law have become necessary in order to meet the new conditions. The many existing buildings on worked-out mining ground, the surface of which is mainly occupied under permissions restricting its use for purposes of, or incidental to, mining, have now become practically valueless to the former mine owner, unless he be also the owner of the freehold of the land. It appears necessary to provide some machinery whereby these buildings may be made use of for other purposes by the owners of the buildings, subject to the rights of the freehold owner. As the law stands, when a mine becomes exhausted the mine owner, unless he is also the freehold owner, is confronted with the prospect of selling valuable buildings at their break-up value. Heavy penalties are provided in the gold law, in the event of these buildings being used for any purposes other than those connected with mining, but if the mine owner is also the owner of the freehold he has, of course, only to await the deproclamation of the land to obtain unrestricted use of them, and of the surface of the land generally. It is, therefore, at this stage that the question of deproclamation arises, *i.e.*, freeing the land from the restrictions imposed upon it by the gold law, and it would appear that, as a preliminary, some machinery should be provided to protect the owners of the numerous dwellings and other buildings, regard being had to the rights of the owners of the soil. Considerable areas of proclaimed land on the Witwatersrand have also been utilised for many years for municipal and other purposes under permissions granted in terms of the gold law and it should be possible for the Legislature to provide some equitable means for the continuance of these occupations after deproclamation where necessary."

The Week in the Sharemarket.

A SET-BACK—PRICES LOWER AND BUSINESS LESS—WAITING A LEAD FROM LONDON—S.A. ALKALIS AND ROOIBERGS.

The cessation of buying from London has led to a set-back in business during the week, and at the time of writing prices have receded and business has fallen off considerably. The official statement regarding the ex-enemy shares means more delay under that head, and has been a little disappointing. It is clear, however, that the Prime Minister now recognises the necessity for finally settling this matter, and has instructed the Custodian of Enemy Property accordingly. The settlement of the labour troubles on the Far East Rand mines, the Modder B and Van Ryn Deep has been followed by the threat of a railway strike. This could hardly be a protracted affair, and the Railway Administration seems to have no option but to enforce its programme of economies. The Government has decided to issue a substantial loan for development purposes almost immediately, and this should help to brighten the general business position. The August gold output figures are very satisfactory, and the month was quite the best from the profit-earning point of view for the year. Nevertheless, the spurt in gold shares has not been maintained, though the price of gold continues to stand in the neighbourhood of 110s. per oz. Diamonds likewise are easier, after some activity, particularly in smaller priced shares. The reports from the diamond centres continue to be most favourable, but it is thought that no great change for the better can take place before the end of the year. The news of the wild speculation in Berlin is not encouraging, and there is no doubt that all markets, ours included, are suffering from the exchange and currency chaos. Until something is done in this direction, it is held in authoritative quarters that markets nowhere can improve very much. Apart from gold and diamonds, there is little to report locally. Shale oils are firmer on better reports from the African and Wakkerstroom properties. Tins are quieter than ever, and Rooibergs contemplate further restricting their already limited operations. S.A. Alkalis are said to be about to issue £50,000 debentures, which are to be taken up by Sir Abe Bailey, and the shares have been easier as a result. Colliery shares remain quiet with Natal Navigations and one or two others firm.

	Fri. 9th.	Sat. 10th.	Mon. 12th.	Tues. 13th.	Wed. 14th.	Thur. 15th.
Anglo-Amer. Corp	24 9*	24 6	24 6	23 9	23 9	22 6
Apex Mines	—	—	—	—	7 0*	7 0*
Bantjes Cons.	5 9*	5 9*	5 6*	5 9*	5 6*	5 6*
Brakpan Mines	55 0*	—	—	53 6*	53 9*	—
Brick & Potteries	—	4 0†	—	—	—	—
Bushveld Tins	0 6*	—	0 7*	0 8*	0 8*	—
Cinderella Cons.	2 3*	2 3*	2 3*	2 9*	2 3*	2 3*
City & Suburbans	2 3*	—	2 3*	2 0*	2 3*	—
City Deeps	50 6*	50 0*	50 6	50 6	51 0	50 9
Clydesdale Colls.	27 0*	26 6*	27 0*	26 6*	26 6*	26 9*
Con. Diamonds	19 0	19 0*	18 9*	18 9	18 7½	18 0*
Con. Langlaagtes	—	—	—	15 0†	—	—
Con. Main Reefs	12 0	11 6*	11 3*	11 3*	11 0	10 6*
Con. Mines Selectn.	—	18 0†	—	—	—	—
Coronation Colls.	—	40 0*	42 6	—	—	—
Do. Freeholds	0 10*	0 10*	0 10*	0 10*	0 10*	—
Do. Syndicates	6 6*	6 3*	6 0*	6 3*	—	6 3*
Crown Diamonds	4 9	1 4*	1 3*	4 0*	4 3*	1 1
Crown Mines	44 0*	46 3*	43 0*	43 0	—	—
Daggafont. Mines	3 1*	3 0*	3 1*	3 1*	3 0*	3 0*
East Rand Colls.	2 1*	—	2 1*	2 3†	2 0*	2 3*
East Rand Deeps	0 10*	0 10*	0 11†	0 10	0 11†	—
East Rand Props.	6 6	6 3*	6 3	6 0*	5 9*	5 6*
E.R. Debentures	—	£72½*	£72½*	£72½*	£72½*	£72½*
Eastern Golds	0 6*	—	0 9†	—	—	—
Frank Smith Dias.	5 3	5 5	5 6	5 5	5 0	4 1
Geduld Props.	19 0*	19 0*	19 0	18 9*	18 6	17 9*
Glencoe Collieries	—	13 0*	12 6*	12 6*	12 6*	13 0*
Glynn's Lydens	9 6b	—	9 6b	7 0*	—	9 6†
Government Areas	84 3*	81 0*	84 0	83 0*	82 6*	82 0*
Knight Centrals	4 8*	4 7*	4 8*	4 6	4 5*	4 4*
Lace Props.	8 0*	9 6†	7 9*	—	—	7 3*
Leeuwpoort Tins	10 6*	10 6*	10 6*	10 9	10 3*	10 3
Luipaardsvlei Est.	4 0	—	—	—	—	—
Lydenburg Farms	5 6*	5 6*	5 6*	5 7½	5 0*	—
Middelvlei Est.	1 3*	—	—	1 3*	—	1 3*
Modder B's	30 0	29 0	29 0	27 9*	28 3	28 0
Modder Deep	44 9	44 3*	44 0	43 9	44 0	44 3a

	Fri. 9th.	Sat. 10th.	Mon. 12th.	Tues. 13th.	Wed. 14th.	Thur. 15th.
Modder Easts	10 6	10 6*	10 7½	10 4*	10 1½	10 1*
Hume Pipes	—	11 6*	14 6*	14 6*	14 6*	14 0*
Natal Nav. Colls.	30 6*	—	—	30 0*	—	29 0*
New Eland Dias.	25 0*	26 0	25 0*	28 3*	30 6	30 0
New Era Cons.	7 6*	7 6*	7 9*	7 6*	7 6*	7 9*
New Geduld Deeps.	—	1 4*	1 4*	—	—	—
New Kleinfonteins	—	6 6*	—	6 9*	—	5 6*
New Modderfontu	71 0	73 6	73 0*	—	74 0a	72 9*
Nourse Mines	9 6*	9 0*	9 0*	—	9 3*	9 0*
Premier Defs.	105 0*	—	—	—	—	—
Pretoria Cements	45 0*	45 6*	45 0*	—	—	45 6
Princess Estates	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Rand Nucleus	1 2*	1 1*	1 1*	1 6*	1 1*	1 1*
Randfontn. Central	12 6	—	12 6	12 0*	12 0	—
Randfontn. Ests.	18 9	18 6	18 0	17 3	17 3	16 9
Roberts Victors	9 6*	9 0*	9 6*	9 0*	9 6*	9 0*
Rooibergs	3 10*	3 10*	3 10	3 11*	3 9	3 6*
Ryan Nigels	—	3 3*	3 3*	—	3 9*	3 3*
S.A. Breweries	27 0*	27 0*	27 0*	27 0*	27 0*	27 0*
S.A. Lands	4 8*	1 6	1 6*	4 6*	4 3*	4 5*
Springs Mines	44 6	44 6	45 3a	48 3*	43 0*	42 6
Sub Nigels	12 0	12 0*	12 6†	11 6	11 6	11 6*
Swaziland Tins	10 0†	10 0†	10 0†	10 0†	9 9†	—
Trans. G.M. Est.	—	10 0†	10 0†	10 0†	—	10 0†
Van Ryn Deeps	74 0*	74 3*	73 9*	74 0	73 9*	73 6
Village Deeps	—	—	—	8 9*	—	—
W. Rand Estates	4 1*	4 1*	4 3*	—	4 3*	4 0*
Witbank Colls.	40 0*	40 6*	40 6*	41 0†	—	40 0*
Witwatersrd. Deeps.	8 6*	8 6*	8 6*	—	8 6	7 6
Woluhuts	4 3*	4 3*	4 3*	4 3*	4 3*	4 2*
Zaaiplaats Tins	3 6*	4 0*	3 9*	3 6*	3 9*	3 9
Union 5 per cent.	£99½*	£99½*	£100	£100½*	£100½*	£100½*
New States	25 9†	24 9*	24 6*	24 0	24 3*	24 0
Rouxville	1 6*	—	1 7*	1 6*	1 8*	1 6*
S.A. Alkali	17 6	17 3*	17 3*	17 0	16 9*	16 9
Trans. Silver	22 0	23 3*	24 3	23 6*	23 9	23 6*
West Springs	13 3*	13 3*	13 0*	13 0	12 6*	12 6
Tweefontein	—	19 0†	19 0†	19 0†	—	19 0†

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Rhodesia Exploration.

The Rhodesia Exploration Company holds a half interest in coal rights on 18 farms in the Middleburg, Carolina, and Ermelo districts, valued by Mr. C. L. Kessler, a director of the Tweefontein Colliery, at £145,000. It is also concerned in the Far East Rand to the extent of holding a five-sixths interest in the farm Maraisdrift, comprising 4,570 acres, as to which Mr. G. A. Denny made an exhaustive report a year ago. Further investigations conducted during the past year tend to confirm the broad conclusions stated by Mr. Denny, and the board considers that this asset will prove to be one of great importance and value. The company's interest in asbestos and chrome is represented by shares and debentures in Rhodesia Base Metals, Ltd. Up to date the investment has cost £27,000. Mr. Denny, who has just returned from Rhodesia, states that the chrome property covers an area of about 7½ square miles on the Umvukwe Range, Mashonaland. Several separate beds of chrome are found on it in a trough-shaped formation on which extensive prospecting stripping work on the outcrops has been carried out. From the outcrop stripping several thousands of tons of chrome ore have been accumulated, and bulk supplies up to several hundreds of tons in weight have been sold. The average contents of the whole of the ore so far won exceeds 50 per cent. chromic acid. The demand for chrome steels is world wide, and increases with the expansion of the steel industry. The world's deposits of high grade ore are few. "This deposit in its extent, regularity, and average high grade ore," Mr. Denny says, "may claim to be potentially one of the most important ever discovered." He adds that it is bound to become one of the great producers, to satisfy the enormously growing demand which there is for high grade ore, a demand which only waits the cheapening of manufacture to grow to proportions now hardly thought of.

The August Output in Detail.

AN INCREASE OF £88,010—BETTER NATIVE LABOUR FIGURES—BEST MONTH'S PROFITS OF THE YEAR.

An increase of 21,971 ozs., value £88,010, is shown by the Transvaal gold output for August, which was declared by the Chamber of Mines on Sept. 10. The totals for the past two months are as follows: August, 711,526 ozs., value £3,966,757; July, 689,555 ozs., value £3,878,743. The value of the gold produced in August was taken at £5 11s. 6d. per ounce, as against £5 12s. 6d. for July.

For the first time for many months the native labour figures show an improvement, the number of boys employed on gold mines in August being 169,008 compared with 166,999 in July. The native labour totals for the past three months are:—

	June.	July.	August.
On gold mines	168,152	166,999	169,008
On coal mines	14,704	14,688	14,446
On diamond mines	1,317	1,246	1,207
	184,173	182,933	184,661

Individual Returns.

	Increase.	Decrease.
Aurora West	82	—
Brakpan	669	—
City Deep	2,086	—
Cons. Langlaagte	263	—
Cons. Main Reef	388	—
Crown Mines	—	1,203
Durban Deep	160	—
E.R.P.M.	—	862
Ferreira Deep	1,306	—
Geduld	—	35
Geulenhuis Deep	260	—
Government Areas	5,863	—
Knight Central	467	—
Langlaagte Estate	171	—
Luipaardsvlei Estate	—	546
Meyer and Charlton	602	—
Modder B	—	1,595
Modder Deep	840	—
Modder East	2,144	—
New Goch	219	—
New Kleinfontein	—	64
New Modderfontein	2,690	—
New Primrose	331	—
New Unified	86	—
Nourse Mines	1,187	—
Randfontein Central	1,524	—
Robinson	—	54
Robinson Deep	112	—
Rocdepoort U.M. Reef	—	82
Rose Deep	149	—
Simmer and Jack	521	—
Springs Mines	—	394
Van Ryn Deep	3,258	—
Van Ryn Estate	518	—
Village Deep	384	—
West Rand Cons.	127	—
Witwatersrand	1,145	—
Wit. Deep	245	—
Wolhuter	—	61
Miscellaneous	—	1,165

Outside Districts.

Sub Nigel	30	—
Transvaal G.M. Estates	318	—
Glynns Lydenburg	—	30
Miscellaneous	—	102

Group Profits.

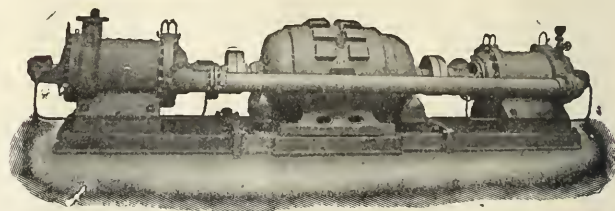
	June.	July.	August.
Central Mining	£427,557	£518,252	£538,321
Barnato	281,801	331,703	372,497
Gold Fields	38,035	45,173	42,122
General Mining	40,518	44,440	44,919
Mines Selection	76,925	89,922	88,967
Union Corporation	106,642	120,660	123,908
Totals	£971,478	£1,150,150	£1,210,734

Monthly Output Totals.

	Ounces.	Value.
January	651,598	£3,420,863
February	558,137	2,895,336
March	671,123	3,481,450
April	681,382	3,534,370
May	687,776	3,567,838
June	678,490	3,646,336
July	689,555	3,878,747
August	711,526	3,966,757

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PRETORIA.

Geology of Heidelberg—V.

MR. BLELOCH REPLIES TO DR. ROGERS—THE VAN RYN AND NIGEL REEFS.

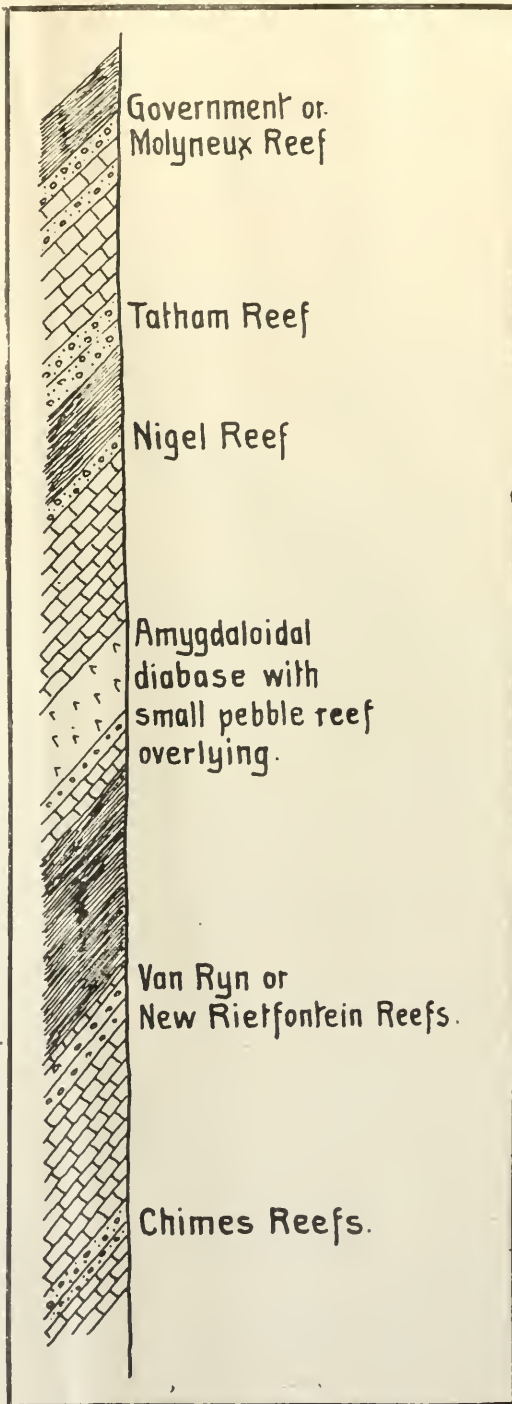
Dr. Rogers' "Bird Amygdaloid."

In the time at my disposal I can only deal with this question in the briefest manner. As I have said in a previous contribution to the discussion, Dr. Rogers based his conclusions that these two reefs are identical although totally dissimilar in appearance and character, because he has found an amygdaloidal diabase which he calls the "Bird Amygdaloid," extending over a long line of country in the Heidelberg district, and he correlates this amygdaloidal diabase, which he has proved to have been a contemporaneous lava flow, with certain amygdaloidal diabases which occur in horizons above the Van Ryn Reef over considerable areas of the Far East Rand. I submitted in my brief address at the earlier meeting of the Society that Dr. Rogers had presented no definite evidence that his so-called "Bird Amygdaloid" in the Heidelberg district is the same as the diabases found in horizons above the Van Ryn Reef in the Far East Rand. Dr. Rogers, in an important footnote at the end of his paper, states the "Bird Amygdaloid" to be a contemporaneous lava interbedded with the quartzites between the two uppermost thick groups of slate in the Witwatersrand System, and he recognises it as an important rock in the determination of horizons in boreholes and shafts where the beds do not crop out. That is No. 3 of his material points. That being so, I submit that he must bring the clearest evidence forward for such a material point on which his correlation of the beds mainly rests. Where is his evidence that the "Bird Amygdaloid" of Heidelberg is the same as the amygdaloidal diabases of the Far East Rand? On page 33 Dr. Rogers speaks of the distribution of the "Bird Amygdaloid" east of Boksburg, etc. Why the singular number? In most of the shafts and boreholes of the Far East Rand the amygdaloidal diabase sills are two, three, or even four in number, and I cite the Government area shaft sections especially, as giving definite evidence that the diabases found above the Van Ryn Reef on that mine are sills and not contemporaneous lava flows. These shaft sections completely bear out Mr. Horwood's view, that the diabases there are intrusive. That is my view, and I submit that all the shafts of the Van Ryn Reef Mines on the Far East Rand without exception show these diabases to vary both in number and position from shaft to shaft, and the Government area sections show them to cut across the sedimentary beds. Dr. Rogers in his address at the last meeting of the Society again failed to deal with this question. He brought forward no evidence that his "Bird Amygdaloid" of Heidelberg has any connection whatever with these diabases of the northern Far East Rand. Dr. Rogers, too, has quoted from my book, *The Far East Rand*, in a way which I submit is remarkable for a Doctor of Science to adopt. He says: *In Mr. Bleloch's book it is stated that "the evidence in every case of several boreholes in the Heidelberg district showed that the igneous rock was intrusive and that it invariably traversed the bedding planes of the sedimentary rocks. This statement is made of the amygdaloidal diabase as well as of diabase without qualification. It is certain that the observations of Mr. Bleloch's book are wrong!"*

I submit that anyone who has not read my book on reading this quotation would think that I was the author of the statements made in it. That, however, is not so. I would not have described the facts revealed by the boreholes quite as the words quoted imply. The words are the words of Mr. C. J. Tutt, an independent contributor to my book, and the observations are Mr. Tutt's observations, not mine, although I do not think Mr. Tutt was far wrong. Moreover, Dr. Roger's chief, the Rt. Hon. the Minister of Mines and Industries, rightly demands that the views of his officers when referred to should at least be correctly stated. One would expect that his own officers would be careful to keep to that standard; yet in the first place we find Dr. Rogers

quoting the passage in such a way as to leave the impression that the statements were mine, while my book shows clearly that Mr. C. J. Tutt was the author of the words quoted; and, secondly, he quoted the words incorrectly, for Mr. Tutt referred to several boreholes in the Nigel and Heidelberg district, not in Heidelberg only. Further, Dr.

Sequence of Bedding now established around the East and Far East Rand, at New Rietfontein, New Modder, Southern Van Ryn, and at Heidelberg-Tulipvale-Klippoortje (Houtpoort, Ltd.) and Boschfontein (Nigel Transvaal Goldfields). The Amygdaloidal Diabase is an interbedded lava flow (Dr. Rogers' "Bird Amygdaloid"), but it occurs at Rietfontein, New Modder, Southern Van Ryn, Heidelberg, and elsewhere as shown in the section below the Van Ryn Reef and not above it.



Rogers very carefully ignores the most important and definite material point made by Mr. Tutt—that in regard to the diabases revealed in No. 7 borehole and No. 1 shaft of Daggafontein, Mr. Tutt says: "Compare sections of No. 1 shaft and No. 7 borehole on Daggafontein mine; they are less than 100 feet apart. The shaft section shows two bodies of igneous matter while the borehole shows three, and these are at different horizons." Here we have two closely neighbouring sections in question, and I submit that if Dr. Rogers had given an explanation showing how two sheets of interbedded amygdaloidal diabase can become three and change to different positions in the short distance of 100 feet or so it would have been a stronger argument than misquoting Mr. Tutt and putting his words on to me. I am preparing a diagram of sections showing the varying number of the diabase sills in some of the shafts and boreholes of the Far East Rand for presentation with this discussion. Will Dr. Rogers tell me why he speaks of "*The Bird Amygdaloid*," implying that it is one body which does not vary in position when the facts presented in these shaft and borehole sections show that there are several bodies and that they occur in varying positions.

The Contemporaneous Lava Flow is below the Van Ryn and above the Nigel.

To-night I can go further and state to you that I quite agree with Dr. Rogers that the amygdaloidal diabase he has found lying conformably below a grit bed and outcropping over long distances on Maraisdrift and other farms in the Heidelberg district represents a contemporaneous lava flow, truly interbedded in the Witwatersrand System. As a matter of fact, we found what I believe to be this same amygdaloidal diabase immediately below what appears to be the same grit bed in both our boreholes on the Southern Van Ryn Mine, and we duly investigated the possibility of the grit bed being the Nigel Reef and decided many months ago that it was not that banket body but that the presence of the interbedded lava in both the boreholes bore out that we were correct in identifying the reef in our Nigel Van Ryn Mine as the Nigel Reef.

Our Van Ryn Reef in the Southern Van Ryn Mine, which lies above this interbedded amygdaloidal diabase, was certainly never cut in the upper levels of the Sub-Nigel shaft, where the Far East Rand Kimberley reefs were passed through at less than 500 feet, and no reef like our Van Ryn Reef has ever been found in the so-called Kimberley Series of the Far East Rand, and now that this contemporaneous lava—the "*Bird Amygdaloid*" of Dr. Rogers—in the Heidelberg district has been proved by our Southern Van Ryn boreholes to lie between our Van Ryn Reef there and the Nigel Reef, it affords further strong evidence, as I will shortly show that our Southern Van Ryn Reef is the true Van Ryn, and if, as Dr. Rogers states, such a contemporaneous lava bed lying immediately below a grit bed has been found above the reef mined at a depth of 4,000 feet in the Daggafontein Mine, I would take this fact as very strong evidence that the Daggafontein Reef is the Nigel Reef, *and not the Van Ryn Reef, which lies above the truly interbedded diabase and not below it*, and I am strengthened in this statement by the following confirmatory data which, if he will deign to come with me, Dr. Rogers can see for himself.

Some years ago Mr. Knox, the owner of the claims north of the Van Ryn Reef of the Far East Rand which figured in the Knox Arbitration Case, on my advice opened the Nigel Reef at this outcrop on his claims north of the New Modder Mine, and found it to be identical in appearance and character with the Nigel Reef at the Nigel. About three weeks ago I inspected the section between the Nigel Reef exposed on Mr. Knox's claims, and the outcrop of the Van Ryn Reef there at the New Modder Mine, and in that section I found an outcrop of a grit bed lying on an igneous rock which, although much decomposed, gives evidence of being amygdaloidal diabase. I have no doubt it is the same interbedded lava as that found by Dr. Rogers on Maraisdrift and called by him "*Bird Amygdaloid*." But I can present still more conclusive evidence, because I have found north of the Reitfontein Reefs on the Reitfontein Mine, now accepted by

both Dr. Mellor and Dr. Rogers as the Van Ryn Reef, seeing they class them both as Main Reef Leader, a definite outcrop of an interbedded amygdaloidal diabase overlain by a grit bed lying in the same relative position to the Reitfontein Reefs *above* it, as the igneous rock I have described as occurring north of the New Modder Mine lies to the Van Ryn Reef there. And in the same relative position to that of the amygdaloidal diabase with the grit bed above it lying below the Van Ryn Reef on the Southern Van Ryn Mine and above the Nigel Reef there. I present for your inspection specimens of the rock from New Reitfontein and specimens from the Southern Van Ryn both from a shaft and from a borehole, and specimens from the outcrop on Maraisdrift described by Dr. Rogers, and you will, I think, say they appear to be the same. The occurrence, therefore, of a truly interbedded amygdaloidal diabase representing a contemporaneous lava flow with a grit bed immediately overlying it in the position described by Dr. Rogers instead of being evidence that the banket bed lying on a shale in the succession which occurs below it, is the Van Ryn Reef turns out on the contrary to be very definite and concrete evidence that the banket bed which lies below it in the succession is the Nigel Reef, *and that the banket beds which lie above it in the succession are those of the Van Ryn Reef Series.*

That is the series of gold bearing reefs identical in sequence of bedding, appearance, composition, and gold-bearing character with the Van Ryn Series of the Far East Rand which have been located and opened up on the Southern Van Ryn Mine, by Houtpoort, Ltd., on Tulipvale and Klippocrtje; by Dr. Sauer on the Heidelberg Townlands, and by the Nigel Transvaal Goldfields on Boschfontein. At all these places our Van Ryn Reef carries gold values like those to be found at the outcrops of the Reef on the Modder B, New Modder, Van Ryn, and Kleintfontein mines.

To show that there is the highest geological authority for the views in regard to these igneous rocks which I have presented, I will quote one more brief passage from Sir Archibald Geikie, as follows:—

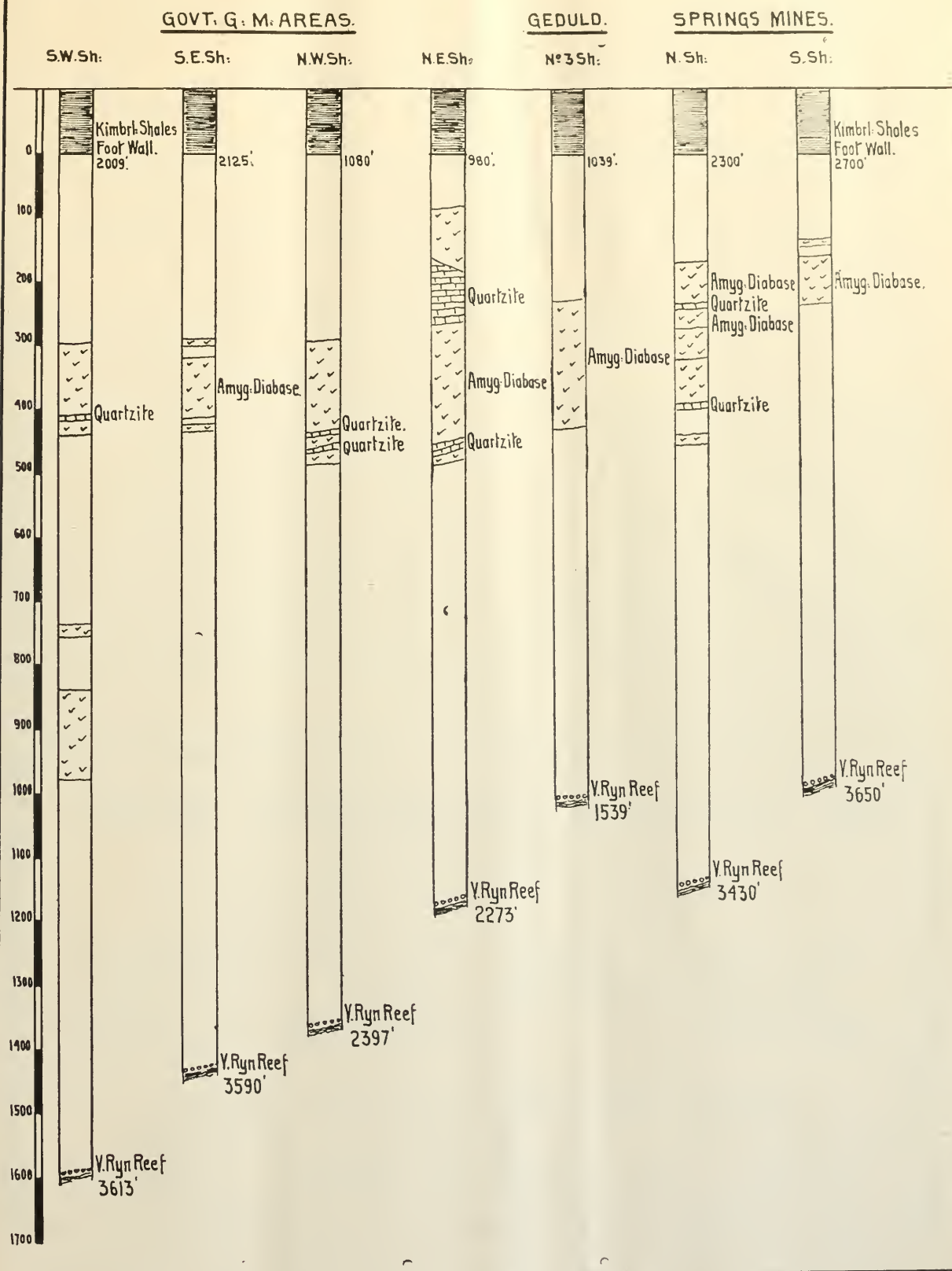
"The relative date of an intrusive rock can only be certainly affirmed with reference to the rocks through which it has broken. . . . An interbedded or contemporaneous igneous rock has its date precisely fixed by the geological horizon on which it lies."—*Text Book of Geology*, page 522.

That is our method of identification, and it is exactly the opposite of Dr. Rogers' method, which is to fix the date of the sedimentary rocks by means of the igneous rocks intruded into or interbedded with them. I feel safer in following Geikie as my geological guide.

The Position of the Nigel Reef at Heidelberg.

Dr. Rogers has stated that I am six miles in at one point on my line of the Nigel Reef in the Heidelberg district. I say in reply that on the contrary, owing to his erroneous identification of the Molyneux or Government Reef as the Nigel, it is Dr. Rogers who is six miles out. To place my views clearly on record I will state that the sub outcrop of the Nigel reef has been proved close to the eastern boundary of Boschfontein, that is several miles in from his spurious outcrop of the treacherous and misleading Molyneux or Government Reef. Another actual outcrop exposure of the Nigel Reef is that of the small banket reef lying on a shale footwall on Poortje just east of the Tulipvale Boundary near the old free stone quarry. We have evidence of the interbedded diabase, Dr. Rogers' "*Bird Amygdaloid*," overlying it on Tulipvale. The Reef and its shale footwall has recently been well exposed by a cutting put in by the road party in repairing the Main Road from Heidelberg to that high veld. Dr. Rogers knows the outcrop I refer to; on his map he has marked it Kimberley-Elsburg, and I may say that we have opened up the Van Ryn Reef with Van Ryn Reef gold values, nearly a mile on its dip! Measured in terms of miles, the difference between us may be as Dr. Rogers says, six; measured in terms of mining progress and the means of livelihood for thousands of people and indeed of financial security for the State, the difference between us may run into tens of millions.

Shaft sections shewing varying numbers and varying positions of the Amygdaloidal Diabases found in sinking to the Van Ryn Reef in the northern areas of the Far East Rand, affording strong evidence that they are later intrusive sills and not contemporaneous lava flows. -



The Van Ryn Reef at Wilgepoort.

I must further ask Dr. Rogers why he has left out Wilgepoort No. 244 in the Balfour district from his mapping. He has mapped the farms on two sides of this very important farm. I am informed that Dr. Rogers spent a lot of time on Wilgepoort, where he knows that Mr. Thorburn has opened up a reef for the Corporation Syndicate, Ltd., of which company Mr. Harry Graumann, M.L.A., is chairman. I submit that the reef on Wilgepoort has been opened up in the true geological position of the Van Ryn Reef that is, below the Far East Rand Kimberley or South Reitfontein Reefs and above the Nigel Reef. All three reef horizons, the Far East Rand Kimberley, or South Reitfontein, the Van Ryn and the Nigel, are exposed in the Wilgepoort section. The Van Ryn Reef there is just like our Van Ryn Reef on Tulipvale, Klippoortje, Heidelberg Townlands, and Boschfontein, called Kimberley in the Government cables and now again called Kimberley in Dr. Rogers' present paper. Development on this Reef on Wilgepoort has disclosed payable gold values. This is what Mr. Thorburn, who found the Van Ryn there, says about it:—

“Development by the Coronation Syndicate has been steadily proceeding on the Van Ryn Reef Series of this property (Wilgepoort), disclosing highly payable values in two reefs of the series. The Reefs are quite different in appearance and bedding to the Nigel Reef.”

On the other hand, what has Dr. Rogers to say about this important farm—the only farm in the Balfour area where active development has been going on during the period of his study of the Heidelberg geology. Exactly nothing! Could he not have spared a little time from his study of the igneous rocks of the district and given it to this all-important event in the economic geology of the Balfour district, the discovery and identification of the Van Ryn Reef. But no; Dr. Rogers avoids all reference to this farm and its reefs. I would like to know why? I am informed that Dr. Mellor has stated that the Wilgepoort reef is certainly Van Ryn. Does Dr. Rogers agree? I submit that in view of the extraordinary action of his department last year in advising the people of England so urgently by cable about these reefs it is Dr. Rogers' public duty as Director of the Geological Survey and as one responsible for these cables to say definitely what his conclusions are about that important and payable Wilgepoort Reef. Is it Kimberley or is it Van Ryn or Nigel or “Main Reef Leader”?

If it is Kimberley, why does Dr. Rogers not get the Minister busy with a cable to the good people of England warning them to withhold their money? If it is Nigel or Main Reef Leader, why is not a cable sent advising them to get in, so that our mining industry may be pushed ahead? These are questions which I submit cry out for an answer, and I will be mistaken if an answer is not demanded in no uncertain way by the people's representatives during the next session of Parliament.

Heidelberg Geology: A Correction.

Owing to the omission of a line, the article by Mr. Bleloch, in our last issue, was made to do an unintentional injustice to Dr. Rogers. The correct reading of the passage in question is as follows:—“Dr. Rogers admitted that he had not even examined the South Reitfontein Series, and that being so, I submit, he has not yet had sufficient experience to justify him in making dogmatic pronouncements on Rand geology before this Society or in the form of cables to the High Commissioner in London. Can anyone here justify geological dogmatism in that form?”

British Turbo-Electric Locomotive.

Great secrecy is being observed regarding the turbo-electric locomotive which a leading British engineering firm is building for trial on a main line British railway. It can, however, be stated that the principle adopted is similar to the system of electric ship propulsion which was first patented in Great Britain. The prime mover is a high-speed turbine coupled direct to an electric generator; this generator supplies current through controllers to motors which drive the wheels through some form of gearing. The advantage of this arrangement is that it combines the great efficiency of the high-speed turbine with the flexibility of electric speed control. If the trials are successful they will probably lead to the conversion of many express steam locomotives to the electric drive. This turbo-electric locomotive is not to be confounded with a new type of “thermo-electric” locomotive which another leading British firm is building for experimental purposes. In this case the prime mover is an internal combustion engine of a novel and economical design, which can utilise any kind of crude oil. In countries overseas where there is a deficient water supply along the routes of railways there is a magnificent field for an internal combustion engine locomotive which proves to be really efficient.

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ENGINEERING SECTION.

A Water Power Scheme for Railways and Iron Industry.

PROPOSAL TO HARNESS ORANGE RIVER TO DEVELOP POSTMASBURG IRONFIELDS AND ELECTRIFY RAILWAYS.

In the course of his latest annual report, the Inspector of Machinery for the Kimberley district writes:—

Under this heading I took the opportunity last year to remark on the possibility of the construction of a generating station at Vierfontein Colliery, the ultimate object of which was the development of the iron fields near Postmasburg. I am still confident that such a scheme as then outlined would prove of enormous benefit to the State, but now realise that, owing to the conflicting interests involved, it has little chance of being undertaken in the near future. To still pursue the original object, would it not be possible to develop the iron fields from the west instead of the east? To me it seems that nature, though withholding coal from the Postmasburg areas and supplying an abundance of iron ore and the Aughrabic or King George Falls in the distance, almost pointed to the means of developing these fields. The falls are approximately 160 miles west of Postmasburg, and if harnessed are capable of generating an abundance of power, not only to develop an iron industry, but to run the present and any extension of railway within that area. As gaugings of the river or the falls are not available, I am not in a position to state definitely the power capable of being developed at the period of lowest river. Four years ago the writer was in Kakamas at the time when water ceased to flow in the irrigation furrows there—the first time since Kakamas Settlement was established, so I was informed by Mr. Conradie, the superintendent—and there was then a considerable volume of water flowing in the lower channels of the river, which if it reached the falls would, I estimate, be capable of developing from 8,000 to 10,000 horse-power, which is ample for the requirements of the scheme at present outlined. The maximum power capable of being developed is only limited by the size of any conservation scheme that may be decided upon. At present I am not interested in this phase of the scheme. In the past there has been no great incentive to utilise the potential power that has been running to waste from time immemorial; but now that the development of a great iron industry is possible within a comparatively short distance of the falls, it would be a great injustice to the country to allow this waste to continue. With such a scheme in active operation, the lack of coal from which this particular area suffers would be more than compensated for by the cheap power available and consequent industrial expansion that would follow. The falls are 400 feet high and are within 40 miles of the Upington-Windhoek railway system. It will be readily understood that a river such as the Orange, the catchment area of which is about two-thirds of the whole Union, with falls 400 feet high, in the vicinity of which latter there are practically no vested interests, must offer great inducements to any one interested in the industrial development of the country. The construction of a hydro-electric installation would be the means employed to convert the power of the falls to power easily transmitted to any point required. The initial stage

of the scheme would only necessitate a comparatively small installation, which, as necessity demanded, could easily be augmented; and the power generated could be used to electrify the De Aar-Windhoek railway and later any branches that may be built from the present system. In the near future a line must be built within the area under consideration, and were I to offer a suggestion, it would follow the route Upington-Griquatown, at which point the system would open out into two branches, viz., Griquatown-Campbell-Douglas-Belmont and Griquatown-Postmasburg-Kuruman-Mafeking. With such a system in operation it would bring the real object of these remarks within the realms of possibility. The power, by whatever electric system the railways will be operated, will be within reasonable distance of the iron fields, and thus place them in a very favourable position with regard to their economic development. Electricity would, of course, be the motive power employed to develop the iron fields, from "grass" to the finished product. The lack of coal and the inaccessibility of the iron fields to a railway has unduly delayed their development, whereas if they had been more favourably situated, they should have proved a strong factor in the establishment of a permanent and lucrative industry. That the ore must be of good quality and practically unlimited may, I think, be accepted, if only for the reason that the late Mr. Francis Oates, I believe, seriously considered the exploitation of these fields, even in face of their adverse situation. Could one visualise Postmasburg, say, fifty years hence, with this scheme in operation, it is possible that it may compare favourably with the cities of the world that owe their present position to the successful exploitation of their iron-ore resources. At present there are few industries requiring power within the area under consideration, but there is little doubt that, with the development of the iron industry, the opening out of the area by means of railways, and plenty of cheap power available, there will be no lack of demand for power to supply the requirements of the many industries which, under such stimulus, will spring into being. The recently discovered galena deposits near Griquatown, if, on development, the silver content proves as valuable as rumoured, is a likely consumer of power, as are also the diamond mines near Postmasburg. These latter—although favourably impressed with what I saw during my last visit—do not enter seriously into this scheme, except for the reason that they are situated close to the iron fields, and thus may add support to the point I am endeavouring to make. My reason for apparently discounting the importance of the diamond mines is not that I think them unpayable, but simply for the reason that I don't think that any addition to the diamond mines at present producing can add to the stability of the State or the diamond industry. In fact, were it possible, I should, in the interest of the State, prohibit the exploitation of any new diamond mines. The asbestos propositions in the district would certainly benefit

to a considerable extent by reason of the shorter distance that that commodity would have to be transported by road to rail; and, in addition, the fact that cheap power would be available might induce those interested to open out the mines more in accordance with modern practice than is the case at present. The pastoral interests, too, would benefit by being placed within easy distance of a railway, and therefore making reliable markets easily accessible. The part of the country through which the suggested branch railways would pass is one of the greatest stock-raising districts of the country, its full development in the past only having been retarded by its remoteness from any railway station. There is no need to dwell further on the saving that would be effected or the benefits accruing to those enjoying the service of such a scheme; its possibilities are so vast and its potentialities for good of such magnitude that, if carried to a successful issue, it might prove the means of inaugurating a wave of industrial development which would make itself felt beyond the confines of the Union.

To summarise the benefits in order of importance, I suggest the following:—

1. Supply of cheap power to operate present railway system and any extension within the area De Aar-Upington-Windhoek, etc., Upington-Griquatown-Campbell-Douglas-Belmont, etc., Griquatown-Postmasburg-Kuruman-Mafeking, etc.
2. Supply power necessary to develop Postmasburg iron fields and later operate furnaces, rolling mills, etc.
3. Impetus given to stock-raising within the area served by the railways and the development of agriculture in general, where the conditions are suitable, by giving access to important markets.
4. Means of developing all mining ventures, present and prospective.
5. Supply of power to farmers for irrigation and other purposes.
6. By opening up a part of the country, the full development of which is being retarded owing to lack of railway facilities.

Ball and Roller Bearings.

As a result of a request received from the British Ball Bearing Manufacturers' Association, a full representative conference, called by the British Engineering Standards Association, met recently at the Institution of Civil Engineers, under the chairmanship of Col. R. E. Crompton, to discuss the standardisation of ball and roller bearings covering the requirements of the engineering industry as a whole, the purpose of the enquiry being to ascertain, before proceeding further, whether there exists a consensus of

opinion favourable to the work being undertaken. It was quickly evident that there was no doubt in the opinion of those present as to the desirability of the proposed standardisation, the only points upon which there was any discussion being in connection with the actual types of bearings to be included. A resolution was unanimously passed recommending the setting up of a sectional committee of the B.E.S.A. to undertake the work, and such a committee will no doubt be formed as soon as circumstances permit. This sectional committee will not, we understand, supersede the existing B.E.S.A. committees dealing with ball bearings for automobile and aircraft purposes, but will co-operate with them.

* * * *

Underground Loco. Costs.

At a meeting of the West Virginia Mining Institute, E. E. Boon, manager of the coal and oil section of the Westinghouse Electric and Manufacturing Co., in a paper on "Storage Battery v. Reel Type Gathering Locomotives," presented the following table of relative costs:—

	Trolley cable-reel.	Trolley rope-reel.	Storage battery.	Combination.
First cost	100	105	122	139
Total installation cost	150	160	165	195
Interest and depreciation	16	17	26	27.5
Yearly maintenance	9.5	6.2	5	7
Power	1.2	1.2	1.1	1.2
Attendance	1.0	1.0	1.5	1.5

The author said that the power used by the cable reel and rope reel locomotives, though generated during the day, was charged at the same rate as that used by the storage battery locomotives, which was generated during the night, and that used by combination locomotives, which was generated partly in the night and partly by day. In consequence, the figures showing the relation that exists when all power is regarded as equally expensive would be modified so as to give a better rating to the storage battery power if the hour at which the power was produced were duly considered. One anthracite company the power plant of which is already overloaded by day, is ordering its superintendents to requisition for storage battery locomotives whenever they can be used and is doing this for the express purpose of cutting down the day load, which is excessively high. Several speakers stated that they had found the cost of mule haulage less than that of locomotives. L. C. Ilesley called attention to the fact that the Bureau of Mines had established schedule 15 under which storage battery locomotives were being examined for approval. He stated that one locomotive had already been approved and that three others were under examination.

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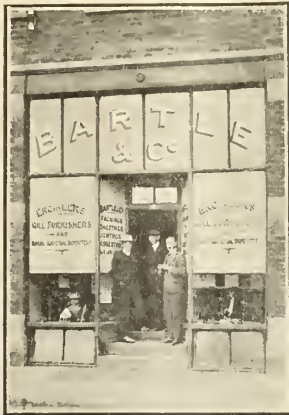
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Eighteen Years of Progress.

THE BUILDING OF THE BARTLE BUSINESS.

At the time the Bartle business was established, eighteen years ago, the offices, show-rooms and stock-rooms combined, occupied but one comparatively small room and that was located in the Main Street section of the New Club Buildings. Mr. J. O. Bartle, founder, was his own manager, salesman, as well as office-boy. In other words, his was, at its commencement, a one-man business in the truest sense. To-day, the staff of the entire Bartle organisation numbers nearly three hundred. Any attempt to tell in detail of the firm's small beginnings or to outline the big and rapid strides that have been made on the road to bigger things, would be to tell a long story though one full of meaning.



Eighteen years ago—at New Club Buildings.

The progress of the undertakings was greatly accelerated in 1906 by the advent of Mr. A. R. Callow (now managing director of the firm). Mr. A. R. Callow lost little or no time in getting behind the wheel of affairs, and from then on the business which was at that time characterised by its large supply of enthusiasm, determination and ability rather than by a stock of supplies usually associated with an undertaking



Loveday House—Head Offices of Bartle & Co., Ltd.

catering for the mines, moved ahead at great pace, never looking back, and soon developed into a business of considerable standing. Shortly afterwards, a partnership was formed by Mr. Bartle and Mr. Callow. The business was then carried on under the title of Bartle & Co., Mr. J. M. Jackson, who had represented the firm for a considerable time, becoming a director. The new era of prosperity into which the undertaking passed after the formation of this alliance is clearly reflected in the following short account of its growth.

The year 1907 saw the firm as sole South African representatives for a fairly large number of well-known British and American manufacturers, and the rapidly growing business was already demanding bigger ways of doing business. Extensive yards with suitable storerooms were secured, and this allowed of the carrying of much larger and more varied stocks than had hitherto been possible. In 1910 Loveday House, at the corner of Loveday and Marshall Streets, was acquired, and the Bartle business was immediately transferred from the New Club Buildings to its new home. In the following year the firm became a limited company—Bartle & Company, Limited, as it is known to-day.

A year or two later found Bartle's interesting themselves in the motoring business, and it was not long before several very important agencies in this connection were added to their then long list of sole agencies for leading manufacturers in the engineering world. It was soon after found necessary to control these motor undertakings as a distinct side to the business, and within the comparatively few years that have followed, direct branch businesses for the handling of motor and allied lines have been successfully launched in each of the eight leading centres. To-day the Bartle Motor Organisation are leaders in their line and second to none; but that is another story.

Returning, then, to the Bartle engineering business, let us but add that, as year has followed year, so has success followed success. And to-day, after eighteen years of rapid and consistent progress, the House of Bartle's holds an



Mr. A. R. Callow, the Builder of the Bartle Business.

enviable position in the vanguard of South Africa's biggest commercial undertakings, and is firmly placed with the leaders in its particular class of business. Of such businesses, that of Bartle's is as big as any and bigger than most.

Nothing short of a personal visit to the firm's extensive yards and warehouses at Marshall, Mooi and Polly Streets can give one any adequate idea of how surprisingly vast and varied are the stocks carried. And, large as the staff employed is, the continual despatching of supplies of any and every kind to all parts of the Union and adjoining territories, together with the constant arrival of fresh shipments, make every day a busy day at the stores. In addition to the Johannesburg stocks, the value of which runs well into hundreds of thousands of pounds sterling, further large stocks are, it should be remembered, carried at the firm's Kimberley and Durban branches.

With such large and assorted stocks on hand at all times it means that, when it comes to the needs of the gold or tin mine, the colliery, or engineering requirements of any general character, few indeed are the supplies of which Bartle & Company, Limited, cannot offer immediate delivery at right prices, and if it comes from Bartle's it is reliable—always.

Letters to the Editor.

SUBSIDIES FOR THE LOW-GRADE MINES.

A Criticism of the Commission's Findings.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Regarding the report of the Low Grade Mines Commission of 1920, paragraphs 76 and 77, dealing with the suggestion to subsidise the low-grade mines, paragraph 76 makes a good *prima facie* case against achieving the desired object by subsidising these mines, but on analysis it will be found that the grounds on which this suggestion is turned down are utterly worthless; clearly this suggestion, which is economically unassailable, has not been dealt with on its merits at all by the Commission. To analyse paragraph 77. It is true that "the gold mining industry is not peculiar in contributing indirectly to the coffers of the State. Every other branch of productivity which puts money into circulation has the same result." These remarks have absolutely no relevance to the point at issue. Had it been clearly established by a previous enquiry that in the case of all other industries than that of gold mining that the granting of subsidies was economically unsound, this alone could have justified this reference to these facts. Replying to the specific instance taken of a copper mine, it should be obvious that when it was shown that subsidisation of gold mines was to the benefit of the State, the same would also apply to a copper mine. In the case of the boot factory, the Government has already responded to the demand for subsidisation of this industry by granting it that very uneconomic and costly form of subsidy known as protection.

Again, dealing with the statement that "it would be difficult to resist the demands for subsidies to other industries." Firstly, it is not proved that such demands should be resisted, and, secondly, *were* it found that such demands should be resisted, it is conceivable that this difficulty of resisting these demands should be faced rather than shirked, in view of the extreme importance of the issue at stake.

Replying to the next sentence, "it is true that a gold mine, once closed down, may remain closed for ever, and that thus its potentialities of production may be lost for good and all, but this seems hardly a sufficient reason for differentiation," I would remark that this may be so, but that the Commission was appointed for the express purpose of giving a definite finding on such points (or of ascertaining whether this were so or not). This same remark may be taken to apply to the next sentence *re* theoretical economics. I think I have said enough to show that the suggested remedy of subsidies for the salvaging of the low-grade mines was very inadequately dealt with by the Commission appointed to enquire into the matter, and that the country should therefore demand that this question be re-opened. As an economist, I beg to state that subsidisation by relieving the unpayable mines of such portion of their present burden of taxation as is requisite to enable them to pay their way (within the limits hereinafter stated) is a sound economic solution of the problem. It is, of course, out of the question to go fully into the matter here, but I will put the matter briefly as a simple business proposition.

The Government gets—according to official estimates—some 9s. 3d. per ton crushed from the mining industry in *direct and indirect taxation* and in railway rates and harbour dues; now the actual out-of-pocket expenses to the Government for the services which it renders to the mines is probably only some 2s. or 3s. per ton, the balance being for overhead charges on railways and in Government offices, interest on capital in railways, harbours, buildings, telegraphs, and for defence and police, and so forth; thus the difference of some 6s. or 7s. may be regarded as profit, and thus a rebate on taxation (or subsidy) of anything up to this amount per ton could be given without the State losing, and any amount less than the total of this profit would be a gain to the State as compared with closing the mines down. In some cases a rebate of only 6d. per ton might be sufficient to keep a mine running; again there might be

some in which, if the State sacrificed the whole of its profit on taxation, there would still be a loss; in such cases the mines should, of course, close down.

To put the matter in another way; the giving of a rebate in taxation is analogous in its operation to the recognised principle in railway economics of adjusting the rates to "what the traffic will bear," under which valuable ore such as copper may pay several times as much per ton per mile as less valuable ore, such as chrome or iron. I would here suggest to the consideration of the Government that the adjustment of taxation by means of rebates in the principle of "what the traffic will bear" is one that may be found on investigation to be susceptible of wide application with beneficial results.

Some four weeks ago I wrote to the Minister of Mines and Industries pointing out how ridiculous were the reasons given in paragraph 77 of the Low Grade Mines report for turning down the suggested remedy of subsidies, and indicating that, in view of the supreme importance to the State of saving—if possible—the low-grade mines, that consideration of this remedy of subsidies should be re-opened; three weeks afterwards I received a reply which contained no reference to the subject matter of my letter. On coming to Johannesburg I saw Mr. Nixon, M.L.A., who, being impressed with the importance of my case, introduced me to some of the ministers, to whom I explained my views. Sir Thos. Watt expressed himself as greatly interested; the others, including the Prime Minister, appeared—perhaps naturally enough—to be so staggered by my temerity in attacking the findings of a Government appointed Commission that they were unable to give me serious consideration.

In conclusion I will point out that it is not a case of whether the Government is justified in subsidising these mines in order to keep them open; it is clear that no Government could justify itself in *not* subsidising such mines under the circumstances.

Clearly, Commissions appointed to inquire into economic matters should be composed of men with at least some knowledge of economic science.—Yours faithfully,

ARTHUR M. LAWS.

Talc and Fluorspar.

The following, taken from recent publications of the Imperial Mineral Resources Bureau, is of interest:—

Talc.—Talc is a hydrated silicate of aluminium, and has a characteristic soapy feel. A compact variety is known as steatite or soapstone; it is usually grey in colour and extremely soft. When mined the mineral is subjected to careful sorting, and dressing operations usually consist of crushing, grinding, and grading into sizes. About 90 per cent. of talc mined is ground to flour and used in the manufacture of paper, moulded rubber goods, and foundry facings. The world's production of talc in 1919 amounted to about 226,000 tons, of which the United States contributed 168,000 tons and South Africa 788 tons. Talc mining is an industry which is conducted on a very small scale in the Union, although the mineral is widely distributed in the older rocks of the country. The chief producer is the Verdite Mine situated in the Barberton district. The following figures represent the sales of talc in the Union:—

Year.	Sales and Shipments.	
	Quantity. Tons.	Value. £.
1915	39	218
1916	118	586
1917	701	1,962
1918	598	1,713
1919	676	3,102

Fluorspar.—Fluorspar is composed of calcium fluoride. It usually occurs in well-defined cubic crystals of purple, green, yellow or white colour. It is used chiefly as a flux, especially in the manufacture of steel, and also enters into the manufacture of glass. Up to the present South Africa has not exported the mineral. What small occurrences that are known are mined and used locally and at the works of the Union Steel Corporation. In 1918 the output was valued at £360.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

IMPROVEMENT IN BUSINESS CONTINUING—IRON AND STEEL—TIMBER AND BUILDING MATERIALS
—ELECTRICAL GOODS—ROODEPOORT MAIN REEF'S PROPOSED PROFIT-SHARING SCHEME WITH
WORKERS—OIL—BRITISH TRADE SHIP—COAL PRICES IN BRITAIN—GERMAN TRADE—SHIPPING—
BRITISH TRADE IN AUGUST—WIRELESS MARVELS—FINANCIAL—METAL MARKET.

General Review.

The improvement in business reported in our last issue, slight though it was, has been maintained this week, and merchants report a bigger turnover and brighter prospects than have obtained for months past. An increase in activity has been witnessed on the Commercial Exchange during the past fortnight. Of course, nobody expects a big improvement this year, but competent judges are of the opinion that we have at long last turned the corner; and, provided no further set-backs occur to retard the smooth running of industrial concerns, gradually improving conditions may be anticipated. The building dispute has been settled, although, it is said, the workers are not altogether at one with their Executive in accepting on their behalf the 10 per cent., or 5d. per hour reduction in wages, which brings their earnings down now to 3s. 10d. per hour. It is hoped that with this reduction of wages and no further considerable fall in costs of material to be expected for some time at least, building operations will be prosecuted vigorously. In this connection a well-known and influential merchant, when asked his opinion as to the immediate future of the building trade, replied that now the dispute in regard to wages had been settled, merchants were looking forward to favourable developments. A great deal, he said, will depend upon the financial position. A number of people are preparing to start building operations provided they can raise money on reasonable terms. Should anticipations be realised, there is every likelihood that the building trade will revive. The gold premium has declined slightly during the past week, but it is generally thought that no big fluctuations will occur between now and the end of the present year, which should enable the mining industry, including the lower grade propositions, to carry on for that period at least. Prices of materials generally during the week under review have been well maintained. Corrugated iron, which we mentioned in our last issue as being firmer, has since gone up another one-halfpenny per foot. A satisfactory feature in connection with the future trend of things is the fact that at last week's wool sales in London the tone was firmer, prices generally showing an advance of from 10 per cent. to 15 per cent. on those of July, which in their turn were a decided improvement on previous purchases.

Iron and Steel.

Business this week has continued to improve and transactions on the Commercial Exchange have been of an encouraging nature.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 45s.; $\frac{3}{8}$ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; $\frac{3}{8}$ in. iron, 37s. 6d.; steel, 39s. 6d.; $\frac{7}{8}$ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; $\frac{1}{4}$ in. square iron, 55s.; $\frac{3}{8}$ in., 47s.; $\frac{1}{2}$ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, $\frac{3}{8}$ in., 41s.; $1\frac{1}{4}$ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, $\frac{3}{8}$ in., 10 $\frac{1}{4}$ d.; $\frac{1}{2}$ in., 10d.; 1 in., 8d. to 9d.; $1\frac{1}{2}$ in. to 2 in., 7d. to 8d.; larger sizes, 8d.; steel plates, 1-16 in., 24s. to 25s.; $\frac{1}{8}$ in., 32s.; 3-16 in., 32s.; $\frac{1}{4}$ in., 21s. to 22s. in all sizes up to 8 x 4; 30s. to 32s. 6d. for the larger sizes; spring steel flats, 8 $\frac{1}{2}$ d. to 9d. per lb.; bolts and nuts, $\frac{3}{8}$ in., 1s. to 1s. 2d. per lb.; $\frac{1}{2}$ in., 65s. per 100 lbs.; $\frac{5}{8}$ in., 62s. 6d.; $\frac{3}{4}$ in., 60s.;

nuts, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 87s. 6d.; fish plates, bolts and nuts, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 8 $\frac{1}{2}$ d.; $\frac{1}{2}$ in., 6 $\frac{1}{2}$ d.; $\frac{3}{8}$ in., 6d.; $\frac{1}{4}$ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 1s. 3d. per lb.; $\frac{3}{8}$ in., 10d.; $\frac{1}{2}$ in., 50s.; $\frac{5}{8}$ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, $\frac{3}{8}$ in., round, 1s. 7d.; $\frac{1}{2}$ in., 1s. 5d.; $\frac{5}{8}$ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d. and 8d.; hollow, 9d.; $1\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to $1\frac{1}{2}$ in., 2s. 6d. per lb.; $1\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Mr. Lavenstein, the Managing Director of the Union Steel Corporation, Ltd., in announcing the reduction of their products to an all-round rate of 30s., states that the Corporation are getting a great amount of support and sympathy from the consumers of their goods, that they have now got their steel industry firmly established and are out to meet all comers, and are not at all afraid of fair foreign competition. The quality of the goods supplied by the Union Steel Corporation, Ltd., is giving the greatest satisfaction to their customers; the plant has been improved and extended, and the men of this country, who have been trained during the war, are now reaping the benefit of their efforts and have become skilled workers. There is an increasing demand at the moment for the Corporation's goods.

Second-hand Machinery.

There has been practically very little business done this week in regard to second-hand material, and the orders from the mines have been very scarce, particularly in battery spares, as many of the mines took advantage of those companies which have closed down, and replenished their stocks of spares for several months from those sources. Second-hand pitch pine will become a scarce commodity within the next month or so when all has been absorbed from the above-mentioned defunct mines, and the price will rise, as well as that for other essentials required by the industry. When all the second-hand material has been used, prices for new stuff will be maintained. Merchants in town have complained a good deal in recent months of a lack of business, on account, presumably, of the large quantities of second-hand mining material thrown on the market, and they are hoping to see better times and prices within the next two months; especially will this benefit those merchants with decent stocks, as the majority have been chary of indenting for large quantities for some considerable time, and

we do not blame them. It must have been most disheartening to merchants importing goods, particularly mining material, to see mines closing down and selling off their second-hand machinery, which other mines took the advantage of by purchasing at lower prices to restock their own mines. Indeed, the merchants' lot has not been a happy one of late.

Engineering Shops.

Business is brightening, more orders are coming to hand, and the tendency is undoubtedly upward, the shops now finding work for all their men. There are this week no special features to report.

Iron and Steel Factories in Germany.

An extraordinary recovery of German industry is shown by the September report of the Prussian Ministry of Trade. It states that the Rhenish and Westphalian iron and steel factories are refusing further orders for fulfilment this year.

Sir Arthur Trevor Dawson, Chairman of Vickers, after a visit to Germany, says that the engineering and electrical works there are very busy, and that the works are perfectly equipped. The output was high and labour working without hitch. Wages there, he said, are 3d. per hour, compared with 1s. 9d. of similar workers in England.

Timber and Building Materials.

There is no change to report in these this week, prices being well maintained, with no immediate prospects of their declining below present levels, 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 1s.; beaver board, 5d.; floorings, 7d. to 7½d.; ceilings, 5½d. to 5¼d.; Oregon, 7s.; pitch pine, 8s. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Business remains fairly good, and with the dispute settled regarding the wages of building operatives, should improve shortly. Consignments of timber are coming in freely from Europe. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality; 14s. 9d. for seconds at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at mills, Rhodesia; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 9d. per ft. of 1 x 12, here; American pine shelving, 1s. per ft. There is no change to report in bricks, which are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed, per 1,000 at yards; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp, course and roofing, 37s. 6d., 47s., 55s. 3d. for 1-3 ply.

Blue Hydraulic Building and Plastering Lime.

Business in this section has been fairly steady, but the tendency of those about to build is to wait until costs have come to a lower level. Prices rule now at 3s. 9d. a bag for the building lime and 4s. 9d. a bag for the plaster lime, which is particularly low. Big producers have considered it advisable to bag their lime in bags branded with their name to avoid cheaper substitutes being sold as their manufacture. This is a move in the right direction, as it protects the contractors as well. The works recently erected outside Krugersdorp have gone into liquidation, the main cause being the huge amount of capital invested and the poor output returned. Shortage of houses continues to remain acute, and with the settlement of the dispute between the master builders and the building trade employees, a demand for blue lime is bound to be created.

Second-hand Iron and Timber Yards.

Business is still very quiet in these, but dealers are hoping for better times shortly. Iron is ruling at 5d. to 6d.; timber at 10d. to 1s.

Electrical Goods.

Although there is not much doing at the moment, dealers, now that the building dispute has been settled, are looking forward to improved business conditions very soon. As predicted in these columns, there have already been

some reductions during the past few days, viz., in lamps, from about 1s. 9d. to 2s. to 1s. 6d. to 1s. 10d. per dozen. Adapters, lampholders, switches, ceiling roses, etc.: these have been reduced by from 7½d. per cent. to 10 per cent., with the probability of a further drop shortly. Goods now arriving from Britain are, however, showing no declines, but rather the reverse, but local merchants have been obliged to realise some of their accumulated stocks in view of the possibility of a decline occurring oversea.

Agricultural Implements.

Business merchants report as rather slow at the moment, the present financial stringency operating against farmers and preventing them from many needed purchases. It is generally expected that things will improve after the recent rains and the expected advent of more shortly.

The mine profit-sharing scheme proposed by Mr. Leopold Albu, managing director of the General Mining and Finance Corporation, and chairman of the Roodepoort United Main Reef G.M. Co., Ltd., regarding the future working of the latter company, seems, in view of the present plight of that gold mine, a step in the right direction. The importance of such a co-partnership between the company and the workers is very great and deserves the greatest possible consideration on the part of the mine employees and their unions.

Penrol (S.A.) Ltd.

The provisional directors announce that, owing to the difficulty in obtaining the whole of the capital offered in the prospectus issued recently, they have reconsidered estimates. The initial working capital is to be £20,000. In the meantime, until the capital necessary has been acquired to erect a plant for the manufacture of alcohol from maize or other products, the board proposes to purchase alcohol to the required strength for the manufacture of Penrol and to undertake such manufacture, so that all that would be required would be such plant and containers as are necessary for the conversion of the spirit into Penrol and the handling and distribution of same. It is proposed to start business with a capital of £80,000, and it is anticipated that results will be such that development of the company's business will be rapid. It is stated that Penrol has made a highly favourable impression in Australia, where a parent company has recently been floated. The former Chief Government Chemist in the Commonwealth, in an analytical report, gives it as his opinion that Penrol is better than any other alcohol mixture on the market.

Oil.

An agreement has been arrived at between representatives of the American oil interests and the Mexican Minister of Finance, which means the immediate resumption of oil-producing operations in the Tampico region and the lifting of the Government embargo on oil now in storage. This agreement is expected to lead to a final settlement of all American petroleum problems in Mexico.

British Trade Ships.

The scheme for a specially designed steamer, named "British Industry," is receiving very considerable support from British manufacturers, and the movement will, it is expected, command support from all authorities in the Empire. British manufacturers will thereby be able to offer their goods where local effort is still unable to meet the demand. There will be every commercial facility for banking and cabling on board the vessel. The "British Industry," which will have a displacement of 20,000 tons, will, it is expected, leave England in the summer of 1923, visiting South America, South Africa, Australia, New Zealand, Japan, China, the Straits Settlements and India. During her cruise she will probably cover 43,000 miles in 18 months. The vessel will contain four huge floors for exhibits and accommodation for 300 trade representatives.

Coal Prices in Britain.

Prices of coal in London are being reduced by from 1s. to 4s. per ton. The best Waalsend remains at 68s. per ton, while other descriptions range from 57s. to 62s. In the

Welsh anthracite coal trade there is a boom; most of the pits are in full swing and some are working double shifts.

German Trade.

There is no doubt that, owing to the exchange, Germany is recapturing her pre-war trade, especially in respect of chemicals, which she is in a position to sell at prices with which British firms find it impossible to compete. Stocks of chemicals are now arriving here from Germany at prices which will cause tremendous losses to merchants holding large stocks imported during and after the war, because with such lower quotations in favour of the Continental goods, it is only human nature for people to buy the cheaper article regardless of country of origin. It is true that the Allies have imposed a stiff tariff against German goods, but as German exporters are subsidised by their Government to the full amount of such tariff, it is nugatory in effect.

Shipping.

The Port of London was considerably busier last year than in 1919; the net tonnage of incoming and outgoing vessels was, according to the annual report, 32,758,604 tons in 1920, compared with 26,335,191 tons in 1919.

Canadian Government Shipping Line of Steamers.

By the end of the present year the Canadian Government will be in the possession of some 63 ships, with a dead weight of 390,000 tons, carrying Canadian produce to all parts of the world. These vessels are the last word in ship-building science, and are equipped with every modern device and some with cold storage space. They have all been built in Canadian shipyards. The ships, in spite of the big slump in freights, have been active and have been operated at a substantial profit which, in view of the millions of tons of shipping lying idle in the United Kingdom and the United States, is a very satisfactory result. Voyages have been made to all parts of the world, and the outlook for the immediate future is, it is said, very promising. The policy of the Canadian Government steamers is to open up new trade routes with the help of existing steamship organisations and no competition in the matter of rates. Joint freight services have been established with the Blue Funnel Line, across the Pacific to China and Japan, and across the Atlantic to India, Ceylon and the Straits Settlements with the British India Steam Navigation Co.—Messrs. Mitchell, Cotts & Co., of Capetown, are looking after the Canadian Government Merchant Marine, Ltd., in South Africa.

Municipal Wages.

Under the conditions of the Lucas award, and in view of the figures supplied by the Director of Census, showing that the drop in the cost of living in the last nine months amounted to 23 per cent., and the fall in the April-June quarter, upon which period the October-November wages are based, calculated at 11.7 per cent., the municipal employees have agreed to accept a reduction in wages of 5 per cent. as from October 1. This reduction will, it is estimated, effect a saving of £20,000 to the town. On the other hand, the Council's grading scheme for increasing staff salaries of the Municipality will, if accepted by the Council, add an extra £9,000 to the rates.

British Trade in August.

The Board of Trade returns for August show big reductions. Imports amounted to £88,500,000, compared with £153,000,000 for August, 1920, and exports to £51,000,000 compared with £115,000,000. The largest decrease in imports was in raw materials and manufactured articles. The reduction in the value of exports was almost wholly confined to manufactured goods.

Unemployed in Britain.

The unemployed in Britain now exceed 1,500,000. That this problem is one of the most urgent facing the Government is indicated by the serious rioting in many parts of the country. With winter approaching and fewer chances of any large proportion of this unemployed army being absorbed in trade occupations for months to come, the situation has become aggravated.

Proposed New Thames Tunnel.

A scheme is on foot to construct a new railway tunnel under the Thames between Gravesend and Tilbury at a cost of £5,000,000, to improve road facilities from Essex into London. In the northern manufacturing areas, as well as in the south-east, it is hoped that the tunnel will eventuate in the not too distant future.

Dye Industry.

A Swiss Professor states that Germany before the war controlled 95 per cent. of the dye industry. Since then other countries had entered the field. Synthetic indigo, he said, could equal natural indigo if made sufficiently pure.

Writing by Wireless.

It is reported that a French scientist, M. Belin, has discovered a way of transmitting written messages by wireless. After smaller experiments in France, the experiment was conducted between Paris and New York, a distance of 3,000 miles, and resulted in a big success. What this discovery, fully developed, will mean to the world goes without saying.

Wireless Telephony.

Berlin reports very successful experiments carried out in wireless telephony between Berlin and Copenhagen.

Financial.

London reports that with Treasury Bills selling at 4 per cent. discount there is a growing inclination to take up short-dated securities.

The Bourses in Berlin, Hamburg, Frankfort and other German centres have recently been the scene of wild speculation consequent on the exchange on London going to 369 marks to the pound.

New Australian Loan.

Melbourne cables that three-quarters of the new loan of £10,000,000 has been subscribed, and that the period for subscription is being extended for a few days.

Metal Market.

Latest London quotations:—Standard copper, £67 5s. cash, £68 5s. forward; electrolytic copper, £72 cash, £74 forward; Straits tin, £156 7s. 6d. cash, £158 15s. forward; English lead, £23 7s. 6d. cash, £22 17s. 6d. forward; bar silver, 38½d. per ounce; fine gold, 110s. 1d. per ounce. Copper was steady during the week, tin advanced on influential buying, but the outlook is not encouraging for the English tinplate industry.

KROONSTAD COAL ESTATE COMPANY, LIMITED.

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are invited and will be received by the Undersigned up to and including Saturday, 1st October, 1921, for the purchase of the **MACHINERY, PLANT, EQUIPMENT, MINE STORES, TOOLS, ETC.** lying for disposal at the above Company's property at Vierfontein, O.F.S.

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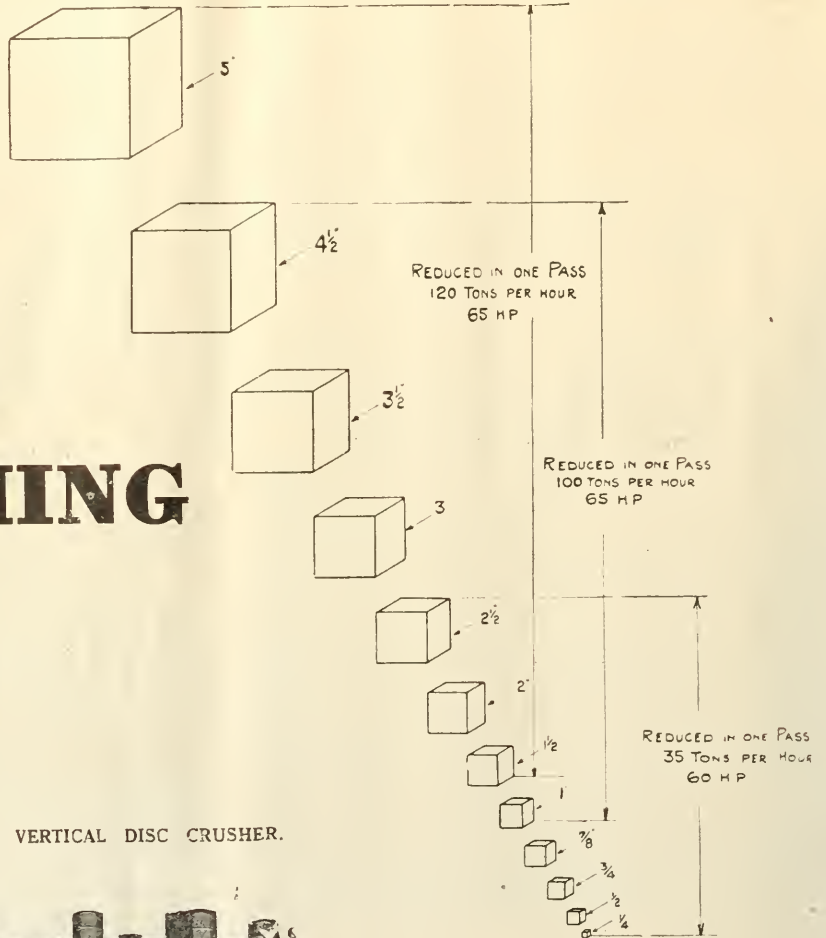
Secretaries,

Kimberley.

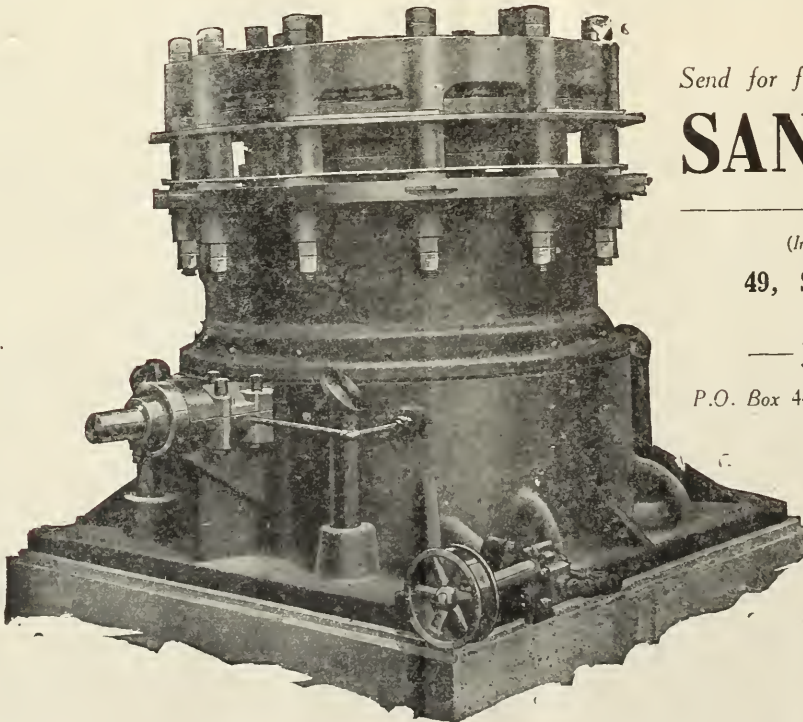
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Successful Year with the Hume Pipe Company.

GOOD PROFITS EARNED—SOUND FINANCIAL POSITION—EXCELLENT OUTLOOK.

A very satisfactory showing was made at the fourth annual meeting of the Hume Pipe Co. (South Africa) Ltd., held on September 14. Those present at the meeting included Lieut.-Col. C. L. Anderson, O.B.E., Messrs. W. Wolstenhohne, J. R. Leisk, C. A. Wentzel, M. C. Bird, F. H. Wallers, E. M. Geard, P. Lange, and A. C. Smith, secretary. Altogether 153,161 shares were represented out of 250,000.

Mr. John E. Orr presided, and in moving the adoption of the report, said:—Gentlemen, the continued ill-health of Sir J. Percy Fitzpatrick has, I regret to say, prevented him from being present to preside over this meeting. The report of your directors and the statement of accounts for the year ended June 30, 1921, have been in your hands for a sufficient time to enable you to become *au fait* with the position of the company at the end of its last financial year, and it now remains for me to supplement the information already in your possession. The chairman at the last annual meeting referred in his address to the proposed acquisition from the Germiston Municipality of additional industrial sites so as to facilitate the company's operations. Certain formalities as between the Municipality and the Townships Board, however, have not yet been completed, and it may be some time yet before the Municipality will be in a position to deal with the area which it desires to lay out as industrial sites. During the year your company purchased a stand adjoining its ground, and this additional space, together with other space made available by temporary arrangement, has eased matters considerably, and we have been enabled to carry out our work without inconvenience. As you will have seen from the balance sheet, the factory buildings, machinery, plant, etc., account, which stood at the beginning of the year at £58,882 0s. 11d., was increased during the year by £41,711 9s. 7d. This is the expenditure forecasted at the last annual meeting, and the position now is that, with very little further capital expenditure, your factory at Germiston can cope with all reasonable demands which may be made upon it in the future, only a certain amount of erection and completion work remaining to be done.

Increased Stocks of Pipes.

Another item in the balance sheet which perhaps calls for some comment is "Manufactured Stocks on Hand, £49,582 13s. 8d." This is a considerable increase on the figure shown last year. The increase is accounted for by the fact that we had an increased stock of pipes at Germiston seasoning, and awaiting delivery owing to the larger volume of business transacted during the year, an increased stock of pipes against orders requiring delivery from stock, an increased stock of pipes held in terms of our contract against orders from the Administrator of the Transvaal and, further, a stock of pipes held at the new factory at Bellville, as well as a fairly large quantity of bricks made and in course of manufacture at the Brick and Tile Works, Bellville. The value of stock on hand for firm order was £19,122 15s. 2d., and the value of stock made without definite orders having been received therefor was £30,418 18s. 6d., over £7,000 of which being held against contracts.

Anticipating Orders.

It has been found from experience that it is necessary to manufacture certain types of pipes in anticipation of orders so as to avoid delay in delivery when the pipes are urgently required, also that with a longer period allowed for seasoning there is less liability of breakage during delivery by rail and transport. The absence of a sufficient reserve stock has on occasion been responsible for the loss of small orders. Your board is of the opinion that the manufacture of pipes for stock is sound policy, although it, of course, recognises that such stocks must not be unduly large. As was done last year, the stocks on hand have been taken

into the books on a very conservative basis. The desirability of this policy will, of course, be demonstrated in succeeding profit and loss accounts.

The Weekly Output.

During the year 1919-1920 the output of concrete pipes at the works reached 85 tons per week; during the year under review this output had been increased from 85 tons to over 400 tons of concrete pipes per week. Amongst new developments is the manufacture of an entirely non-reinforced pipe made on the Hume principle.

You will also have noted that sundry debtors stand in the balance sheet at £60,517 4s. 1d.; this large amount is due to the fact that the company has had to give extended terms of payment to certain municipalities and other public bodies, which policy was necessary in order to introduce a practically unknown and unproved product. Your board has now decided that the time has arrived to make more stringent terms of payment, and anticipate that the current year will see this figure largely reduced.

Profit for the Year.

At June 30, 1919, a loss of £10,583 13s. 8d. was carried forward to the following year, and at June 30, 1920, this loss had been increased to £11,188 9s., the loss for the year ending on the latter date having amounted to £3,604 15s. 4d. Had it not been for the fact, however, that certain non-recurrent items were charged out, there would have been a profit on actual working for that year of a little over £2,500, so that it was apparent at that time that the company had entered upon the profit-earning stage. From the accounts now before you, you will have seen that your profit for the year under review amounted to £37,714 4s. 5d., and, after wiping out the loss of £11,188 9s., to which I have just referred, there now remains at the credit of our profit and loss account a sum of £23,525 15s. 5d., a result which cannot be regarded as other than satisfactory. Your board has given very careful consideration to the question of disposal of this amount, and has arrived at the conclusion that the interests of the company will be best served by deferring in the meantime any distribution by way of dividend. In forming this opinion, your board has been influenced by the circumstances that very recently several tenders have been made by the company for contracts involving large amounts. It is considered a reasonable assumption that the company will secure a fair proportion of these contracts, and, should this assumption prove to be justified, it will be necessary to provide for fairly heavy outlay on materials and wages, the returns in respect of which will not be available for several months after commencement of the contracts. The tenders referred to are either now being considered or will be considered at an early date.

Fully Equipped.

During the year the Hume Pipe factory at Bellville commenced manufacturing operations, and has already supplied a fair quantity of pipes to complete a sewerage scheme in the Cape Province. The results from our brick-making operations have been very satisfactory, and, with the increased output which it is expected will be produced in the current year, your board anticipates an improvement in the profits from this source. As I have already indicated, your factory at Germiston industrial sites has been enlarged sufficiently to permit of the execution within a reasonable time of any contract, no matter of what extent, which your company may secure in the Union, and the position to-day is therefore that your company is practically fully equipped for its purposes in its present sphere of operations, and, with the improvements and progress which have been, and are being, constantly made as the result of experience gained and of experiments carried out, it can, I think, look forward with confidence to continued success.

The Industrial Depression.

During our financial year the wave of industrial depression which all countries have experienced was not felt by your company until late in the year under review. Since March we have experienced shortage of orders, principally due to the financial straits of the Government and municipalities, who are amongst our largest customers. I am pleased to say that there are signs of improvement in this respect, but I anticipate that it will be some time before trade conditions again become normal.

Before closing my remarks I should like to record our appreciation of the loyal and valuable services that continue to be rendered to the company by its officials and staff.

I now beg to move that the directors' report and the balance sheet and accounts for the year ended June 30, 1921, be received and adopted.

The report of the directors and the balance sheet and accounts were unanimously adopted.

The appointment of Mr. M. C. Bird as a director was confirmed, and Mr. E. G. Izod, M.B.E., and Mr. T. W. Reynolds, the retiring directors, were re-elected.

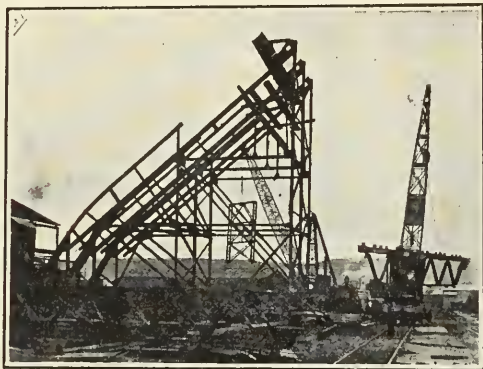
The meeting then concluded.

Industrial Respirators.

Before the War respirators specially designed for use in industry were, practically speaking, non-existent. Experience with respirators as protection against poison gas during the War, however, has been turned to good account from the industrial point of view, and Dr. Leonard Levy recently, at a meeting of the London section of the Society of Chemical Industry, gave an account of the latest developments in this connection. Improvements have been made in the facepiece of respirators over the type used in the Army, but the canisters employed are unused small box respirator

canisters of the type used in the Army, which it has been found difficult to improve upon, and, moreover, they happen to be readily obtainable in large quantities. The fillings of the canisters, however, are quite different from the Army fillings. For industrial purposes there are now ammonia respirators, which find extensive application in cold storage plants, and for which the most satisfactory absorbent has been found to be crystalline copper sulphate. The next type gives protection against neutral vapours, such as hydrocarbon fumes in oil fields, cleaning out oil tanks, etc., and here the best results have been obtained with a filling of highly activated vegetable charcoals. A third type of filling is designed to deal with acid gases, such as hydrochloric acid, chlorine, sulphuretted hydrogen, phosgene, sulphur dioxide, nitrous fumes, hydrocyanic acid, etc., and in this case it has been found that a uniform mixture of alkaline granules and charcoal has the longest life. The alkaline granules made use of by the author are slaked lime, kieselguhr, ferric hydroxide, and activated charcoals. Finally, there is the carbon monoxide respirator, which has presented many novel problems, because there is no known absorbent suitable for use in a respirator canister for the removal by chemical absorption of carbon monoxide from an atmosphere contaminated with that gas. An effective method, however, is by the catalytic oxidation of the carbon monoxide by the oxygen of the atmosphere, using certain special mixtures of oxide, such as finely divided manganese dioxide, copper oxide, cobalt oxide and silver oxide. Moreover, as carbon monoxide gives no indication of its presence, it is necessary for a detector to be embodied in the respirator, so that the wearer can be warned if the respirator has accidentally failed.

Mr. L. D. Normand, late manager of Landau Mine, has been appointed general manager of the Tendega Collieries, Natal.



Illustrations show part of an incline gantry for the Delagoa Bay Coaling Plant, under construction.

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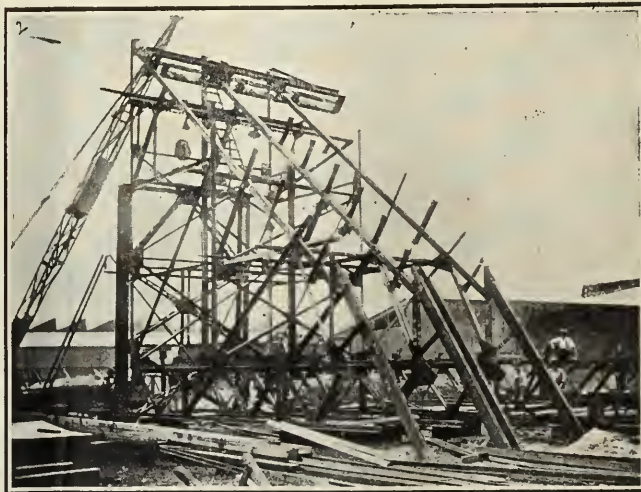
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Diamond Returns for July.

PUBLIC DIGGINGS IN THE CAPE PROVINCE.

The output of diamonds from the public diggings in the Cape Province for the month of July is as follows (the number of claimholders in Barkly West district being given as 1,367):—

BARKLY WEST DISTRICT (3,849 carats value £25,470 17s. 6d.).

	Carats.	Value.
Blaauwbank	139½	£1,108
Delpoort's Hope	251¾	1,518
Eland's Drift	3½	6
Forlorn Hope	1½	4
Gong Gong	219¼	1,580
Good Hope	265	1,100
Grootkop	7¾	34
Harrisdale	143	613
Hebron	380¾	2,325
Holpan	197¼	1,227
Holsdam	9	38
Jonas Kopje	1¾	11
Kareepan	4	8
Keiskama	10½	34
Kilmorey	28¼	280
Klipdam	311¼	1,731
Klipdrift	300½	1,201
Last Hope	3	21
Longlands	490¾	4,203
Niekerk's Rush	203¼	1,810
Ricketts' Prospect	60¾	271
Scholtz's Prospect	50¼	284
Synder's Rush	162¼	1,698
Sunnydale	17¼	89
Sweetwaters	1½	5
Van Zoelen's Langte	88¾	329
Waldeck's Plant	282½	2,070
Ward's Hope	17½	116
Winter's Rush	196¾	1,745

HERBERT DISTRICT (228½ carats value £1,684 12s. 6d.).

Brypaal	20¾	£174
Davisdrift	7¼	71
Douglas Kopjes	6¾	24
Mosesberg	132½	846
Platdrift	5¾	28
Schmidt's Drift	53	529
Sevonelles	2½	10

KIMBERLEY DISTRICT (402 carats value £3,132 7s. 6d.).

Robinson's Kopje	216¼	£1,871
Wedberg	185¾	1,260

TAUNGS DISTRICT (125 carats value £677 5s.).

Doyle's Prospect	52½	£293
Home Rule	38¼	134
Killarney	13¾	79
Tlapeng	20½	171

PRIVATE ESTATES.

Amantia	111	£1,165
New Vaal River D. and E. Syndicate	580¾	3,415
Pniel Estate	494¾	3,172
River View Dia. Syndicate	100¼	799

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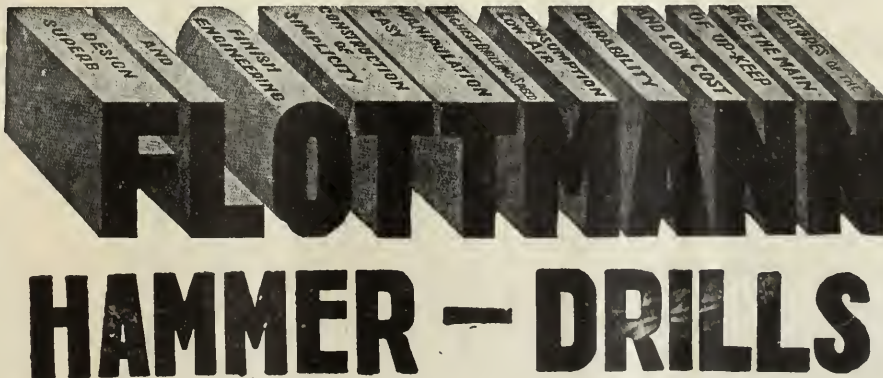
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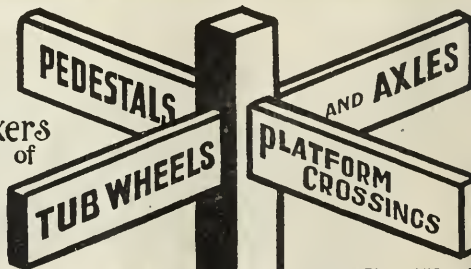
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The South African
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THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, SEPTEMBER 24, 1921

No. 1565.



The late Major Clem D. Webb, M.C.

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The Late Major Clem D. Webb, M.C.

PASSING OF PROMINENT PIONEER AND PROPRIETOR OF THE "S.A. MINING AND ENGINEERING JOURNAL"—SKETCH OF THE CAREER OF A PUBLIC-SPIRITED CITIZEN, A GOOD SPORTSMAN, AND A BRAVE SOLDIER.

With the deepest regret we have to record the death of the proprietor of this journal, Major Clem D. Webb, which took place early last Monday morning. The late Major Webb had been ailing since last June with head trouble, and successive operations had proved ineffectual. He went for a change to his farm in the Northern Transvaal in July, and was forced to go into the Messina Mine Hospital for treatment. From there, after everything possible had been done for him by the doctor to the mine, he returned and entered the Park Lane Nursing Home, which he was fated never to leave alive. The very best medical and surgical skill was powerless to save him, and after an operation to his head on Saturday last, followed by another in the early hours of Monday morning, he succumbed after a plucky fight for life. Fortunately, his end was without pain, and he passed peacefully away in the presence of his family on Monday morning. Owing to the day fixed for the funeral happening to synchronise with a review by the Acting Minister of Defence, it was not possible to arrange a military funeral, but the obsequies were attended by a large and representative gathering on Tuesday

troubles of those days. His forbears had more than their share of fighting blood. His grandfather, John William Webb, an old English squire, came from England in the good ship "Belle Alliance" with the 1820 settlers, accompanied by seven children. One of these, Frederick Charles Webb, who was born in England and came out at the age of seven, turned out to be a prominent leader in these early days. His wife was Mary Stuart, a direct descendant of the Royal house of Stuart. He was commandant at Fort Peddie, and during a big rebellion Commandant F. C. Webb led a body of men against the rebel chief, Macomo, captured him, and among other booty seized a seal that had been presented to Macomo by Queen Victoria, which bears the inscription "Vincit arna Pax." It is to-day a treasured possession of the Webb family.

Mr. F. C. Webb married the sole surviving daughter of Colonel Llewellyn Davies-Ap-Davies, of an old Welsh family, and of the Royal Engineers. As she was the last remaining member of the family—her only brother, Captain Llewellyn Davies, being killed in the early wars—Colonel Davies re-

LEADERS OF THE SOUTH AFRICAN LEAGUE, 1899.



Mr. C. K. White,
First Chairman, Johannesburg Branch.

Mr. W. Wybergh,
President, Transvaal Province.

Mr. C. D. Webb,
Vice-President, Transvaal Province.

Mr. T. R. Dodd,
Hon. Secretary.

that testified to the widespread respect and esteem in which the deceased was held. Messages of condolence were received from relatives and friends from all parts of South Africa, and the floral tributes at the funeral came from every section of the community.

Sketch of His Career.

The late Major Webb was born at Fort Peddie nearly fifty-nine years ago, being the son of the magistrate there. Educated at the Diocesan College, Rondebosch, he was articled to his elder brother, Mr. A. D. Webb, a well-known local practitioner in Queenstown. The latter educated him and acted as a father to him. Indeed he lived with "A. D." until he came to the Rand. In 1886 he was appointed by the Cape Government to take charge of its exhibits at the Colonial and Indian Exposition in London that year, and on his return he came to the Rand at the age of twenty-five, where, though a qualified solicitor of the Supreme Court in Cape Colony, he took up stockbroking for a time. Indeed, it is characteristic of him that he tried several occupations at this time, being successively native labour contractor, stockbroker, and lawyer. Coming of a fighting stock, he was naturally attracted to soldiering at an early age, and he took a prominent part in the Basuto War and in the native

quested her husband to incorporate the name with his own so that it might not be lost. Thus the descendants are properly Davies-Webb. The Davies family came out with the troops long after the arrival of the 1820 settlers.

A Keen Sportsman.

Both at school at Rondebosch and while serving his articles, deceased was a keen, all-round athlete. He was fond of sport all his life, and for two years, in the early nineties, was the amateur heavy-weight boxer of South Africa. He helped to found the Wanderers, Johannesburg, and never lost his interest in sport.

The Reform Movement.

In the strenuous and exciting days that preceded the Raid and the Boer War he played a prominent part, and he assisted in the formation of the S.A. League. Indeed, his life at that time was bound up with the history of the movement for freedom of the Uitlanders, and the story of his activities is written in the chronicles of the period.

The following extract from *Black and White* of February 18, 1899, sketches the rise of the S.A. League and shows the prominent part he played in it. The photos of the four leaders of the movement, of which he was one, are reproduced:—

"The recent riots in Johannesburg showed that the spirit of the Uitlanders is far from dead, and the South African League has been working quietly and steadily to maintain this spirit of independence. Some information about the leading members of this League may be of interest to our readers.

"The President of the Transvaal province of the South African League is Mr. Wilfrid Wybergh, who has already been called upon to make substantial sacrifices for the sake of his sturdy political principles. Mr. Wybergh is of good Cumberland stock, and won a Foundation Scholarship at Winchester College. For three years he studied mining engineering at the Freiberg Royal School of Mines in Saxony, and then in 1890 went up with the pioneers to Mashonaland, where he remained till 1893. Thence he went to the Witwatersrand, and was consulting engineer to the George and Mary Company on the West Rand during 1894, a post which he left to join the staff of the Consolidated Gold Fields of South Africa. As soon as the South African League began to take a prominent part in the agitation against the intolerable condition of British subjects within the Transvaal, Mr. Wybergh's connection with that powerful corporation abruptly ceased.

is a solicitor and notary public of the Supreme Court of the Cape Colony. He was sent by the Cape Government as a representative of the colony to the Colonial and Indian Exhibition held in London in 1886, and had the honour of lunching at Windsor Castle, where he was presented to Her Majesty. Going in 1888 to Johannesburg, he was one of the early members of the Stock Exchange and Rand Club. For some years he has been closely associated with the *South African Mining Journal*, and is the general manager of the company publishing that paper. During the time of the imprisonment of the Reformers, Mr. Webb and four others started the South African League in the Transvaal. He is still on the executive, and is the Vice-President of the Transvaal Province and Chairman of the Johannesburg branch.

"Mr. Tom Dodd is a Northumbrian, and was for ten years mining at home. He was a member of the Northumberland County Council, and was asked to stand for Parliament in the Liberal interest. In 1895 he went to South Africa, and has worked energetically for the cause. He is hon. Secretary of the South African League in the Transvaal, is one of the finest orators in Africa, and is white all through."



Major Webb (in centre, front row) with a group of Pioneers of the Transvaal Goldfields. Photo taken at the inaugural meeting of the '87 Pioneers of the Transvaal Goldfields, presided over by Mr. W. P. Taylor.

"The first President of the South African League in the Transvaal was Mr. Charles Kimber White, who still is one of the most valiant champions of British rights. Mr. White is of blood well known in the country of Somerset, but has for over sixty years been identified with the history of South Africa. In 1838 he took part in the stirring Kafir war on the eastern frontier of the colony. In recognition of his pluck he was granted a farm at Cathcart. Ever since then he has been where history was being made—Kimberley being for some years his residence. During the British occupation of the Transvaal he was appointed representative of the people to the Legislature under the Lanyon Government, upon which he made his memorable onslaught by reason of its delay, its nepotism and its broken promises. After the Retrocession following upon the Boer War, Mr. White and a Dutch colleague of loyal proclivities spoke throughout England for redress for those who were ruined by that great betrayal; but, of course, ineffectually. As a member of the League, however, he has done much good work in the struggle against Boer misgovernment.

"Mr. Clem D. Webb was born in the Eastern Province of the Cape Colony, and is a descendant of the British settlers who went to South Africa in 1820. By profession he

The Edgar Case.

From the *Standard and Diggers' News*, of December 26, 1898, we take the following sidelight on the political turmoil on the Rand at the time, and the part played by the late Major Webb in what was known as the Edgar case:—

"In preparation for the public demonstration which had been announced to take place on the Market Square on Saturday afternoon, a very large crowd congregated at the Post Office end a long time before the appointed hour of 3.30. It had then been decided by a small committee, principally members of the South African League, to place a petition before the British Vice-Consul, for despatch to Her Majesty Queen Victoria, setting forth the facts of the case of the Edgar shooting tragedy, and alleged partial treatment of Police Constable Barend Stephanus Jones by the Public Prosecutor, in releasing him on bail without waiting for any magisterial enquiry, and reducing the original charge of murder to that of culpable homicide. The current of public feeling ran very strong, and an interested crowd gathered about the Square waiting for the first orator.

"While this was going on an open carriage was drawn up, which contained Mr. Clem D. Webb, Advocate Foster,

and J. Dunn. This arrival was the immediate signal for cheering and an enthusiastic reception. Some climbed on to the seat, others on to the wheels, while the body of the vehicle groaned under the weight of a few journalists who suffered discomfort for the gain of 'copy.'

"Mr. Webb then rose, amidst a perfect din of applause, and addressing the assembly in a loud voice, said:—Gentlemen: You are all aware that public and open-air meetings are not allowed in this country. (Hooting and groans.) I don't want you to do that; I want you to respect the law, and to understand that it is the intention of the British subjects to go down in a quiet and orderly manner to the British Vice-Consul, to emphasise the gravity of this particular instance, and to formally protest against what has

murder. For God's sake, let us ask for justice, and go down to the Vice-Consul's in an honest, manly way and show that we have done our duty. (Applause.) Will you please follow the committee and thereby signify your willingness to the petition that is going to be presented. The British Vice-Consul has sent up a message to say he is ready to hear what we have to say. (Deafening cheers.)

"With frantic enthusiasm, the crowd gathered still closer round the carriage. Some insisted on outspanning the horses and drawing the vehicle along themselves. During this operation one man was badly bitten by the horses. The carriage was dragged down Loveday and along Commissioner Streets, followed by an enormous crowd, singing "Rally Round the Flag, Boys," "Freedom for Ever," and other



THE OLD QUEENSTOWN BOYS.

The above is a picture of pioneers from Queenstown (Cape Colony), taken at Johannesburg in 1887 by Alfred Dugmore, photographer. At the present day a good many of those appearing in the group are dead, and some have left the Rand, but a fair proportion, including several prominent men, are still residing here. The late Major Webb is seated on the right of the picture, with pipe in hand. Seated third on his right is Sir Abe Bailey.

taken place. (Cheers.) It is not the intention of anybody associated with me in this affair to do anything of which we need be ashamed. (Cheers.) We are here as British subjects, and are prepared to stand the brunt of what we are going to do. (Loud applause.) What we intend to do is that those who desire to accompany us in a quiet and orderly manner, should go down to the British Vice-Consul's office in the Standard Bank Buildings, and there the Committee which has been formed will present a petition to the Queen—(cheers)—protesting against what has taken place in connection with the Edgar murder case. Gentlemen, let us give the police and detectives, which I see around us, no chance of saying that we have done anything of which we need be ashamed. (Cheers.) At the same time, I would say this, that for God's sake as British subjects let us show that we are not afraid to emphasise our objections to this brutal

similar patriotic ditties. It was noticeable that in spite of Mr. Webb's remarks, there was not a policeman to be seen in uniform at any part of the route.

"Preceded and followed by a huge crowd, the carriage at length arrived at the Consulate, which was swarmed by an enormous crowd. The members of the committee and some fifty others presented themselves before Mr. J. Emrys Evans and advanced on to the balcony, where the petition was read by Mr. T. R. Dodd, as representing the British subjects of Johannesburg."

The ending of this *cause celebre*, of course, is written in the history of the Transvaal.

The Boer War.

When the war broke out he, with other well-known colonists, assisted to form the Imperial Light Horse, which was a

corps d'elite of the time and which distinguished itself particularly in Ladysmith. Under Colonel Scott-Chisholm, in that regiment served, with Captain Webb, as he was then, such well-known fighters as Colonel Sir Aubrey Woods-Sampson, Major Karri Davies, Colonel Creswell, Captains Fowler, John Orr, Barnes, and dozens of others of the fine flower of South African manhood. With no mishap beyond a severe bout of illness in Kimberley Hospital, Major Webb came through that struggle, and being one of the first back to the Rand, he held several important official positions under the military *régime*. He commanded the Fire Brigade and held other posts under the Health and Sanitation Committee, which was afterwards merged into the Town Council. Later he took an active interest in politics, and contested Marico as an independent unsuccessfully. He sat for Yeoville in the Provincial Council since Union, but the deliberations of that phlegmatic body soon lost interest for him. Farming, which had always exercised a fascination for him, occupied his attention at intervals, and he was never happier than when he could throw off the cares of running the *Mining Journal*, and retire for a spell to the country.

The Great War.

Although well over military age, he was not to be denied participation in the Great War, and after several ineffectual attempts to go in any capacity, he secured, through the good offices of his friend, General Byron, the post of Transport Officer to the 5th S.A. Infantry in German East. Both Generals Beves and Byron, under whom he served at this period, speak highly of his personal bravery and devotion, and he won the M.C. for an act of conspicuous bravery in the field. About the same time his eldest son, Stuart, won the same coveted decoration in France, and this emboldened his old friends on the Rand to send him the following unique testimonial:—

An Unique Tribute.

The message was couched in the following terms:—

To
CAPTAIN CLEM D. WEBB, M.C.,
Section 8, A.P.O., B.E.F., France.

"We are guilty in the conventional sense, but we have not forgotten. We did not know your whereabouts. We admire and envy your achievements, which are worthy of you, this being apart from heroics. Continue for the benefit of us who would be glad to have the opportunity of doing likewise to deserve the distinction which has been won by father and son."

"Everyone is the son of his own work."—*Don Quirote*.

This was signed by the following:—J. Beatty, P. D. Dyer, Wm. Beachy Head, P. A. Ogilvie, C. Tremer, Percy Greathead, J. M. Buckland, C. F. Tainton, Emrys Evans, Richard Currie, R. G. Rimer, G. W. Ogilvie, Frank Emley, W. G. Stevens, John R. Williams, W. B. Knox, Sir T. M. Cullinan, Sir A. Bailey, Arthur M. M. Cooke, Oswald Fletcher, H. A. Green, J. Spranger Harrison, W. P. Taylor, Sir A. Wood-Sampson, H. S. Harger, Wm. Stayt, E. H. Danckwerts, H. C. Fletcher, J. A. Vaughan, T. A. R. Purchas, J. Dobson, G. D. Masey, E. W. Buxton, W. K. Tucker, H. Solomon, L. B. Chesterton, J. Frank Brown, Claude Sampson, J. C. Burchmore, E. A. "Barborton" Halliwell, Harry S. Head, Cato Miller, J. V. Blinkhorn, C. J. Watson.

A Padre's Testimony.

The following interesting account of a forgotten incident of the fighting in German East is from the pen of a padre attached to Major Webb's regiment, the 5th S.A.I. It is taken from a vivid pen picture of the fighting contributed by the padre to the *Cornhill*:—

"Scarcely had the firing begun when another sort of crackling sound broke out quite near us, and increased forthwith in intensity. It was a sound I had never heard before and hope never to hear again, the sound of animals stampeding, or trying to stampede, through dry elephant grass. A moment more, and they were upon us, horses,

mules, all our first-line transport, their heels flying wildly in all directions, their distracted leaders hanging on for dear life to the bridles. And with animals came men, helmetless in some cases, and all of them beating the air wildly, and apparently quite distracted. Someone shouted 'wild bees,' and almost at once they were on us too, swarms of them, stinging viciously, and attacking every living thing they came across. Meanwhile the situation was growing every moment more critical. A panic is at all times a formidable peril, but who can calculate the effects of a panic precipitated down an elephant path two feet wide, into an advancing regiment and a large train of native porters? One of the machine-gun mules had already been lost, and we seemed in a fair way to losing the remainder, let alone the fact that the rifle fire from in front still continued, and the arrival of the enemy might at any moment put the finishing touch to what threatened to be a grave disaster. Fortunately, we had in the 5th S.A. Infantry a very remarkable man, a man of many and varied accomplishments, and of very wide experience. He had been, I believe, a member of the Johannesburg



The late Major Webb (left centre) with friends, taken in London in 1886, when he was 26 years of age.

Reform Committee at the time of the famous Raid, and besides being a politician, he was also a mining expert and a journalist, an agriculturist, a hunter, and an authority on native customs. He could also charm snakes, and frequently carried poisonous varieties about with him in his kit-bags. Presumably, he was accustomed to deal with desperate situations: at any rate he dealt with one on this occasion in a truly masterly manner. In a few moments, as it seemed to me, he had hewn out a new path through the elephant grass, and was diverting the stream of tortured men and animals down it, and, by a detour made to avoid the bee area, round to the front again. This officer, a few months later, received the Military Cross for gallantry displayed on another occasion, and no decoration, in my humble opinion, was ever more richly deserved. The episode proved what the South African civilian soldier could do on an emergency. He may sometimes have fallen a little short, in his views of discipline, of the ideals I had been accustomed to with the Guards, but he displayed on occasion a resourcefulness which even the Guards themselves might have envied."

After the successful close of the East African Campaign, Major Webb secured a company command in the Native Labour Contingent that went to France, and one well remembers his gratification on the receipt of a personal message from General Botha commending the natives to his care and consideration and emphasising the importance of the trust imposed on him by the Government. It is not too much to say that Major Webb was overjoyed at the opportunity of getting to France, and only with difficulty was he kept from seeking adventure in the danger zone. When towards the end of hostilities he was allowed to visit the firing line as the guest of the Commander-in-Chief, he tried hard to be allowed to remain near the actual theatre of war. A spell in hospital, however, led to his being sent back to South Africa in charge of a draft, and before he could return the Armistice was declared. It was a matter of the greatest satisfaction to him that he was able to take part in the Great War, and that he was able to give to the service of the Empire four stalwart soldier sons, all of whom distinguished themselves and won commissioned rank and were mentioned in despatches.

Preceding the interment in Brixton Cemetery, a brief impressive service was held in St. Mary's Church, Plein Street, by Canon Harrison Thompson. The coffin, borne by four sons of the deceased, with Captain Fowler, D.S.O., and Mr. A. Child, was covered with the Union Jack. There was a mass of floral tributes.

The chief mourners were the widow (Mrs. Clem Webb), Mr. and Mrs. Howes (daughter), Mr. and Mrs. Guy Webb, and Messrs. Stuart and Clement Webb (Godwan River), Mr. Dodd Webb (Johannesburg), and Mrs. Helen Driver (sister, Pretoria).

The gathering in the church and subsequently at the cemetery, where Canon Thompson conducted the final service, included, among others, Col. A. Woolls-Sampson, Col. Bettington, Col. J. Donaldson, Major Jenner, Senator Kidger Tucker, C.M.G. (representing the 1820 Memorial Settlers Association), Messrs. H. Adler, S. C. Black, W. B. Taylor, W. Webber, M.L.A., J. E. Nixon, M.L.A., W. Grey Rattray, H. Head, Colin Watson, J. Mackie Niven (representing the old Unionist Party), W. Bleloch, A. E. O'Flaherty, Samuel



Officers of the Imperial Light Horse, including Col. Scott-Chisholme, Col. Woolls-Sampson, Dr. W. F. T. Davies, Major Karri Davies, Captains John Orr, Barnes, Fowler, D.S.O., and Lieuts. Clem Webb (first figure on left, standing), F. H. P. Creswell, P. Norman and Brabant.

His Family.

The late Major Webb married, in 1889, Miss G. E. Pretorius, a descendant of the late General Pretorius and of the family of the late ex-President Pretorius of the South African Republic. There are six sons, Stuart, Guy L., Clement, Dodd, Herbert and Owen, and three daughters, Ellen, Mabel, Roma Gladys and Lorna. The sympathy of the whole community will go out to his family—particularly the younger members—on the loss they have sustained of a fond and affectionate father.

Rand Pioneers and W.A.S. Activities.

Amongst his other activities he was for several years on the executive of the Rand Pioneers, and he was also on the general council and executive of the Witwatersrand Agricultural Society to the day of his death. He was also a foundation member of the Rand Club and a life member of the Royal Colonial Institute.

The Funeral.

The funeral on Tuesday was a fitting ending to a varied and adventurous career. Every class and section of the community was represented, and the wide range of his sympathies was reflected in the attendance.

Evans, J. Lang, S. R. Potter (*Mining Journal*), Harry Smith, C. Hewitt, R. H. Sawyer, J. Gill, J. W. O'Hara, M. B. Gardiner, H. S. Lyons, R. Fielding, S. C. Black, Frank Hilner, John Martin, Murray Roberts, L. L. Feltham, W. Blaine, and W. J. Dold.

Floral Tributes.

Floral tributes with expressions of deep sympathy were sent from Sir Abe Bailey, M.L.A., Sir William and Lady Dalrymple, Stuart, Clement and Dodd; Harriet, Constance and Ivan; Guy and Glory, Alice and Sydney, "Chum," Vinny, Nell and Arthur; Vinnie, Harriet and Helen; Herbert, Roma, Lorna and Owen; the Webbs of Bulawayo; "Your godson and old comrade's son" (Almoth Clement O'Flaherty), the chairman and directors of the *Daily Mail* and *Sunday Times*, staff of the *South African Mining and Engineering Journal*, directors of the Central News Agency, Ltd., directors and staff of the Argus Company, Newspaper Union of South Africa, directors and staff of *Mining Journal*, Major and Mrs. Warby, Julius Jeppe, Mr. and Mrs. W. Ross, Mr. and Mrs. J. H. L. Manisty, Mr. and Mrs. J. H. Dinwoodie, Major and Mrs. H. A. Rogers, Mr. and Mrs. Moseley Brady, Richard R. Hollins, Mr. and Mrs. A. H. H. Grant, Mr. and Mrs. C. J. Kleudgen, Mr. and Mrs.

Kilgour, Mr. and Mrs. C. Meintjes and family, Mr. and Mrs. E. L. Bateman, Mr. T. Lloyds Ellis, Mr. and Mrs. Edward Blinman, Mr. and Mrs. Stayt and family, Committee and members of the Witwatersrand Commercial Exchange, Harold Mayer, H. H. L. Feltham, R. T. Ford, M. A. Zoccola and family, T. W. Becket and Co., J. Cyrus Milbourne, Chairman and Directors of the Rand Mines, Ltd., the Ladies' '89 Pioneer Club, the Directors of E. H. Adlington, Ltd., Captain C. H. Fowler, Jack Hartdeger, Hugh Grosvenor, Capt. and Mrs. Childe and family, Harry W. Smith and family, Mr. and Mrs. Dowling, Major and Mrs. S. Munnik, Mr. and Mrs. Frank Donaldson, Deputy chairman, committee and members of the United Party Club, Professor and Mrs. J. G. Lawn, T. P. E. Butt, Mr. and Mrs. A. N. Clogg, J. G. Fitzpatrick, C. E. Nelson, T. G. Currey, Carr Hammett, Transvaal Branch of the 1820 Memorial Settlers' Association, Union Club of South Africa, Rand Pioneers Incorporated, S.A. Party Club, Mr. and Mrs. A. Murray Roberts, Mr. and Mrs. Chas. Jenner, Mr. and Mrs. Henry Adler, Mrs. Kusel and family, Committee and members of the Witwatersrand Agricultural Society.

The funeral arrangements were carried out by Messrs. J. A. Hobkirk, Ltd., Bree Street.

A Personal Tribute.

By W. P. Taylor.

"Your brother is dead and you do not weep." "My brother is dead and I do not weep. Would all the tears that I could shed bring him back to life? My brother is dead and I do not weep." These were the words spoken at the grave of a noble Greek near on two thousand years ago. They were recalled to me by one who to-day is no more. They were brought to my mind by his own words when last I saw him in life. They were recalled to me by his noble bearing, his utter indifference to death. Perhaps I was one of few who realised his danger, and it was only the long years of friendship, unbroken friendship, that permitted me to venture so deeply on the danger of his physical trouble. In the good old days when we were all much younger, how often had I seen him in the white flannels of gymnasium. I had seen him in the ring with the gloves, and whether on bars or where it was, in that garb he was the true type of the figure loved by that great man whose embodiment of physical energy has been placed as an outstanding emblem on the slopes of the hill at "Groote Schuur." The Hermes of Praxitiles at Olympia in Greece, said to have all moods of human expression, and pouring all human beauty and strength, I saw near its bed, where for near two thousand years it had rested, and as my eye fell on its beautiful outlines, I thought of a face that had filled my mind with the same forces away in Africa's veld. I thought of the face of my friend, Clem Webb, and I said to myself, "there are other Hermes living." I have known him in sport and in the field—a lover of fair play and hard fighting, gentle as the moods portrayed by that dead sculptor twenty centuries ago, a living embodiment of life in its best aspect. He accepted death as those do whom the Gods are pleased to call. "My brother is dead, and all my tears will not call him back to life."

Another Pioneer Gone.

By Alfred Stenhouse.

The pity of it! There cannot be more than 300 or 400 real Pioneers now amongst us. Men who laid the foundations, in 1886, of the greatest gold mining industry the world has ever known. Soon we shall know them no more.

Cannot there be a last reunion of these Pioneers in the garden of "Arcadia"? Our first thought every morning should be "First seek ye the kingdom of Heaven." Our friend Clem Webb superlatively possessed the greatest of all virtue, "absolute unselfishness." At the final bar of justice rich and poor alike will toe the line on an equal footing, and by our deeds shall we be judged. Life is short, but once our mission on earth is accomplished, may we also, with every confidence, endorse the farewell song of the meteoric stars:

"O Grave, where is thy victory?
Oh, Death, where is thy sting?"

An Old Comrade's Tribute

By Capt. C. H. Fowler, D.S.O., late I.L.H.

Life was a vivid reality to Clem Webb, and he lived it fully. Athletic and virile, he revelled in the vigour and abundance of it. An all-round sportsman who put the game above the prize, he believed passionately in fair play. He had strong convictions and stood to them strongly, but in thirty years I heard no malice or uncharitableness from him. His good fellowship, his sense of humour, his anecdotes, his optimism, made him an attractive and most lovable man, and the basis of his character was a wide and deep sympathy. He loved his country; he loved his fellows, and he loved children. Though his business kept him in town, he was an out-of-doors man, and his heart was in the calling spaces of veld and bush and berg, where God keeps open house. His heart was very near Nature.

His record of active service began with the Basuto War in the seventies, when he got into trouble for joining too young. It ended on the Western Front when peace was declared in 1918. A fighting man; he got to every war he could reach. He was a valuable officer in the Imperial Light Horse through Ladysmith in the Boer War, and in East Africa was awarded the Military Cross for a signal act of cool gallantry at the age of nearly sixty. He believed fervently in his Race and its cause. He was a Crusader from his youth up.

He represented South Africa at the Colinderies Exhibition in London in '86. He was identified with every form of sport. He played his part in the troublous nineties in the Transvaal, including the Johannesburg movement in connection with the Jamieson Raid at the end of '95, and was especially prominent over the Edgar case in '99. He acted as a head of one of the branches of the municipal service of Johannesburg after the military occupation of the town in 1900, and he represented Yeoville in the Provincial Council about 10 years ago. This is not meant to be a list of his activities, but merely those that occur to me as I write.

Natives trusted him implicitly. His fondness for animals was remarkable, and their response extraordinary. The only horse in the Imperial Light Horse that came out of Ladysmith in decent condition was his "little mare." He dug roots for her. She followed him like a dog. I wish that someone who knows about his horse "Jerry" from personal experience in East Africa would tell the story.

Stevenson says finely, "Every heart that has beat strongly and cheerfully has left a hopeful impulse behind it in the world, and bettered the tradition of mankind." It was thus he lived. He was very human. He was a rare companion; he was a chivalrous opponent, and he was a strong and a sincere friend. He was a pioneer of the Rand, and dated from '88. He did his level best. He pulled his weight; he played the game. This place is the poorer by a great and loyal heart, and many, many miss "a friend that sticketh closer than a brother." The heartfelt sympathy of his friends goes out to those near and dear to him.

An Appreciation.

By Colonel R. A. Bettington.

Seeing that my old friend and I used to exchange experiences covering a period of no less than forty years, I did not hesitate in accepting the Editor's courteous request to put down a few personal recollections of the dear old fellow. His military career has already been dealt with at length, so I will limit myself to saying that he was of the best type of officer—of the men who do things and say nothing, who infinitely prefer speaking of what others have done, and when pressed for personal details relate amusing incidents of which they have been witnesses. Unlike many officers of irregular forces, who so often consider themselves immeasurably superior to their professional brethren, he had a profound admiration for the real thing. I recollect his telling me how in France he attended a gymkhana managed by some of the old "Contemptible" cavalry officers. He turned to his companions and said, "These be officers." "So are we," somewhat indignantly. "Oh, yes, but we can't look like them." "You know, Bettington, our fellows can fight with the best, but it's no use, we can't carry our uniforms like those fellows, even if we have them made by the same tailors; it takes years to walk as they do." For all that, there was not a Guardsman in the British Army who would have denied Clem Webb the right and title of an "officer and a gentleman."

His prowess as an athlete and a boxer have already been mentioned, but never was that mighty hand of his raised save in justice. While we were connected with that financial failure, the *Sunday News*, we had planned a series of articles on extended education for those who had to work for their living, and also on the native question, on which he held the soundest views. When the town and reef were all agog over native outrages, he told me that his old Zulu servant said: "Baas, if this matter was left to us Zulus, we would stop it very soon; we don't like it." It is a pleasure to remember that over the long term of years never one angry word or thought passed between us. His wife must be comforted by the knowledge that she has four gallant sons to carry on the tradition of his own fine record. Righteous people may say, "God rest his soul." It is the last thing he would have wished. As I am writing, I know that my friend is living and doing good work with increased vigour and ability. For "the souls of the righteous are with the Lord." And he is no idler.

Au revoir, my friend.

By Scott Alexander.

The demise of Major Clem Webb, M.C., the proprietor and managing director of your esteemed journal, leaves a blank file in the dwindling ranks of the early and worthy pioneers of the Rand, but those of his pals who are left, like good men and true, knowing that they also will soon have to face the inevitable, in all reverence bid him "au revoir," but not good-bye. His life's history the newspapers all over the country have given, and you will elaborate; but kindly allow me, sir, an old friend and admirer of so noble and charming a character, to add Wordsworth's words as my humble tribute to his memory:

"That man who is from God sent forth,
Doth yet again to God return;
Such ebb and flow must ever be,
Then wherefore should we mourn?"

Some Reminiscences.

By C. J. Lever.

My recollections of Clement Davies Webb extend back for 41 years. When I went to the Diocesan College in 1880, I found him there, and a more handsome specimen of man-

hood it would be difficult to find anywhere. He was then about 19 years old, but well-grown and splendidly developed. He was a particularly good gymnast and boxer, and well to the fore in any kind of sport going. When I first met him he was Senior Lieutenant of the Diocesan College Cadet Corps, and shortly after was promoted Captain Commanding vice Frank Molteno, who was leaving the College; and I can assure you that Clem looked particularly smart in his dark blue uniform with white facings. He left College at the end of 1880 and went to his home at Queenstown, where, as it happened, I too went in 1882. For the four years of my stay there I was constantly in touch with Webb, not only socially but in connection with football, etc. He and I were members of the Queenstown Swifts Football Club, and we have played together in some hard fought contests against Kingwilliamstown, East London and the C.M.R.

I left Queenstown in 1886 for Pretoria, and soon after heard that Clem had come to the Witwatersrand to try his luck. His career here is so well known that I need not touch upon that, except to say that he always took a keen interest in sport of most kinds.

His service in the Anglo-Boer War is well known. During the late War I met him on board the *Professor* at Dares-Salam, and we journeyed to Durban together, where he was invalided out of the 5th S.A.I. Later, in 1917, when I went to France, I had the honour of serving under him in the S.A.N.L.C., in which he was one of the most popular and efficient officers.

Clement Davies Webb was a gallant gentleman, kindly, courteous and debonnaire, and his keen sense of wit and humour always made his society charming and entertaining, and I, and others who knew him so well, will miss him sadly.

"Clem Webb of Ours,"

By A. E. O'F.

It didn't seem to be Clem Webb's turn—not yet. Our people have been marshalled in legions through the wide gates of Death and the most grievous sacrifice has been taken of the young. We are benumbed by unseasonable death: and the epitaph is complete with a date and a number. Yet the closing of Clem Webb's life has suddenly shocked us all again. We measure time by our own shadows; and Webb cast so little shadow that his day seems to have ended in the meridian. I know now what this quality of his was. He took an interest in living—the first quality in a journalist, in the philosopher, and here I see him smile—in this religious man. "Behold that which I have seen to be good and comely is for one to eat and to drink and to enjoy good in all his labour wherein he labour-eth under the sun all the days of his life which God hath given him . . . and to rejoice in his labour: this is the gift of God. For he shall not much remember the days of his life: because God answereth him in the joy of his heart." That "vitality" of his interest caused us all, too, "not much to remember the days of his life," and so he has left us with the pang that belongs to the death of a boy.

It is more than a quarter of a century since I inherited Webb as a friend; and to review the memories of him in those momentous days of South Africa is to walk again in the paths of youth. None of us would claim now that the "patriotic" things we did were right in themselves, but I can safely make the claim for Webb that the spirit in which he did them took away this essential evil—as it seems now—of his deeds. What the unseen forces were which swept Boer and Briton into unnatural and futile conflict none then guessed. For Webb it was not only the high call of patriotism and duty, but a demand which no man of honour could shirk. Idealist in everything, the ideal of England was for him what, I suppose, the Cross was to the Crusaders. It is true that he returned from two such crusades with thoughts severely chastened. He learnt to call himself an Afrikaner

and to feel a genuine friendship for that section of us who first took a pride in the name. It was in their interest he founded *The Farm News* and he looked forward to end his days as an oprechte boer. Yet it was very largely due to this fiery zeal of Webb and Dodd—another idealist—that the turnouts of Johannesburg provided the occasion which the politicians turned to war. His influence was neither oratorical nor literary. His courage vitalised the men around him and his gaiety overbore reflection. Perhaps nothing could more vividly have evidenced the sincerity of his regard and reconciliation with "the Dutch" than his candidature for the Parliamentary representation of Marico. In this he was admirably supported by the beautiful girl he had romantically wooed and won as wife in the years before the turbulence. His instinctive humanity made it easy for him to resume kindly relations with old German friends in spite of the propaganda of hate; and he told me with perhaps a touch of emotion on his return from the battlefields of Flanders that he had found a more cordial welcome from the Germans here than he had from his own. Perhaps it was because it touched his chivalry he felt it so much.

Perhaps the most surprising characteristic of Webb was his modesty. It suited well with his broad shoulders and manly bearing. It made him under-rate his own capacity. He would have been an admirably straight-forward speaker was he not always made shy by a sense of unproficiency, and the *Mining Journal* would have been strengthened had he written more of it. What is remarkable is that while the Journal had as editor many of the most brilliant men of the time, Webb's own personality always made it his paper. I suppose that in no newspaper office in the world was the blue pencil of "the management" so little used; but his editors had a regard for Webb's friendships, and on the whole it had the effect of sound policy.

Behind the apparent unanimity of what is known to the public as the "Mining Houses" there have been intense and even fierce personal rivalries and animosities. In a place like Johannesburg the journalist writing on public themes knows, if he knows his work, that he is also dealing with the crucial affairs of men he is meeting every day. "Detachment" is only got by effort and the "elimination of the personal equation" is hard and, perhaps, not always sound. Webb, however, was no sycophant and criticism of the "Houses" has appeared in the Journal that would not have been permitted by one who only regarded his advertisement pages. In this, however, he proved to be the best friend of his friends, and none can say that "small men" or "new propositions" have been cold-shouldered or repressed or excluded by the *Mining Journal*. Wherever there is a live newspaper the editor's office is a live place. No thrilling thing of his many thrilling things this land has felt since Kimberley reached out to the Rand was long of reaching "the office." Whether it was a new current pushed from outside into the South African League, a new direction about to be imparted to our politics from outside the politician, a new event in this mining or social world, it was earliest and most fairly canvassed in Webb's office. It would be out of place here to record these: over his grave should be preserved the urbanity that distinguished all his dealings. His idealism was tempered with the scriptural counsel: "Be not righteous overmuch." Perhaps that is why all the manly padres liked him. He was most at home with the Catholics, I think, and his national respect for holy things and gay courtesy were always charming.

I seem to have been at Church services very often with Webb. Some of them are vivid now. All but one were for the consecration of a soldier's cause. They grow fewer who recall the last Church parade in Maritzburg, when Scott Christolme read the lesson. Fewer still who recall the rest on the arms reversed when we committed that fine soldier to the grave in the Ladysmith twilight, of which John Stuart wrote so well. I recall the solemnity of the Imperial Light Horse in St. Mary's and some firing parties elsewhere. But none of such things could be more cut into memory than his last Church parade. The soldiers were all engaged with the Minister of Defence and no one had leave to grace his passing with a soldier's farewell, such as

he had a right to. Well, they treated Lukin's arrival here with the same unconsciousness. But his four strong boys in uniform carried their gallant father's body up the aisle and from the altar attended it for the last salute at the grave. The best soldier's funeral I have known.

To them is committed, I suppose, to carry on the *Mining Journal* and the *Farm News* in the same spirit of bright faith and balanced sincerity as illumined their happy father's work and life.

Frater, ave atque vale.

A. E. O'FLAHERTY.

Mozambique Portland Cement.

In the course of a long and detailed report, Capt. H. Pooley, Jr., B.Sc., A.M.I.C.E., F.G.S., one of the consulting engineers to the Mozambique Portland Cement Co. Ltd., states that the company was fortunate in securing its plant at so reasonable a figure, as if quotations were obtained afresh, he thinks that the price would be increased by some £30,000. He concludes his report as follows:— "There is little need for me to say much to you in connection with the prospects of a cement company. At the present time in Africa the field for cement is practically unlimited; cement is being used more largely as time goes on in connection with all manner of constructional work, and I see no reason to doubt that larger quantities still will be required in the future. I feel sure that, before long, you will be wise to consider the duplication of your plant, because the opportunities of your company are unique, and when the factory is in running order, you can look for very substantial returns on the money you have invested."

South African Carbide and By-Products.

At the first annual general meeting, held at Winchester House, Old Broad Street, E.C., Sir Cecil Partridge, K.B.E., the chairman, in moving the adoption of the report and accounts, said that circumstances had arisen since the last meeting over which neither the directors nor the various contractors employed by them had had control, by which the company's programme had been considerably retarded. The directors had determined to push on with the greatest possible speed the carbide side of the company's business, and, in order that production might be secured as early as possible, the consulting engineers had been requested to concentrate upon the construction and equipment of the carbide factory and power station, and it was confidently expected that these sections would be in full working order in six or eight months' time. The progress made in connection with the producer and low temperature section led the directors to anticipate that a portion of this plant would be in operation at an early date.

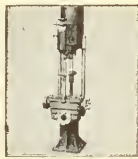
The increases in the cost of labour and materials since the formation of the company had been reflected in the cost of the company's works and equipment, but the actual expenditure would not be so high as was at one time feared. The estimated commitments were now £292,933. Ten per cent. of the total cost of the plant was not payable until the plant had been operating for three months, and it was hoped that at the expiration of such period the company would be in receipt of revenue sufficient to meet current expenses. The market price of carbide in South Africa had very much increased, and, although working and transport costs had shown a similar tendency, the directors anticipated that the profits accruing to the company would exceed their original estimate. Sir Dennis Bayley, who had recently returned from a visit to South Africa, reported that, considering the unavoidable delays caused by the moulders' strike and the serious congestion on the South African Railway, he was pleased to find the work on the carbide and by-product factory at Ballengeich so well in hand. In his opinion, a very good contract had been made for the building of the factory.

Asbestos in the Pietersburg District.

PROPERTY OF SOUTH AFRICAN ASBESTOS MINES, LIMITED.



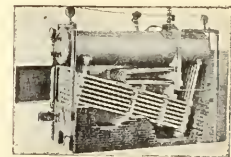
1. Waterkloof: Mr. Sumner, Major Trevor and Mr. Baker (right to left). 1 & 4. Waterkloof, showing dense vegetation and hills in background. 2. Nature of country in vicinity of Asbestos property. 3. Present treatment plant situated on side of valley (McPie Valley). 5. Centrifugal disintegrator and separator.



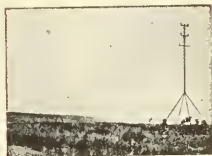
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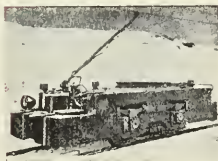


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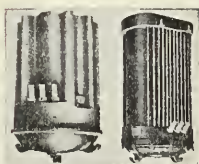
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Early Days at Kimberley.

DIAMOND BUYING METHODS—SOME NOTABILITIES—GUN-RUNNING—SOCIAL AMENITIES.

(By W. P. Taylor.)

These sketches of early diamond fields life are entirely from memory. One or two friends who trod that same soil in those days have corrected impressions and recalled events. I may be guilty of repetition, but with all this risk I venture to show things as I saw them when a boy of 13. Although the country was flat at first, it was not long before we had our mountains. They did not rise to 30,000 feet, but we had our Mount Ararat, Mount Frames, and mountains at the West End, and dotted about were numerous kopjes, all made out of the siftings and sortings from the mines. When I am asked to-day where streets and avenues are, I don't know. I wasn't brought up with streets. We had our Main Street, Dutoitspan Road, and one or two other places you had not dare to forget, but our points of direction were our mountains of debris. Alas, the debris washers came and destroyed all early attempts at scenic beauty, for in order to get the diamonds left by the early sorters, they were all put through the washing machine, and the town returned to its early flatness. When men first came in, it was seen that our discovery was something unique. In America, in earlier days, there was a general movement across a great continent. The Red Indian and the bison had their centuries old sanctuaries invaded. Mormons usurped Utah, and over the great Rockies and their divides Europeans were laying the foundation of that great Republic that already counts over one hundred million souls. In Australia the red-shirted digger had sunk paddocks upon alluvial beds at Bendigo and Ballarat, and from these places there were men whose love of adventure had brought them all the way to Kimberley. There were men just out of the great American Civil War, and later. There were several that had experienced the Siege of Paris and fought at Metz. There were men from Ceylon and India, sugar planters from Mauritius, tea tasters from Mincing Lane, and diamond cutters and others from various vocations. There was a man called "Lying Watson." He found his way to Natal with a shipload of Australians that were induced to come and work alluvial gold. Watson had "pitched the tale," and his ideas were immense. From the first he never took any interest in diamonds. Gold was his dream. He would harangue a crowd of Australians and loudly maintain that the Transvaal was the greatest gold field on earth. Ballarat and Bendigo would be nothing compared to it. His mates would fill him with brandy and he would go to sleep saying "Bendigo, Ballarat—faugh. I know the, the, the—why, damn it, of course—the, the, why this country's full of it, full of it; I know." Strangely enough, old lying Watson was quite right.

The man that you constantly saw peddling diamonds was a Dutchman. The soft yellow ground suited him. He got up early, and directly after breakfast he turned up with a stone. He sold anything he found, just as quick as it turned up: a chip for 10s. or a stone for £50. Up to winch and bucket he had a great time, but the blue ground knocked him silly. When his pick would not bite the blue, he was done. His hasty conclusion was he'd struck the bottom, and selling his claims he returned to his farm. Blue ground had to be weathered. This entailed lots of things. It entailed borrowing money. Two to three per cent. per month was the customary rates. The banks—Marais Bros., L. H. Lyons—and others did a great trade in money lending.

My friend, Mr. Henry Adler, tells me he bought the first diamonds from Dutoitspan and Bultfontein. The early profits were fabulous, inciting London to send out large sums to purchase diamonds, with the result that they were over supplied and lost heavily. In the early scramble to buy

diamonds the Port Elizabeth firms came first—Mackay, Dunn & Co., Hill & Paddon, Mosenthals, Lipperts, Prince, Vincent, and others were very early in the field. Charles Meige, (Sir) Julius Wernher, Bordineks and Faleke, Schwabacher, Max Gammius, (Sir) S. Neuman, Litkies, S. Neales, S. Sacke, Von Beek, Petersen and Dreyfus were, with others, the first foreigners. Then there was Sir Joseph Robinson, J. C. Rimer, James Ferguson, J. T. Phillips, F. T. Gervers, John Birbeck, W. Corbridge, H. B. Webb, C. J. Posno, Barnatos, Harrises (Sir David), Morris, Pickler, Pittiar, Levenson's representatives, English and Yankee Wilson, and H. J. King's Americans. The great Paddon family had the West End to themselves. Amongst the earliest brokers were my father (T. R. Taylor), T. G. Glyn, the Anells, A. Bain, Count Platé, the two Bowleys, Harry Harris, W. Heckrath, Parsons, King, Kopje Smith, W. Else, W. Norris, Arthur Davis, H. Barnsley, and various others that I cannot remember. It was wonderful how we all pulled together. Somehow or other, we did not get in one another's way. With slight exceptions there was an honourable camaraderie that has lived to these years, for I never meet one of the old brigade without some recollection of the old days being revived. It was a sunny time. Most of the years we dressed in white flannels or drill, and it was a religion to have a helmet to match. If you saw a man in white at any time, he was one of the diamond brigade. It was an easy life, the hours being from 9 to 1 and from 3 to 5. It was no good trying to bring in an eight hours day; the buyers only looked at goods when the light was right and the day cool. There weren't many fortunes made in those days. Life was an easy problem, and those that had talent distinguished themselves in music, and others with histrionic ability on the stage. My father was an actor of no mean ability. There are those who will remember his rendering of such parts as Shylock, Fouche in "Plot and Passion," or his Triplet in "Masks and Faces." He had acted over a long period, formerly having introduced the first opera company and the first circus to the Cape. He also introduced the first sewing machine and the first daguerreotype (photograph); that was very long ago, in the fifties, I think. He never was a rich man, but his efforts in those days procured more for charity than those of half the community among whom he lived. He was ever ready to do a service, and the first man to be called upon. Probably there are still some who have not forgotten his wonderful talent and versatility. The present picture shows are destroying the old arts. Local personality is supplanted by American films; our playgoers are no more. The farce, comedy, drama, tragedy and burlesque are not now followed

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), 15 Metal Certificates were granted in South Africa, and of this number our students secured 10 certificates. Previous examination we secured 7 certificates from 8 entries, and in two other recent examinations 15 passes from 19 entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured 3 certificates from 6 entries.

OVERSEAS EXAM.: 21 certificates secured 1920, and 14 certificates to date, 1921.

SURVEY EXAM.: We have secured practically all the certificates granted by the Mines Department during recent years and have obtained 60 certificates to date.

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and the renderings of favourite actors registered. As time goes on, reality will fade, and from our midst there will be no entertaining geniuses unless it is from the schools of music and singing. But in those good old days we fell in love with our talented actresses, and the girls went to see Dave and Charlie and all the other young heroes that came out of the diamond market.

Now I come to a wonderful little man with a soft dark beard and a pair of piercing bright eyes. When in action he was coatless and had a lovely coloured shirt, diamond studs, a white helmet, clothes from Peole's, and last, but not least, his buttoned boots, cloth and patent leather, and the heels, just to make him a bit bigger, were actual high heels. In his hand was a white ox tail, and on his signboard A. A. Rothschild—otherwise the Baron. When his various natives rang their bells, Von Bressendorf, the postmaster, donner-wettered and cursed, but the whole street succumbed to the baron. Long rows of tables were laden with miscellaneous goods, and a merry crowd surrounded the wizard and were taught to bid. He made auctioneering an art, and he made a fortune as well. Old Martel was kept busy for years with great ledgers full of figures, and the irrepresible little baron never tired of selling. There was no article he could not fix a tale on to, and sometimes his embellishments were so effective that his customers veritably fought to get the worthless thing. I cannot remember his poetry, yet I can still scent the far-off rose leaves, the very incense and myrrh of his prose, and if in his ecstasy he rose to untold heights, the warmth of his story brought sublimity never too low to entice a buyer, and withal he was loved, and Kimberley lost a bright little pillar when the baron descended from his pedestal and closed his portals.

Wild mobs rushed beside Mount Ararat to burn out canteen keepers. There was the conflagration of canvas and burning liquor. If three-quarters of the liquor sellers had been burnt out, it would have done good. They were getting all the principal diamonds; but without certain evidence things were going too fast. The canteen keepers did not make fortunes; they were a la forchete, for if they did not sell cheap to the buyers they were in danger of being denounced to the mob. It was the buyers who made the money. On Monday mornings certain brokers sold large parcels for certain buyers. The brokers who sold for the legitimate buyers had thin parcels. This sort of thing became so obvious that it attracted the serious attention of a certain gentleman named Cecil John Rhodes. The first thing he did when he returned to Africa after having eaten his dinners and being called to the bar, was to frame a new diamond law. He did it well and truly, with the assistance of other skilled lawyers, and after that John Fry and Izdebsky and others were kept busy, and the big parcels of heavy diamonds were not so apparent on Monday mornings.

The first natives that came to work were most intent upon having guns. There was no law to prevent gun-running, and long rows of Kafir stores sold coloured blankets, old military coats, tunics and trousers, and old military rifles. The muzzle-loading Enfield was not rifled. Equipped

with powder flask, bars of lead and moulds, and garbed in the tunic of a guardsman or the red serge of a foot soldier, thousands of Makatees from the Northern Transvaal, and Shangaans from further on, trailed back with these rifles. How incongruous natives looked in their attempts at European dress. They had come into camp in loin cloths and loose waist adornments, and then they would wear a white paper collar, sometimes that was their one article of European refinement. Coloured tunics and no trousers was quite ordinary for a time. Afterwards dress regulations came in, military sales were stopped, and the colourings sobered down. The early efforts of natives to reach the mines must have been great. They marched from six hundred to near on a thousand miles. Many died on the way, and those that survived were in many cases mere skeletons. It was wonderful to see how quickly they revived and fattened. It was interesting to observe how they settled down to their work, and once they understood their master and what was wanted of them, they carried out the routine and gave little trouble. Well, routine is so easy when once understood. The mules were trained afterwards to trot from the machine to the floor and back again to the machine, without drivers; but when Chicer came, that is, the one o'clock whistle, they had to look slippy, for the mules put their ears back and bolted for their stables.

During all these years there was constant prospecting for new mines. There was St. Augustine's Mine, Taylor's Kopje, Otto's Kopje, the Jagersfontein and Koffyfontein groups. Diamonds were found in impossible places. People rushed about and made a picnic of the occasion until they learnt that an ostrich, a turkey, or a fowl could swallow diamonds and retain them in their crops. They had been too ready to believe in new discoveries. The largest diamond I heard of being found in a fowl's crop was a 14 carats, worth £100.

There was no telegraph, only one post a week, no telephone, no electric tram, and no motor car. It cost 10s. to drive to the river for a week-end. There were yellow fish and barbel. The world was young. What could one wish for more?

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The operations on the Simmer and Jack during the year ended 30th June, 1921, resulted as follows:—A comparison of the results obtained during the last six years is as follows:

Year ended 30th June, 1916: Tons milled, 797,900; yield per ton, 5.288 dwts., value 21s. 11.236d.; costs per ton, 14s. 8.854d.; profit per ton, 7s. 2.382d.; total profit on working, £227,184.

Year ended 30th June, 1917: Tons milled, 765,300; yield per ton, 5.125 dwts., value 21s. 4.865d.; costs per ton, 15s. 5.619d.; profit per ton, 5s. 11.216d.; total profit on working, £227,184.

Year ended 30th June, 1918: Tons milled, 685,400; yield per ton, 5.518 dwts., value 23s. 1.289d.; costs per ton, 17s. 4.902d.; profit per ton, 5s. 8.387d.; total profit on working, £195,304.

Year ended 30th June, 1919: Tons milled, 605,900; yield per ton, 5.224 dwts., value 21s. 11.746d.; costs per ton, 19s. 10.960d.; profit per ton, 2s. 0.786d.; total profit on working, £62,575.

Year ended 30th June, 1920: Tons milled, 621,300; yield per ton, 4.933 dwts., value 26s. 1.780d.; costs per ton, 22s. 9.007d.; profit per ton, 3s. 4.773; total profit on working, £105,550 (including premium on gold).

Year ended 30th June, 1921: Tons milled, 702,900; yield per ton, 4.581 dwts., value 25s. 4.559d.; costs per ton, 21s. 11.788d.; profit per ton, 3s. 4.771d.; total profit on working, £119,253 (including premium on gold).

Mr. G. A. Chalkley, the Superintending Engineer, writes: "From the figures given in the manager's report it will be seen that the premium obtained on gold during the year ended 30th June, 1921, amounted to £211,766 2s. 11d., and was equivalent to 6s. 0.399d. per ton milled. The tonnage milled during the year amounted to 702,000 tons, with a yield of 4.581 dwts., as compared with 621,300 tons, with a yield of 4.933 dwts., for the year ended 30th June, 1920. Working costs per ton were approximately 9d. lower than for the preceding year, the decrease being due chiefly to the adequate supply of native labour, especially during the latter part of the year, and the reduction in the number of white underground workers. The average number of natives employed was 3,803, as compared with 3,396 during the previous year. The development accomplished amounted to 4,266 feet, of which 1,227 feet were sampled. Payable reef was exposed over a distance of 594 feet, with an average value of 13.7 dwts. over a reef width of 33 inches, equal to 452 inch-dwts. During the year the tonnage hoisted through the Rhodes Shaft increased from 9 per cent. to 48 per cent. of the total tonnage. The sinking of the Rhodes Incline Shaft has been completed to the 39th level, and the installation of the engine and shaft boxes is being proceeded with. Through this shaft will be hoisted the ore from the claims taken over from the Simmer Deep and Jupiter Companies, the workings of which are now being opened up. The outcrop section of the mine produced 12 per cent. of the total tonnage at a profit of £1,300 per month, and a further twelve months' supply of rock is in sight. Owing to the closing down of the Simmer Deep, Jupiter and Knights Deep mines, and the dismantling of the central pumping plant at the Lohse shaft of the Knights Deep, the water from these mines, and also from the Simmer and Jack, is now accumulating in the workings of the Simmer Deep below the southern boundary of your property, and it will be necessary to instal new pumping plant to deal with the water before it endangers the working of your mine. The ore reserve fully developed at 30th June, 1921, is estimated at 1,081,000 mine tons of an average value of 5.71 dwts. per ton over a stopping width of 76 inches. I wish to place on record my appreciation of the work performed by your manager and his staff during the year."

Simultaneously with the revival of the diamond trade, merchants at Antwerp have opened a new palatial diamond exchange, work on which was begun in 1913 but was interrupted by the War.

"Stabilising the Exchanges."

It is reported from Washington that Treasury officials there "are considering the question of assembling an international congress of financiers, possibly coincident with the coming disarmament Conference, to discuss the stabilisation of the foreign exchanges." What exactly is proposed is not yet clear, but apparently in financial as well as in political affairs, the United States is beginning to realize that an attitude of "aloofness" is impossible in the present interdependent condition of all countries in the world. If so, this is a satisfactory development. It is suggested that the Conference may consider the question of settlement of some forms of commercial indebtedness along the lines of international bonds, instead of in actual currency, but it is clear that if exchanges are to be gradually stabilised, to put their currencies on a gold basis, however reduced the ratio of gold to paper, something must be done to help the more necessitous countries.



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EDITORIAL.

THE LATE MAJOR CLEM D. WEBB, M.C.

Although we all recognised the dangerous nature of the illness from which the late Major Webb was suffering, his death on Monday morning came as a painful shock. Knowing his indomitable spirit, his wonderful power of resistance, and his magnificent physique, we continued to the last, hoping against hope, that he would win through. But though he had the very best medical and surgical help available—indeed, the surgeons fought for his life with rare and wonderful perseverance—coupled with the loving care of a devoted wife and family, the trouble had become too deeply rooted to allow of his life being saved. We who have served under and with him through years of stress and strain, ups and downs, of anxious change and ever-varying conditions are left to mourn a good man gone—a broad-minded, generous, big-hearted friend, who was at once a leader and a comrade. Other pens in other parts of this paper pay tribute to his worth as a man, his personal bravery as a soldier, his steadfastness in face of trouble, and his unflinching high courage that marked a life full of action and endeavour. In a brief and inadequate sketch of his career printed elsewhere in this issue, we have tried to illustrate the many-sidedness of his interests and the surprising cheerfulness with which he encountered "the slings and arrows of outrageous fortune." His were in full measure the difficulties that invariably beset the path of the adventurous and the pioneer. But he refused to let them daunt his brave spirit, and it is not too

much to say that few men would have survived with such unbroken serenity the trials he underwent during the thirty-three years of his connection with the Rand. Though Fortune denied him the favours lavished so bountifully on many of his pioneer contemporaries, he enjoyed the substantial compensations of a devoted wife and family and a wide and warm circle of friends drawn from many walks in life. His large-hearted generosity was his most pronounced quality. No appeal of a fellow-creature in distress could he resist, and he was never happier than when "helping a lame dog over a stile." He was known among the needy from far and near, and it is not too much to say that the extent of his private benefactions was out of all proportion to his means. As the history of his career so clearly shows, fighting was in his blood, and his happiest days were spent on the veld with horse and gun. In the world of sport he held a record to be proud of, and the fame of his prowess extended far beyond the confines of South Africa. As a soldier, we have the sincere and enthusiastic testimony of all who served with him to the effect that he was brave almost to the point of rashness and a born leader of men. In civil life, perhaps, his naturally modest—almost shy—and unassuming nature prevented him from taking the prominent part his talents would otherwise have rightfully commanded, and also mitigated against his success in politics. In private life his lovable attributes of comradeship and cheerful good fellowship made him a host of friends and warmly endeared him to them. If we may introduce a personal note, it may be added that no one was easier to work for or with when once his trust and confidence had been gained, and he had in a remarkable degree the capacity for drawing forth the best efforts of all associated with him. Indeed, his personal magnetism and the uncommon devotion he inspired in his colleagues and associates was perhaps, in practice, his most valuable asset. His memory will long be cherished by those of us who were privileged to serve him, through the not always easy years, as that of one who fought the good fight, maintained his spirit in the face of many trials and discouragements, and who left behind an honourable and enviable record in private life, as a loving father, husband and brother, and, in public life, as a loyal and generous friend to many.

DEATH OF MAJOR McCORMACK, O.B.E., M.C.

With deep regret we have to record the death, which took place suddenly this week, of Major M. McCormack, O.B.E., M.C., Manager of the Union Corporation, Ltd., and a member of the Executive of the Chamber of Mines. The late Major McCormack was born in Ireland fifty years ago and came to South Africa in 1898. He served through the Boer War in Kitchener's Horse, attaining the rank of captain and paymaster. In 1902 he came to Johannesburg, and joined the railway service, in which he held the position of assistant accounting officer, New Construction Department. In March, 1905, he was appointed accountant to the Rand Water Board; in March, 1906, he became acting secretary, and in October of that year he was appointed secretary and treasurer to the board. This post he held until June, 1920, when he resigned his service with the Board in order to take up the important position of manager in South Africa of the Union Corporation, Ltd. This position he was occupying at the time of his death. In February, 1915, when the campaign in German South-West Africa was in progress Major McCormack was appointed D.A.Q.M.G., Northern Force, and held that position until the end of hostilities in the territory, receiving for his services the Military Cross. In August, 1917, he went overseas and was gazetted to the "Queens" (Royal West Surrey Regiment). He was then placed on the staff at the War Office, becoming later Assistant Controller of National Aircraft Factories, and for some time being Acting Controller. At the termination of this service in July, 1919, he received the O.B.E. To his sorrowing widow and family we extend our deepest sympathy.

Notes & News.

Machavie Prospects.

Tests of the tailings at the Machavie Mine made by the Minerals Separation people have given favourable results, and it is hoped that, like the Afrikander, which is to be re-opened soon, the Machavie may be given another chance.

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S.A. Alkali.

A reference in the share market notes in our last issue to the forthcoming debenture issue by the S.A. Alkali has been misinterpreted as reflecting on the guarantor of the issue. What actually it was intended to convey was that the fact that the company had found it necessary to make an issue of debentures had unfavourably affected the shares. After all a debenture issue is a loan and a first charge on the assets of a company, and no matter who the lender may be, the transaction is bound to depress the quotation for the shares.

* * * *

Rand Refinery.

It is officially announced by the Chamber of Mines in regard to the Rand Refinery, Ltd., that it is expected operations on a small scale will commence at the Refinery during the month of October, and that early in the New Year the whole of the production of the Witwatersrand gold mines will be able to be refined. A staff of some seventy employees will be engaged. A photo of the Refinery appeared in a recent issue.

* * * *

Birthday Asbestos.

The Willoughby's Consolidated Company issues the following announcement with reference to the Birthday Asbestos Mine, in which it has a 40 per cent. interest: "Willoughby's Asbestos Pool is taking advantage of the slump in the asbestos market, and its improved financial position, to cease producing from its Birthday mine for six months in order to bring the plant up to date, instal grading machinery, and further develop the mine, the recent reports from which are highly satisfactory." The Birthday Asbestos mine is in the Shabani district of Rhodesia in the neighbourhood of a block of claims belonging to the Rhodesian and General Asbestos Corporation. The Chicago-Gaika Company also owns a 40 per cent. interest in the Birthday mine, while the remaining 20 per cent. is held by the Surprise Gold Mining Company.

* * * *

The Afrikander Redivivus.

We understand that the old Afrikander, in the Klerksdorp district, may soon be re-opened by a syndicate composed of well-known Johannesburg mining men. The property, of course, is owned by a company, the Afrikander G.M. Co., Ltd., and the new syndicate is in negotiation to tribute the mine. It is generally agreed that they have embarked on a profitable enterprise, and it is hoped that their success will encourage others to undertake the working of other dormant "propositions" in the "outside districts." The company was registered on March 10, 1905, in the Transvaal, and acquired 306 prospecting claims and 62 diggers' claims on farms Wolverand No. 383 and Rietkuil 626, together with a freehold portion of farm Kafirskraal, 18 morgen in extent, twenty machine stands and two water rights situate in the Klerksdorp district, about 10 miles west of Johannesburg, Transvaal, and formerly owned by the New Afrikander Gold Mining Co., Ltd. The vendors received 150,000 fully-paid £1 shares. During March, 1910, the entire Wolverand Mynpacht was acquired equal to a further 364 claims. Some of the claims have been abandoned, leaving total area now held

656 claims (404 reef-bearing), in addition to freehold property, water rights, etc. Three shafts have been sunk, the Main Eastern Incline, Central, and the New West, the last named being about 3,300 feet west of the Incline and 1,500 feet from the Wolverand boundary. Development work was in progress up to December, 1910, when, owing to exhaustion of working capital, operations were suspended. The ore reserves at the time of suspension were estimated at 227,088 tons, value 8.2 dwts. per ton, and 158,893 tons value 2.6 dwts. per ton.

* * * *

A Rhodesian Reconstruction.

The scheme for the reconstruction of the Bwana M'Kubwa Copper Mining Company, which owns an extensive concession in Northern Rhodesia, has now got to the underwriting stage. The present company has an authorised capital of £600,000 in 1,200,000 10s. shares, of which 925,053 were issued at the date of the last accounts. It is understood that the shares in the new company to be offered to existing shareholders will involve a liability of 2s. 6d. each. At the meeting last December the Acting Chairman summed up the then position as follows:—"We have a mine already showing 3,000,000 tons of ore, assaying 4 per cent. to 5 per cent. copper, and a probability of many more millions of tons with development. Hitherto we could not extract the copper without exorbitant expenditure for treatment plant, but the Minerals Separation have now found a process which will not require such a heavy outlay, and have carried out a practical test at the mine which has been entirely successful. To develop and equip the mine for a plant of 1,000 tons a day capacity and to pay the £26,000 we owe will require £300,000. An option has been given to reconstruct the company and to guarantee the necessary funds, and, subject to your approval, the option will be exercised if railway rates can be arranged, and so soon as there is anything definite to put before you we will call you together to consider it." Assuming that a satisfactory arrangement has now been come to as regards railway rates, it would not be surprising if such also benefited the Rhodesia Broken Hill Development Company, whose lead-zinc property is situated about 100 miles south of the Bwana M'Kubwa mine.

The Future of Copper.

News of the formation in the United States of a Copper and Brass Research Association, including representatives of the copper, brass, and copper alloy interests, mining, manufacturing and commercial, is pretty clearly one outcome of the slump in copper values. The aim of the association is to revive demand by stimulating the use of brass and copper products. In this as in other directions the reaction has swung too far. Copper, in any event, may be relied upon to come into its own again, for it is much too remarkable and useful a metal not to have a wide application in industry. The American Association already includes an imposing array of names, individual as well as corporate, and it has set out on the right line in seeking to link up science with manufacture. But if the report from Laporte, Indiana, turns out correct, that a young inventor named Buntun has rediscovered the ancient and long-lost secret of tempering copper, and that the invention has been bought by the United States Steel Corporation, then the Research Association looks like having stepped in after the event. There seems to be little doubt, looking at the fine grain and tensile strength of the metal, that the tempering of copper to a high degree of hardness is a scientific possibility. Nobody, at all events, can safely lay down the limits of the possible in science. The question that arises is how far the tempering process now said to have been rediscovered affects the tensile strength of the material. If it does not, then for a great many purposes copper will be superior to steel, and its uses will be multiplied in all those directions where now its qualities are off-set by its one defect of softness. In that event neither the Research Association nor anybody else need trouble themselves about the demand. The only fly in the ointment will be that the Steel Corporation will have got in first. Most probably the secret is really very simple. Nearly all epoch-making discoveries are.

South African Asbestos Mines, Limited.

A representative of this paper visited the property of the S.A. Asbestos Mines, Ltd., last week-end, and contributes the following interesting account of his visit.

The South African Asbestos Mines, Ltd., was floated in September, 1920. The directorate consists of:—

Chairman: Mr. A. B. Sumner.

Managing Director: Mr. Hugh J. Orr.

Consulting Engineer: Mr. H. Rose-Martin.

Directors: Messrs. J. Cohen, E. A. Johnstone, J. Norman, C. J. Williams, W. M. Taylor.

With a capital of £50,000, divided into 100,000 shares of 10s. shares, the company holds 3,590 base metal claims lying 65 miles by road south-east of Pietersburg, the nearest railway station.

The only means of communication which exists between the company's holdings and the town of Pietersburg is the road by which the property was reached, and this is in a very bad state of repair. Unless serious attention is paid to its upkeep its state will become much worse as soon as the property has to dispose of its full output.

Property.

The country in the neighbourhood of the claims is very mountainous, and well timbered and watered. A good supply of cheap timber and water is an asset which greatly enhances the value of any mining proposition. The claims lie between two parallel ranges made up by a very prominent ridge of dolomite, and an equally prominent ridge of succeeding quartzites. Both these rocks belong to the Transvaal system. Between these two prominent ridges there occurs the banded ironstones of the same formation, and it is in these that the several layers of asbestos containing rock is to be found. The formation of the country strikes roughly east and west, and the dip lies in a southerly direction. The Olifants River valley also lies to the south of the property, hence all streams run south, with the result that the property has been cut transversely to the strike by a series of vallies no less than six in number. The result of this erosion is that the formation which dips 20 to 25 degrees south has been exposed by these valleys, which are down to 2,600 feet in depth. The asbestos veins which occur in the banded iron stones are thus exposed over the entire property, which has a length of eight miles. This asbestos belt extends in the direction of strike of the country rock on either side of the property, and aggregates over a hundred miles in length. It is opened up on the west on the property of Mr. MacBean, and on the east at Penge, which lies to the south of the Olifants River. Asbestos of two varieties is to be found in this belt, namely, blue asbestos (crocidolite) and white asbestos (amosite).

The white asbestos is to be found both below and above the horizon of the blue asbestos in this locality, and the latter occurs in numerous lodes or groups of veins. Prospecting and mining operations have been concentrated chiefly on two valleys known as McPie valley and Waterkloof. The lodes have, however, been traced at outcrop over the whole length of the property. In the McPie valley no less than 12 lodes of blue asbestos are to be found, and several are to be seen at Waterkloof. A waterfall exists in the latter valley, and will when harnessed provide a cheap source of electric power. A good supply of water is to be found in both valleys, and greatly adds to the value of the property.

Mining.

Mining operations are being confined to the McPie valley, where the treatment plant has been erected, at present. Attention is paid only to one lode, which has been opened up from the base of the valley to the tops of the slopes on either side. The lode is mined to a width of 5 feet, and over that stopping width contains about 11 per cent. of asbestos varying in length from 2 inches downwards.

No shafts need to be sunk at present, as sufficient tonnage of ore exists above the base level of the valleys to

supply the works for a considerable time to come. Preliminary mining expenses are thus cut down to a minimum, and all work done results in the production of ore. The lode will be attacked by drives at various levels connected by stopes. As the treatment plant is situated some distance up the hill side, ore from the opposite side will be brought to the crushers by means of an aerial rope-way. The rope-way will be secured to the hillside, and ore brought to it from above by means of a chute. Expenses incurred by conveying ore will thus be exceedingly low.

Ore Treatment.

The treatment to which the ore is subjected is as follows: It is first of all hand-cobbed in the mine. This process consists of breaking off from the ends of the asbestos any pieces of waste rock. It is conducted by boys by hand, and it follows that its scope is limited by the length of fibre. Short lengths are difficult, and become impossible to cob, and have up to the present been rejected as waste, while the cobbed asbestos has been bagged, after sorting into sizes varying with fibre length, and sold. The method of treatment to be adopted here aims at the following improvements:—

1. Utilisation of the material which has been rejected as waste.
2. The further removal of waste rock from hand-cobbed asbestos in order to reduce the weight of material to be transported.

The treatment plant thus has as its object the recovery of every particle of asbestos which is mined; and the large tonnage of waste which usually accompanies the old method is entirely eliminated.

The mined ore has now been reduced to hand-cobbed asbestos and waste. The waste is crushed in a Blake crusher and then passes a set of rolls. It then passes into a sizing trommel which grades it approximately according to its fibre length. The graded products each pass in turn to edge-runners, which further break off any waste rock adhering to the asbestos. A fan superimposed on the edge-runners removes by suction all the fibres of asbestos, and deposits them in a suitable cage, from which they are removed and bagged. The hand-cobbed asbestos is sorted into sizes or graded, and each length in turn sent through the centrifugal disintegrator. All adhering waste rock is removed, and the disintegrated fibres bagged for export. The fines produced are deposited in the settling chamber, while the shorter fibres discharged with the waste rock are removed subsequently. Each different length is treated similarly.

The mined asbestos has thus been reduced to waste free products varying in length from about two inches down to asbestos dust. Several grades of product are produced, and each marketed as such. The fines produced form an excellent binder for asbestos-cement products.

The economy brought about by this method of treatment is noteworthy. On hand-cobbed asbestos the weight of product is reduced to one-half and one-third of the original, while the saving of the asbestos in the waste rock represents an indisputable gain.

Transport.

Transport represents the only serious problem with which this venture is burdened. At present the only mode which exists is by means of ox-waggon over the 65 odd miles to the railway at Pietersburg. The cost of this transport amounts to 50s. per short ton of asbestos. This cost of transport clearly shows the urgent need there is to this industry as well as others in the neighbourhood for a more adequate means of transport. A railway which would pass through this locality would greatly assist any undertaking of an industrial nature by removing the chief obstacle in the road of development, namely, uncertainty of transport. However, the venture is one with immense possibilities, and the management is to be congratulated on the large amount of progress achieved in an exceedingly short time and under the most trying conditions.

It is also noteworthy that the mine employs several miners suffering from silicosis and that one of these, who was given six months to live by the doctors, has already been on the mine for nearly ten months, and has gained sixty-eight pounds in weight.

The district of Malips River in which this mine is situated covers the exceedingly fertile valley of the Oliphants River, and although the ground is very sparsely

occupied at the present moment, we are informed by the secretary of the local farmers' association that the district in question is producing 15,000 bags of winter wheat and grows three crops per year on the same piece of land. If served by a railway it would be capable of supporting a very considerable number of settlers and producing at least ten times the quantity of produce at present marketed. There is little or no fever.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Coal and Fuel.

Distillation of Oil-Shale.—*Mining and Scientific Press*, August 20, p. 257.

The Uses of Oil in Cleaning Coal.—*The Colliery Guardian*, August 26, p. 585.

French Coal Dust Experiments.—*The Colliery Guardian*, August 26, p. 587.

Control of Factors Causing Dirt in a Coal.—*The Colliery Guardian*, August 26, p. 589.

The Application of Oil Fuel to Boilers.—*The Colliery Guardian*, August 26, p. 599.

Coal Handling Section.—*Coal Trade Journal*, August 17, p. 938.

Engineering.

Painting with Metal Spray.—*The Scientific American*, August 20, p. 129.

An Automatic Sub-station.—*The Colliery Guardian*, August 20, p. 592.

Utilising the Heat of Compressed Air.—*Iron and Coal Trades Review*.

Interconnected-Star Method of Connecting Three-Phase Transpower Windings.—*The Electrical Review*, August 26, p. 268.

Power Factor.—*The Electrical Review*, August 26, p. 275.

Leaves from an Inspector's Note-Book.—*The Electrical Review*, August 26, p. 289.

Water-Power Developments in North Wales.—*The Engineer*, August 26, p. 210.

Vacuum Pump for Corrosive Gasses.—*The Engineer*, August 26, p. 224.

200 H.P. Uniflow Steam Engine.—*The Engineer*, August 26, p. 222.

Economics.

South Africa, Commercial and Financial Conditions in 1920-21.—*The Board of Trade Journal*, September 1, p. 226.

The Mining Industry in 1920, Southern Rhodesia.—*The Board of Trade Journal*, September 1, p. 232.

Wages and Costs.—*Mining and Scientific Press*, August 20, p. 246.

Industrial Co-operation.—*Mining and Scientific Press*, August 20, p. 248.

The Mineral Industry During 1920.—*Mining and Scientific Press*, August 20, p. 266.

The Economics of Coal Production.—*Iron and Coal Trades Review*, August 26, p. 262.

Mining and Metallurgy

Iron-Ore Resources of Europe.—*Mining and Scientific Press*, August 20, p. 249.

The Volatilisation Process at the Pope-Shenon Mine.—*Mining and Scientific Press*, August 20, p. 263.

Heat Treatment of Alloy Steel.—*Iron and Coal Trades Journal*, August 26, p. 270.

The Magnetic Properties of Monel Metal.—*The Electrical Review*, August 26, p. 292.

Industrial.

The Service of the Chemist.—*The Scientific American*, August 20, p. 136.

Blast Furnace Plant of St. Louis Coke and Chemical Co.—*Iron and Coal Trades Review*, August 26, p. 257.

Dividends Declared.

The Ferreira Deep has declared a dividend of 7½ per cent., or 1s. 6d. per share, for the six months ended September 30, 1921.

Latest Metal Quotations.

On the metal market last week there has been little change in the general situation. European business has been handicapped by adverse exchanges. The new business in copper for the home trade has been disappointing, but the reports from America are more hopeful. The consumption of tin has slightly improved, but is insufficient to influence prices. Production is still restricted. There is enough to meet current requirements, but consumption must broaden considerably if the present prices are to be maintained. In lead there were indications in favour of the continuation of a steady market. There was some demand for spelter, which improved, but it was insufficient to make any decided change in the tendency of the market. Existing supplies are strongly held. Present values are below the cost of production, and a recovery in price may reasonably be anticipated. There was no essential alteration in tins, except in the firmness of the market for wasters, chiefly for the Far Eastern market. There was a more hopeful feeling as regards iron and steel, but dear fuel returns are further restricting idle works. There was a more general disposition to cut prices. China bought silver both here and in New York, while the Indian demand was substantial.

The Tin Outlook and Swazi Tin.

"He would be a rash individual who ventured to-day to foretell the course of the metal market during the ensuing 12 or 18 months. There are many depressing features, such as accumulated world stocks, fall in consumption, high costs of exports and realisation, financial stringency—to mention only a few. On the other hand it is well known that tin is one of the most speculative items of the world's metal markets, and is periodically subject to the most unexpected fluctuations of price. It is therefore not beyond the bounds of possibility that the position a year hence may falsify the somewhat gloomy outlook of the present moment." Thus said Mr. J. R. Leask, C.M.G., speaking at a meeting of the Swaziland Tin, Ltd., this week. In concluding, the chairman said: "The company's financial resources are good, and we are in a position to undertake active development should any fresh discovery or enlarged field for our enterprise be opened up. We are probing these possibilities, and should any reasonable opportunity arise we shall grasp the opportunity of extending our scope of activities and prolonging the life of the company. The first two months of the current year have shown a small working loss, due the low price of metal and to a heavy fall of overburden in one of the paddocks in July. The 39 tons of concentrate won during the two months have not yet been sold, and we hope that a rise in price may yet enable us to reduce the adverse balance when we realise."

Springs Mines.

RESULT OF METALLURGICAL EXPERIMENTS.

An official statement has been issued to the effect that the board of directors has decided, on the recommendation of their technical advisers, that in extending the nominal capacity of the reduction plant, already authorised and in course of erection, from 40,000 to 50,000 tons per month, the stamp battery and plate amalgamation will be discarded, and that all-sliming of the ore and direct cyanide treatment will be adopted.

This decision has been come to as the result of experimental metallurgical work on a large scale which has been carried out on the company's property. The experiments show that the above method of treatment will result in:

- Reduced capital expenditure.
- Probable saving in operating expenses.
- Increased extraction of the gold contents.

The consulting engineer's report sets out the results obtained by the experiments as follows:—

- The elimination of the stamp battery as a crushing unit and the direct tube milling of the product obtained from single stage breaking in gyratory crushers.
- The elimination of plate amalgamation, the pulp from the tube mill plant being taken directly to the slimes plant for cyanide treatment.

Referring to "A." As the result of crushing some 30,000 tons in our experimental plant it has been demonstrated that a standard 22 ft. x 5 ft. 6 in. tube mill can economically handle a much coarser feed than has hitherto been furnished by means of stamps; this coarse feed being obtained by single stage breaking in gyratory crushers, with certain minor modifications from existing practice. It has also been determined that tube milling under these conditions gives a product having a much higher degree of comminution than has hitherto been economically obtainable by means of the operation of the standard plants. It is this which has led to the possibility of the elimination of plate amalgamation and direct cyanide treatment of the pulp.

Referring to "B." As the result of the elimination of plate amalgamation and the direct cyanide treatment on the above lines of approximately 4,000 tons of pulp from the experimental plant, an increased extraction of the gold contents of the material treated has been obtained.

KROONSTAD COAL ESTATE COMPANY, LIMITED.

TENDERS

are invited and will be received by the Undersigned up to and including Saturday, 1st October, 1921, for the purchase of the **MACHINERY, PLANT, EQUIPMENT, MINE STORES, TOOLS, ETC.**, lying for disposal at the above Company's property at Vierfontein, O.F.S.

Tenders must be for the whole of the above, and the successful tenderer will be required to remove same at his own expense and risk within one month of the acceptance of the tender.

The highest or any tender not necessarily accepted.

Lists and further particulars may be obtained from

SALISBURY, BEATON & RAYNHAM,

Secretaries,

Kimberley.

17th August, 1921.

In view of these results, and also because a considerable reduction in capital cost and a probable saving in operating expenses will be effected, I have now to recommend that in the extension of the Springs Mines plant the stamp battery and plate amalgamation be discarded, and that all-sliming of the ore and direct cyanide treatment be adopted."

August Company Registrations.

Enealte, Ltd., 85, Standard Bank Chambers, Johannesburg.

Monarch Syndicate, Ltd., 302, Church Street, Pretoria.

British Manufacturers, Ltd., 53, Winchester House, 87, Main Street, Johannesburg.

Elements, Ltd., Estate Buildings, Fox Street, Johannesburg.

Softs, Ltd., 142, Market Street, Johannesburg.

The Observatory East Company, Ltd., 2, Birch's Buildings, 92, Market Street, Johannesburg.

Universal Providers, Ltd., 51, Cullinan Buildings, Simmonds Street, Johannesburg.

West End Ranching Company, Ltd., Ground Floor, Trust Buildings, corner Fox and Loveday Streets, Johannesburg.

Fox Mining Syndicate, Ltd., 25, York House, Rissik Street, Johannesburg.

Sinclair & Company, Ltd., 49, Church Street, Pretoria.

Salric Agencies, Ltd., 123, Commissioner Street, Johannesburg.

United Bioscope Cafes, Ltd., 2-3, Permanent Buildings, Harrison Street, Johannesburg.

The Tributaries, Ltd., 2-6, Estate Buildings, Fox Street, Johannesburg.

Bioscope Improvements, Ltd., 78, Cullinan Buildings, Simmonds Street, Johannesburg.

Tivoli, Ltd., 81-3, Mint Road, Fordsburg.

Bourke's Luck Syndicate, Ltd., 57-58, National Mutual Buildings, Rissik Street, Johannesburg.

Aids and Benefits, Ltd., 52, Meischke's Buildings, Harrison Street, Johannesburg.

African Provident Investment Corporation, Ltd., 35, Bureau Street, Pretoria.

E. J. Hoffman and Co., Beperkt, King Edward Straat, Potchefstroom.

Dutch Chocolates, Ltd., Criterion Buildings, 156, Jeppe Street, Johannesburg.

De Transvaal Pers, Beperkt, 157, Church Straat, Pretoria.

Ainsworth, Ltd., 306, Corner House, Johannesburg.

The Northern Development Syndicate, Ltd., Winchester House, corner Main and Loveday Streets, Johannesburg.

Pretoria Loan and Mercantile Company, Ltd., 206, Pretoria Street, Pretoria.

Propp-All (South Africa), Ltd., 15, Macdonald Street, corner Jules Street, Jeppe Extension, Johannesburg.

Consolidated Oils, Ltd., c/o W. B. Hobbs, 36-39, Permanent Buildings, Harrison Street, Johannesburg.

The Lonely in August.

The following are particulars of gold, etc., from the Lonely Mine for the month of August, 1921:—Mill ran 688 hours; crushed 5,170 tons; fine gold recovered, 1,781.687 ozs.; value, £7,492 7s. 5d.; treated by cyanide, 5,170 tons; fine gold recovered, 3,119.667 ozs.; value, £13,121 14s. 11d.; total fine gold, 4,901.354 ozs.; total value at 84s., £20,614 2s. 4d.; profit, £19,888 13s. 10d. The above profit includes the sum of £12,264 8s. 9d., premium received February-April, and £127 15s. 5d. adjustment on June gold.

The Grootfontein Borehole.

MR. G. A. DENNY'S OPINION.

The secretary of the Rhodesia Consolidated, Ltd., writes:—

"During the past few months information with regard to the progress of the Grootfontein Vogelstruisbult borehole, which has been successfully sunk under the supervision of the engineering staff of the New Consolidated Gold Fields, Ltd., has been communicated to shareholders as received.

"On the 4th instant, it was reported that the main or Van Ryn reef had been intersected at a depth of 3,440 ft., showing a width of 6 ft. 3 in., and the subsequent gold assay value was reported as averaging 1 dwt. The comparatively shallow depth at which the reef has been struck, and its width, are very favourable features.

"To the uninitiated, it is possible that the low assay value may suggest a non-payable deposit, and in order to counteract such an impression the directors have obtained from Mr. G. A. Denny, M.I.M.M., who has had extensive experience in this district, the enclosed report thereon, which explains the position clearly and concisely, and sets out in true perspective the valuable nature of the results so far secured.

"The directors take this opportunity of congratulating the shareholders on the highly satisfactory outcome of the boring operations."

Mr. Denny's Report.

Mr. Denny's report is dated August 12, and is as follows:—

"Diamond drilling on the Far East Rand basin has, in general, been disappointing if considered from the standpoint of value. This is not surprising when you consider that very large patches of poor ground exist in the richest mines, and that the section of the reef produced by the drill measures about $\frac{7}{8}$ in. in diameter, or an infinitesimal percentage of the area of the reef intersected.

"The long experience gained in this region—that is, the area of the reef basin east of a line joining the Van Ryn Mines on the north and the Nigel Mine on the south—of the relationship between the results obtained from boreholes and those subsequently got by actual mine development shows that the latter has always proved to be payable, no matter what results were given by borings. As a case in point the Brakpan Mine borings may be taken. I was responsible for the laying out of the original borehole sites on this property in 1898. The results obtained were most disappointing, but the estimates made of the probable future yield, based on the development of the mines producing in the vicinity, proved to be very accurate.

"Present-day opinion, therefore, does not attach great importance to localised assay values, whether they be high or low, although naturally it is gratifying when they are high. The principal function of a borehole to-day is to determine the depth of the main reef series below the surface and to exhibit at the same time a section of the rocks passed through by the drill.

"The Grootfontein borehole has traversed a normal Far East Rand section, comparable in every essential with the sections disclosed in boreholes and deep shafts all over the area. Development of the great producing mines of the Far East Rand area now covers so wide a field that it is possible to make very safe generalisations respecting the prospective value of any given property, having especial regard, of course, to the producing mine which is nearest to it.

"The nearest producing mine in the vicinity of your borehole is the Springs Mines. Your property lies directly in the line of the ore shutes projected from New Modderfontein through the Springs Mines. The latter company

crushes upwards of 40,000 tons per month, had ore reserves as at December, 1920, amounting to about 2,750,000 tons, assaying 8.76 dwt. over 63 $\frac{1}{2}$ in., and is making a profit of £30,000 to £40,000 per month.

"This is the soundest indication of the prospective value of the reef intersected in the Grootfontein borehole, when that reef has been explored over areas as wide as those in the Springs Mines. I say 'prospective' value advisedly, because there can be no assurance of the actual value without extremely wide development."

Mine Ventilation Committee's Report.

An interim report has been issued by the joint committee appointed by the Government Mining Engineer and the president of the Chamber of Mines to inquire into "dust prevention" in mine development. It contains conclusions which are of considerable importance and interest. The report states: "We have, apart from preliminary tests by the individual members, conducted a series of tests in development drives in the Crown and Springs Mines to ascertain the effect of water-blast and of auxiliary ventilation after blasting. We have come to the conclusion (1) that observance of the water-blast regulations will not necessarily give such a satisfactory condition in developing ends; (2) (a) that the useful purpose of a water-blast is to damp the face and broken rock; (b) that the present water-blast is ineffective in allaying the fine dust which has been projected by the blast; (c) that if the water used is not clear of solid particle the water-blast is likely to increase the dust contents of the development ends; (d) that one water-blast at the face is sufficient to damp the face of broken rock if it is of a type to project the necessary water; (3) that the exact amount of air required to clear development ends has not been definitely determined. From tests conducted it would appear to be not less than a volume of air equal to that of the development end. The exact amount may be dependent upon the rate and method of supply of the air; (4) that the most practicable way of dealing with the fine dust in development ends is by ventilation. Tests are being conducted to ascertain the volume of air necessary under different conditions for ventilation of development ends both during the working shift and after the blast." The report is signed by Albert E. Payn, A. V. Lance, A. A. Coaton, J. Boyd, Chamber of Mines representatives; A. P. Swinburne (chairman), Charles J. Gray, A. J. Pretorius, R. G. Ray, Mines Department representatives.

* * * *

Fineness and Dryness of Pulverised Coal as Fuel.

From a series of extended tests on a 500 h.p. boiler fired with pulverised coal, it is concluded that the grinding and drying of the coal need not be carried to such high degrees as has been considered necessary heretofore, states Messrs. Henry Kreisinger and John Blizard, in a paper before the American Society of Mechanical Engineers. It is pointed out that it has been customary to state that for good results the coal must be powdered to such fineness that 95 per cent. will pass through a 100-mesh screen and 85 per cent. through a 200-mesh screen. Results from coals in which 88.6 to 93.2 per cent. passed the 100-mesh and 64 to 74 per cent. passed the 200-mesh screen indicate that extremely fine grinding is not necessary for efficiency or good combustion. The completeness of combustion seems to be more a matter of a proper furnace and burner design and the right way of supplying air, than of the fineness of the coal. The losses due to coarseness of coal would be shown by the greater percentage of carbon in the refuse. The average loss due to that cause for the tests with the coarser coal is 0.7 per cent., as against 0.6 per cent., with the finer coals, the averages of the efficiencies being nearly the same. The ability to use the coarser coal efficiently means increased capacity of the pulverising mills and decreased cost of preparing the coal. Another statement generally accepted is that pulverised coal must be dried to about 1 per cent. moisture in order to be burned successfully. Test made with undried coal, however, showed equally good combustion.

Spontaneous Combustion of Coal in Mines.

The subject of the spontaneous combustion of coal has lately been investigated by a Commission in South Africa, and the following summary of the findings of the British Departmental Committee has an important bearing thereon.

The Report of the Departmental Committee just issued is divided into four main sections, and the introduction calls attention to the fact that the committee was appointed by the Home Secretary in August, 1912, "to enquire into the circumstances in which spontaneous combustion occurs in mines, its causes, and the means of preventing it, or of dealing with it when it occurs." It further relates that in December, 1913, the committee presented an interim report, which dealt particularly with the measures necessary to safeguard the lives of persons employed in mines subject to the occurrence of spontaneous combustion. It is stated that the war interfered with the publication of the final report, that two members died during the war period, that one member resigned, and that a further appointment was made. The number of meetings held was 28, of which 26 were devoted to the taking of evidence.

Early theories are discussed, the antiquity of the subject is indicated, and prominence is given to an account by Dr. Plott in 1686 of the occurrence of spontaneous combustion of coal both on the surface and in underground workings. At that remote period and well into the nineteenth century, the commonly accepted explanation of the phenomenon was that the heat evolved by the oxidation of the pyrites in coal was the primary and principal cause of the initiation of spontaneous combustion. The history of the gradual refutation of this long-established theory is carefully traced and supported by numerous quotations from various writers on the subject. The most prominent of the nineteenth century investigators were Richters (a German chemist) and Fayol (a French mining engineer), and they independently came to the conclusion that pyrites had little or no effect on the spontaneous heating of the coals examined by them. The "pyrites" theory was replaced by others, such as "absorption of oxygen by the coal substances," "bacterial action," "moisture," etc., but none of these was generally accepted as a solution of the problem.

In view of the divergent theories held as to the occurrence of spontaneous combustion, the committee decided to investigate the subject in the light of the most modern scientific research. To this end many of the most eminent mining chemists and palæobotanists of England were invited to give evidence. Definite scientific experiments were made at the request of the committee, the results of which are embodied in the report and appendices. Complete unanimity was not obtained on all these points, but, after careful consideration had been given to the evidence, the committee arrived at the conclusions here quoted in full:—That the self-heating of coal is not in any way due to the presence of bacteria; and bacterial action, even if it occurs in coal, does not account for even the initial stages of self-heating. Some small amount of heat may be developed by the oxidation of pyrites when it occurs as an amorphous form of marcasite; but as pyrites is present in coal in such small proportions as compared with the coal substance proper, which is a bad conductor of heat, the effect of this heat is negligible. The chief part played by pyrites when present in an unstable form is that of a disintegrator of the coal, so rendering the latter more permeable by air, and exposing a greater area of coal substance in oxidation. The presence of moisture in coal has an accelerating effect on its oxidation, and consequently coals high in hygroscopic moisture absorb oxygen more readily than those of low moisture content. The self-heating of coal is mainly due to the absorption of oxygen by the coal, resulting in the generation of heat. Though coal absorbs both oxygen and nitro-

gen in a physical sense as well as in a chemical sense, the absorption, in so far as heating effects are concerned, is a chemical and not a physical process; the chemical process is mainly one of attachment of oxygen to molecules of high carbon content, but subsidiary to this, and playing an important part in determining the actual spontaneous ignition of coal, is a chemical interaction between the oxygen thus loosely held by the carbon-like molecules and other atoms in these molecules or other portions of the coal conglomerate.

The conclusions arrived at by the committee as to the causes, from the practical point of view, of the spontaneous combustion of coal, and their recommendations, are reproduced in the report, and it is said that probably all bituminous coal is liable to spontaneous combustion in some degree; but the fact that there is greater liability to self-heating of the coal in the seams of some coalfields of the United Kingdom than in others is due to several causes other than the chemical composition of the coal.

The committee recommend that mining engineers should consider the application of the cementation process to combat fires that have occurred in main roads, ribs, and pillars; but do not recommend the establishment of regulations additional to those brought into force in July last, which were based upon their interim report, and which they regard as sufficient under present circumstances.

Shamva Mines Position.

The Shamva Mines Company issues its quarterly report to 30th June:—Tons crushed, 164,150; ounces fine gold won, 7,720; tons cyanided, 163,547; ounces fine gold won, 16,346; total yield fine gold (ounces), 24,066; value, taking gold at £5 5s. per ounce, £126,346! working costs, £87,384; working profit, £38,962; total ore reserves at 30th June, 1921, value 4.1 dwts. (tons), 1,831,000. The tonnage crushed is 71,800 tons higher than in the March quarter, when operations were suspended owing to the strike of employees. Compared with the last normal quarter (December) the increase is 16,850 tons. The whole additional plant is in commission and has given full satisfaction. Two sections of eight stamps each in the mill have been dismantled and put in good repair. The fall in the gold premium did not allow the mining of much from the lower-grade sections, which are outside the calculated ore reserves, in consequence of which these were decreased by 96,000 tons. Development was again curtailed, there being no machine development. The new air compressor was completed and put into commission at the end of July. Working costs, compared with the last normal quarter, are the same at 10s. 8d. Development redemption was calculated at 1s. per ton up to the end of May and at 9d. for June, averaging 11d. for the quarter. An adjustment to 9d. per ton will be made from the 1st January, 1921, under this heading. The anticipated fall in the price of stores has not yet materialised, many lines, including cyanide and explosives, actually showing an increase. No benefit is now derived from bank exchange, which will account for a rise of 2d. per ton in general expenses compared with the December quarter.

Concerning Mines and Men.

Mr. James Leisk, C.M.G., has been appointed Chairman and Managing Director of the National Bank of South Africa, Ltd.

Mr. Arthur French, * Manager * of the * General Mining and Finance Corporation, Ltd., has returned to the Rand after a six months' visit to England.

Mr. H. C. Fletcher, of Messrs. Johnson and Fletcher, Bulawayo, has been visiting the Rand, on his way back from East Africa and the Kilo goldfields of the Congo. Mr. Fletcher was much impressed with the vastness of the great Kilo fields, and is one of the few British subjects who have been privileged to visit them.



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Geology of Heidelberg—VI.

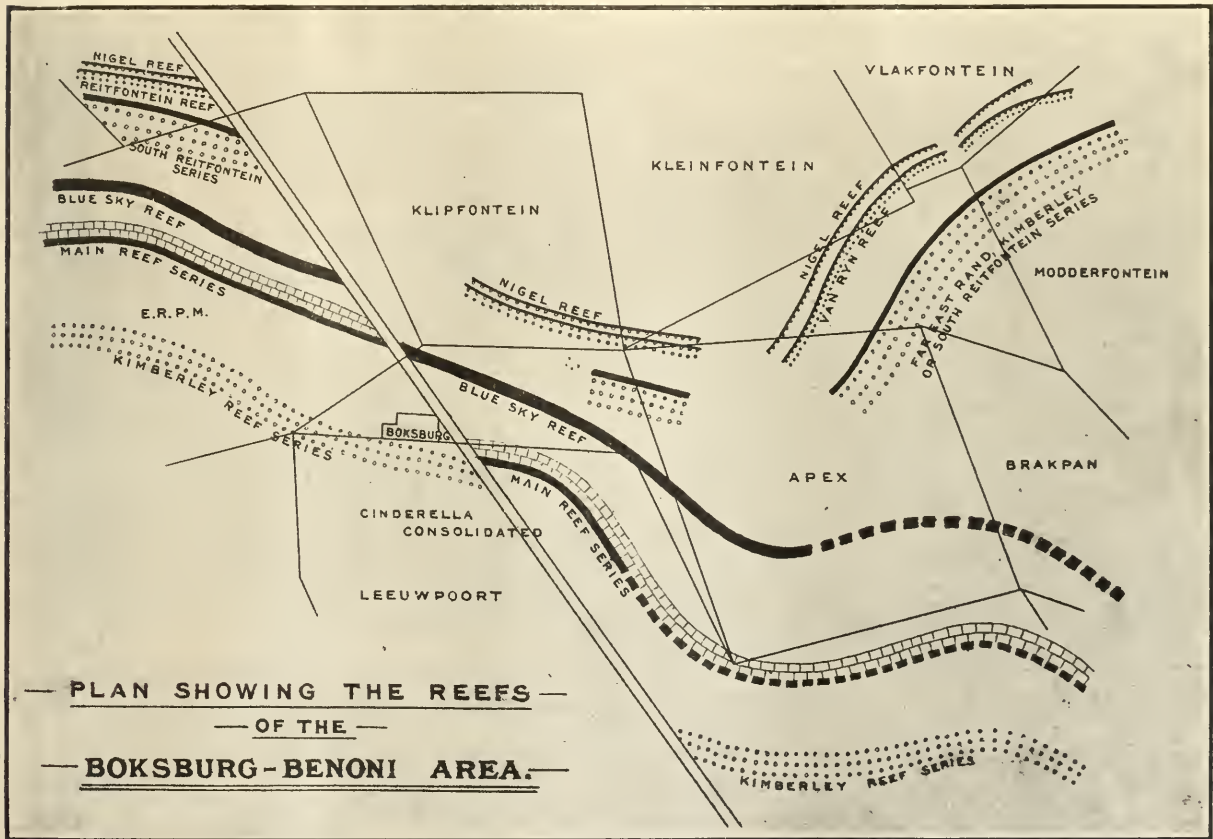
MR. BLELOCH REPLIES TO DR. ROGERS—OTHER REEFS.

The Blue Sky Reef and the Main Reef Series S.E. of Boksburg.

Seeing Dr. Rogers has referred to my views on the true extension of the Main Reef series of the Central Rand beyond the East Rand Proprietary Mines, I think it is necessary, in order to make the position clear, to present with this paper a sketch plan of the area which I have prepared to show the position of the outcrops and sub-outcrops of the reefs there. The sketch plan will convey my views of the position and identity of these reefs.

Before Boksburg is driven into rapid decline by the closing down of the East Rand Proprietary Mines, I hope that the Mayor and Town Councillors will come out with me to see and examine the outcrops, and that after seeing them they will insist that the shafts and drives on the Main Reef Leader and South Reef in the old Leeuwoort G.M.

Perhaps the reason for this is a feeling of delicacy towards his predecessor, Dr. Mellor. The Tatham Reef is a most distinctive large pebble reef, carrying payable gold, whose geological position is at the base of the Nigel shales and at the top of the Government Reef quartzites. The Reef has been supporting the Modder West mine with gold from its mill only and without cyanide works for many months. It has been opened too on the West Rand and it was one of the underlying markers from whose position the important borehole on Luipaardsvlei south of Randfontein was located by Mr. J. A. Thorburn a few months ago. That borehole was located to cut the Randfontein reefs. The borehole has been successful and the west reef carrying high gold values has been intersected. The sectional diagram I have presented in No. V. shows the relative positions of the Government Reef, the Tatham Reef, the Nigel Reef, and the Van Ryn-Reitfontein Reefs. The diagram shows the sequence



Company's workings will be de-watered so that they may be sampled and assayed, and I feel sure that the results will cause development to be proceeded with. On reflection, I think Dr. Rogers did well apologise for reiterating all these points concerning "mistaken correlations." He was correct in saying there was nothing new in his arguments. They are the same old obstructive ill-founded arguments which have been gradually closing up the Rand mining industry. Again I ask, why the determined opposition to putting these views to the test, why should not these reefs on Leeuwoort be sampled and assayed?

The Tatham Reef.

Dr. Rogers in the course of his paper has never mentioned this reef—the reef mined at the Modder West mine.

of beds occurring below the Van Ryn now established right round the Rand syncline from Randfontein to Nigel and beyond. Why does Dr. Rogers ignore the Tatham Reef? Is it because Dr. Mellor gave evidence on oath in the Knox Arbitration Case that the Tatham was not a reef at all. In his evidence in that case Dr. Mellor said: "I should not call Tatham's a reef." "I did not go down Tatham's shaft, I simply viewed it from the surface." "It was not necessary to pan." "It is apparent to the eye." "I have never seen portions of the Main Reef like it." That evidence and other similar and incorrect evidence resulted in an unjust and wrong decision against Mr. Knox, who lost the £3,000 he had paid in claim licences, his claims, and his costs. As I have mentioned above, the Nigel Reef had since been opened by a shaft on three claims which on my advice

Mr. Knox retained. It is worth noting that Mr. Knox recently lost even these three claims because he was 10d. short in his remittance for the licences and fines due on them. He had forgotten to pay in time, so for 10 pence the Government sacrificed a steady revenue on these three claims of 9 pounds per annum! I will say, too, that Dr. Rogers ignores the Tatham Reef, and the above facts relative to it, although he has been clearly informed of them by me, and as a matter of fact the existence of the Tatham Reef is to-day common knowledge; yet on page 50 of his paper, referring to Dr. Mellor and myself, he says: "I am thus in a position to compare the results of the methods of the two men." Well, my conscience is clear: I have never given evidence on oath that a reef was not a reef, on which there are now tens of thousands of tons of pay ore actually developed to witness that my evidence, bringing ruin in its train, was hopelessly and manifestly wrong.

"Errors of Correlation."

Dr. Rogers accuses me of making "errors of correlation which give rise to public expectations which are not otherwise justified." Here again my conscience is clear: I have never put forward the poor and unpayable Blue Sky Reef, with £5,000,000 of money against it, lost by the misguided shareholders who found the money to develop it on the faith of its official correlation with the "Main Reef Leader." I have never correlated an unpayable reef like the Molyneux with the "Main Reef Leader," a correlation which when publicly made by the Director of the Government Survey is extremely likely "to give rise to public expectations which are not otherwise justified."

I will tell Dr. Rogers, too, that I have never ruined thousands of innocent shareholders by inspiring an ill-advised Minister to cable to London condemning the great pay reef we have found in the Heidelberg district—the true Van Ryn Reef of the Far East Rand, the pay reef of our richest goldfield by calling it Kimberley in spite of the fact that our reef has the appearance, the character, the footwall, and the gold of the Van Ryn Reef and not of the Kimberley, thereby preventing the much-needed and the only possible expansion of the Far East Rand mining industry; stopping a round million of new working capital in these times of unemployment and falling State and railway revenues, and in very fact endangering the financial future of the country which pays him. For the Molyneux Reef—the reef he identifies in the Heidelberg district as the "Main Reef Leader"—has been known and proved in many shafts for twenty years past to be unpayable.

Has Dr. Rogers in the whole course of his paper informed you of that simple yet all-important fact? Has he informed the Minister? Evidently not, for on the contrary Dr. Rogers says (page 32): "The Molyneux mine, where a conglomerate lying directly on slate and, I am informed, another thin conglomerate 40 feet higher up in the quartzite were successfully worked some years ago." Dr. Rogers, by putting these words in his paper—an important State paper—practically gives the warranty of the Government to mining enterprise on the Molyneux Reef. The future may

show how "public expectations" raised on that statement will be realised. I would ask Dr. Rogers what authority has he for saying that "the conglomerate lying on slate in the Molyneux mine" was ever successfully worked and who informed him that the conglomerate 40 feet up was also successfully worked? Did he trouble to verify the statements of his informant by looking up the records of the Mines Department? It appears that he did not, because if he had done so he would have found that no mine on the Molyneux Reef or Government Reef—the reef he refers to as identified as the "Main Reef Leader"—has ever been successful. That is the pity of it; that he, the Government authority, should not only make an erroneous correlation, but in addition pass on statements which may "give rise to public expectations which are not justified."

In the last issue of the *South African Mining and Engineering Journal* Dr. Rogers is reported to have stated in reference to our Van Ryn Reefs at Heidelberg, "the mistaken correlation has given rise to very greatly exaggerated expectations of profits from mining certain reefs at Heidelberg." I challenge Dr. Rogers to find any leading mining engineer of the Rand mining houses who will confirm the opinion that the Molyneux Reef, his "Main Reef Leader" at Heidelberg, to which he has in the words quoted above given the imprimatur of the Government, is a payable reef. Yet he has the assurance to encourage "public expectations" on that reef while at the same time he goes out of his way to condemn the true Van Ryn Reef which we have found, which has always justified the greatest "public expectations" in every mine where it has been worked and whose actual outcrop and borehole values in the Heidelberg area give the greatest assurance of justifying public expectations there too.

Ill-advised Assurance.

Dr. Rogers has the ill-advised assurance to lecture me about reefs which I have known and studied for half a lifetime, and on which I have done more practical and costly research work than he is ever likely to do, work done too, not at the country's expense as with him, but to the country's immense gain, because merely to be licensed to do that work there has had to be paid into the State coffers not less than a quarter of a million pounds. He has the assurance to put forward as a final and closed judgment, not to be questioned, that a reef which for long has been proved to be economically worthless and unpayable is the representative in the Heidelberg district of the greatest and most valuable gold reef the world has ever known—the Van Ryn Reef of the Far East Rand. He shuts out all other Heidelberg reefs, no matter how unmistakably one particular series of them may agree in sequence of bedding, character and in gold values with the Van Ryn Reef. His reef being unpayable, he yet has the assurance in this way to bang the door on any expansion of the Far East gold

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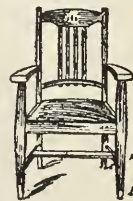
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mining industry and thus to seal the economic and industrial doom of this mining community. That and nothing less is what Dr. Rogers's paper comes to. That and nothing less, too, is what the dogmatic identification of the worthless Blue Sky Reef with the Main Reef Leader, east of the E.R.P.M., comes to. There, too, the door is banged and no one may try to develop the reef which we submit is the true Main Reef series on Leeuwpoot, except at the peril of being denounced by Dr. Mellor and Dr. Rogers and the Mines Department, and to such lengths will dogmatic tyranny go, that an attempt may even be made to get the man who tries it into jail. Meanwhile, the town of Boksburg is in decline and thousands of workers are in danger of being thrown out of work. I ask, why this banging of doors? Why should the Mines Department by means of the Geological Survey and cables to the High Commissioner prevent these reefs being developed and their gold values being tested and proved? Why not rather encourage capital to do the necessary work to put them to the test? Such colossal assurance which goes so far as even to imperil the livelihood of whole communities on the strength merely of an opinion based on the uncertain and accidental occurrence of an igneous rock is surely extraordinary even on the part of the most autocratic Mines Department or on the part of the most learned geologist.

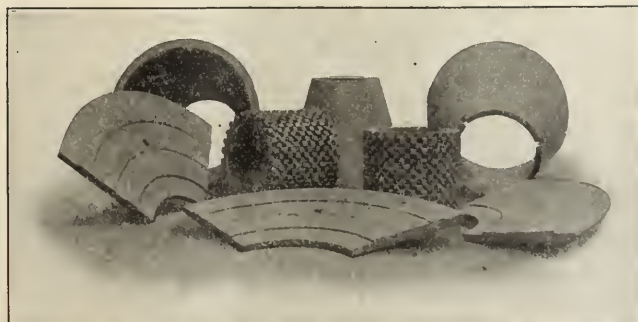
Dr. Rogers's predecessor, Dr. Mellor, said that the Tatham Reef was not a reef, although he did not take the trouble to go down an 80 ft. shaft to see it. Dr. Rogers is silent on the matter! and follows faithfully in Dr. Mellor's footsteps. He is silent, too, in regard to the Minister's statement that it was not his (Dr. Rogers's) opinions but those of Dr. Mellor, at that time the technical adviser of the Corner House, which were sent last year in these Government cables—opinions which I submit I have proved to have been based on "errors of correlation"—cables which ruined for the time being not one but several mining enterprises on whose success the future welfare of this community and indeed the financial stability of this country greatly depends.

He is silent, too, although he must know that these cables were excused in Parliament the other day by the Rt. Hon. the Minister of Mines and Industries by the accusation that I had used his (Dr. Rogers's) name or the name of Dr. Mellor, forsooth, as supporting my geological views and for company promotion purposes. Gentlemen, that accusation made in Parliament by the responsible Minister, on the written authority, he said, of Dr. Rogers, was a false accusation. Will Dr. Rogers repeat that accusation? I say to you that neither the Minister nor Dr. Rogers, nor any one else, can bring forward one sentence of mine written or spoken to justify it even in the remotest degree, and I have respectfully requested the Minister to order an inquiry into the whole of the circumstances which brought it forth.

I submit that the sooner the Government and people of this country realise that the dogmatic but erroneous correlation of the Molyneux Reef in the Heidelberg district as the one and only "Main Reef Leader," the condemnation of all other reefs there, and the interference with mining enterprise by Government cables has shut out all hope for the present of any expansion of our most profitable gold field. That expansion can, I submit, only take place on the reef that carries the gold—the true Van Ryn Reef which we have found and opened up, and it can never take place on the unpayable Molyneux Reef put forward as the "Main Reef Leader" by reason of a deplorable and tragic "error of correlation."

Sir Robert Hadfield's Plea for Unity.

In the course of an arresting article contributed to "Unity," Sir Robert Hadfield, Bart., who as metallurgist and inventor enjoys a world reputation, makes a powerful appeal for industrial peace as the only alternative to national disaster. To the workers whose wages have not much more than kept pace with increased cost of living, except in certain cases where they were scandalously low before the War (says Sir Robert Hadfield), the wage-cut now imposed by circumstances sounds the knell of the hopes they had of a better standard of life in the country for which they fought. They may bow to the logic of facts because they have no alternative, but unless some permanent edifice of conciliation and co-partnership is reared on the foundation of the present agreements the peace for the present attained will prove but a hollow truce. Renewed prosperity will bring renewed demands, in all probability ill-timed and impatiently urged, and we shall traverse the whole "vicious circle" again. "I would suggest to all employers," Sir Robert concludes, "that now is the time to meet all the workers in full and frank discussion of all the conditions of their common industry, to lay the cards on the table as to the state of the order books and the conditions under which contracts may be obtained, the profits and losses made during recent years, and to discuss, with a view to arriving at a permanent scheme, the question of unemployment; in a word, to dissipate the great cloud of suspicion and mistrust which is poisoning all relationships, hampering the recovery of the country, and giving the extremists who wish to overturn the whole social and industrial system their best chance. It is no business of mine to preach to Labour, but I do venture to ask this: that the workers should believe that the majority of employers are really and sincerely endeavouring to find a path to a better world of industry; that our ears are opened to reasonable suggestions; that the War in which our sons sweated and froze and fought and died together has not left us callous. And, as a consequence, that Labour should, in this new spirit of trust, put forth its best efforts to regain that measure of prosperity without which the best laid schemes of future prosperity are bound to 'gang aft agley.'"



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Letters to the Editor.

THE GOLD QUESTION.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I have read with much interest Mr. Speak's article on the real value of gold. He states in the first paragraph that "gold differs from all other commodities, except silver, in that the demand for it is almost entirely for money purposes." I remember some years ago that the chairman of the London City and Midland Bank stated at his annual meeting that India absorbed an enormous quantity of gold annually. It would, I am sure, be of great interest to your readers if Mr. Speak has in his possession any data showing approximately how much of the world's gold production is absorbed by the arts and industries, including the amount hoarded in the form of raw or wrought gold, or minted coins in the East, annually. This question is rarely dealt with, and I feel sure that Mr. Speak will be glad of the opportunity of giving us any information he has on the subject.—Yours,

ENGINEER.

IS THERE A FREE GOLD MARKET?

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I notice from the Home financial papers that all the gold we send over goes to U.S.A. Is there really any competition at all? We are told that there is a world hunger for gold. Then surely with open competition between Continental countries, India and China, some of the gold would be taken by other countries than America. Then, again, the price is often reduced by varying amounts, no matter whether there is any gold in the market or not, and thus we get prices wired out here to South Africa as being the price of gold, when really there was no gold to sell in the market. Another thing I can't understand: Imports from America at this time of foodstuffs are very heavy, and on the top of that there was all the coal we imported during the strike which should have helped considerably to put the exchange against England, and yet we have the fact of the sovereign improving in value day by day and the premium disappearing. How is it?—Yours, etc.,

"CURIOUS."

Salisbury, Rhodesia,
13th September, 1921.

THE FINANCE OF THE MODDER EAST.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Allow me to express through the medium of your valuable paper my approval and appreciation of "Mere Shareholder's" suggestion of a scheme for the financing of Modderfontein East Gold Mining Company with funds sufficient to put up its own plant, and at the same time reduce its £2,000,000 capital to a more reasonable figure.

I, as a shareholder, who looks upon an investment in sound mining shares as upon a business proposition with its risks and chances, have been following keenly all the stages of the opening up of this property, and I am convinced that the hitherto failure of the financing scheme was due mostly to external causes, like the sporadic conflagration in Europe, from the Irish to the Caspian Seas, local financial strain caused by the fall in prices of the principal South African products, in addition to the heavy capital (authorised though not yet issued).

All these causes helped to overthrow the past schemes. As the financial strain is now becoming easier, a scheme whereby the company's capital could be reduced by 25 per cent. is bound to meet with success, and I think every shareholder will see to making it a success.

I will try here to sum up what Modder East is losing through not having her own plant. At present it crushes about 320,000 tons per year at a profit of £160,000, losing £80,000 in transport and rent for the Apex plant; interest on £110,000 invested in the Simmer Deep plant at 8 per cent. is £8,800; total, £88,800, which is would-be profit lost: whereas with a 50,000 to 60,000 tons plant the company will crush about 720,000 tons, at 10s. per ton, equalling £360,000; plus saving on rent and transport at 5s., £190,000; profit per annum, £550,000—sufficient to pay off the debentures when these are due, or in case debenture options are exercised, a thing which is very likely to happen. Then a dividend of over 30 per cent. can be paid in 1922, and such a result would be the best reply the "Controlling House" could give to the unscrupulous and foolish suggestion of a Government inquiry about the affairs of the company.

It seems people are always keen in looking for some one to put every blame on, so in the Middle Ages heretics were accused of droughts, rinderpest or failure of crops, etc. In our new democratic times it is fashionable to ascribe any trouble or crisis to the "vile" capitalist, as if a corporation who ably controls the technical and financial affairs of the mining industry is to be blamed for any trouble caused by a De Valera, Corfanty, or falling wool prices, things which, incidentally, upset the plans of an over zealous speculator unintentionally, and which are as uncontrollable as a drought, flood or any natural outbreak.—Yours, etc.,

AN INVESTOR.

FAILURE OF STATE CONTROL.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—With reference to your remarks under this head in your last issue, may I state the following facts:—

According to the Brisbane correspondent of the *Melbourne Argus*, Queensland has more than £1,500,000 involved in State enterprises. It is the richest State in Australia so far as resources are concerned. Yet it has had an increase of unemployment in six years of 117 per thousand registered unionists. The greater part of the £1,500,000, the above-named authority goes on to say, is locked up in the 23 State farming stations, which comprise about 31,000 square miles of excellent grazing country. In 1919-20, the best pastoral season Queensland ever had, the State stations, allowing for undue inflation in the value of stock on hand, paid less than 2 per cent. in profit. At the same time the Government was paying 7 per cent. to the Bank of England for a temporary loan, which it is now trying to redeem by monthly instalments. It is contended that even in that year the stations were in reality worked at enormous losses, since the Government pays neither State nor Federal taxes, and if the original lessees had not been disturbed the State would have obtained many thousands of pounds more in income, land taxes and stamp duty than it claimed as profit, whilst the Federal revenue would have benefited similarly by income and land taxes. The results for the last financial year have not been made available, but even Ministers admit that they have been "very disappointing"; in fact, says the correspondent, there is good reason for believing that the loss has been staggering. The Queensland Government, it is further stated, has followed the policy of not gazetting a business as a State enterprise till all development work has been paid for from the consolidated revenue or loan fund. The Warra coal mine, for instance, was closed with a dead loss of £47,000. The State trawler, which cost £32,000, was laid up after costing £10,676 to catch fish valued at £1,583. The Baralaba and Styx River coal mines have cost some thousands of pounds in development work, yet neither of them is treated as a State enterprise. The losses on enterprises that have been closed are charged against consolidated revenue, and the development work on other enterprises is charged against that fund or the loan fund. Perhaps the most pronounced failure of all, says the writer of the article under notice, was the lime-crusher, which cost approximately £15 4s. a ton to crush lime, although the price in the open market was

£1 2s. 6d. a ton. That, too, was charged against revenue. "The experience in Queensland is that the enterprises have had a discouraging effect on industry; they have decreased employment, and they have developed into a thoroughly bureaucratic and centralised administration, 'soaking up' public funds, and are condemned even by some leading Labour supporters." Western Australia, too, is affirmed to have had a surfeit of State enterprises, and the present Ministry is represented as anxious to rid itself of the obligations in this respect which it inherited from its Labour predecessors. The Premier (says the *Melbourne Argus*) wishes to sell out as soon as it is possible, and invest as much of the money that he can get back in "more profitable directions." This after a trial of many years, and the expenditure of no less a capital sum than £2,000,000. "When the idea was first conceived the attraction held out was that the people would obtain meat and other foodstuffs at cheaper rates than the ordinary market price." It is now declared on responsible authority that commodities are "not a penny cheaper" as the result of State trading, and although it would be too much to assert that such enterprises can never be successful, some of the Australian object-lessons, if the facts are as represented, would appear to have been attended by distinctly discouraging results.—Yours faithfully,

"STUDENT."

THE FAILURE OF STATE RAILWAY CONTROL.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Apropos of your article on the above, it is only necessary to contrast Canada and Australia and the results of Government administration in the two countries. One part of the picture: New South Wales, Labour ridden till its withers are wrung. Its debt is three hundred and sixty millions. England had to come to its rescue and lend it six and a half millions a year for three years.

That place and its Government railways, run by labour conditions, will show exactly what is happening and will continue to happen here. In order to get political support and in order to please parties, the Government of this country may venture to experiment, but we must never forget that our conditions are entirely different. In order to conciliate white labour, the Government may do many things, but it must not forget that although it may be threatened by skilled labour and appealed to by indigent whites, the major part of this country's population is black, and although black labour has so far not combined and appointed its leaders, yet, as one that has seen conditions for two generations, I venture to say that at the rate of advancement of the black man, his majority is not going to remain a dead letter much longer, and if white labour's programme is to make South Africa as impossible a country as New South Wales, it will be the native and its overburdened white citizens that will have to come to its relief. The present system of slavery in mines will have to give way. The native is entitled, at least, to the same conditions that slaves were before the world's philanthropists released them to what is to-day a worse slavery than was ever endured under the early Dutch. If the needs of this country points to the sale of its railways and introduction of foreign capital and companies that will run them on competitive lines and thereby enable the population of this country to avoid being placed in bankruptcy by white labour. Is it possible to continue on a wild, downward course, determinedly ignoring our great black population? Can we ignore that, without his aid these fifty years, little would have eventuated in this country? For although the white skilled labourer may have his co-operations and associations and their combined effect may have immediate destructive results, as we evince with daily apprehension at every hour, yet this is but a terrible destructive weapon. The true builder up and the only reliable resource offering is the hand of the black man. As we see white men placed upon the veld, so do we see natives, for land is purchased and natives located on it, just as continuously as white settlers. Are all these settlers, black and white, to be led

into the same conditions as New South Wales, in order to pander to labour unions?

We are on the verge of Rhodesia entering this Union. There is a long railway line. Its traffic is on a par with the Cape's, and added to the present lines it will become a heavier millstone round our neck. Investigations will probably show that that line may have to be taken down and added to the Messina line, which serves richer districts and lessens length. Whatever may have to be done, it would be wise to interest the present owners in railways. It would be wise to even tempt them to take wider interests; in fact, it would be wiser still to sell them all our railways and regulate the rates by agreement. If not, and our native population keeps on increasing, and our debts as well, the time is not far distant when, through poll-taxing this man, it will become necessary to take a plebescite of the country, black and white, upon the continuance of running our railways under white labour and Government direction, or under joint stock companies and competition. Make no mistake, the native is being placed upon the land for a purpose. He is constantly improving his position. He is already reading, writing, clothes himself and his women in European clothes. He uses the latest plough and agricultural implements. He is invited to become a producer. He is to incur fresh taxation, and he is either to be ignored for the purposes of labour unions, or he is to be consulted and have his say. I am not saying he will have a white vote and enter a white Parliament, but his built up position will advance probably as fast, if not faster, than the labour unions will, and for the purposes of regulating his political position, he will have his native councils, and I venture to say soon, and through them he will have his right to say something not only upon railways but upon the condition of suppressed black labour.—Yours, etc.,

"ECONOMIST."

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The Week in the Sharemarket.

BUSINESS RESTRICTED—PAUCITY OF ORDERS—WAITING A LEAD FROM LONDON.

Business has been dull and quiet this week, awaiting a lead from London. The stagnation affected the whole market, and is disappointing in view of the higher price of gold and the cessation of labour troubles on the mines. An erroneous impression exists in some quarters that Germany might sell scrip now that she is again free to deal. In point of fact, either the Public Trustee or the Union Custodian of Enemy Property has either vested with him, or has a tight grip upon, virtually all the pre-war enemy holdings in South African gold and allied companies. Company secretaries would probably not recognise the transfer of even bearer warrants by ex-enemies, should coupons be presented for dividend payments. The pre-war property of the last named in the Allied countries is held, under the Peace Treaty, as security for debts to Allied citizens. The former German owners have to look to their own Government for recompense for the securities and other properties which have been sequestered and already, in many cases, realised. Thus the Germans—or other ex-enemies, for the matter of that—can have no substantial blocks of Rand shares to sell, and they would be very courageous if they tried to open bears just now, even did our current system of dealings allow of it. Despite the good profits being earned by the mines, London is not giving much attention to South African shares, and it is now thought that there will be no great activity until the ex-enemy shares question is disposed of. Oil shale shares after a spurt on rumours that the Shell people were favourably impressed with the prospects of African oil, have become quiet again. Tin shares are still stagnant, on the outlook for the metal, which was dealt with by Mr. Leisk at the Swazi Tin meeting this week. Colliery stocks may be written down as dull, but industrials have been a little more active, notably Hume Pipes, which firmed up during the week. In some quarters the statement in this column last week has been misconstrued which dealt with the reported issue to Sir Abe Bailey of £50,000 debentures in S.A. Alkali. What it was intended to convey was that the very fact that it was found necessary to raise further capital by means of a debenture issue had depressed the price of the shares. A debenture issue is, of course, but another name for a first mortgage on a property, and however good the name of the mortgagee may be, the depressing effect on the ordinary shares is just the same.

	Fri. 16th.	Sat. 17th.	Mon. 19th.	Tues. 20th.	Wed. 21st.	Thur. 22nd.
Hume Pipes . . .	11 6*	11 6*	11 9*	15 9*	17 0	18 9*
Natal Nav. Colls.	—	30 0*	30 0*	—	39 6*	39 6*
New Eland Diams.	29 9	30 0†	—	27 6*	31 0†	28 0*
New Era Cons. . .	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
New Geduld Deeps	—	1 4*	1 4*	1 4*	1 1*	1 4*
New Kleinfonteins	6 0	5 9*	5 8*	5 10	6 0	6 1*
New Modderfontn.	73 6*	72 6*	72 6*	72 6*	73 0	73 0*
Nigels	—	—	—	6 6†	—	—
Nourse Mines . .	9 3*	8 6*	8 6*	8 6*	8 6*	8 9*
Pretoria Cements	45 0*	45 6	45 6	45 0*	—	45 0a
Princess Estates .	1 0	1 0*	1 0*	1 0*	1 0*	1 0*
Rand Nucleus . .	1 0	1 1	1 1	1 0*	1 1*	1 1*
Randfontn. Cents.	11 6*	11 6*	—	11 0*	11 0*	11 0*
Randfontein Ests.	17 1/2	17 1/4*	17 3/4*	17 3/4*	17 3/4	17 6*
Roberts Victors . .	—	9 0*	9 0*	9 0*	9 0*	9 0*
Rooibergs	3 6*	3 6*	—	3 0*	3 3*	3 3*
S.A. Breweries . .	27 0*	27 0*	27 0*	27 0*	—	—
S.A. Lands	1 1*	1 2*	—	1 3*	1 3*	1 3*
Springs Mines . .	43 3	43 0	42 6*	43 0	43 2*	43 9
Sub Nigels	11 9	11 3*	11 6*	11 6*	11 9*	11 9*
Swaziland Tins . .	10 0†	8 0†	10 0†	—	—	10 0†
Trans G.M. Ests.	10 0†	10 0†	—	8 9*	8 9*	12 6*
Van Ryn Deeps . .	73 2*	73 0	72 6*	74 0	73 2*	74 0
W. Rand Estates .	4 0*	4 0*	4 0*	4 3	4 0*	4 6†
Witbank Collieries	41 0†	41 0a	40 0†	39 0	—	—
Witwaters. Deeps	8 0*	8 0*	8 0*	8 6*	8 9*	9 0*
Woluhuters	4 2	4 0*	4 3†	4 0*	4 6†	4 0*
Zaaiplaats Tins . .	3 10*	4 0	3 6*	3 9*	3 11	4 0†
Union 5 per cent.	£100†	£100†	£100†	£100†	£100*	£100*
New States	24 0	23 6*	—	21 9†	23 6*	23 9†
Rouxville Diams. .	1 8*	1 6*	1 6*	1 6*	1 6*	2 0†
S.A. Townships . .	10 6	10 6*	10 6*	—	10 6*	10 6*
S.A. Alkali	17 0†	17 6	16 9*	16 9*	17 6*	17 6†
Transvaal Silvers	23 9	23 6*	25 3	24 6*	24 6	24 3*
Tweefontein Colls.	19 0†	—	19 0†	19 0†	—	—
West Springs . . .	12 9	12 6	12 3*	12 3	12 3*	12 2*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

	Fri. 16th.	Sat. 17th.	Mon. 19th.	Tues. 20th.	Wed. 21st.	Thur. 22nd.
Anglo-Amer. Corp .	23 6	23 3	23 3*	23 0	—	23 0*
Apex Mines	7 0*	—	7 0*	7 0*	—	7 0*
Bantjes Cons. . . .	6 0	—	5 9*	6 0	—	5 9*
Brakpan Mines . . .	55 0*	56 0†	53 9*	—	—	54 0*
Bushveld Tins . . .	0 6*	—	—	0 6*	0 7*	—
Cinderella Cons. . .	2 3*	3 0†	2 3*	2 6*	2 6*	2 6*
City and Suburban	2 3*	—	2 0*	2 0*	2 3*	2 3*
City Deeps	50 9*	50 3*	—	47 6*	49 0*	49 9*
Clydesdale Colls. . .	26 0*	—	27 0†	26 0*	26 0*	26 6*
Con. Diamonds . . .	18 0	17 6	18 0*	18 0*	18 0	18 0
Con. Longlaagtes . .	15 0†	—	15 0†	15 0†	13 6	—
Con. Main Reefs . . .	11 0*	11 3*	11 3	11 9†	12 0*	11 0*
Coronation F'holds .	0 10*	1 0	0 10*	0 8*	0 10*	0 10*
Do. Syndicates . . .	6 3	6 0*	6 0*	6 0*	6 1*	6 6*
Crown Diamonds . . .	4 0*	—	4 0*	4 1*	4 1*	4 3
Crown Mines	—	41 0	—	40 0*	41 0*	41 0*
Daggafont. Mines . .	3 1	3 1	3 0*	3 0*	3 1*	3 1*
East Rand Coals . . .	2 0*	2 0*	2 0*	2 1†	2 4	—
East Rand Deeps . .	—	—	1 0†	0 8*	0 6*	0 8*
East Rand Props. . .	5 9*	5 8*	5 6*	5 6*	5 6	5 6*
E.R. Debentures . . .	£72 1/2*	£72 1/2*	£72 1/2*	£72 1/2*	—	£72 1/2*
Frank Smith Dias. . .	4 3	4 6	4 9	4 9	4 7*	4 8
Geduld Props.	48 3*	48 0	47 6	47 9	47 6	48 0a
Glencoe Collieries . .	13 0†	—	12 0†	13 0	—	—
Glynn's Lydenburgs	—	9 6b	7 0*	9 6b	9 6b	—
Government Areas . .	83 0*	83 0*	81 0†	82 6*	81 3*	82 3*
Knights Centrals . . .	4 6	4 6	4 4*	4 3*	4 4*	4 3*
Laco Props.	7 6*	—	7 6	7 3*	7 3*	7 3*
Leeuwpoot Tins . . .	9 7*	10 0	9 9	9 6*	9 3*	9 3*
Lydenburg Farms . . .	5 4*	5 3*	5 3*	5 3*	5 4*	5 4*
Meyer & Charltons.	85 0†	85 0†	—	—	—	—
Middelvel Estds. . . .	1 3*	—	—	—	1 3*	—
Modder B.'s	28 0*	27 3	27 0	26 6	26 9*	27 0*
Modder Deeps	43 9*	43 9	44 0a	44 0	43 9*	43 9*
Modder Easts	10 3	10 3*	10 3	10 1/2	10 0*	10 0*

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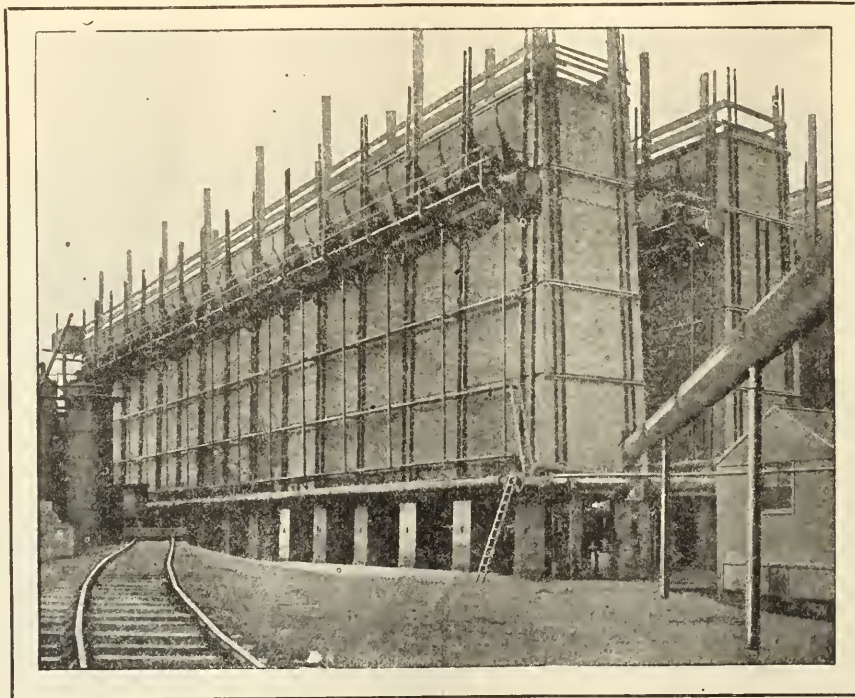
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS NOT SO STRONG, BUT TONE CHEERFUL—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—BRITISH TRADE RETURNS—UNION RAILWAY EARNINGS AND EXPENDITURE—PRETORIA PORTLAND CEMENT CO.—OIL SHALE PROSPECTS—NATIONAL BANK CHAIRMANSHIP—LONDON METAL MARKET.

General Review.

These notes would be incomplete without some reference, however slight, to the gloom caused in commercial and other circles by the untimely decease on the 19th inst. of the founder of this journal, Major Clem Webb. The sad event is referred to in another part of this issue, and it only remains to be said in regard to the commercial community that the deceased had endeared himself to all by his sterling personality. The writer of these notes, having had the privilege of knowing him since 1888, is well assured that he could never possibly have had one single enemy. *O si sic omnes!*

There is no important change to report this week in general business. The most satisfactory feature, of course, has been the final settlement of the building trade wages dispute. It is naturally full early to look for any great improvement in the building trade, but now that wages have been reduced and materials are as low as they are likely to be for some time to come, developments may, it is thought, occur shortly. As is well known, there is a tremendous amount of building work to be tackled, and there seems nothing to be gained by postponing operations in the hope of lower costs. Labour, of course, represents about two-thirds of the building cost, and while a 5 per cent. reduction is after all not a very big matter, it still means about £50 reduction in the cost of an average house, and so is in the right direction. The gold premium has advanced to 110s. 10d. per oz., and authorities consider that there may be even further advances within the next few weeks. However hard for Britain as regards the pound sterling, the upward exchange can only be viewed as a blessing by us on the Rand. The pendulum will, of course, sooner or later, swing the other way, but in the meantime our lower grade propositions may take heart of grace. Apart from forced sales, there are no changes to report in prices generally, but it may at once be said that the improvement of the past fortnight has not been maintained and has given place to the lethargy prevailing during past months. However, optimism is in the air, and these relapses are generally compared by the commercial community to the ebb and flow of the strength of a convalescent—after each relapse a fresh accession of strength. Better conditions are confidently expected to rule even during the present year.

Iron and Steel.

Business has been very quiet during the past week, the improvement noticeable during about a fortnight not being maintained, and the volume of dealings has relapsed to recent levels. On the Commercial Exchange forced liquidations have again been the order of the day. The present financial stringency, while leaving firms of big financial resources comparatively cool, is undoubtedly causing some merchants, without such financial strength, a rather warm time.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 45s.; $\frac{3}{8}$ in. iron, 38s.; steel, 7-16 in., 44s.; mild

steel, 43s.; $\frac{3}{4}$ in. iron, 37s. 6d.; steel, 39s. 6d.; $\frac{7}{8}$ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; $\frac{1}{4}$ in. square iron, 55s.; $\frac{3}{8}$ in., 47s.; $\frac{1}{2}$ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, $\frac{3}{8}$ in., 41s.; $1\frac{1}{4}$ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, $\frac{3}{8}$ in., 10 $\frac{1}{2}$ d.; $\frac{1}{2}$ in., 10d.; 1 in., 8d. to 9d.; $1\frac{1}{4}$ in. to 2 in., 7d. to 8d.; larger sizes, 8d.; steel plates, 1-16 in., 24s. to 25s.; $\frac{1}{4}$ in., 32s.; 3-16 in., 32s.; $\frac{1}{4}$ in., 21s. to 22s. in all sizes up to 8 x 4; 30s. to 32s. 6d. for the larger sizes; spring steel flats, 8 $\frac{1}{2}$ d. to 9d. per lb.; bolts and nuts, $\frac{3}{8}$ in., 1s. to 1s. 2d. per lb.; $\frac{1}{2}$ in., 65s. per 100 lbs.; $\frac{5}{8}$ in., 62s. 6d.; $\frac{3}{4}$ in., 60s.; nuts, $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 87s. 6d.; fish plates, bolts and nuts, $\frac{3}{8}$ in. and $\frac{1}{4}$ in., 8 $\frac{1}{2}$ d.; $\frac{1}{2}$ in., 6 $\frac{1}{2}$ d.; $\frac{5}{8}$ in., 6d.; $\frac{3}{4}$ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 1s. 3d. per lb.; $\frac{3}{8}$ in., 10d.; $\frac{1}{2}$ in., 50s.; $\frac{5}{8}$ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, $\frac{3}{8}$ in., round, 1s. 7d.; $\frac{1}{2}$ in., 1s. 5d.; $\frac{5}{8}$ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d. and 8d.; hollow, 9d.; $1\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; piek handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to $1\frac{1}{2}$ in., 2s. 6d. per lb.; $1\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Engineering Shops.

Business is still improving, and there is this week quite an optimistic tone in engineering circles. During the slack time experienced by the trade, brains have been busy in inventing and adapting several money-saving devices, which are now approaching the practical stage, and to which we hope very soon to revert to and report upon.

Second-hand Machinery.

The market in second-hand machinery has made no improvement since our last report, possibly on account of the unsettled state of the railways and the farming community and outside mines delaying purchases. There have been during the past few days fairly large purchases of boilers and engines for industrial purposes in the Northern Transvaal. In view of the flotation of one or two big companies on new discoveries, there is likely to be a big demand for machinery very shortly. Local orders are very scarce, although there are still a few to keep dealers going. The

mines will not purchase any large quantities as they used to do, and are only buying from hand to mouth. The management of a mine to-day is a fine art, and expenses are cut very fine; every department is well supervised, and before a big order is placed it has to go through several departments before the final decision is arrived at—not as in the early days, when the heads of each department had the authority to order on their own responsibility; in fact, the managers in those days left everything in the way of purchasing entirely to their subordinates; to-day we have a very different system before a purchase is made. There have been several orders for second-hand steel plates lately for certain cyanide tanks which have come down to £10 10s. a ton; the better class is fetching up to £14 a ton. Several mines of late, to economise, have even collected all their short drills and welded them together, making them as serviceable as new—quite a contrast to a few years ago, when these drills were buried in the dump, as well as short pieces of bar iron and other commodities. Things have undoubtedly changed in respect of the economic working of our mines.

The iron and steel industry in Britain is still suffering from the high price of coal, which, although cheaper than during the strike, is still too high to admit of general profitable workable conditions, in view of the keen Continental rivalry. Hitherto British manufacturers have been able to sell considerable quantities of high-speed steel to the United States. Until recently it was possible to place British steel, containing 18 per cent. of tungsten, on the American market at £483 per ton, inclusive of duty (£63), plus the cost of freight and insurance, representing a difference in favour of Britain as against America of nearly 300 dollars per ton. Under the new tariff systems to be adopted by America, which will render imported goods liable to duty on their American values and not on the value in the exporting country—representing about 30 per cent. increase on present duties—Britain will be unable to sell her products at a profit. It is feared that the new tariff will prove prohibitive to British importations. It is stated that the industrial boom in Germany, especially in iron and steel and cognate industries, is largely due to orders from England, Holland and the United States. There is at the moment a large English demand for German half-finished iron and steel.

Coal prices are still falling in Britain, with the result that an increasing number of iron and steel works are resuming work, which is having an encouraging effect in combating foreign competition. Belgian foundry iron is quoted now at £6 15s. per ton, as against the Scotch make of £8 5s. British pig iron is, however, making some headway against Continental quotations. German iron and steel goods prices are advancing rapidly, with big Home and export orders, the explanation of which is to be sought in the continued deterioration of the mark.

Timber and Building Materials.

Things are much about the same as last week, prices are unchanged, and business is only fair. Now, however, that the building trade dispute regarding wages has been definitely settled, the general impression is that we shall shortly see increased activity in the building trade. 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 1s.; beaver board, 4½d.; floorings, 7d. to 7½d.; ceilings, 5¼d. to 5½d.; Oregon, 7s.; pitch pine, 8s. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality 14s. 9d. for second at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cub. ft. at the mills; Honduras mahogany, 30s. per cub. ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks, in the absence of any activity in the building trade, are unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 37s. 6d., 47s. 6d., 53s. 3d. for 1 to 3-ply.

Second-hand Iron and Timber Yards.

Business in this section, although at the moment practically much as it was, has an undercurrent of firmness, which is expected to eventuate in activity within a few weeks. With the settlement of the building dispute, there is undoubtedly a better outlook, and dealers with full stocks are looking forward to more prosperous times. Iron is ruling at 5d. to 6d.; timber at 10d. to 1s.

STANDARD BANK
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LIMITED.

Established 1862.

(With which is incorporated the African Banking Corporation, Ltd.)

Authorised Capital	- - -	£10,000,000
Subscribed Capital	- - -	£8,916,660
Paid-up Capital	- - -	£2,229,165
Reserve Fund	- - -	£2,893,335

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MAGNOLIA
ANTIFRICTION METAL

"FLOWER" BRAND.



HAS THE LOWEST CO-EFFICIENT OF FRICTION.

KEEPS down the bill for lubricants, making **BEARINGS** smooth as glass and keeping them **COOL** under heaviest pressures and highest speeds.

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THE MAGNOLIA ANTI-FRICTION METAL CO. OF GREAT BRITAIN, LIMITED,
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Agents for South Africa: **FRASER & CHALMERS, Ltd.,** Johannesburg, Bulawayo and Salisbury

Electrical Goods.

Dealers admit that it is yet too early to look for any radical improvement in business, but they are sanguine that, notwithstanding the present dullness, better times are in front of us. In the meantime they report that inquiries are now much more numerous than of recent months and that the tendency is better. No further reductions have to be reported than those given during the past fortnight, but notwithstanding the unbending of British prices up to the present, it is generally thought that by about the beginning of October a few more reductions may occur—not warranted, they state, by the general position, but by the continued financial stringency, which compels merchants to reduce heavy stocks at a sacrifice notwithstanding the world's position as regards raw materials. A satisfactory feature to report is increased inquiries, not orders, but which may eventually lead to business, from the country. The Springs, Kimberley, etc., are now more enterprising than they have been for some months. In short, electrical goods merchants are now in quite a cheerful mood regarding the immediate future.

British Trade in August.

This shows some revival both in imports and exports, amounting, as compared with July, to about £8,000,000, while business in foreign and Colonial goods showed an increase of about £10,000,000. During August over 3,000,000 tons of coal, valued at £5,000,000 sterling, were exported; £19,000,000 sterling worth of raw materials were imported, compared with 15½ millions sterling during July; £18,000,000 sterling worth of manufactured goods were imported during July and August, but during the latter month the exports of manufactured goods amounted to £40,000,000, an increase of £3,250,000 compared with July.

British Revenue and Expenditure Returns from April 1 to September 10.

These show receipts of £400,000,000 and expenditure £449,000,000, in comparison with £541,000,000 and £456,000,000 respectively for the corresponding period of last year.

Union Railway Earnings and Expenditure, 1914-1921.

The expenditure on railways has increased from £14,491,696 in 1914 to £28,348,563 in 1920-21, or 95.62 per cent. The position is best disclosed by giving the imports and exports in 1914 alongside of those of last year, viz.:—

	Imports.	Exports.
1914	£30,162,000	£38,495,000
1919	46,712,000	95,803,000
1920	93,404,000	70,799,000

Taking, however, the exports of wool, hides and skins, corn, grain, meat and mohair, the position is:—

1914	1919	1920
Tons.	Tons.	Tons.
227,058	575,671	187,354

which shows that notwithstanding an increase of expenditure since 1914 on railways of 95 per cent., our products exported are less in 1920, which calls for increased economy in the working of our railways.

Pretoria Portland Cement Co.

Mr. James R. Leisk, C.M.G., presiding at the annual general meeting of shareholders last week, had the pleasant task of announcing that the company's profit for the past year amounted to £195,231, an increase of nearly £50,000 on the preceding 12 months. The capital of the company had been increased during the year by £270,000, bringing it up to £630,000. Two dividends, each of 15½ per cent., had been declared during the year.

Oil.

The Karoo series of oil shales is reported upon very favourably by a well-known engineer. He says that the area known to be covered by these beds is very large, the thickness of the beds varying from a few inches to three or four feet. The value of the content seems to vary from 12 to 50

gallons per ton, the possible average being 20 gallons. It is estimated that the costs of running and refining will be covered by 20s. to 25s. a ton, so that 20 gallon shale should show a profit of 35s. to 40s. a ton. In his opinion a plant to treat 500 tons per day could probably be fixed up for less than the cost of a 100-stamp gold mining mill. A point in favour of producing oil in the Union would be the capture of the South African market for oil and lubricants. Regarding the estimated value of these shale areas, he stated that, based on data of the best authorities, and allowing amply for contingencies, the profits to be made would be greater than those presently obtained from the gold and diamond industries. In his opinion, the structural geology of the country precluded the probability of gushers being found. He thought that the oil shale proposition in the Union was one of the biggest economic chances South Africa had ever had, and that it should be exploited without the help of the great oil groups, who might possibly queer the pitch.

Oils and Colours.

White lead in oil, small sizes, 1s. lb., 41s. per 50 lb kegs; red lead, 1s. per lb. in 6½ lb., 12½ lb. and 25 lb. kegs; 10 lb. in 50 lb. kegs; dry white lead, 1s. 6d. lb.; linseed oils, raw or boiled, small bottles, 1s. 9d. each; 7 lb. tins, 8s. 6d. each; 4 Imperial gallons, 42s. 6d.; spirits of turpentine, small bottle, 2s. 6d. each, 10s. 6d. per 83 Imperial gallons; turpentine substitute, 6s. 6d. per tin, each 5-6 Imperial gallons; finest linseed oil putty, in 100 lb. drums, 5d. lb.; English putty, in bladders, 7½d. lb.; colours ground in oil, 1s. 6d. to 4s. 6d. lb.; dry colours, 6d. to 4s. 6d.; colours ground in water, 1s. to 2s.; in turpentine, 3s. to 10s. 6d. lb.; ready mixed paints, 1s. 6d. lb.; 70 lb. drums, 1s. 4d. lb.; roof paints, 1s. 6d. lb. in 14 lb. tins; 1s. 4d. per 70 lb. tins; varnishes, 25s. to 47s. per Imperial gallon; red oxide, ground in linseed oil, 50s. per 100 lb.; alum, 9d. lb.; creosote, 4s. 6d. per 5-6 Imperial gallon; methylated spirits,

USE

“PORPOISE”

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ANTIFRICTION GREASE

Used for years by the majority of Mines all over South Africa.

Manufactured by

South African Lubricants & Chemical Works, Ltd.,

DURBAN & JOHANNESBURG.

Phone 1618, Johannesburg Branch Office.

5s. 6d. per tin, 5-6 Imperial gallon; bottles, 1s.; resin, 8d. lb.; caustic soda, 1s. 3d. lb.; tallow, 1s. 3d. lb.; coal tar, per 83 Imperial gallons, 4s. 6d.; per 4 Imperial gallons, 17s. 6d.; Stockholm, per 83 Imperial gallons, 9s. 6d., per 5 Imperial gallons, 47s. 6d.; beeswax, 1s. 6d. lb.; common glue, 1s. lb.; good quality, 1s. 6d.; finest Russian, 1s. 9d. lb.; good leaf, English, plain, per book, 3s. 9d.; transferred, 4s. 3d.; aluminium leaf, plain, 1s. 9d. per book; transferred, 5s.

National Bank Chairmanship.

The board of directors announce with regret that the Hon. Hugh Crawford has decided to relinquish his position at the end of the present year, Mr. J. R. Leisk, C.M.G., accepting the chairmanship from the beginning of 1922. The Hon. Hugh Crawford has been connected with the National Bank of South Africa since its inception in 1890-1.

Settlement of Strike at Messrs. Hubert Davies & Co.

This has been satisfactorily made; the strike is off and all employees have resumed work.

A lock-out of boiler-makers is threatened in the Mersey ship-repairing yards in connection with the restriction of the use of "burners." The "burner" is a mechanical device entailing a big saving of labour, to which the Boiler-makers' Society object.

Transmission of Power.

The General Electric Company of America make the important announcement that for the first time in history it has generated and transmitted an excess of a million volts pressure by transformer equipment designed along standard lines, with current at ordinary household efficiency of 60 cycles per second. They claim the feasibility of using considerably higher voltage in the transmission of power and that the extent of long-distance transmission has advanced tremendously.

Australian £10,000,000 Loan.

The Treasurer of the Commonwealth, the Right Hon. Sir J. Cook, announces that the success of the New Australian loan is now assured.

Radium.

It is announced that a British company has concluded an agreement with the Czecho-Slovak Government, virtually amounting to a monopoly of the output of radium in the producing mines at Joachimstal, which is the only European State producing this valuable metal. The mines are expected to produce three to four grammes yearly. The company will not sell, but hire the radium for medical and research purposes.

Gold Cathodes in place of Platinum.

An American chemist is making apparatus out of gold instead of platinum to save money. His expedient grew out of his need for several cathodes in making electrolytic tests for copper. To avoid the large investment for platinum, he stated, cathodes of 24-carat gold were tried. They

proved to be, to all appearances, the equal of platinum, at one-tenth the price. He has had since then several open cylinder cathodes of the same dimensions as the platinum cathodes in constant use with perfectly satisfactory results. He states that he still has to use platinum as anode, but with the precaution in using the gold cathode when igniting to remove any traces of grease, these cathodes seem to be the equal of platinum.

Bwana Mkubwa Copper Mine Reconstruction.

This company, which owns extensive concessions in Northern Rhodesia, is now in course of reconstruction.

London Share Market.

Latest quotations: Standard copper, £67 13s. cash, £68 13s. 9d. forward; electrolytic copper, £72 15s. cash, £74 forward; Straits tin, £154 7s. 6d. cash, £156 10s. forward; English lead, £23 2s. 6d. cash, £22 15s. forward; bar silver, 39½d., and fine gold 110s. 10d. per oz.

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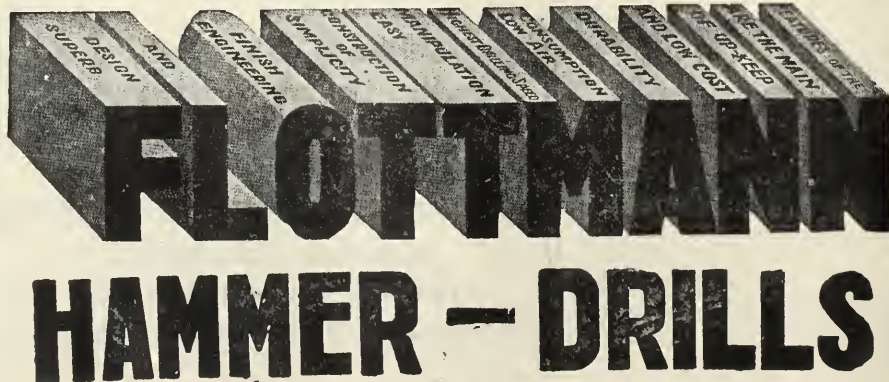
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"BRITFLOTT."

The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

VI.

(By Arthur Stenhouse.)

In 1886-7 the Market Square of Johannesburg was one vast dusty plain, partly surrounded by tin shanties. Towards the evening, and all night long, the Boer farmers with their ox wagons laden with pigs, produce and poultry, would trek in from every quarter and camp upon the Square, and the Boers would sleep beneath the wagons. It was a weird and imposing spectacle watching the camp fires burning, and listening to the lowing of the cattle in the silence of the night.

In 1888-9 there was a tremendous boom in gold mining shares. The Stock Exchange was situated in Simmonds Street, facing the Corner House. Traffic between Commissioner Street and Market Street was "barred" by iron chains. Share gambling was universal, and, daily, after the closing of the Exchange, the space between the chains was densely packed with brokers and their clients. Miners trooped into town after completing their shifts on the mines, and joined the noisy throng. The sharebrokers' clerks were often occupied in the offices throughout the entire night. Share gambling was a mania.

The proprietors of the "Star" newspaper were very enterprising. Hourly editions, containing the latest quotations, were published, and eagerly purchased by an excited crowd. The local bars did an enormous trade, and champagne flowed like water. Appropriately was the Stock Exchange named the "Kafir Circus"; it only required a brass band to complete the picture!

Away from the crowd, on the silent hills behind the town, overlooking the treeless valleys, towards the blue mountains surrounding Pretoria, placidly I recalled happy memories of leisurely wanderings through the lovely gardens attached to the Villa Pallavicini—the loveliest in Italy, viewing the noble cathedrals at Genoa, containing paintings and pictures of priceless value; exploring the marble palaces of the Duke de Galleiria, the Palace Durazio, and the Doria Palaces; admiring the pictures by Raphael, Corregio, Titian, Perugino, Guido, and other celebrated masters; and by easy stages travelling along the Mediterranean shore to Monte Carlo, with its world-famed terraces, and resting in the lovely gardens attached to the Casino beneath the palm trees shade.

In the pioneer days we wandered afar in quest of gold. Crossing the Zambesi River we trekked through an almost mythical country, passing by the way enormous ant-heaps sufficiently large to inset a double line of rails. From the summit of a lone mountain, half hidden by bush, we gazed down upon an extinct volcano, which resembled a great cup, the bottom of which had subsided to a level floor. A weird and impressive scene; somehow there was an indefinable feeling that the crater might at any moment burst forth into flame and envelop us with molten lava. Hurriedly we descended, and once more freely breathed the balmy air beneath the welcome sky.

Romance figured largely in the solitude of our sub-tropical surroundings in those days of long ago.

We take the following from the *Pretoria News*: Mr. Geo. Jackson Kirby, of New York, who is taking a great interest in South Africa (mines and minerals), informs us that he is prepared to present the Government, or Pretoria, with the finest site on Capital Park (15 or 20 acres), on the ridge overlooking the Magaliesberg valley and range, for the purposes of a college or similar building, provided that such building as was found desirable and was approved, was commenced without unreasonable delay.

Facts of Management

ONE WAY OF REDUCING WORKING COSTS

With operating costs what they are to-day, purchases in your plant which were once considered matters of routine have come up for sharp executive scrutiny.

Take the matter of steam lubrication. The executive whose mind is keyed to to-day's conditions knows that:—

1. There is a correct steam engine for his power needs.
2. There is a correct steam cylinder oil for that engine.
3. Either a poorly-chosen engine or incorrect steam cylinder lubrication involves a definite money loss.

The steam cylinder oil for the lubrication of your steam engine should be chosen with great care to meet the operating conditions of that engine.

There are five factors which influence the service value of an oil used for the lubrication of steam engines and cylinders and valves. These five factors must be taken into consideration before the correct selection can be made. They are

1. The size of the engine.
2. The speed of the engine.
3. The load carried by the engine.
4. The pressure of the steam.
5. The quality of the steam.

We are able to offer oils which will meet any combination of the foregoing conditions in operation, and satisfy all the requirements of correct lubrication of steam cylinders. We shall be glad to prescribe the correct oil if you will consult us.



Lubricants

A grade for each type of service

Vacuum Oil Company of S.A., Ltd.

Consolidated Building, Johannesburg.

ENGINEERING SECTION.

The Crucible Steel-Making Process.

By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Steel Makers, Sheffield.

This process, as its name implies, is carried out in crucibles which are (in Sheffield practice) made from a mixture of refractory clays together with a little coke dust. Two crucibles are placed in each melting hole, and they are heated to redness in an annealing furnace first. When in the melting hole they stand on a fire clay stand. The lid is placed on the crucible and the fire drawn up in the usual way until the crucible and stand are brought to a good heat when a small quantity of sand is thrown into the crucible to frit (join) the crucible to the stand. Crucibles when made have a hole in the base like a plant pot, and the sand fills this hole and fuses, fastening the pot and stand together. The first method used was simply to melt carburized iron and cast into ingots. However, this has been superseded by melting a quantity of wrought iron or ordinary scrap steel, together with either charcoal or white iron, which act as carburising agents, i.e., they add to the steel the necessary carbon content. This process is purely and simply a melting of the mixture put into the crucible, and it has no purifying effect on the material as charged. In other words, if you want a pure steel, you must commence with pure irons. When the crucible is at a good heat and is well fritted to the stand, the metal is charged through the "charger," which is an iron funnel made to fit the mouth of the crucible. The lid is placed on the crucible again, and more coke added, and after $3\frac{1}{2}$ to 4 hours the charge is clear melted. We now have to keep the steel in a molten condition until it is dead melted or killed, which are terms used for the elimination of the gases in the steel. The crucibles are now pulled out and the steel cast into ingots. As the crucibles only hold 56 lbs. of material the usual practice is to make ingots not exceeding 56 lbs. each, although very large ingots have been made from crucible steel by various methods, such as the using of the ordinary steel ladle, or by a relay of teemers, the flow of

metal being kept continuous until the ingot is made. The pots are put back into the furnace and another charge added of less weight than the first. The reason for this is, the slag which floats on the surface of the steel attacks the crucible, and on examination you can clearly see the slag line, which shows that at this particular place in the crucible we have a weak spot, and if the same height of steel for the second heat as for the first was used, the action of the slag would be in the same place and would break through the walls of the crucible. Some pots have done as many as four separate heats, but the present practice in Sheffield is two heats only, not due to the fact that the crucible will only do this amount, but the working day of eight hours is in vogue, and therefore two heats is called a working day and is approximately $7\frac{1}{2}$ to $9\frac{1}{2}$ hours, according to circumstances. Once the crucible becomes cold it is of no further use.

As I have already said, this process is essentially a melting operation, and the chemical changes in the steel are very small. The carbon may gain slightly, obtaining carbon from the crucible, to which you will remember coke dust is added in the course of manufacture. The Silicon increases considerably, this also being obtained from the crucible, which is dependant on silica for its refractory properties. The phosphorus, a deadly impurity, is practically unchanged. The manganese is reduced by about 40 to 50 per cent., and this is due to the oxygen in the molten steel combining with it. The sulphur, another impurity, is actually increased, due to the sulphur in the coke forming sulphur dioxide, penetrating the walls of the crucible and being absorbed by the molten steel. This is the theory put forward, but how it does happen is yet to be proved, for experiments in this direction are very difficult. Suffice it to say, however, that the increase in the sulphur content in crucible steel is entirely due to the poor quality of coke we now have in Sheffield, and although you may use the best irons as base metal, the resulting product is high in sulphur. It is very obvious to all that steel of high chemical purity is the first essential, method of casting, etc., following in importance, and it is for this reason that Swedish irons have for many years formed the base of the best Sheffield crucible steels. A few days ago I was asked to explain why crucible steels differed from Siemens steels when the analysis of each steel was practically the same. I pointed out that this was very rarely the case, as the manganese in the Siemens was invariably higher than the crucible, in some cases more than double, and in fully explaining I quoted H. Brearley's "Heat Treatment of Tool Steels," in which this question is so ably dealt with.

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A point of comparison between Siemens and crucible steels which is often insisted upon when both are used for tool making is that Siemens steel does not withstand so well the re-hardening operation, the reason commonly expressed being that the former does not contain so much "body" and loses its "nature" more easily than the latter. This explanation is a remnant of the time when the manufacture of tool steel was purely an empirical art and the influence exerted by the essentially different composition of Siemens steel had not been clearly realised. These terms "body" and "nature" have no precise meaning; they refer to nothing which can be measured or weighed; they do not even belong to that class of appearances such as fractures and the position of a crack, which can be appreciated as reliable indications though they cannot be expressed in any scale of units. They belong rather to the primitive jargon of a craft, and may be taken to-day to reflect something of experience, something of prejudice and a semblance of commercial astuteness. There is greater danger to begin with that a tool made from Siemens steel will break on hardening. This is consequential to the fact that the steel contains more streaks of non-metallic impurity, such as slag and manganese sulphide, and is generally less homogeneous, because it has been cast in larger ingots under conditions of casting somewhat remote from the ideal. The main reason why Siemens steels are different, when equally sound as crucible steel, is that they contain almost invariably larger amounts of manganese than crucible steels, and on this account harden more intensively and to a greater depth, which may be an advantage or otherwise. This obviously increases avoidable stresses if it hardens those parts where hardness is not required, e.g., at the roots of teeth, and at the same time **lessens the resistance of the material to stress.**

If a tool, for the reasons stated, is more apt to crack at the first hardening, it is still more apt to do so on the second hardening, because on re-heating, the stresses, already larger than usual, are in greater danger of being increased to breaking point. The explanation of this relative behaviour lies not in some mysterious property conferred by a melting process, but in the choice of material well or ill suited for its purpose on account of its chemical composition.

The first point you will see, therefore, if any trouble is experienced, is the question of using the correct chemical composition of steel for the purpose, and Sheffield manufacturers are always willing to advise on any point such as this.

British Engineering Standards Association.

The British Engineering Standards Association held its third annual meeting on Thursday, the 14th ult., at the Institution of Civil Engineers, when the chairman (Sir

Archibald Denny, Bart) presented his annual report, and made a review of the position. The meeting was well attended, some 80 members being present, and a number of useful suggestions were made. The chairman's address once again showed the vastness of the work undertaken by the association, and the economical manner in which it is carried out. There are now more than 1,500 engineers who give their time and experience to this national work, but the business community is not as impressed as it should be with the commercial value of standardisation, otherwise the association would not have so much difficulty each year in raising the comparatively small sum required for this work, which is of such value to the trade and commerce of the country. Last year £15,000 alone was expended, of which the industry of the country contributed about £10,000, the remainder being in the nature of grants from H. M. Treasury and the Indian and Dominion Governments. The chairman emphasised the progress made in regard to the revision of the steel sections, the standardisation of railway materials, the work in connection with a British specification for girder bridges, the extensive programme of standardisation of details in the construction of ships and their machinery, and the important development in the electrical work. He mentioned that the chemists and chemical engineers were now making use of the organisation, and that their work was bound to have a beneficial effect on that branch of British trade. He also referred to the satisfactory working agreement which had been arrived at with the various research associations, which will enhance the already cordial collaboration between those engaged in research and the standards organisation, the line of demarcation of which is sometimes none too easy to draw. In glancing at the work abroad, he mentioned that there are now 11 local committees actually at work. These committees are continually making valuable suggestions to the home committee, and from their vantage point of experience in local conditions are in a position to offer most welcome advice. He also mentioned the question of international standardisation, and the proposals which are to be put into effect in order, with proper safeguards, to assist in guiding along right lines the trend of international agreement in engineering matters generally. A number of suggestions were made by those present, the more important of which were the advisability of giving greater publicity to the work of the association, and the question of assisting purchasers to ascertain without difficulty the names and addresses of manufacturers who are prepared to work to British standards. These suggestions will be considered by a publicity committee recently nominated.

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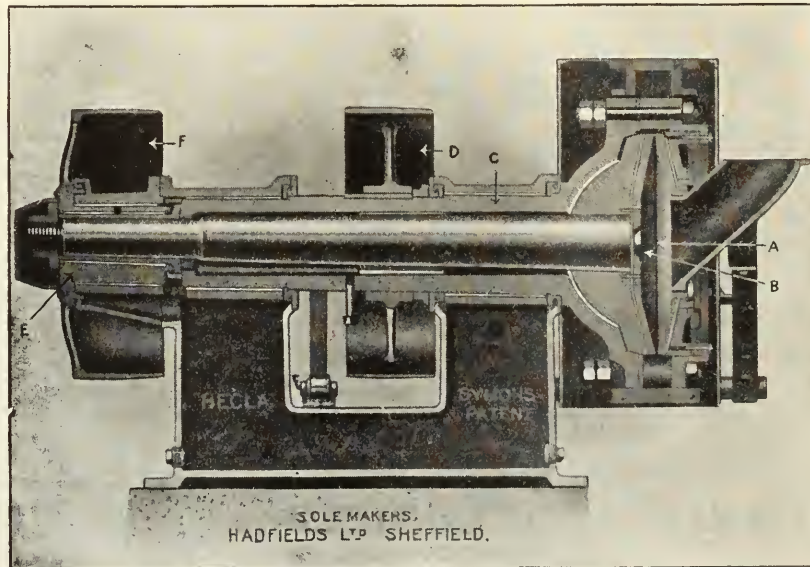
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Otavi Mines Scheme.

Authoritative particulars are now available of the scheme for converting the Otavi Mines and Railway Company (the Otavi Minen-und-Eisenbahn Gesellschaft) from a German undertaking registered in Berlin to an undertaking registered in South-West Africa, with its capital in sterling instead of marks. As reported recently, the company has now been duly registered as a foreign company in the South-West African Protectorate. An extraordinary general meeting has been called for the purpose of passing the necessary resolutions for the conversion of the mark capital into a £ sterling capital, the exchange of the old shares and Genussschein (deferred shares) for new shares in English currency, and the raising of further working capital. The Union of South Africa having assumed the Protectorate over South-West Africa and introduced sterling currency there, it becomes necessary, especially in view of the great fluctuations in the mark, to free the capital of the company, which naturally has to operate under the influence of the new currency, from such fluctuations. After the occupation of South-West Africa the funds required by the local management had to be procured in sterling by means of bank loans, which now have to be covered.

In order to eliminate the not very fortunate distinction regarding dividend rights between shareholders and Genussschein holders—a distinction which had its rise in the historical development of the company—it is intended in future that Genussschein holders shall be enabled to acquire full rights as shareholders, including the possibility of acquiring new shares. In exchanging old shares for new ones a cash amount of 20 marks will be paid per share.

The new working capital will be applied chiefly to paying off the bank loans contracted during the war, extending the machinery and dressing plant for oxide and carbonate ores, constructing a new dressing plant for sulphide ores, and putting down a new main hauling shaft.

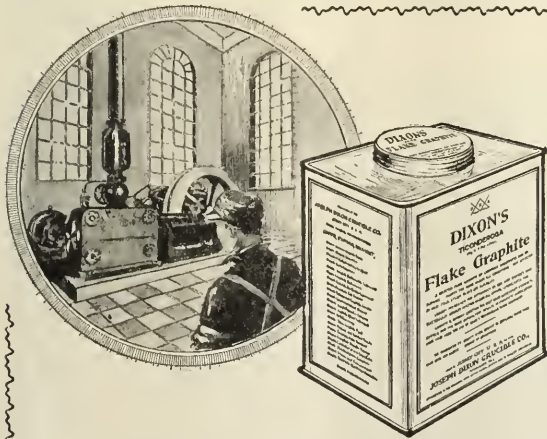
The bank loans have been chiefly employed in developing a further 500,000 tons (approximately) of new ores. The extension of the existing dressing plant for oxide ores and the construction of a new plant for sulphide ores are urgently required to deal with the large quantities of low grade ores—particularly the aplite ores—now on the dump.

During the past year the ore output is stated to have been satisfactory, and, with the introduction of piecework, pre-war figures will, it is hoped, be reached within a reasonable time.

The exportable ores resulting from the output of the current and the next financial year are sold firm, and the management hopes later to reach a figure of exportable ores in excess of the quantity sold.

Trans-Zambesia Progress.

According to the latest advices received in London, track has been laid on over 100 miles of the Trans-Zambesia Railway, which is to connect Beira with the railways of Nyasaland. The earthworks are completed to the 140-mile post, and the rails are expected to reach the temporary terminus on the south bank of the Zambesi, opposite Chindio, before the end of this year. Borings at the proposed site of the bridge, which will be erected when general conditions are more favourable, have not yet been completed, but the results obtained indicate that there will be no difficulty about finding a rock foundation at Mutarara, some thirty miles up the river from Chindio. As the bridge will cross nearly 1½ miles of water, in addition to a sandbank about 1¼ miles wide between the two arms of the river, it will be an expensive structure. How long it will be before it is put in hand must depend largely on the trend of prices for bridging material and the possibility of raising the necessary capital at a reasonable rate of interest.



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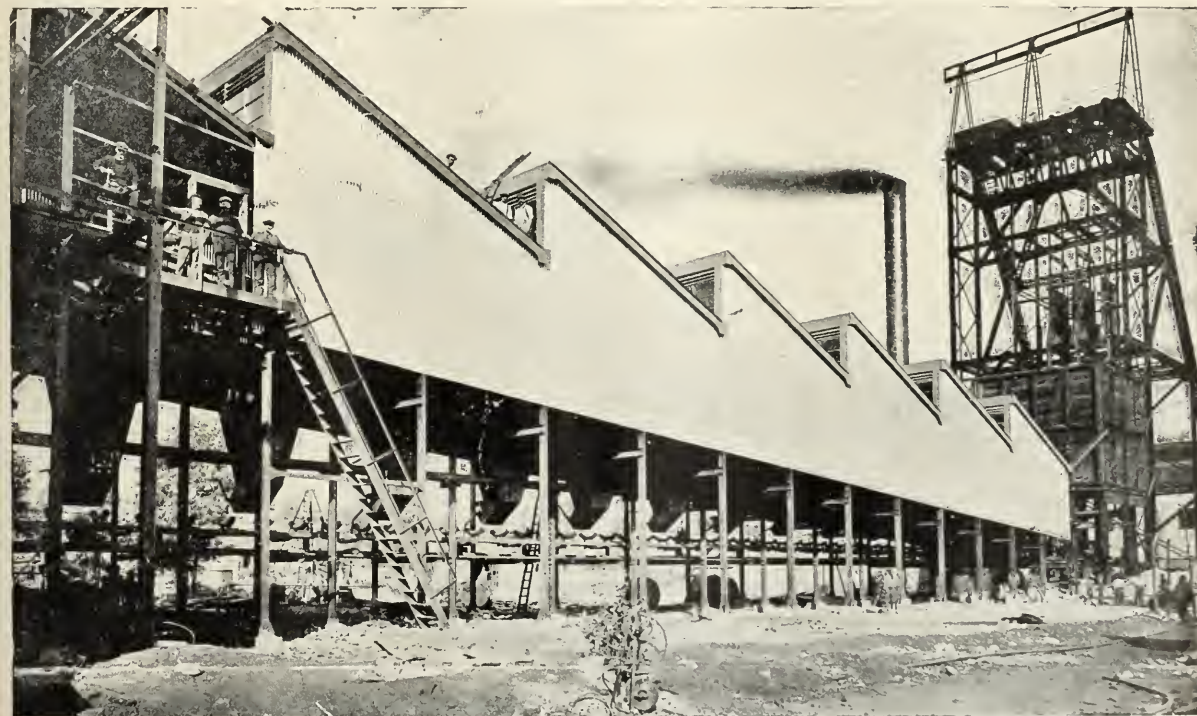
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The Roodepoort U.M.R.: Proposed Co-Partnership

SUB-COMMITTEE OF M.W.U. INVESTIGATING—PARLOUS POSITION OF THE MINE—RECENT HISTORY OF ITS STRUGGLE TO KEEP WORKING.

Early in the month the Rand was startled by the offer of the Albu Group to the employees of the Roodepoort U.M.R. to introduce a co-partnership scheme to obviate the closing down of the mine. The doubtful merits of co-partnership applied to mining are discussed in our leading columns, and we here set out the particular case of the Roodepoort U.M.R.

Of all the low-grade mines of the Rand now being kept alive by the gold premium, the Roodepoort United Main Reef is in the most precarious position. Its financial history in the past couple of years is briefly as follows:—From January to July, 1920, the company made a working loss of £21,296. In the middle of that year, it will be remembered, the employees were called together and the impossible nature of the position explained to them very fully and frankly. A retrenchment scheme was then agreed upon by the management and men, and as a result the following six months, working on that basis, resulted in a small profit of £17,731. With the drop in the gold premium the position changed again, and for the period to August, 1921, a net working loss of £11,953 resulted. The company, it may be recalled, is burdened with a debt of £380,000, on which, of course, interest must be paid. The Albu group, it must here be said, have all along made a brave struggle to keep their low-grade mines alive, and the present proposal at the R.U.M.R. is simply a last desperate expedient to keep the mine going at all costs. There are 164 white employees on the property, and in order to save them from being thrown out of work at a time like the present, the directors, as a last resort, decided to put forward the co-operative scheme explained in the following letter from the chairman, Mr. L. Albu. That letter was dated September 8, and is as follows:—

"In accordance with the promise which I made to the representatives of the various Workmen's Unions and Officials' Association, at a private meeting held in this company's office on Saturday, the 3rd instant, I now beg to place before you a recapitulation of the terms on which this company is prepared to continue working.

"1. That all employees of the company be guaranteed one-half of the standard wages ruling on the mines of the Rand, from time to time, during the period of this agreement.

"2. That the revenue which accrues to the company from gold mining operations (not including any revenue derived from sale of plant and stores) shall be utilised as follows:—

- (a) To cover the working expenditure, including the cost of shaft sinking and development, and such capital expenditure as may become necessary in future.
- (b) To payment of interest on the loan, at present, approximately, £2,500 per month.
- (c) To payment to employees to bring them up to the standard wage, as defined under (1).
- (d) Any balance which may remain over after (a), (b) and (c) have been provided for, to be distributed equally between the company and the employees.

"3. This arrangement to be in force for a period of two years, provided, of course, that circumstances do not render it necessary for the company to suspend operations prior to that time.

"The principal reason which influences me in making this offer is that I am firmly of the opinion that it is only want of efficiency in the various departments of the mine which has brought this, and other low-grade mining companies, to a position where they have either to close down altogether or to continue the struggle under extremely adverse conditions. I feel confident that if the Unions will only remove all artificial restrictions and allow free play to the most economic method of working that the carrying out of these proposals will prove to be for the benefit of the employees as well as of the company. I feel also that the fact that the prosperity of the company will be shared by employees will give them an incentive to work such as they have never had before on the Rand, but I reiterate that to give this experiment fairplay the men must be allowed full scope for their productiveness.

"As explained to you, this company is heavily in debt, and as the bank is pressing for a settlement of its liability, I shall be obliged if you will let me know at the earliest possible moment whether you are willing to lend your support to the scheme outlined above."

To this a reply was sent by the Secretary of the S.A.I.F. last week stating that the Unions concerned had been communicated with, but that all had not replied, and that, as the scheme was quite a new departure to the workers, it was essential that they should be allowed time to consider and discuss it, as any hasty decision might be a means of eventually wrecking a scheme of this description. In these circumstances it was hoped that the directors would bear with the seemingly unnecessary delay.

Need for a Decision.

To this communication the following reply from the Secretary of the Board of Directors was received:—"I am instructed by my Board to acknowledge receipt of your letter of September 22 in reply to mine of September 21, stating that you do not anticipate being able to reply to our chairman's letter of September 8 until towards the end of the coming week, notwithstanding the fact that the matter has been put before your Federation for consideration for quite a considerable time. This my directors very much regret, as it is essential that a decision should be come to at once, and I am therefore directed to inform you that unless a satisfactory arrangement has been arrived at before the end of the month, my directors will be reluctantly compelled to take steps for the immediate closing down of the mine."

This letter was considered at a meeting of representatives of the joint Trades Unions on Monday evening, when it was decided to reply to the effect that the Federation would require at least another month before it could come to a decision, and expressing regret if, in the meantime, the mine was closed.

The position is now that a sub-committee of the S.A. Mineworkers' Union—not, as the "Rand Daily Mail" has it, the Reduction Workers—has been appointed by the executive of that body to investigate the whole matter, and that while the company is anxious for their decision by the end of September, there may be some further delay in view of the importance of the subject. Some general considerations bearing upon it are discussed in our leading columns.

New Detector for Fire-Damp.

Fire-damp is the great enemy of the collier, and it is peculiarly insidious inasmuch as it collects without giving any sign to the senses of its presence. Many attempts have been made to devise a reliable detector, and it is interesting to learn that very promising experiments have been carried out by the British Ministry of Mines with a new form of instrument for this purpose. This instrument relies for its operation upon the expansion of liquid in a glass tube. It is now undergoing extensive trials underground, and the final result will be awaited with keen interest.

Distillation of Oil Shale.

An exceedingly interesting and instructive article on the above subject by David E. Day appears in the "Mining and Scientific Press" for August 20, 1921. In view of the South African oil shale activities, this article should prove of great value to those who are interested in the industry. Extracts from this instructive article are reproduced hereunder.

The major operations in a plant producing oil from shale are: (1) mining and crushing the shale, (2) treating the shale to recover the oil, and (3) refining the oil into marketable products. The first and last of these operations present no new features.

There remains only the problem of producing the oil from the shale—a problem that does not present any serious difficulties, but one that at present retards the operations of those who believe that the time for oil-shale development has arrived. Except in isolated instances, the only commercial method of recovering oil from shale is by means of a carefully regulated heat treatment. Although the condition in which the oil-producing substance exists in shale is not definitely known, it is almost certain that it is an exceedingly complex hydrocarbon. It cannot readily be dissolved and extracted by solvents; it adheres too closely to the shale to permit mechanical separation. There remains only the method of vaporising this hydrocarbon, and condensing the vapors formed. In all probability, the original hydrocarbon is so complex or so tightly bound in the shale pores that it will not distil without "cracking." Assuming that this theory is correct, and that a "cracking" distillation is the only method of recovering oil from shale, the problem resolves itself into the controlled-heat treatment of a fragmentary material.

By the principles of retorting shale for oil is meant those that are involved in producing oil as the main and most important product. The factors governing the efficiency and economy, and oil-recovery of a retort, considered from the standpoint of the retort alone and ignoring the factors introduced by the type of shale or its preparation before retorting, are as follows:—

- (1) Factors affecting efficiency:
 - (a) Thin shale layer.
 - (b) Mechanical agitation.
 - (c) Complete heat control.
 - (d) Efficient application of heat.
 - (e) Efficient furnace design.
 - (f) Simple mechanism.
 - (g) Large unit capacity.
- (2) Factors affecting economy:
 - (a) Continuous operation.
 - (b) Minimum number of moving parts.
 - (c) Maximum use of automatic machinery.
 - (d) Minimum fuel requirements.
 - (e) Accessibility of parts.
 - (f) Mechanical strength and endurance.
- (3) Factors affecting the quantity and grade of oil recovered:
 - (a) Temperature control.
 - (b) Even heat application.
 - (c) Progressive heating.
 - (d) Protection of vapors from abnormal temperatures.
 - (e) Free passage of vapors.
 - (f) Freedom from dust.

Factors Affecting Efficiency.

Thin Layer of Shale.—The necessity for a thin layer of shale in the retort is due to the insulating qualities of the spent shale. Because of its high porosity and carbon con-

tent, spent shale is one of the best of insulating materials. A thickness of ten inches of spent shale is equal in insulating qualities to a two-course wall of firebrick.

Mechanical Agitation.—The agitation of the material as it passes through the retort is important, both from the standpoint of heat efficiency and operating efficiency. It is obvious that a greater shale layer may be retorted with the same amount of heat and in the same time, provided that it is constantly stirred and agitated, than would be possible if it remained stationary. Furthermore, most rich shales tend to coke in the retort unless they are subjected to constant agitation.

Complete Heat Control.—The importance of complete heat control is so obvious as to require little discussion. If too little heat is applied the time of retorting will be increased, with a loss in retort efficiency. If too much heat is applied, some of the oil will be lost as permanent gas, and heat will be wasted, thus reducing both operating and heat efficiency.

Correct Applications of Heat.—Not only must the heat be under complete control, but it must be correctly applied. To achieve high efficiency, shale should be heated progressively to higher and higher temperatures; the greatest heat should be applied at the discharging end of the retort, and should decrease gradually toward the charging end.

Correct Furnace Design.—Too little attention has been given to the furnace in which the retort is placed. This furnace should not only be designed to regulate and apply the heat as discussed under the last three headings, but should also be designed with attention to the general principles of furnace efficiency.

Simple Mechanism.—The simpler mechanism, the lower the cost of installation and of upkeep and operation. Many retorts that produce good results in the laboratory are totally unfitted for commercial operations because of the complication of their mechanism.

Large Capacity.—In designing an oil-shale retort, or in considering the adoption of a process, the primary consideration should be the adaptability of the retort to large-scale operations. The oil-shale industry is fundamentally a low-grade mining enterprise. To be commercially successful it must handle large tonnages at low costs. For this reason any successful retort must not only be adaptable to large-scale development, but must be capable of attaining this development without too great a duplication of units.

Factors Affecting Economy.

Continuous Operation.—Continuous operation is essential, not only from a standpoint of efficiency, but to secure economical operations. No matter how ideal a batch type of retort may be from an efficiency standpoint, it can never be as economical as a correctly designed continuous retort. The time required to empty and recharge a retort of the non-continuous type is a total loss. A non-continuous type of apparatus cannot be made as nearly automatic as a continuous retort, and consequently requires a greater labour and superintendence charge per ton capacity.

Minimum Number of Moving Parts.—The number of moving parts required should be kept at a minimum not only for the reasons discussed under efficiency, but also for reasons of economy.

Maximum Use of Automatic Machinery.—The effect of automatic machinery on the economy of operation is too well known to require discussion.

Minimum Fuel Requirements.—It is obvious that to obtain operating economy, fuel requirements should be kept at a minimum. For this reason full use should be made of all possible heat applied (1) by designing an efficient furnace, (2) by controlling the heat applied, and (3) by recovering some of the heat at least from the spent shale and the vapors.

Accessibility of Parts.—The entire retort should be completely accessible. Shale may tend to coke or clog the retort, or carbon may form on the walls. Consequently, access to the interior should be provided so that the walls may be scraped or cleared if necessary.

Mechanical Strength and Endurance.—The last and, possibly, the most important factor is the mechanical strength and endurance of the retort. No matter how sound and perfect a retort may be from a theoretical point of view, it is worthless unless it can withstand continuous service without excessive repairs and replacements.

Factors Affecting the Quantity and Grade of Oil Recovered.

Temperature Control.—If the theory that oil is produced from shale by "cracking" complex hydrocarbons, already existing in the shale, is adopted, the importance of complete temperature control is at once evident. Experiments have proved that radically different results are obtained when shales are treated at different temperatures. When high temperatures are used a large amount of light oil is produced at the expense of a lessened total recovery. When low temperatures are used, a maximum amount of oil is recovered, but this oil has a small percentage of low boiling hydrocarbons.

Even Heat Control.—Inasmuch as the use of different temperatures will result in the production of different grades of oil from the same shale, similar heat treatment must be given to each particle of shale in order to produce an even product and to avoid losses. This will necessitate:

- (1) A thin layer of shale.
- (2) Mechanical agitation.
- (3) Continuous treatment.

The thin layer of shale avoids over-heating of the shale nearest to the retort wall in the attempt to heat sufficiently the shale further removed. Mechanical agitation further reduces the effective insulating property of the shale layer, and makes even treatment of the individual particles possible. Uniform heating conditions can only be maintained by continuous treatment.

Progressive Heating.—Experimental work and research have shown that to obtain a maximum yield of the most desirable product, the shale must be heated progressively. In practice the temperature of the shale should be increased gradually to the point at which oil vapors are formed, and then increased uniformly until all the oil is driven off.

Protection of Vapors From Abnormal Heat.—Shale vapors as formed are composed of complex molecules which are easily dissociated if exposed to temperatures higher than those at which these vapors were formed. Some of this breaking down or "cracking" may be desirable for the production of light oils, but in any case it must be carefully controlled. In general, it seems essential to withdraw the vapors as rapidly as formed, and to protect them from high temperatures. If, on the other hand, the vapours come in contact with a layer of relatively cool shale, and are condensed and re-vaporised, a large loss will result, and undesirable hydrocarbons will be produced. Except in special cases, therefore, the vapors should be withdrawn without over-heating or re-distillation.

Free Passage of Vapors.—One of the most essential factors in obtaining the result discussed above is a free passage for the vapors, not only in the retort itself but also from the retort to the condenser.

Freedom From Dust.—Although, as already discussed, mechanical agitation is essential to successful retorting, this agitation should not produce dust by grinding the shale, nor should it tend to stir up the dust that may be present with the crushed shale. Shale dust, if given the opportunity, will go over into the vapor lines and condenser with the vapors, and will absorb oil to form a thick paste, which not only clogs the lines and causes countless mechanical difficulties, but also wastes a large amount of oil.

The Retorting Apparatus.

The determination of the factors just discussed indicated certain features essential to the retorting apparatus. It is directly evident that the retort should be continuous, it should be capable of complete temperature control, it should agitate the shale, it should treat the shale in a thin layer, it should heat the shale progressively, it should avoid dust, it should be simple mechanically, it should be of large capacity, and it should be strong and durable. It also indicated that the retort should be vertical because of the mechanical difficulties involved in externally heating a horizontal retort. In a vertical retort, the stresses all act downward on a firm basal support, whereas in the externally-heated horizontal retort, these stresses are balanced only at the points of support and the unbalanced stresses between these points cause the retort walls to sag and to twist out of shape.

The Day-Heller Retort.

The retort is composed of three main parts: (1) the retort-shell, which may be made of cast-iron, cast-steel, or refractory material, (2) the vapor-manifold, and (3) the furnace.

Mechanically, the retort is extremely simple. There is only one moving part—the vapor-manifold—and this is strong and durable. It moves slowly, encounters no stresses acting directly against its motion, and is insulated from the heat. Access may be had to the complete retort by lifting the vapor-manifold out through the top. This can readily be done by unbolting the cover plate, by lifting the upper brace bearing from its lugs, and by removing the gear and bearing from the lower end of the manifold pipe. With the manifold removed, the retort is open for inspection and clearing. All the parts are standardised, and are interchangeable with similar parts in other units, so that by keeping a few spare parts on hand a large plant may be operated continuously without serious shut-downs and delays.

The furnace is designed particularly for high efficiency, economy, and complete control. The greatest objection to a vertical furnace is the difficulty of efficient heating. This has been overcome in this retort by using horizontal annular flues, which are separate and independently controlled by dampers. The retort has a high capacity compared to its bulk and to the ground space occupied. Thus a single unit 25 ft. high and 10 ft. in diameter, including flues, will have a capacity of from 100 to 250 tons per 24 hours, depending on the type of shale treated.

Mineral Occurrences in the Namib Desert.

Our knowledge of the mineral wealth of this country is continually being added to by valuable contributions in papers, and the short account of a portion of South-West Africa, read by Dr. P. A. Wagner before the Geological Society, is not without interest. Dr. Wagner shows that, excepting for certain superficial deposits, the area under review consists of ancient crystalline rocks belonging to the Fundamental Complex of South-West Africa. It comprises all manner of schists, metamorphosed sediments, granites of several ages, and various types of composite gneiss. The iron deposits in this neighbourhood are situated about 10 to 16 miles south-east of Walvis Bay. The ore is of very variable character, and is usually made up of iron-rich and iron-poor layers. The average grade of the ore is poor and far below the value for an iron ore. Precious metals have been reported to be present in these ores, and assays have shown up to 1.3 dwts. of silver and 3.5 dwts. of gold per short ton of ore. Other samples, however, have shown no values whatsoever. The precious metal content is thus scattered and patchy, and of little economic value. Other minerals to be found are cordurite, garnet, sunstone, beryl, felspar, and phlogopite, a variety of mica. The last-named mineral has been systematically opened up, and is of excellent property both as regards splitting and electrical properties.

Cheap Pig Iron.

By G. H. Blenkinsop.

In this article the author, a well-known authority, declares that it will be possible for the Union to export pig iron to Europe at much less than the cost of production there.

A few months ago, at the request of the editor of *The South African Mining and Engineering Journal*, I enquired into the prospects of the establishment of an iron and steel industry in the Union of South Africa. My conclusions were that the erection of blast furnaces for the manufacture of pig iron was not a commercial proposition inasmuch as the Union lacked a supply of coking coal in commercial quantity. Since then I have become possessed of data which render it imperative that I should revise my conclusions.

A process known as "froth flotation as applied to the washing of industrial coal," the invention of Minerals Separation, Ltd., has been investigated by Messrs. Ernest Berry, Walter Broadbridge and Alfred Hutchinson at the works of the Skinninggrove Iron Company. The results of their investigations are embodied in a paper read before the Institution of Mining Engineers, Manchester, 15th September, 1920. Suffice it for my purpose to say that in some instances the percentage of ash in the original coal was reduced from 20 per cent. to less than 4 per cent. Colliery dumps and washery waste also showed remarkable results, the percentage of ash in some instances being reduced from 60 per cent. to less than 7 per cent.

The percentage of colliery smalls produced at the South African Collieries is very high; it is a soft coal, the thro' and thro' containing quite 50 per cent. smalls. This colliery small costs sixpence per ton to dump, and it could be put in truck at the screens practically free of cost.

I will, however, in my calculations take the cost at one shilling per ton f.o.r.

In addition to the results achieved by the "froth flotation" process, I have read the results obtained in "The Carbonisation of coal at low temperatures." See paper read before the North of England Institute of Mining and Metallurgical Engineers on August 6th, 1921.

For details of these tests see *The Iron and Coal Trades Review*, 12th August 1921. These trials have proved that a bright hard coke having a crushing strength of over 400 lbs. can be manufactured from a coal containing a moderate percentage of volatile matter such as the South African coals contain. I may mention en passant that these data have only just been in my possession.

Cost of Raw Materials.

In the investigations which I carried out at the request of the Editor of *The South African Mining Journal* I arrived at the following figures as to the cost of the raw materials delivered at a suitable blast furnace site. The Union possesses large resources in high grade acid iron ores and also in high grade basic iron ores containing, say, 0.25 to 0.30 per cent. phosphorous. These latter cannot, of course, be considered basic ores per se, but when dealt with on the lines which I propose they are eminently suitable. In a number of instances these occurrences of high grade iron

ores, both acid and quasi basic are situated on farms containing an abundance of coal.

Iron ore containing 60 per cent. metallic iron and upwards, 1 ton pig iron=5s. 0d. per ton, say 34 cwt.

8s. 6d. per ton pig iron	...	8	6
Dolomite for flux, say, 7 cwt., 2s. 6d. per ton (CaCO ₃)			
MgCO ₃ pure limestone not being available	...	10	½
Labour "boys" wages, 2s. 6d. per day	...	3	½
Coke from Colliery Slack, say, 22 cwt. at 5s. per ton		5	6
Overhead charges	...	2	0

Total (per ton) 17 2

In taking the cost of coke at 5s. per ton I have not taken credit for by-products. I have carefully checked my figures and I am satisfied that the cost of producing a ton of pig iron should not exceed, say, seventeen shillings and sixpence per ton. In addition the Union also contains a large quantity of high grade iron ore having a phosphorous content in excess of the acid steel limit.

At these figures it will be possible for the Union to put pig iron in the United Kingdom and the Continent at much less than the cost of production in those countries.

ANSWERS TO CORRESPONDENTS.

"Syntax."—(1) The Chamber of Mines. (2) No. (3) The Secretary, Chamber of Mines.

"J. Somers."—Libellous.

"W. P."—(1) No. (2) Unknown here.

Electric Welding by the Wilson Plastic Arc System.

The application of electricity to welding processes has not made such rapid strides as one finds in its application in other directions. The term electric welding implies the joining of metals, salvaging defective castings, repairing of cracks or breaks, etc., by means of the electric current. Until recently various difficulties have existed which have retarded the growth and application of the process. These have been successfully overcome in the Wilson Plastic Arc system of electric welding. A trial run of the plant was conducted at Wright and Boag's engineering works on Thursday, the 29th. A very instructive display of the work the plant was capable of doing was given, and even the welding of cast iron, formerly thought to be impossible, was successfully demonstrated. A detailed account of the plant, as well as remarks on the quality of the work done by it, will be given in next week's issue.

* * * *

Simmer and Jack Prospects.

The future of the Simmer and Jack is, of course, bound up with the maintenance of the gold premium. That, and the possibility of a reduction in working costs, govern the existence of the mine. Mr. D. Christopherson presided at the annual meeting of the company last week and showed that it was only the so-called premium on gold which has enabled the company to show a profit on working of £119,250. During the year under review the average price per fine ounce at which gold was realised was 110s. 9d., with the result that revenue from gold was the greater by £211,766 as compared with what would have been the case if gold had only realised par value. "This fact," Mr. Christopherson said, "makes it evident that a substantial reduction in the cost of working must be effected if this mine is to work at a profit when exchange conditions become such that gold will only realise its normal value, as an improvement in grade can hardly be expected. It is perhaps somewhat encouraging to note that for the first time since 1916 the working costs per ton for the year show a decrease as compared with the previous year, not that this decrease is great, it being only represented by 9d. per ton, but still we hope it indicates the turn of the tide so far as costs are concerned."

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The "J.C.I." Year.

GOLD PROFITS AND PREMIUM.

BETTER DIAMOND PROSPECTS.

The "J.C.I." Co., Ltd., has issued an excellent report for the year ended June last.

After providing for depreciation, English and Colonial Income Tax, and other charges, the profit for the year, including £191,453 8s. 4d. brought forward, amounts to £579,411 13s. 8d. On the 23rd June the Directors declared a dividend of 10 per cent., free of Income Tax, payable to Shareholders registered as at 30th June, 1921. This distribution (excluding provision for Income Tax) absorbs £395,000, leaving a balance of £184,411 13s. 8d. to be carried forward to next account. The financial position of the Company continues to be very satisfactory, and as opportunity occurs the Company's interests are being extended and developed.

Mining Interests.

The usual Reports issued by the various gold mines under the Company's control afford all necessary detail as to their position. The following general information, however, is given:—

Government Gold Mining Areas (Modderfontein) Consolidated, Limited.—This property continues to make excellent returns. The tonnage milled for 1920 amounted to 1,515,000 tons, which was an increase of 154,000 tons, and the number of fine ounces of gold recovered was 603,239, an increase of 33,857 fine ounces when compared with the previous year. In view of the Company's large ore reserves, amounting to over ten million tons, the policy of the Company is to maintain the ore reserves at this figure.

Van Ryn Deep, Limited.—The ore reserves are over three million tons of an average value of 9.7 dwts. over 72 inches; both tonnage and grade showing an improvement as compared with the previous year. The development of the Western section of the mine shows improvement.

Randfontein Central Gold Mining Company, Limited.—The scheme for the re-organisation of this mine is now nearing completion, but progress has been retarded by strikes and other obstacles beyond the control of the management. It should be borne in mind that the work which required to be undertaken has been practically equivalent to the opening up of a new deep level proposition at the bottom of the former workings. There is every reason to anticipate that substantial benefits will shortly accrue from the re-organisation of this property.

The taking over of the Randfontein Deep, Ltd., property, referred to in last year's Report, has been completed, and mining operations in this area have been carried on for the last twelve months. It is anticipated that ore from the Randfontein Deep section will be sent to the mill at an early date.

Randfontein Estates Gold Mining Company (Witwatersrand), Limited.—In the Company's previous Report reference was made to an action successfully brought by the Randfontein Estates Company against Sir Joseph B. Robinson, which resulted in the Randfontein Estates Company being awarded £215,000, plus interest at 6 per cent. as from February, 1907. In respect of this judgment a payment of £391,155 11s. 6d. on account has been made to the Randfontein Estates Company. The latter's solicitors have since been served with notification that Sir Joseph B. Robinson has applied for permission to appeal to the Privy Council against this judgment.

New State Areas, Limited.—The work of sinking the two shafts on this property is now completed, the south shaft having been sunk to a final depth of 4,071 feet and the north shaft to a final depth of 3,768 feet. The reef intersected by the south shaft gave the extremely high average value of 89.8 dwts. over 18.9 inches. The reef intersected by the north shaft was found to be faulted and disturbed by numerous quartz intrusions, and therefore no reliable assay

value has yet been possible. Development is rapidly proceeding and there is every reason to anticipate that the New State Areas will prove a most valuable property.

Working Costs.

It has for some time been obvious that existing circumstances no longer justified a continuance of the high scale of wages paid to the miners in South Africa. It is therefore satisfactory to report that an amicable arrangement has been concluded between the Transvaal Chamber of Mines and the Trade Unions concerned resulting in an immediate reduction of wages, with the probability of further reductions in the near future.

Gold Production.

The value of the gold produced by the Company's Group of Mines during the year under review amounted to £9,926,943, the average price obtained being approximately £5 11s. 0d. per fine ounce.

Coal Interests.

As mentioned by the Chairman on the occasion of the Company's last annual meeting, the Company has acquired considerable coal interests in South Africa. The equipment



The Johannesburg Headquarters of the "J.C.I."

of the mines is nearing completion, and they will be capable of producing a large quantity of coal. The Directors are hopeful that the Company will eventually derive material benefit from this new enterprise, more particularly when the necessary railway facilities have been obtained.

Diamond Mines.

Regarding the Company's interests in the leading Diamond Mines of South Africa, it may be mentioned that during the period under review the falling off in the demand for stones has been met by a drastic curtailment of production. This is no new feature in the history of the diamond industry, and it is confidently anticipated by those who control the policy of the diamond mines that an improvement in the position may be expected in the near future, and of such improvement indications are already apparent.

New Modder Year.

**RECORD PROFIT—GOLD PREMIUM MEANS EXTRA
£751,427.**

The New Modder has had a record year in point of output and profit. The tonnage milled, the amount of gold recovered and the working profit earned are the highest yet obtained during the history of the Company, and exceed by 114,500 tons, 27,691 fine ounces and £205,207 the records established in the previous year. Included in the working profit of £1,699,052 is an amount of £751,427, equal to 44·2 per cent., representing the amount realised above standard price for gold sold. Development operations show a further substantial increase in footage accomplished. Very satisfactory values were obtained in the western section of the mine, where active development has been resumed; the eastern section continued to fulfil expectations. The average price realised for gold during the year was 112s. 7d. per fine ounce, as compared with 102s. 3d. per fine ounce for the year ended 30th June, 1920. The ore reserve was re-estimated at 30th June, 1921, and at 8,884,600 tons of 8·4 dwts. shows a small increase in tonnage, with no change in value. The crushing capacity of the Company's reduction plant has been increased to 105,000 tons per month by the addition in May last of eight Nissen stamps to the mill at the circular shaft. The balance of the working expenditure and revenue account for the year shows a net profit of £1,720,202 17s. 4d. This amount, together with the balance of £344,025 13s. 0d., unappropriated at the commencement of the year, and £763 12s. 9d. in respect of forfeited dividends, making a total of £2,064,992 3s. 1d., has been dealt with as follows:—Capital expenditure.—Equipment, less sales of plant, £50,672 13s. 7d.; annuity in respect of undermining rights leased from Government, £17,310—£67,982 13s. 7d.; less amount received under Bewaarplaats Money's Application Act, 1917, £7,789 10s.—£60,193 3s. 7d.; Government and Provincial taxes, £297,950 9s. 5d.; dividends Nos. 29 and 30, £1,400,000—£1,758,143 13s.; balance unappropriated at 30th June, 1921, represented by cash, investments, and cash assets, less liabilities, £306,818 10s. 1d.—£2,064,992 3s. 1d. This balance is made up as follows:—Shares and interests in co-operative and other concerns, £33,024 10s.; stores, materials, etc., £115,980 12s.; sundry debtors and payments in advance, £26,908 7s. 11d.; Rand Mines Power Supply Company, Limited, compressor account, £56,280 4s. 5d.—£232,193 14s. 4d.; net cash and investments, after allowing for liabilities, £74,654 15s. 9d. Two dividends, Nos. 29 and 30, of 57½ per cent. and 42½ per cent. respectively, absorbing £1,400,000, were declared during the year.

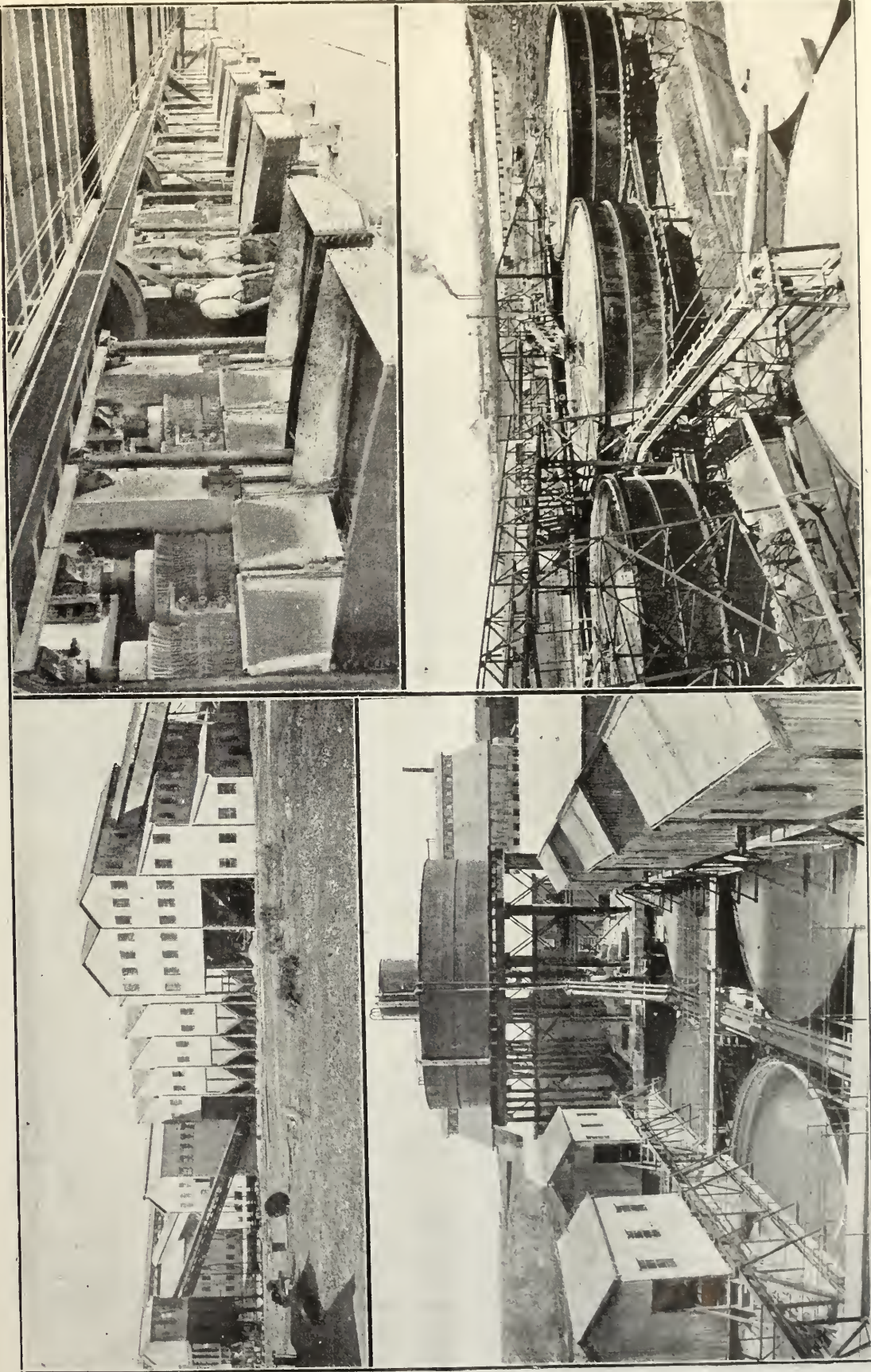
In the course of his annual report, the consulting engineer, Mr. H. Stuart Martin, writes:—Comparative figures of the leading features for the last three years are as follows:—Tons milled, 1919 920,500, 1920 968,500, 1921 1,083,000; yield per ton milled, 1919 10·485 dwts., 1920 10·321 dwts., 1921 9·741 dwts.; yield per ton milled at standard price of gold, 1919 43s. 10d., 1920 43s. 2d., 1921 40s. 11d.; working costs per ton milled, 1919 20s. 2d., 1920 21s. 11d., 1921 23s. 5d.; working profit per ton milled at standard price of gold, 1919 23s. 8d., 1920 21s. 3d., 1921 17s. 6d.; working profit at standard price of gold, 1919 £1,089,891, 1920 £1,029,188, 1921 £947,625; revenue derived from price of gold above standard, 1919 nil, 1920 £464,637, 1921 £751,427; total working profit, 1919 £1,089,891, 1920 £1,493,845, 1921 £1,699,052; total working profit per ton milled, 1919 23s. 8d., 1920 30s. 10d., 1921 31s. 5d.; ore reserve, 1919 8,854,300 tons; 1920 8,869,700 tons, 1921 8,884,600 tons; ore reserve value, 1919 8·5 dwts., 1920 8·4 dwts., 1921 8·4 dwts. The yield obtained in fine dwts. per ton is slightly below that of the previous year, and working costs increased 1s. 6d. per ton milled. These were, however, offset by the improved price obtained for gold, the difference showing an improvement in the profit per ton of 7d. The average native complement for the year has been 6,162 natives, and the average number employed 5,390, or 87·4 per cent. On this account it has not been possible to

derive full benefit either from the large and accessible ore reserve or from the full capacity of the reduction plant, which at the close of the year had been increased to a capacity of 1,200,000 tons per annum. Development operations were extended, the total linear footage being 2,716 feet more than in the preceding year. An important feature has been the disclosure of high grade ore over a large stoping width in the area west of No. 2 Shaft between the 12th and 13th levels. The tonnage developed here amounted to 302,800 tons of 9·7 dwts. value over 82 inches stoping width. Nothing of this character has hitherto been found in this section of the mine. Results on the eastern side of the mine have continued to fulfil expectations. The payable reef disclosures for the year average 669 inch-dwts. on the footwall leader only; allowing for the additional reef disclosed by prospecting in the hanging wall, the figure becomes 803 inch-dwts. The total payable ore developed for the year amounted to 1,234,100 tons of a value of 10·5 dwts. per ton. The ore reserve, re-measured and re-valued at June 30th, 1921, was 8,478,700 tons valued at 8·5 dwts. over 68 inches stope width, this being exclusive of 405,900 tons of 6·8 dwts. value consisting of boundary and shaft pillars temporarily unavailable. There is very little alteration in the above figures when compared with the preceding year. The value of the ore stoped was again somewhat over the average value of the reserve and approximated more closely to the value of the year's development. Capital expenditure for the year was on account of the additions to reduction plant, additional housing, and measures for safeguarding the water supply for the reduction plants. The commitments for the current year are very small and are to complete the last two items. During the current year, sand-filling operations will be taken in hand with the object of recovering valuable pillars (not included in the ore reserve) from the upper levels of the north-eastern section of the mine, and of controlling the movement of the hanging wall. The re-equipment of No. 2 Incline with heavier rails, skips and winding equipment, will enable development and stoping to be carried on in the western section of the mine with greater effect. The general position of the mine is all that can be desired, and given sufficient labour, the output for the year can be increased a further 200,000 tons as compared with the past year. The manager, Mr. E. Miles Sharp, and, during his absence on leave, Mr. M. O. Tillard, together with the staff, have accomplished a first-class year's work.

Southern Rhodesia Geological Survey.

Recent issues by the Southern Rhodesia Geological Survey have come to hand. The reports are as follows: "The Geology of the Diamond-bearing Gravels of the Somabula Forest," by A. M. Macgregor, B.A. The work embraces much valuable information on the various aspects of the mineral deposits found in the area under consideration. The history of the discovery as well as the previous geological work done on it is mentioned. A noteworthy discovery made during the examination of the area is the presence of fossil plants which has led to the determination of the age of the beds. The result is to put the prospecting for similar diamond-bearing beds of like age in a totally new light. Of the economic minerals present, the most important is the diamond. A discovery of platinum caused some interest, but attempts to verify the reports were very discouraging, and showed only very small amounts of that metal. "Short Report No. 11" makes public a summary of the field work carried out during the last field season in the Bembesi basin. "The Provisional Table of Geological Formations in Southern Rhodesia," compiled by H. B. Maufe, gives a list of all the formations to be found in Southern Rhodesia. Their equivalents in the Union are mentioned as well as the igneous intrusions and earth movements which have at times affected them. A list of the economic minerals found in each formation is also given and should prove to be of great value to the prospector.

The New Modder Plant.



Four Views of the Surface Works of the Modern Equipment of the New Modder's Circular Shaft Section.

Adv—XIO—Southads.



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Consolidated Main Reef.

INCREASED WORKING COSTS OFFSET GOLD PREMIUM.

The outstanding fact at the Consolidated Main Reef last year was that the increased working costs more than offset the gold premium. With practically the same tonnage milled as for the previous year there is a slight reduction in the yield per ton. Owing to the increased price obtained for gold there is an improvement in the revenue of 2s. 1d. per ton, but, on the other hand, working costs rose by 3s. 1d. per ton, the net result showing a decreased profit of 1s. per ton.

The average price realised for gold during the year was 112s. 4d. per fine ounce, as compared with 102s. 2d. per fine ounce for the year ended 30th June, 1920.

The value and tonnage of the ore reserve remains practically the same as last year.

To the working profit for the year of £199,124 17s. 6d., which includes credit adjustments on gold realised up to 31st March, 1921, has been added £5,820 7s. 10d., representing the difference between sundry items of expenditure and revenue detailed in the working expenditure and revenue account, making a total profit of £204,945 5s. 4d., which has been carried to appropriation account. This amount, together with £193,562 19s. 5d. unappropriated at the commencement of the year, and forfeited dividends £192 16s. 5d., making a total of £398,701 1s. 2d., has been dealt with as follows:—Capital expenditure (net), £24,513 5s. 8d.; Government and Provincial taxes, £29,775 13s.; dividends Nos. 25 and 26, £155,950 5s.—£210,239 3s. 8d. Balance unappropriated at 30th June, 1921, represented by cash, investments and cash assets, less liabilities, including Mine Development Suspense Account £11,328 6s. 6d., £188,461 17s. 6d.—£398,701 1s. 2d. This balance is made up as follows: Shares and interests in co-operative concerns, £19,231 16s. 10d.; stores and materials, etc., £66,292 3s. 7d.; sundry debtors and payments in advance, £19,134 8s. 3d.—£104,658 8s. 8d. Net cash and investments, after allowing for liabilities, including Mine Development Suspense Account £11,328 6s. 6d., £83,803 8s. 10d.

Mr. A. J. Brett, the Consulting Engineer, writes:—Tonnage milled, 1919 570,710, 1920 557,500, 1921 561,800; working costs per ton, 1919 26s. 3d., 1920 29s. 2d., 1921 32s. 3d.; revenue per ton at standard price of gold, 1919 29s. 6d., 1920 30s. 6d., 1921 29s. 3d.; profit per ton at standard price of gold, 1919 3s. 3d., 1920 1s. 4d., 1921 loss 3s.; working profit at the standard price of gold, 1919 £93,715, 1920 £38,256, 1921 loss £83,599; additional revenue due to gold being above standard price, 1919 nil, 1920 £188,779, 1921 £282,724; total working profit, 1919 £93,715, 1920 £227,035, 1921 £199,125; total working profit per ton milled, 1919 3s. 3d., 1920 8s. 1d., 1921 7s. 1d.; development footage, 1919 15,798, 1920 22,962, 1921 22,815; ore reserve tonnage, 1919 1,200,900, 1920 1,186,000, 1921 1,176,500; average value of ore reserve—dwts. per ton, 1919 7.6, 1920 7.6, 1921 7.5; average strength of coloured labour force, 1919 4,301, 1920 4,412, 1921 4,573. The result of the year's work, measured in terms of the profit earned, must be considered satisfactory, albeit not quite so favourable as that of the preceding year. One of the most noticeable and, at the same time, disquieting features to which attention must be drawn, is the further heavy increase in the cost of operating the mine. During the preceding financial year—at a time when costs were considered abnormally high—the total working expenditure was £812,362. In order to treat practically the same tonnage and carry out the same amount of development work during the year under review, however, no less than £905,952 had to be expended, an increase of £93,590, representing 3s. 1d. on every ton milled, of which stores and materials were responsible for 1s. 5d., white wages

10d., coloured wages 7d., and other costs 3d. The reason for the further large increase in the cost of white labour was that the all-round increase in wages granted in November, 1919, only affected a portion of the year ended 30th June, 1920, while, of course, it was in force during the whole of the year under notice. The yield per ton declined slightly owing to the fact that much more stoping was carried out in the latter part of the year in areas where the reef is very narrow and the gold distribution very irregular; under these conditions the difficulty of valuation of ore reserve tonnage is increased and considerable fluctuations in grade may be expected. The small decrease in the yield, however, was more than counterbalanced by the higher average price obtained for gold throughout the year, the result being that the revenue per ton was 2s. 1d. above that of the preceding year. The net effect of these factors was to reduce the profit per ton by 1s. and the total working profit by £27,910. Development operations were continued vigorously, and sufficient ore was added to the reserve to replace that mined. Work under this heading was confined in the main to an area in the centre of the property, bounded roughly by No. 4 incline shaft on the west and No. 3 incline shaft on the east. This area has been the most promising for some time past, hence it will be understood that the results achieved during the year were due to a considerable extent to selective development, and are probably by no means representative of what development throughout the whole of the property would show. Prospects of encountering considerable bodies of ore which would be payable with present working costs, to the west of No. 4 incline shaft, do not appear promising.



Consolidated Main Reef Headgear.

but some encouraging values have been disclosed in the area east of No. 3 incline shaft, referred to last year; it is intended to explore each of these districts by extending drives at various intervals in depth, as it is important that every effort be made to find some extension of the present central zone of payability. Should no further areas be found which will yield a reasonable proportion of payable

ore, and the tonnage that can be obtained from reclamation in worked out areas decrease, as it must necessarily do within a year or so, the position will become difficult. With the present percentage of payability and the limited number of faces available for development in the areas selected, it will not be possible to maintain the tonnage in the ore reserves, and a reduction in the scale of operations will have to follow, unless the proposed skeleton development mentioned above reveals other areas of promise, or a considerable reduction in working costs renders payable tonnages at present classed as unpayable. The question of the most suitable method of exploiting the deep level ground in your property received further consideration during the year. While it was recognised that the best means of attacking this ground would be afforded by sinking a new deep vertical shaft from the surface, it was felt that the values and percentage of payability found in the lower levels of the mine did not justify the heavy expenditure which would have to be incurred were such a policy adopted. It was accordingly considered advisable to equip No. 3 incline shaft in such a manner that it could be used as a main artery to its utmost limit in depth, while the other two inclines, Nos. 2 and 4, would be continued as long as necessary. The ore standing in reserve in the mine at the end of the financial year was estimated to be as follows:—Main Reef leader, 1,171,800 tons, average value 7.5 dwts. per ton, average width 49 inches; South Reef, 4,700 tons, average value 8.7 dwts. per ton, average width 48 inches; total, 1,176,500 tons, average value 7.5 dwts. per ton, average width 49 inches. The present rate of yield should be maintained during the ensuing year, but, given a satisfactory supply of native labour and freedom from industrial troubles, the profit to be earned will be determined mainly by the selling price of your product.

Nourse Mines.

BIGGER TONNAGE CRUSHED.

At the Nourse Mines in the twelve months ended June 30 last there was an improvement in the tonnage milled compared with the previous year. The yield obtained in fine dwts. per ton was slightly below that of the previous year, but owing to the improved price obtained for gold there is an increase in the recovery value of 2s. 5d. per ton milled. On the other hand working costs increased by 1s. 5d. per ton, the net result showing an increase of 1s. per ton in profit, which totalled 4s. 8d. per ton. At the standard price of gold and on the basis of working costs obtaining during the past year there would have been a loss of 4s. 4d. per ton. Development operations resulted in a little over half a million tons being added to the ore reserve, the re-estimation of which shows little change compared with the previous year, the tonnage being slightly more, but the average value .1 dwt. per ton less. A further 539 feet were sunk in the south-eastern shaft, making its total depth 3,296 feet. The working profit for the year, which includes credit adjustments on gold realised up to 31st March, 1921, amounted to £118,347 6s. 8d., from which has to be deducted £546 13s. 11d., being the difference between sundry items of revenue and expenditure enumerated in the working expenditure and revenue account, making a total profit of £117,800 12s. 9d., which has been carried to appropriation account. This amount, together with the balance of £134,037 1s. unappropriated at the commencement of the year, and £163 2s. 2d. in respect of forfeited dividends, making a total of £252,000 15s. 11d., has been dealt with as follows:—Capital expenditure (net), £62,306 4s. 9d.; Government and Provincial taxes, £11,341 6s. 1d.; dividends Nos. 31 and 32, £62,086 11s. 6d.—£135,734 2s. 4d. Balance unappropriated at 30th June, 1921, represented by cash, investment and cash assets, less liabilities, £116,266 13s. 7d.—£252,000 15s. 11d. This balance is made up as follows: Shares and interests in co-operative

concerns, £14,730 7s. 6d.; stores and materials, etc., £36,432 18s. 6d.; sundry debtors and payments in advance, £17,125 8s. 10d.—£68,288 14s. 10d.; net cash investments after allowing for liabilities, £47,977 18s. 9d.—£116,266 13s. 7d. Two dividends Nos. 31 and 32 of 5 per cent. and 2½ per cent. respectively, absorbing £62,086 11s. 6d. were declared by the directors during the year, free of income tax.

In his annual report Mr. H. Stuart Martin, the Consulting Engineer, writes:—The tonnage milled improved 31,400 tons, whilst the yield at 6.310 dwts. was .146 dwts. lower than in the preceding year. Based on the standard price of gold, the yield was worth approximately 26s. 6d., against average working costs of 30s. 10d. per ton milled. The amount realised above standard on the sale of 160,499 fine ounces of gold was equivalent to 9s. per ton milled, thus converting a loss of £110,568 into a profit of £118,347. In other words, the sum realised for gold above standard price was £228,915. Development operations were well maintained throughout the year, resulting in the addition of 502,340 tons of 6.9 dwts. value to the ore reserve, which at June 30th, 1921, was re-estimated as follows:—Main Reef, 62,690 tons, value 5.6 dwts.; Main Reef Leader, 853,590 tons, value 7.2 dwts.; South Reef, 672,750 tons, value 6.7 dwts.; total and average, 1,589,030 tons, value 6.9 dwts., the estimate being based on stoping widths averaging 54, 49 and 53 inches respectively. Compared with the previous year, the position shows little change. A total of 47,520 tons valued at 6.7 dwts. previously included in the ore reserve, situate in isolated small blocks in the old Henry Nourse area, has this year been excluded from the reserve, owing to their doubtful value under present circumstances. The general condition of the mine is satisfactory, and there are no new features of special interest. The south-eastern shaft of the South Nourse was sunk a further 539 feet to a total depth of 3,296 feet, and the major portion of the capital expenditure incurred was on account of the sinking and equipment of this shaft. During the current year development from this horizon should make fair progress. In view of the probability that the price of gold will gradually revert to standard, it is scarcely necessary to emphasise that the future of the mine is dependent on a reduction in working expenditure. The manager and staff have operated the mine with keenness and attention to the difficult conditions which prevail.

Review.

“Concentration by Flotation.” By T. A. Richard. 692 pages. Price 42s. net. London: Messrs. Chapman & Hall.

The field held by the flotation process has been widened to such an extent within the last few years that it has been an exceedingly difficult task for the person interested in it to keep in touch with its latest developments. The long-felt need for a work which is up to date in this exceedingly interesting process has been supplied in this book. It is a compilation of articles which have appeared during the years 1915 to 1920 by various authorities on the subject. The process is studied from all possible points of view, and a chapter devoted to the flotation of gold and silver mineral should be of special interest in connection with the Rand mining industry. Differential flotation is also treated by itself, and a study of the methods should throw light on the problems met with in the lead and zinc ores of Rhodesia.

The glossary of flotation is a very useful addition to the work, as it explains the more uncommon terms used in the work, without which reading would be difficult to those not acquainted with them.

Modder East.

A YEAR'S RESULTS—INCREASED ORE RESERVES.

The year's results at the Modder East have been considerably benefited by the gold premium. Calculated on the basis of pay limit adopted in the preceding year, the ore reserve shows an increase of 191,900 tons, but a decrease of 5 dwt. in value. Based on the existing restricted scale of milling operations and prevailing working costs, the ore reserve is estimated at 1,611,700 tons of 7.7 dwts. over a stopping width averaging 57 inches. Whilst development operations during the year have not disclosed further high grade blocks such as that adjoining No. 1 Incline Shaft, they have proved the existence of extensive areas of medium grade ore at Nos. 2 and 3 shafts. Milling operations continued throughout the year at the Apex plant. 297,800 tons were crushed, yielding 118,938 fine ounces of gold and a working profit of £209,790, equal to 14s. 1d. per ton milled. Working costs averaged 30s. 5d. per ton milled. The average

profit of £174,338 17s. 10d. After deducting the loss on working for the period 23rd April to 30th June, 1920, viz.: £696 1s. 8d., the balance of £173,642 16s. 2d. has been dealt with as follows:—Profits appropriated during the year for capital expenditure, £16,286 11s. 7d.; premium on debentures, £20,538; Government and Provincial taxes, £3,826; consideration payable to Government in respect of mining lease, £6,069—£46,719 11s. 7d.; balance unappropriated at 30th June, 1921, represented by cash investments and cash assets, less liabilities, £126,923 1s. 7d.—total, £173,642 16s. 2d. The unappropriated balance is made up as follows:—Shares and interests in co-operative and other concerns, £1,057 4s. 6d.; stores, materials, etc., £21,726 1s.; sundry debtors and payments in advance, £11,357 3s. 11d.—£37,140 9s. 5d.; net cash after allowing for liabilities, £89,782 15s. 2d. The loan of £400,000, appearing in the balance sheet,



View at the Modder East.

price realised for gold during the year was 11s. 5d. per fine ounce. It is explained in the consulting engineer's report that the conditions under which milling operations were carried out during the year necessitated a certain amount of overmining of the ore reserve in order to obtain the results achieved. Working capital available at the beginning of the year, viz.: £46,156 6s. 8d., was increased during the year to £363,293 0s. 5d. by the issue of the following shares:—186,692 shares issued in respect of 3 year options exercised at 21s. 3d., £198,360 5s.; less amount received prior to 30th June, 1920, in respect of 3 year options exercised for which shares had not been issued at that date, £65,193 18s. 9d.—£133,166 6s. 3d.; 235 shares issued in respect of 4 year options exercised at 22s. 6d., £264 7s. 6d.; 61,582 reserve shares issued at par, £61,582; 122,121 new shares issued at par, £122,124—£317,136 13s. 9d. As the net capital expenditure during the year, viz.: £379,579 12s., exceeded the working capital available, the balance of £16,286 11s. 7d. has been met out of profits. The working expenditure and revenue account for the year shows a net

will be utilised towards the redemption on the 31st July, 1921, of 6½ per cent. Debentures outstanding on that date: the 5 per centum premium due on redemption, amounting to £20,538, has been charged on the appropriation account now submitted.

The report of the consulting engineer, Mr. H. Stuart Martin, states:—Milling operations proceeded without interruption throughout the year, the average tonnage crushed being 24,816 tons per mensem. Transport arrangements between the main ore bin on the mine and the Apex reduction plant worked smoothly in the hands of the South African Railways and the Kleinfontein Company, at a cost to the Modderfontein East Company of 1s. 9½d. per ton hauled. The value of the ore mined from stopes has exceeded the average value of the ore reserve, this being more marked in the first half of the year and gradually being reduced as the mine opened up and working facilities improved. Taking into consideration the large percentage of output of low grade ore from development faces and from surface dumps, the high working costs due to the limited

scale of operations, the cost of transport and rental of the reduction plant, it will be clear that a certain amount of over-mining is essential in order to obtain sufficient working profit to meet the cost of an extensive development programme. Hoisting facilities at No. 2 and No. 3 Shafts have so far only permitted a limited amount of stoping in the areas which they serve; additions now in hand will remedy this defect. Effective arrangements have been installed to enable waste rock and the lowest grade product from development faces to be handled separately and conveyed direct to the waste dumps on the surface. Development operations were gradually increased from a total of 981 feet in July, 1920, to 2,363 feet in June, 1921. Whilst no new important high grade blocks of ore have been developed, the existence of extensive areas of medium grade ore at No. 2 and No. 3 Shafts has been established. The continuation of development in depth at No. 1 Shaft has been somewhat delayed; the indications, however, are that the limit of the relatively high grade area in the neighbourhood of No. 1 Incline has not yet been reached. The following statement sets out the payable reef disclosures by linear development from the inception of the Company to June 30th, 1921:—

No. 1 Shaft—Footage advanced, 46,444; footage on reef, 29,239; payable footage, 13,932 feet, 47·6 per cent.; reef disclosures, width 23 ins., value 21·2 dwts., 487 inch dwts.

No. 2 Shaft—Footage advanced, 11,031; footage on reef, 9,085; payable footage, 5,370 feet, 59·1 per cent.; reef disclosures, width 25 ins., value 15·6 dwts., 389 inch dwts.

No. 3 Shaft—Footage advanced, 11,194; footage on reef, 8,185; payable footage, 5,445 feet, 66·5 per cent.; reef disclosures, width 28 ins., value 12·7 dwts., 355 inch dwts.

Total and averages—Footage advanced, 68,669; footage on reef, 46,509; payable footage, 24,747 feet, 53·2 per cent.; reef disclosures, width 25 ins., value 17·5 dwts., 437 inch dwts. The above figures are exclusive of vertical shaft sinking and the work done by the Modderfontein B Company. The ore reserve position at June 30th, 1921, calculated on a similar basis of pay limit as in the preceding year, amounted to 1,950,300 tons of an average value of 7·2 dwts. over 57 inches of stoping width, this being in comparison an increase of 194,900 tons and a decrease of 5 dwt. in value. The above figure includes 338,600 tons of 4·8 dwts. value which under circumstances already explained cannot be regarded as profitable at present. The blocks constituting this lower grade tonnage are as a rule favourably situated and will be distinct assets when the Company is producing on a larger scale. The ore reserve position estimated on the basis of the present limited scale of operations is, therefore, as follows:—No. 1 Shaft, 763,100 tons, value 9·2 dwts., stoping width 57 ins.; No. 2 Shaft, 373,900 tons, value 6·3 dwts., stoping width 55 ins.; No. 3 Shaft, 474,700 tons, value 6·2 dwts., stoping width 58 ins.; total and averages, 1,611,700 tons, value 7·7 dwts., stoping width 57 ins. The capital commitments for the current financial year, apart from development, are mainly in connection with additional housing and compound accommodation. I am desirous of emphasising the fact that the mine is still in a transition stage, being a concern which is carrying on an extensive development

programme in conjunction with a limited and expensive milling policy. This being the case, the mining policy has been adapted to circumstances, and it can only be gradually placed on a more normal basis when conditions permit, these conditions being an increased ore reserve and a larger reduction plant, situated on the Company's own mining ground. The development of the mine and its management have been handled well by Mr. W. C. Coe, who has been acting-manager from the inception of the Company to the end of 1920, and by Mr. E. Pam, who succeeded him, and the staff of the mine.

NEW PATENTS.

843. Daniel Walter Gawn, 16, Bourke Street, Pietermaritzburg. A two-cycle internal combustion engine. 3/9/21. P.
846. Michel de Roiboul, 15, Avenue Paire, 1st de Serbie, Paris, Republic of France. Improvements in the manufacture and production of films of silica, alumina, or other refractory substances, and apparatus for using them. 5/9/21. C.
848. Felix Johan Tromp, Transvaal University College, Pretoria. The electro-deposition of metals. 6/9/21. P.
849. Ernest Fraser Jones, Oceana Buildings, Simmonds Street, Johannesburg. Improvements in fluid control for rock drills. 6/9/21. P.
851. Harold Wade, 112, Hatton Gardens, London, E.C.1, England. Improvements in and relating to the treatment of ores containing oxidised copper compounds. 7/9/21. C.
856. (1) Wilfred Hosking, (2) Joseph Ninnis, (3) Wm. Armstrong, all of P.O. Box 668, Johannesburg. Improvements in rigs for machines driven by compressed air. 7/9/21. P.
857. (1) William Grant Adamson, (2) Albert Blackney, both c/o P.O. Box 3146, Johannesburg. Improvements in electrical switches or the like. 7/9/21. P.

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Only Forty Years of Natal Coal.

GOVERNMENT INSPECTOR DESCRIBES NATAL COAL RESOURCES AS "VERY LIMITED"—OTHER MINERAL PROSPECTS.

"The impression, so largely held in Natal and elsewhere, that the supplies of good coal in Natal are inexhaustible, is, on present information, anything but correct.

"The known supply of high-grade coal, such as the majority of that now exported, is very limited, and even at our present rate of production it will probably be exhausted in our children's lifetime. If production increases, as it must do, the exhaustion of the best Natal coal will be complete in a few years, say, forty to fifty years.

"In 1920 Natal produced 3,321,594 tons of coal, while in 1913 Great Britain produced 287,000,000 tons, so that our present known reserves of good coal would be exhausted in less than a year if we produced on the scale that Great Britain does."—Inspector of Mines, Natal.

"Towards the end of the year there was a tremendous boom in coal properties in Natal, and if only half the properties taken up develop into collieries the coal industry will be largely increased.

"I can only reiterate my remarks of last year that it is of the greatest importance for the welfare of the Natal Province that the coalfields should be thoroughly examined

it—and a plausible story, known to many victims on the Rand as the "Commissioner Street Prospector," comes in for a little attention.

The Inspector says:—

"The present method of encouraging prospectors by swallowing the most incredible yarns will never lead to anything, as those persons who are taken in once are afraid to put money into what sounds an ordinary mining venture."

"When such stories as that of a spring of mercury in the Berg are swallowed with avidity, the honest prospector can expect little encouragement."

Mr. Vaughan says: "Considerable interest in Metalliferous mining propositions has been shown during the year, and many claims have been pegged. Interest has chiefly centred in oil shale and asbestos. The country still requires prospecting, and valuable propositions will not be discovered by the present haphazard method of prospecting, which is chiefly done by amateurs in their spare time."

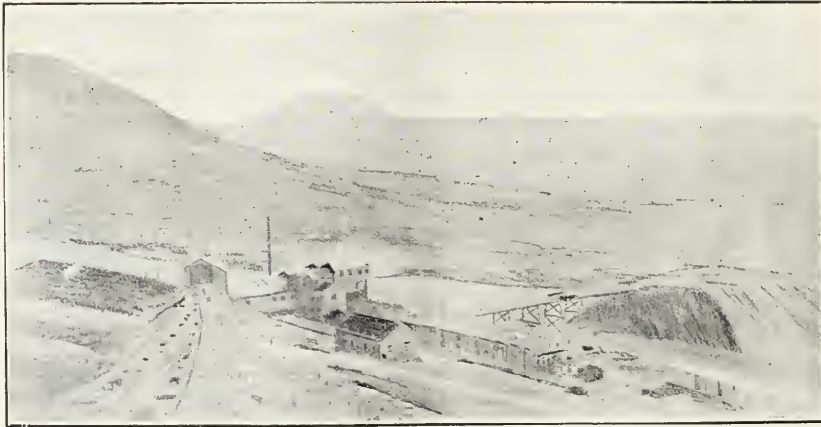
"It cannot be said that any discovery of marked value was made during the year."

In his general remarks the Inspector says:—

"Now that the Rand is on the down grade it would seem high time that attention was devoted to the mineral possibilities of Natal and Zululand.

Where to Search.

"Between Durban and Maritzburg the Umgeni River has carved out a valley for itself through the older rocks



Coal at Dumbe and Makatees Kop, Northern Natal.

and mapped by the Geological Survey, and then systematically proved by boring, so that we have full knowledge concerning our coal supplies."

The report contains much that is of interest in regard to other mineral possibilities of the Province. The absence of systematic prospecting—such as is carried on in the Transvaal and Rhodesia—is commented on. The Inspector says:—

"Considerable interest in metalliferous mining propositions has been shown during the year, and many claims have been pegged. Interest has chiefly centred in oil shale and asbestos."

The Wrong Encouragement.

The gentleman with a piece of road metal in his pocket, an unkempt beard, "hat and shirt to match"—as the lady "frocks and frills" reporters of weddings would have

of the country, and it is in a district such as this that important mineral discoveries should be made. Yet, so far as I can ascertain, not a single prospector has tried his luck in this area, the Inanda and Indwedwe Locations.

"Large areas of the country, close to the railway, are neglected and have probably never been inspected or prospected by either a competent geologist or prospector. Prospectors, when they make discoveries, usually seem to do so in the most out-of-the-way spots, but the Inanda Location is bounded for a long distance by the main line from Durban-Johannesburg and is within one hour's run of Durban by car. Gold, tungsten, graphite and iron have been found on the borders of the location, but no discovery has been made in the location itself, simply, I believe, because no one has tried to find minerals there.

Another big location close to Durban which is worth the attention of the prospector is the Umlazi Location. Copper

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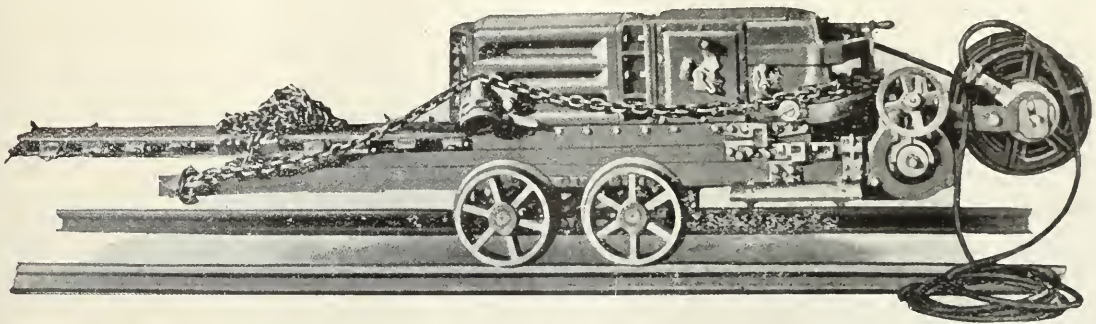
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has been found there, and there is no reason why other minerals should not be.

"The locations, as a rule, consist of mountainous and broken country, and are ideal places for prospecting; but prospectors apparently prefer fossicking in the wilds to examining country which is comparatively close to large towns."

The following are extracted from the Inspector's notes on the various minerals:—

Iron.—Iron propositions were in demand, but little prospecting was done on those which were taken up, and it would appear as though they were held in the hope of off-loading them at a good profit to overseas' speculators.

Mr. J. K. Eaton continued the erection of his blast furnace and accessory plant at Newcastle, and pig-iron should be produced in the coming year.

Asbestos.—The Natal Asbestos Company and the Buffalo Asbestos Company continued prospecting on the farm Tugela Randt, near Krantzkop. Numerous promising veins of asbestos were opened up, and there is little doubt that an almost unlimited supply of this mineral occurs in the neighbourhood.

is held under claims. The syndicates occupied themselves in extracting from 50 to 100 tons of oil shale to be sent to Great Britain for test purposes.

Nickel and Copper.—The Mount Ayliff Syndicate started prospecting operations by driving along the contact between the norite and the shales. Mr W. H. Goodchild, the consulting engineer, holds the theory that where the norite touches the shale there will be a chilled facies, and that the richest zone for the platinum, nickel, and copper deposits will be found a few feet above. Up to the end of the year 118 feet had been driven in cross-cuts, 186 feet in drives, and 148 feet sunk in winzes. At the lowest depths promising ore was encountered, and the rocks exposed afford good evidence of the feasibility of Mr. Goodchild's theories. As the workings get deeper there is an increase in the copper and nickel values, and it is hoped that this concern will eventually turn out to be a sound low-grade nickel and copper proposition.

Tungsten.—A discovery of wolframite was made near Sitoku's Kraal, in the Melmoth District, Zululand. The first sample gave 15 per cent. of tungsten, and other samples averaged 3 to 4 per cent.; further prospecting giving only



The Hlobane Colliery in the Vryheid District.

Galena.—Very promising samples of galena containing high values in silver were submitted by Zululand prospectors, but, strange to say, no attempt to work the deposit was made. This is remarkable considering the high prices touched by silver.

Gypsum.—The Natal Gypsum Company continued operations on a small scale and produced 1,007 tons of gypsum, as compared with 1,000 tons in 1919. The company closed down at the end of the year. Owing to the increasing overburden, the cost of obtaining the gypsum increased, and as the Pretoria Cement Company were able to obtain gypsum at 13s. a ton less than the Natal Gypsum Company could supply it for the cement company refused to renew its contract.

Mercury.—Wild tales were spread of a discovery of a spring of mercury in the Drakensberg in the neighbourhood of Bergville, and a large number of claims were pegged on the strength of the rumours. No cinnabar was found, and, needless to say nothing came of the reported discovery.

Oil Shale.—Much attention was devoted to the oil shale in the Drakensberg, in the Loteni and Unkomaas Valleys. Numerous syndicates started, and practically all the ground blast furnace of the Newcastle Iron and Steel Works.

disappointing results, the venture was closed down and the claims abandoned.

Glass.—The Union Glass Works completed the erection of their furnace and works at Dundee. The buildings and plant are of the most up-to-date type, and everything has been done to secure the erection of a first-class bottle-making factory. The capacity of the furnace is 120 tons, and at present the output is almost entirely confined to the manufacture of beer bottles of the capsule and screw-neck type.

The output at the end of the year was 30,000 bottles per week, and it is hoped to put this up to 80,000 per week.

As was only natural, a few difficulties were experienced when the plant started, but these were soon overcome, and at the end of the year the plant was running efficiently.

Practically nothing but coloured labour is employed in the making of the bottles.

Fire-clay.—302 tons of fire-clay were mined at the Parkside Colliery, near Newcastle, and made into fire-bricks. The bricks were said to be of excellent quality and have been used for lining the interior of the top portion of the blast furnace of the Newcastle Iron and Steel Works.

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EDITORIAL.

PROFIT-SHARING ON RAND MINES.

The Rand was started at the beginning of September by the announcement of the offer of a profit-sharing scheme by the directors of the Rodepoort United Main Reef to their 164 white employees. Details of the scheme and the history of the negotiations to date are given in another part of this issue, and we purpose here merely to deal with some general considerations affecting the proposal. Credit must at the outset be given to the originators of the scheme for what we believe to be a sincere and well-meaning attempt to save a body of mine employees from unemployment. Probably it would prove far more advantageous to the company in every way were the mine to be closed down without further ado, and time, money, and trouble would doubtless be saved to the controlling house were that course adopted.

However advantageous co-partnership may be in practice, the moment, moreover, would seem inopportune to apply it on the Rand. Conditions, chiefly in regard to wages and the colour restrictions, are far from what may be called normal or settled, and the introduction of a new and far-reaching principle such as co-partnership would only serve to postpone or render more difficult a settlement of these vexed questions. It is true that there is a great deal to be said for the application of co-partnership to mining, and as far back as 1906 we advocated in these columns its trial on these fields. In December, 1906, we cited the case of the Levant Mine in Cornwall, where the simplest and crudest form of profit-sharing had just been introduced, and we advocated its adoption on more approved lines—as an experiment—on the Rand. We quoted the successful example of the South Metropolitan Gas Company, and reproduced a thoughtful letter on the subject from the author of that scheme, Sir George Livesey, to Mr. J. Q. Braidwood, the well known Rand mining engineer. It must be admitted that a fair hearing was given at that time by the leaders of the industry to the merits of the proposal, but for reasons inherent in gold mining, it was "turned down." The possibilities of co-partnership are, of course, enormous, though the history of its application to industries in other countries shows a very high percentage of failures. Fortunately, we have available a large volume of data drawn from actual experience of the causes and circumstances which make some profit-sharing plans fail and others succeed. From a multitude of opinions expressed, covering alike well-tried and recently-adopted profit-sharing schemes, in the main satisfactory results are indicated. Both the general objects, such as co-operation and loyalty, and specific objects, such as reduction of labour turnover, economies of material, greater productive efficiency, avoidance of industrial disputes, and the promotion of thrift, are being achieved to a greater or less extent with profit-sharing plans. Indeed, these plans seem to be uniformly successful in producing general co-operation, and loyalty and stabilisation of the working force. One interesting result, which would doubtless be very marked on the Rand, is the elimination of the inefficient, due to the refusal of the better men to work with men of low intelligence and ideals. Another important point observable is that there has been a consistent opposition to profit-sharing by organised labour and by trade unionists generally. From a detailed analysis of past and present profit-sharing plans, the following authoritative conclusions are drawn:—(1) Judged purely on the basis of their longevity, profit-sharing plans are a doubtful expedient, since but few of the many plans put in operation have survived a long period of trial. (2) A critical examination of individual experiences, however, indicates an encouraging degree of temporary success. In conclusion, we may quote the following pertinent passage from an important American research report on the subject: "Profit-sharing is no panacea. It cannot be offered as a solution of the wage problem. But properly understood and utilised, it possesses valuable features. Of greater importance, however, than any mechanism for securing co-operation and loyalty, and necessary to the real success of any plan, is the influence and personal touch of a wise management." We cannot say that a survey of the experiences of profit-sharing, as applied elsewhere throughout the industrial world, encourages us to believe in its beneficial adoption, in the present circumstances, by the mines of the Rand.

MR. H. O. BUCKLE'S QUARTERLY REVIEW.

Mr. H. O. Buckle's speech at the quarterly meeting of the Chamber of Mines on Monday was remarkable more for what was left unsaid than for what was said. Thus, there was no reference to the question of the gold premium, or ex-enemy shares, or the mine co-partnership proposals, or the new co-operative gold refinery. As all these questions are still under discussion, and as Mr. Buckle is much too direct a speaker to be able to talk round a subject without telling us something about it, he no doubt was justified in maintaining an attitude of silence on those vital industrial

questions. Instead, he confined his remarks to labour matters, white and black, and his speech resolved itself into a review of what had happened under these heads during the quarter. As our readers are familiar with the history of the two recent strikes on the Far East Rand, we need not follow Mr. Buckle's summary of these events. He regards the settlement of the white wage question as "a matter for congratulation, as it disposes for a while at least of the necessity of frequent discussion of a very thorny subject." He also welcomes the action of the Mine Workers' Union in regard to the February strike which began at the Consolidated Langlaagte, as showing "a degree of courage and a sense of responsibility which they should welcome as a good augury for the future." He emphasised the fact that "the effect of the break in service caused by the dismissal of the strikers had been entirely wiped out, at a cost to the mines of something like £100,000, which must be admitted to be a very substantial recognition of the union's treatment of the principal offenders." As regards the recent relaxation in mining regulations in regard to natives working underground, he said that though "they did not go so far as the Chamber would wish, or indeed so far as they ought to go, in relieving the industry of the many and onerous burdens under which it laboured, tardy and meagre as the small relief had been, it was none the less welcome, if only as an indication that some notice had been taken of one at least of the recommendations of the Commission." He anticipated an improvement in the native labour supply to the mines in the near future, particularly from the East Coast; and here again Mr. Buckle avoided any reference to the contentious question of the agreement with the Mozambique Government. For the same reason that the monthly public gatherings of the Chamber were abandoned in favour of quarterly ones—viz., the inadvisability of making public pronouncements on matters under discussion—it would seem that the quarterly meetings of the Chamber might without much loss be given up in favour of half-yearly ones.

Notes & News.

The Late Major Clem Webb.

We are indebted to many readers for expressions of appreciation of our Special Memorial Number to the late Major Clem Webb, M.C. The issue was sold out at the Central News Agency early in the week. A printer's error crept into the account of the parentage of the late Major Webb. It should be made clear that his grandfather, John William Webb, married Mary Stuart, and that their son, F. C. Webb, married Miss Davies, who was the mother of the late Major Webb.

General Byron's Tribute to the late Major Webb.

In the course of a letter written to Mr. Mackie Niven on receipt of the news of the death of the late Major Webb, General J. J. Byron writes: "By one of the curious coincidences of life we were discussing Clem Webb at the homestead (not being aware that he was seriously ill then) the evening before his passing over. We recalled his great personal gallantry in action, his unabated cheerfulness under the most exhausting and depressing circumstances, and his wonderful power of inspiring optimism in others. We always reckoned he was well worth his place in any unit for the above qualities alone—and he had many other good ones."

Metallurgical Developments at Springs Mines.

In last week's issue of the *Journal* the official statement of the adoption of the new metallurgical process at the Springs Mines was reproduced. In this connection readers are reminded that a metallurgical development of that nature, and embracing most of the points mentioned had been fully treated in the July 30, 1921, issue of the *Journal*. In an article entitled "The Elimination of the Stamp Mill from Rand Metallurgy," the various aspects of the question were fully dealt with. The scope of the article extended

only as far as crushing to the tube mill circuit was concerned, and elimination of amalgamation after tube milling, and all-sliming were not discussed in that connection. As far as primary crushing goes the conclusions arrived at in the article are identical with those mentioned in the official statement, although the two crushing processes differed in detail only. In the previous article breaking by means of Blake crushers and rolls was described, while the Springs plant will employ single stage breaking in gyratory crushers. The fundamental principle underlying both processes is the same. Figures on operating expenses reproduced in the article clearly show that expenses in that direction will be cut down. Whereas an estimate for crushing by this means only amounted to 14 pence per ton, figures for stamp mill crushing amounted to 26 pence per ton. Mention is also made of the saving in capital cost, but as this appeared to be self-evident the question was not laboured.

Stabilising Gold.

Dealing with the question of the desirability of stabilising the price of gold, the *Westminster Gazette* says that it is easier to state objections than to formulate a scheme whereby this could be effected. But with the goodwill on the part of the South African and Home Governments and the Transvaal gold producers, it is obvious that the difficulties should prove surmountable. If the mechanical difficulties can be overcome, the still more formidable problem will arise in regard to fixing a price at which gold ought to stand. It is already suggested that 110s. per ounce as a minimum and 120s. as a maximum price might be regarded as reasonable, and somewhere between these two figures the basis for a compromise might be reached. It is proposed that the arrangement should last for two years.

The Decay of Gold Mining.

In a statement regarding the gold-mining industry made lately, Mr. E. C. Dyason, president of the Chamber of Mines of Victoria, described the present condition of the industry "as a patient that was being kept alive by the precarious oxygen of the gold premium." To his mind it was surprising that the industry had survived the blows it had received. Costs and charges had increased 25 per cent. in the last decade, and the increase in the price of gold, which was quite recent, had been only from 25 to 35 per cent. Mr. Dyason, after dwelling upon the shocks the industry has received, asserts, for the benefit of posterity, that the obliteration of mining in Victoria is economic, not geological. He contends that hardly any of the goldfields of the State have been exhausted, and believes that, even though the industry may be stopped now, it will some day revive. He states that there are 100 years' work in Bendigo under more favourable conditions, and avows that other fields of the State have similar prospects.

Diamonds in New South Wales.

News from New South Wales is to the effect that an attempt is to be made to revive mining for diamonds on the Bingara field. An exchange states that the diamonds so far found there have been small, but they are exceedingly hard, and have had a value because of their use in polishing other diamonds. Mr. Dickens, a representative of some Victorian capitalists, has spent two or three weeks in making an inspection of the locality, and claims as a result of his investigations to have made discoveries, one of which is that the locality has revealed at least one creative point of the diamond. The geological conditions, he states, appear suitable for the existence of the already much searched for volcanic pipes of kimberlite (the matrix of the diamond), similar to those of South Africa. This, he says, is supported by an examination of some decomposed "blue ground," which revealed the existence of the minerals usually associated with the diamond. Mr. Dickens has returned to Melbourne to report, after first lodging an application for an extensive area of mineral lease. Very close search has been made in the district by the geological officers of New South Wales for the sources of the diamonds, but it has generally been understood that they have not been successful.

Boring on Luipaardsvlei No. 10.

We understand that boring on Luipaardsvlei is proceeding very satisfactorily, a depth of 450 ft. having been reached. The drill is dolomite, and it is expected that it will reach the Witwatersrand beds early next month.

* * * *

T.G.M.E. Meeting.

Mr. Max Honnet presided at the annual meeting of the T.G.M.E. last week and reviewed the prospects of the property in detail. The dividend question was discussed by several shareholders, and the official announcement cabled to London on the subject after the meeting will be found elsewhere in this issue.

* * * *

August Mineral Statistics.

The following statistics have been issued by the Department of Mines and Industries for the Union of South Africa:

	August.		Totals for 8 months from Jan., 1921.	
	Output.	Value.	Output.	Value.
	ozs.	£	ozs.	£
Gold	715,538	3,039,413*	5,337,227	22,671,100
Silver	72,971	10,946	529,677	80,626
	Carats.		Carats.	
Diamonds ...	48,275	175,608	614,914	2,420,384
	Tons.		Tons.	
Coal	1,035,494	448,048	7,671,401	3,460,219
Metallic Tin & Concentrates	77.2	7,347	1021	101,801
Other Base Metals	—	10,407	—	£98,451
Totals		£3,691,769		£28,835,415

*Gold valued at par.

It is gratifying to note that advances in both output and value have been made in all the cases considered. The following figures fully bear out this statement:—

Increase of August over July in—

	Output.	Value.
Gold (ozs.)	19,617	£83,328
Silver (ozs.)	304	45
Diamonds (carats) ...	1,528	107
Coal (tons)	73,161	27,218
Tin (tons)	21.2	2,104
Base metals	—	841

* * * *

De Beers' Industrial Interests.

A feature of interest in the review of developments in the Cape inspectorate included in the annual report of the G.M.E., is the reference to what is being done by De Beers Company in the matter of industrial development, through the medium of the establishment of a fertiliser factory at Somerset West, in which connection the following details are given regarding the position as at the date of the report: "Hitherto the supplies of fertilisers have been limited to the local product, which consisted largely of bone meal, the output of a few small factories, and to importation from other countries, which latter amounted in 1913 to £188,431 and in 1915 to £175,336, and it was to meet this demand that De Beers decided to launch out on a big scale and hope to be in a position in a few months' time to be able to supply the whole fertiliser requirements of the Union, which are said to be about 100,000 tons per annum. The material for erecting a huge building, 700 feet long and 75 feet high, which is to house the main portion of the fertiliser plant at Somerset West, has arrived, and all the foundations have been prepared, and it is hoped that the plant will be operating by June or July. Eight subsidiary buildings in addition to the main one will complete the installation, and the plant, as a whole, will be capable of turning out 100,000 tons of fertiliser per annum on a single eight-hour shift. Every kind of fertiliser will be sold by the company, and those, such as basic slag, which cannot

at present be produced here, will be imported. It will be the policy of the company to aim at large production with small profits, rather than small production and large profits, and the prices charged will depend on the demand, and the question whether the Union will have cheap fertilisers depends largely on the farmer himself, as the incidence of the heavy capital charges will diminish as production increases, and the saving resulting from increased production will go to the benefit of the farmer in the shape of lower prices. The factory, when complete, will be not only the most modern, but also one of the largest in the world, and will be operated by modern mechanical devices which will reduce supervision to a minimum." The report also gives details showing how De Beers Company are extending the uses to which in the past reinforced concrete has been put, and are manufacturing many articles and applying them to many purposes where previously iron, wood, or masonry were used. The reinforced hollow concrete brick is one direction, and the result, the report anticipates, will be eventually to entirely supplant the ordinary clay brick. Towers for electric power lines, sleepers for railway and tram tracks, beaver setts for mining purposes, and water-tanks for all purposes are named as but a few of the other uses to which reinforced concrete is now being put by De Beers. Reference is also made in the report to the possibilities of developing the iron fields.

* * * *

Far East Rand Mining Problems.

In the course of his annual report, Colonel Bottomley, Inspector of Mines for the East Rand, writes:—"There is nothing of a special nature to report regarding the progress or development of the mining industry during the year. The expansion of the Far East has, if anything, received a slight check owing to the stoppage of most of the development ends on the Daggafontein Mine and the poor results of the development in Springs West. The results so far achieved on these two outlying mines are distinctly discouraging, and are certain to influence opinion in connection with the long looked for expansion of the Far East and the development of the large unworked areas between Springs and Nigel. It is apparent that the zones of enrichment or lenses are further apart and the reefs narrower going south from Springs. On the other hand, we have the splendid example of the Nigel, which was a prominent producer and dividend earner for many years. The mine is situated eight miles to the south of Springs, and it is more than probable that similar large patches of rich ground should be found between these two points. The difficulty lies in their location. The deep shafts on the Springs West, New State Areas, Brakpan, and Geduld, have now approached the Main Reef horizon, the New States having actually encountered the reef, and the coming year will witness a programme of development hitherto unprecedented on these fields. Owing to the large claim areas involved, first consideration is being paid to rapid and easy transportation of ore by laying out the drives and main haulages on capacious lines. The question of ventilation, as is only natural in this enlightened age, is receiving every possible consideration, and the wide drives already mentioned will materially assist in this direction. It is satisfactory to note that the North Shaft of the New State Areas was sunk to the reef—a depth of 3,760 feet—without a single fatal accident. It has been decided that the two circular shafts of the Brakpan Mines which are now in their last stages—No. 4 having already encountered the reef—are to handle the work during the development period without their permanent equipment. This means that wire guides will continue to be used without any other steadying factor than their own weight and what is added to them for stabilising purposes. I cannot help feeling that the extra tonnage hauled will be a severe test on the conditions mentioned. The sinking of the two shafts has been a nightmare to the managers up to the present, and it is more than likely that their troubles are not yet over. It is felt that there is insufficient data available in connection with the handling of a large tonnage on rope guides over a shaft depth of 4,000 feet.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgical.

A High-Frequency Induction Furnace.—*The Electrical Review*, Sept. 2, p. 305.

New Bearing Material.—*The Electrical Review*, Sept. 2, p. 315.

The Friction Coefficient of Minerals.—*The Colliery Guardian*, Sept. 2, p. 657.

Current Science and Technology.—*The Colliery Guardian*, Sept. 2, p. 660.

Gründal Flotation Process.—*The Iron and Coal Trades Review*, Sept. 2, p. 295.

Fire Hazards in Metal Mines.—*Mining and Scientific Press*, Aug. 27, p. 297.

The Mineral Industry of South Africa.—*Mining and Scientific Press*, Aug. 27, p. 298.

Placer Prospecting Practice.—*Mining and Metallurgy*, Aug., p. 15.

Drill Steel Sharpening.—*Mining and Metallurgy*, Aug., p. 33.

Engineering.

Water Power Resources of Canada.—*The Engineer*, Sept. 2, p. 233.

Developments in Power Station Design.—*The Engineer*, Sept. 2, p. 235.

A Drop-Hammer Battery for China.—*The Engineer*, Sept. 2, p. 246.

A Safety Device for Oil Furnaces.—*The Engineer*, Sept. 2, p. 248.

Notes on the Grinding of Comulators.—*The Electrical Review*, Sept. 2, p. 302.

Submarine Tests with the Neale Electromagnet.—*The Electrical Review*, Sept. 2, p. 303.

The Allocation of Boiler-House Working Costs in Reducing Steam Engine Plants.—*The Electrical Review*, Sept. 2, p. 304.

A Tramecar Fire Heater.—*The Electrical Review*, Sept. 2, p. 325.

Coal and Fuel.

The Analysis of Coal.—*The Colliery Guardian*, Sept. 2, p. 658.

Should Coal be Sold on Board of Trade System?—*Coal Trade Journal*, Aug. 31, p. 965.

How to Burn Domestic Anthracite.—*Coal Trade Journal*, Aug. 31, p. 982.

Economics.

British Financial Policy.—*The Electrical Review*, Sept. 2, p. 297.

The New Wages Agreement.—*The Colliery Guardian*, Sept. 2, p. 651.

Coal Mining Costs and Profits.—*The Colliery Guardian*, Sept. 2, p. 663.

Coal Export Under Control.—*The Iron and Coal Trades Review*, Sept. 2, p. 291.

Silver and the Pittman Act.—*Mining and Scientific Press*, Aug. 27, p. 290.

Welding in Relation to Economic Production.—*Production and Export*, August, p. 290.

Concerning Mines and Men.

Mrs. Clem Webb and family desire to thank the numerous friends who have extended sympathy in their recent sad bereavement.

Mr. G. A. Keene, director of Sandycroft, Ltd., is on a visit to the Rand.

Col. Bartley, O.B.E., of Messrs. Sykes & Co., Ltd., has returned to the Rand.

Major T. D. Stoward, of Messrs. Sykes & Co., Ltd., has returned to the Rand, after a two years' stay in England.

Mr. W. S. Saunders, of the "C.M.S." group of companies, has returned to the Rand, after a six months' holiday in England.

Mr. P. Rouillard, Consulting Engineer to the Mauritian Group of Natal Collieries, has been on a visit to the Rand this week, on a mission regarding railway rates.

The Bailey-Jeppe group of companies is now engaged in moving into Farrar Building, which has been renamed Clewer House, in Sir Abe Bailey's honour. The W.N.L.A. have moved into the new Chamber of Mines building, which is rapidly nearing completion.

Gold Producers' Association.

We learn from the Australian Press that no sales of gold were made by the Gold Producers' Association, Ltd., during May. On 20th May fine gold was quoted at £5 2s. 8d. per oz., and the board considered it advisable to hold the available gold for a better market. During May and June quotations varied between £5 2s. 8d. and £5 10s. 5d. per oz., this being the gross price, without deduction of insurance, freight, and other realisation charges. The quantity of gold disposed of by the association in June, including local sales for the June quarter, was 184,769 oz. standard. The average net price obtained was £4 19s. 1d. per standard oz. equal to £5 8s. 1d. per fine oz. All but 45,000 standard oz. of the total gold production available for sale during the past half-year has been sold. The board expected to dispose of this remainder before the end of July.

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Geology of Heidelberg—VII.

MR. BLELOCH REPLIES TO DR. ROGERS—CONCLUSION—DR. ROGERS' MATERIAL POINTS.

Dr. Rogers admits there is nothing new in his arguments and apologises for reiterating them. He naively says "some of them have been greatly strengthened by the detailed mapping." That fond delusion must have been comforting, for Dr. Rogers seems to have realised how weak are his arguments and how sadly they needed strengthening. Now that the detailed mapping has been shown to be a new source of weakness instead of a source of strength these temporarily stimulated arguments will have to relapse again among their weaker fellows. In an important footnote on page 52 of his paper Dr. Rogers states: "The material points are:—

"1. No unconformity within the Kimberley-Elsburg series south of the Rand.

"2. The absence of an unconformity at the top of that series south of the Rand.

"3. The 'Bird Amygdaloid' is a contemporaneous lava interbedded with the quartzites between the two uppermost groups of states and as such is an important rock in the determination of horizons in boreholes and shafts in areas where the beds do not crop out. These conclusions were very clearly set forth in the papers by Dr. Mellor referred to on previous pages especially in the upper Witwatersrand system published as long ago as 1915."

Just so! Dr. Rogers and his predecessor have both got into the same boat and they eventually persuaded the Government Mining Engineer and the Rt. Hon. the Minister of Mines and Industries to get in too. Unfortunately for them all, the boat has sprung a leak and they now find themselves in a sorry and desperate plight, and none of the professional brethren of the three experts are showing any ardent desire to come openly to their assistance.

When the notorious cables were dispatched to destroy confidence in the reefs we have found and identified as the Van Ryn series in the Heidelberg district, and to spoil the financial arrangements for developing them, and to stop a million of new working capital from coming to open up the only possible extension of our Far East Rand goldfield, it was never for a moment dreamt that these cables would have a far wider effect than they were intended to have. It was not foreseen that the cables would not only spread doubt and uncertainty about the new mines under our control but that they would put doubt and uncertainty into the minds of the speculative investor in regard to the whole Rand mining industry. People rightly and naturally thought that if a Government goes out of its way to send a warning about the reefs of its greatest goldfield there must be something radically wrong. Not only, therefore, was Dr. Sauer's company wrecked, but the big mining house enterprises, too, came under suspicion. Not only did more or less unsatisfactory properties like Modder Easts and properties like Daggafontein working the Nigel Reef instead of the Van Ryn suffer, but even established mines on the Far East Rand like Springs and Brakpan, the old and new State Mines, West Springs, and all have come in for a no small amount of suspicion and uncertainty, duly reflected to-day in the graveyard quietude of the Stock Exchange. It was not foreseen that the cables would bring about a situation which, unless it is relieved by a public withdrawal and repudiation by the Government itself, must preclude any hope of more capital being forthcoming for new mines, either in the southerly extensions of the Far East Rand under our control, or on the Government's own remaining deep level areas in that field.

A Blacked-out Future.

The Government apologists say that unemployment and depression are not to be laid at the door of the Cabinet—that it is the result of world conditions—but no country that I know of has ever cried out "Stinking Fish" by cable and warned people against investing money to expand its

greatest and most profitable industry. The Government itself, therefore, by these cables has brought about decreasing State and Railway revenues and by its own extraordinary act inspired by Dr. Rogers—so the Rt. Hon. the Minister informed Parliament—it has undermined and impaired the very credit of the country. Popular indignation is rapidly rising against the conditions of poverty and unemployment reigning in the midst of inexhaustible but un-get-at-able wealth, barricaded off and locked up by the permanent heads of the Mines Department. The Rt. Hon. the Minister of Mines and Industries who apparently acted on incorrect and misleading representations which were made to him by his officials, set his seal on the locking up by authorising the cables, and now he looks around at the present consequences of his act and contemplates the blacked-out future of the industry he administers. He must be experiencing a sinking feeling of dismay.

The Points Refuted.

To bring these criticisms and reflections on Dr. Rogers's paper to an end, I will briefly remark on his material points.

Point 1.—In regard to this point I submit that except Dr. Mellor and his school, of which Dr. Rogers proclaims himself an adherent, I do not know of anyone who puts forward that there is unconformity within the Kimberley-Elsburg series. Certainly I have never done so. Only those who say that Langerman's Kop beds, although so like those of Reitfontein that Dr. Mellor once said they must be classed together, are nevertheless overlapping Elsburg beds faulted down, imply such an unconformity as Dr. Rogers denies. The experts who say that belong to Dr. Rogers's school, not to mine.

Point 2.—I submit in regard to this point, that with cited and verifiable facts, I have proved Dr. Rogers to be wrong, and I have shown that at Heidelberg as elsewhere the Ventersdorp system is manifestly unconformable to the Witwatersrand system. I have supported that matter of fact evidence with the testimony of geologists and engineers experienced in Rand Geology some of whom have gone to other lands and others—among them some of the ablest—are, alas, now dead and gone.

Point 3.—I submit that on this point, too, I have proved Dr. Rogers to be wrong, and my proof is again in the form of cited and verifiable facts. I have shown that the amygdaloidal diabases occurring in the horizons above the Van Ryn Reef on the Far East Rand are mostly probably intrusive and that in any case Dr. Rogers has brought forward no evidence to prove that his interbedded lava of Heidelberg has any connection whatever with the diabases encountered in the shafts and boreholes put down to the Van Ryn Reef on the Far East Rand. On the contrary I have brought forward matter of fact evidence which shows that Dr. Rogers's "Bird Amygdaloid" of Heidelberg almost certainly belongs to an altogether earlier period, for just such an interbedded lava flow as that which he has described in the Heidelberg district did take place in the period *before* the Van Ryn Reef was laid down on the Far East Rand, and this rock is to be seen in the neighbourhood of both the New Modder and Reitfontein Mines outcropping north of the Van Ryn Reef on these mines: proving that just such a truly interbedded amygdaloid as Dr. Rogers described as occurring in the Heidelberg district is there in position at New Modder and Reitfontein, but it lies *below* the Van Ryn Reef and not *above* it as it would be if Dr. Rogers's correlation were correct. I may also add that even below the Nigel Reef there is another amygdaloid, and there is still yet another below the horizon of the Molyneux Reef. In view of these facts, how can Dr. Rogers take any of these amygdaloids as the sole reliable markers by which to identify the banket beds which lie above or below them. By doing so, he successively identified three entirely

different reefs—the Van Ryn, the Nigel, and the Molyneux—as all one and the same “Main Reef Leader” and so has brought about his tragic “errors of correlation” with all their disastrous consequences.

In regard to points 2 and 3, I do not believe that Dr. Rogers will find, barring Dr. Mellor, any two geologists to support him. I submit that they constitute the false premises on which his errors of correlation are founded, and on these as a top storey Dr. Rogers has built up a fantastic but unstable edifice of assurance. I further submit that, sooner or later, the Government will have to repudiate and withdraw the sweeping and unwarranted cables banning all the reefs in the Heidelberg district except the unpayable Molyneux: that Cockoo reef of which Dr. Rogers in succession to Dr. Mellor has now become the foster parent.

Closing Up the Rand.

I submit that until Dr. Rogers deals with the facts I have cited bearing on the fundamental questions of Rand geology, like those of Reitfontein and Langerman's Kop, of the unconformability of the Ventersdorp system to the Witwatersrand system, and of the amygdaloidal diabases in relation to the sedimentary beds in which they occur, it is dangerous for the Rt. Hon. the Minister of Mines and Industries to take it for granted that Dr. Rogers is justified to dictate either by cable or by any other way as to which reefs can or cannot give rise to public expectations which are justified. I submit to the Prime Minister that the Government should immediately institute an impartial inquiry into the whole question and that it should meantime order the withdrawal and repudiation of the notorious cables which it now appears were instigated on statements, in regard to my addresses and lectures in London in 1919-1920, which had no foundation in fact. I again repeat my statement that these grave errors of correlation and deplorable errors of judgment are *closing up the Rand*. That they are causing unemployment and poverty and creating chaos and deficits in the finances of the nation.

In addition to the quotations and references made in the body of this paper; for the information and convenience of my readers and of the members of the Geological Society of South Africa I append a further number of brief statements by independent authorities on the questions at issue.

In addition, too, to the diagrams presented with the text, I am able by the kindness of the *South African Mining and Engineering Journal* to present a new geological plan of the Witwatersrand system (1921) illustrating the conclusions regarding the gold-bearing reefs of the system as described in the text.

Brief Statements by Independent Authorities.

“Dear Mr. Bleloch, I thank you very much for the copy of your paper on the Rand with the map. I have read the paper and studied the map with considerable interest. I quite agree with you about the Far East Rand, I also think that portion of the basin too shallow to give enough space for such a great thickness of the strata of the Witwatersrand System as would include the Main Reef. I also expect lower Witwatersrand beds there.” *Dr. G. A. F. Molengraaff, Professor of Geology, Delft University, and formerly State Geologist to the Transvaal Government. 2/11/10.*

Note by W.E.B.—In this, in effect, Dr. Molengraaff states that he is in agreement with me, and that it is his opinion that the reefs mined on the Far East Rand, which produce nearly 70 per cent. of the total profits of the Rand goldfield, are in the lower Witwatersrand beds, and are quite distinct from the less profitable Main Reef series of the Central Rand.

“Certainly the Van Ryn Reef was not the Main Reef, and had not anything to do with it.”—*H. S. Denny, Financier Report. May 17th, 1919.*

“This reef (Van Ryn) outcrops throughout nearly the whole length of these properties.”

“The facts, old and new, set forth in this report are open for all to see, and I can say at once that in my opinion they leave no room for further controversy. How any man with eyes to see, after carefully observing these reefs in position all round the Rand, can declare that the Nigel Reef is the same as the Van Ryn, or that either of these reefs is the same as the Tatham, or the Kimberley, is beyond understanding.

“I am prepared to go with the Government Survey Officers, or with any independent Engineers or Geologists, and check off the several beds shown in these sectional profiles, bed for bed, at each of the places around the Rand to which they refer.”—*W. T. Hallimond, Report, Houtpoort, Ltd., 11th December, 1920.*

“The Reef now being mined from the No. 1 Incline Shaft in the northern section of your property (The Southern Van Ryn) is the true Van Ryn Reef of the Far East Rand. I also confirm that the Nigel Reef is a separate and distinct pay reef which is being mined in the South-East section of your property.”—*W. T. Hallimond, M.I.M.M., M.I.M.E., Report, Southern Van Ryn Reef G.M. Coy., Ltd., 17th December, 1920.*

Nigel Reef.—I am mining the Nigel Reef in the Nigel Van Ryn section of our property (The Southern Van Ryn). The average assay value is 7.25 dwts. over a stoping width of 24 inches.

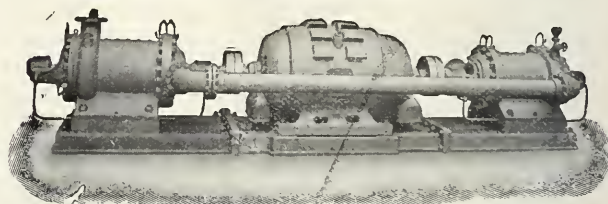
Van Ryn Reef.—Seventy per cent. of last month's development on the Van Ryn Reef from No. 1 Incline Shaft averaged 9.8 dwts. over 24 inches. Values like these will enable me to send ore to the mill of an average grade of, say, 8.5 dwts. per ton, that is nearly as high a grade as that of the New Modder Mine, and higher than the grade of a medium value mine like Brakpan.”—*C. J. Tutt, Consulting Engineer, Southern Van Ryn Reef G.M. Coy., Ltd. Report, 14th December, 1920.*

“I have seen the three reefs—Tatham, Nigel and Van Ryn Reef in their sequence exactly as shown in your brother's sections and exactly similar in character and sequence as they occur at the Southern Van Ryn Mine.”—*W. Marshall Philip, Mining Engineer. 5/5/20.*

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WRIGHT'S ROPES

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(1) The Main Reef as worked on the Central Rand is cut off in the neighbourhood of Boksburg, beyond which point it has not been exploited.

(2) The reef known as the Van Ryn belongs to a much lower horizon of the Witwatersrand System than the Main Reef of the Central Rand.

(3) The Nigel Reef underlies the Van Ryn, and is exposed north-east of Boksburg.—*E. T. Tenby, F.G.S., M.I.M.E., January, 1915.*

"After having examined the evidence and seen the Reefs, I say that no man can say that there is only one reef, or that the Nigel is the same as the Van Ryn."—*A. Danks, Mining Engineer, Special Commissioner, South African Mining Journal, August, 1920.*

"When I went as Manager to Government Areas I was struck by the resemblance between the Van Ryn and Rietfontein Reefs, and also by the total absence of the characteristic features of the Main Reef Series in the Central Rand. As the result of 2½ years' experience in development work on Government Areas—during which period about 70,000 feet of development was done—I came to the conclusion that the Van Ryn Series was the Rietfontein Series, and not the Main Reef Series. I see by the recent published cable report that your latest development results on the Southern Van Ryn are excellent. I hope that you are now entering one of the payable zones of the Van Ryn Reef, which will establish the value of your properties in that district."—*Graham Bell, 2nd March, 1920, Mining Engineer, formerly Manager of the New Rietfontein Estates Mine and the Government Areas, Modderfontein.*

"I cannot understand how any man who professes to know anything about the Main and Van Ryn Reef Series can possibly say that the Nigel is a Main Reef proposition."—*F. E. Rivas, 26th July, 1915.*

"In view of all the evidence, deductive and positive, the most reasonable conclusion is that the Nigel is not Main Reef Series."—*J. T. Carrick, M.I.M.E., Ph.D., 11th July, 1904.*

"I know the Nigel Reef and the Van Ryn Reef. In my opinion the Nigel is not the Van Ryn. I cannot understand how anyone could identify Nigel Reef with Main Reef Series."—*The late Joseph Storey Curtis, Mining Engineer and Geologist with 25 years' experience on Rand, put down first borehole on Main Reef Series. Formerly on Geological Survey Staff, United States of America. From evidence on oath, Knox Arbitration Case.*

"I reported to Rhodes that the Van Ryn Reef had no correlation with the Main Reef but that it was very much more probably an extension of the du Preez (Rietfontein) Series. The Van Ryn Reef is incomparably the most valuable reef in the system.

The Nigel and Van Ryn Reefs are different and distinct."—*Dr. Hans Sauer, Special articles in "The Financier," 1918.*
 "It is quite distinct from the Nigel and from the Van Ryn. The Nigel Reef is distinct from the Van Ryn."—*John Dampier Green, M.I.M.E., F.G.S. Evidence on oath, Knox Arbitration Case.*

"Certain of the facts and showings I saw with my own eyes were of a startling character."—*R. R. Mahson, Special Commissioner for "The Statist."*

"Since then development by the Coronation Syndicate has been steadily proceeding on the Van Ryn Reef Series on this property (Wilgepoort), disclosing highly payable values in two reefs of the series. The reefs are quite different in appearance and bedding to the Nigel Reef."—*J. A. Thorburn, Mining Engineer, with 30 years' Rand experience. 19th March, 1921.*

"I state most emphatically that the Van Ryn Reef of the Van Ryn Series worked in the Van Ryn Mine on the Far East Rand, has no connection with the the Main Reef Series of the Central Rand, and lies stratigraphically far below that series. I may also add that the reef exposed in your No. 1 Shaft of the Southern Van Ryn Gold Mine is the same reef as that worked in Government Areas (Modderfontein), Modder B. etc."—*Scott Alexander, Rand Stratigraphist. 17th March, 1921.*

TO INVESTORS AND SPECULATORS.

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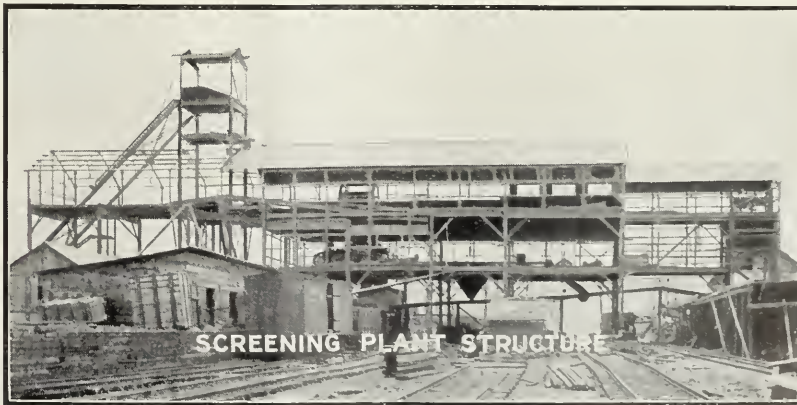
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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

VII.

By Arthur Stenhouse.

On the 3rd September, 1886, I arrived in Pretoria from the United States of America, and was met by the manager of Robey & Co., who at once advised me that Mr. Samuel Marks's carriage was outside the hotel, and he had been sent in specially to take me out to his beautiful home "Zwartkopjes." As I had never met Mr. Marks, I naturally protested, but Mr. Clench insisted that I should accompany him. Reluctantly I consented, and was driven out to "Zwartkopjes," introduced to, and warmly welcomed by, Mr. "Sammy" Marks, who insisted that I should take up my residence there as his guest. Soon afterwards he went to Barberton by coach, and I was left in charge of Mrs. Marks and the baby, and here for a month I resided and enjoyed Mrs. Marks's unbounded hospitality.

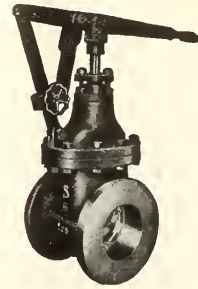
Oftentimes we would drive into Pretoria and have lunch at Mr. Nelnapius's residence. At the Pretoria Club I was also warmly welcomed, and happily entertained. On one occasion, when dining at the Club, the late David Benjamin (one of the earliest Pioneers) arose from the table and, referring to the writer, remarked "that the fame of our goldfields had travelled afar. Here," said he, "was the first mining man to arrive from the four corners of the globe to exploit our goldfields"—a prophecy that has long since been fulfilled.

On the lower side of Church Square (Pretoria) there was a charming white-washed, thatch-roofed bungalow, the residence of the late Mr. Nelnapius, the verandah shaded by honeysuckle and sweet briar, and the garden one mass of colour. The owner was a great personal friend of Paul Kruger, and a most hospitable and kind-hearted gentleman. Oftentimes I would drop in to lunch, or to dinner, without notice, at his hospitable home, and was at all times warmly welcomed. Occasionally the house party would drive away into the country for a picnic, and go a-fishing at the swiftly-flowing river at the Powder Factory. Pretoria at that time was crowded with visitors, and the hotels were packed. Visitors willingly paid one pound a day for the privilege of sleeping on the floor, or anywhere inside the building. There was a peculiar fascination about those Pioneer days. New developments were occurring day by day. We lived at a time of great possibilities, and in an age of universal optimism. The seriousness of business was unappreciated: the combination of pleasure and business at that time would be unrealisable to-day. Individual interests were identical; class distinctions almost unnoticed in the one general aim of the Pioneers to work harmoniously together for the advancement of the gold mining industry. Boer and Briton took a lively interest in each other's welfare; intense heartiness characterised both our work and our pleasure. At a semi-public banquet at Hatherly Distillery, where over 200 guests sat down, I was the honoured guest and sat at Mr. "Sammy" Marks's right hand. What a contrast to my experiences in America, where I earned my livelihood as a farm labourer at a wage of \$15 a month, and where the playful little pigs were my chosen companions! Interesting are the varied experiences of the early Pioneers, and it behoves us to place them on record.

T.G.M.E.: 24th Annual Meeting.

The following cable was sent from the head office to the London secretaries in regard to the T.G.M.E. meeting: "At the annual meeting held to-day the Chairman announced no dividend 30th September, but since desired financial reserve now attained, dividends will be resumed next half-year and onwards as permitted by profits earned."

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Gold Mine Share Returns at a Glance!

APPROXIMATE INTEREST ON GOLD-MINING INVESTMENTS BASED ON LAST DIVIDEND.

COMPANY. (£1 Shares unless specified).	Issued Capital.	Dividends, 1920.	Dividends, 1921.	Approximate Gross Mine Profits, 2nd Quarter, 1921.	Approximate Gross At rate of Quarter's Working equals per annum.	Approx. % on Capital at Estimated Year's Gross Profit.	Middle Price, 30th June, 1921.	Approximate Interest on Outlay at Prices given based on last Dividend.
	£			£	£		s. d.	%
1 Aurora West 10/-	106,352	—	—	2,100	8,600	8	2 0	—
2 Brakpan Mines	850,000	45 ⁰ / ₀ = 9	15 ⁰ / ₀ = 3	116,300	465,300	55	54 0	11
3 City Deep	1,295,000	32 ¹ / ₀ = 6 6	20 ⁰ / ₀ = 4	183,200	732,600	57	46 0	17
4 Cons. Langlaagte	950,000	12 ¹ / ₀ = 2 6	5 ⁰ / ₀ = 1	44,400	177,800	19	11 0	18
5 Cons. Main Reef	1,247,602	15 ⁰ / ₀ = 3	3 ¹ / ₀ = 9d.	29,300	117,300	9	9 6	16
6 Crown Mines 10/-	940,166	77 ¹ / ₀ = 7 9	10 ⁰ / ₀ = 2	131,700	527,000	56	40 0	10
7 Durban Roodepoort Deep	440,000	—	—	27,000	9,200	9	2 0	—
8 East Rand Prop.	2,445,897	—	—	26,300	105,200	4	4 9	—
9 Ferreira Deep	980,000	22 ¹ / ₀ = 4 6	7 ¹ / ₀ = 1 6	38,900	155,700	16	8 0	37
10 Geduld Prop.	1,174,814	17 ¹ / ₀ = 3 6	7 ¹ / ₀ = 1 6	77,100	308,400	26	50 0	6
11 Geldenhuis Deep	585,753	15 ⁰ / ₀ = 3	—	less 3,500	—	—	5 0	—
12 Glynn's Lydenburg	170,000	10 ⁰ / ₀ = 2	5 ⁰ / ₀ = 1	4,000	16,200	9	8 0	25
13 Government Areas	1,400,000	50 ⁰ / ₀ = 10	25 ⁰ / ₀ = 5	404,700	1,618,900	116	82 0	12
14 Knight Central	900,000	7 ¹ / ₀ = 1 6	—	10,400	41,800	5	4 0	—
15 Langlaagte Estates	886,500	10 ⁰ / ₀ = 2	5 ⁰ / ₀ = 1	35,000	140,000	16	13 0	15
16 Luipaards Vlei	472,012	—	—	1,100	4,600	—	1 0	—
17 Meyer & Charlton	200,000	120 ⁰ / ₀ = 24	50 ⁰ / ₀ = 10	70,700	282,900	141	90 0	22
18 Modder "B" 5/-	700,000	82 ¹ / ₀ = 4 1 1/2	40 ⁰ / ₀ = 2	280,400	1,121,500	160	27 0	15
19 Modder Deep 5/-	500,000	145 ⁰ / ₀ = 7 3	65 ⁰ / ₀ = 3 3	225,400	910,500	180	45 0	14
20 Modder East	1,215,624	—	—	38,300	153,400	12	10 0	—
21 New Goch	550,000	—	—	2,400	9,500	2	2 0	—
22 New Kleinfontein	1,151,540	5 ⁰ / ₀ = 1	—	11,800	47,400	4	5 0	—
23 New Modder 10/-	1,400,000	102 ¹ / ₀ = 10 3	42 ¹ / ₀ = 4 3	353,200	1,412,700	101	67 6	13
24 New Primrose	325,000	5 ⁰ / ₀ = 1	5 ⁰ / ₀ = 1	6,200	25,000	8	4 0	—
25 New Unified	250,000	15 ⁰ / ₀ = 3	5 ⁰ / ₀ = 1	6,500	26,100	10	5 0	—
26 Nourse Mines	827,821	83 ¹ / ₀ = 1 9	23 ¹ / ₀ = 6d.	12,800	51,000	6	7 6	13
27 Randfontein Central	4,750,459	—	—	54,700	218,900	5	9 0	—
28 Robinson Deep, Ltd.	806,807	2/- per share on "A" shares.	—	47,100	188,400	23	10 0	—
29 Robinson Gold £5	2,750,000	3 ⁰ / ₀ = 3	1 ⁰ / ₀ = 1	6,900	27,600	1	9 0	22
30 Roodepoort United	460,000	—	—	loss 3,700	—	—	—	—
31 Rose Deep	700,900	27 ¹ / ₀ = 5 6	7 ¹ / ₀ = 1 6	30,900	123,500	18	12 6	24
32 Simmer and Jack	3,000,000	5 ⁰ / ₀ = 1	—	32,500	130,000	4	2 0	25
33 Springs Mines, Ltd.	1,307,236	20 ⁰ / ₀ = 4	7 ¹ / ₀ = 1 6	107,100	428,300	33	36 0	8
34 Sub Nigel	775,000	12 ¹ / ₀ = 2 6	3 ¹ / ₀ = 9d.	20,200	80,900	10	12 0	12
35 T. G. Mining Estate	604,225	10 ⁰ / ₀ = 2	—	6,700	26,900	4	8 0	12
36 Van Ryn Deep	1,196,892	65 ⁰ / ₀ = 13	30 ⁰ / ₀ = 6	217,100	868,300	73	74 0	16
37 Van Ryn Estate	500,000	15 ⁰ / ₀ = 3	7 ¹ / ₀ = 1 6	27,200	109,000	22	10 0	30
38 Village Deep	1,060,671	10 ⁰ / ₀ = 2	3 ¹ / ₀ = 9d.	22,300	89,000	8	8 0	19
39 West Rand Cons.	2,004,424	—	—	12,700	51,000	2	2 6	—
40 Witwatersrand	469,625	20 ⁰ / ₀ = 4	10 ⁰ / ₀ = 2	23,200	92,900	20	12 6	32
41 Wit. Deep	550,000	—	5 ⁰ / ₀ = 1	19,200	76,800	14	7 0	—
42 Wolhuter	860,000	12 ¹ / ₀ = 2 6	33 ⁰ / ₀ = 9d.	11,500	46,100	5	3 6	43

NOTE.—To arrive at an approximate Distributable Profit, the following items require to be deducted from the "Estimated Gross Profit" (which will consequently reduce % on Capital), viz.:-
 Profit Tax (average about 9% of Gross Profits). Interest on Debentures (if any).
 Extra War Tax. Interest on Advances (if any).
 Capital Expenditure (if any). Assessment for Miners' Phtthisis.
 Redemption of Debentures (if any). Government Annuities (if any).

It is impossible to arrive at an average percentage of these items. The calculation most commonly used to arrive at a very approximate "Annual Distributable Profit," is to multiply any one month's profit by ten, thus allowing two months' profits for all appropriations.

In the case of Govt. Areas, Brakpans and Springs, the Government share of profits must be deducted to arrive at the "Distributable Profit."

No Unworked Claim area is given, exact figures being unobtainable.

The occasional discrepancies between "Working Costs" plus "Working Profit" and "Yield" may be accounted for by such items as Sundry Revenue, etc., not shown.

Questions of "life," debentures and Government annuities are dealt with from time to time in our columns in the annual reports of the companies concerned.

Sunken Treasure.

During the war many vessels containing valuable stores were sunk by submarine or by mines. Among them was a liner which contained amongst her cargo 20 bars of gold, each worth about £1,500. An enterprising effort is being made by British salvage ships to recover this treasure in spite of

the fact that the ship was so badly broken up that the gold was buried under many tons of wreckage. This wreckage has to be blasted and carried away to another part of the ocean. So far only seven bars of gold have been picked up, but it is hoped that eventually the skill of the British divers will secure the recovery of the whole amount.

Malaria and "Outside" Mines.

THE RED CROSS SOCIETY'S ACTIVITIES.

The East African Campaign brought home the evils of malaria to thousands in South Africa, who had never previously realised the danger of the disease to the health of the individual and the community. Yet for years past the disease has been rife in many parts of the Transvaal, Zululand and adjacent areas. In many districts of the countries referred to, with the passing of the winter months and the advent of the rainy season, the malarial mosquito awakens to life with the inevitable consequence that, where the necessary precautions are not taken, large numbers of the residents, both whites and natives, go down with malaria. Malaria is a disease which can both be prevented and eradicated. The work accomplished in Panama, Italy, Spain and in many other countries amply proves that where adequate precautions are taken to screen dwellings effectively, this alone has considerably lessened the incidence of the disease; and where steps have been taken to rid malarious districts of the anophles mosquito, malaria has been practically wiped out.

The Anti-Malarial Association.

In South Africa, much excellent educational work has been carried out by the S.A. Anti-Malarial Association in bringing a knowledge of the preventive measures necessary to combat the disease to the population in malarious areas. For various reasons the work practically lapsed during the war, and it was recently deemed advisable to dissolve the association and to hand over the carrying out of its activities to the S.A. Red Cross Society (Transvaal). Malaria was one of the many problems dealt with by the great medical conference which preceded the formation of the League of Red Cross Societies, and it is only natural that the Society, as a member of the League, should be the body entrusted with the propaganda work essential towards the eradication of the disease. The Council of the Society has appointed a special anti-malaria committee, amongst the members of which are the heads of various interested Government departments, including the Public Health Department, as well as representatives of the Transvaal Land Owners' Association.

Organisation.

This Committee, under the chairmanship of Dr. A. J. Orenstein, C.M.G., a recognised and well-known authority on the subject, is taking active measures to continue and

extend the educational propaganda hitherto so well carried out by the Anti-Malarial Association. One of the immediate objects in view is the formation of local committees in the various districts where malaria is at present endemic. The work of these committees is to assist in educating the people to a sense of the real dangers of the disease, and the best means to be adopted to prevent and eradicate it. In country places where it is not possible to form local committees, the Red Cross Society is anxious to have the help and co-operation of individuals who will assist in furthering this educational work among their neighbours. Thanks to the late Association, the Society is in possession of a quantity of literature in English, Dutch and Native languages, which is available for immediate distribution, while the committee is also prepared to arrange for lantern and bioscope lectures on the subject. Applications will be welcomed from persons resident in malarial districts, who desire to avail themselves of any assistance which the Society can give. Correspondence on the matter should be addressed to the Secretary of the Society, P.O. Box 3266, Johannesburg.

New Anti-friction Metal.

There are many special alloys for the purpose of lining the bearings of machinery so as to reduce the friction to a minimum. The objection to most of these is that if from any cause they should become hot the metal melts and runs out. This drawback is avoided in a new metal which has been tested in Great Britain with very satisfactory results. In these tests the metal became very hot without showing any signs of melting, and when forced lubrication was used the bearings showed no sign of wear or flow even with a load of over 1,000 lbs. per square inch.

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1920 (12 months) 66%	34%
1921 (6 months) 64%	36%
No failures for 6 months, 1921.	

MANAGERS' CERTIFICATES.—Our record is 100% passes. 1912-20 we claimed 165 certificates; 40 in 1919-20; last 3 Exams., 29 certificates (total). 10 Coal Certificates in last 3 Exams.

TUITION (Metal or Coal) by class, correspondence or privately. The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

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ENGINEERING SECTION.

George Ellison's Electrical Specialities.

(From a London Correspondent.)

Unique among the big engineering concerns of the British Isles stands the Perry Barr firm of Mr. George Ellison. Essentially a "one-man" organisation, it is also a working demonstration of sustained effort and organised concentration.

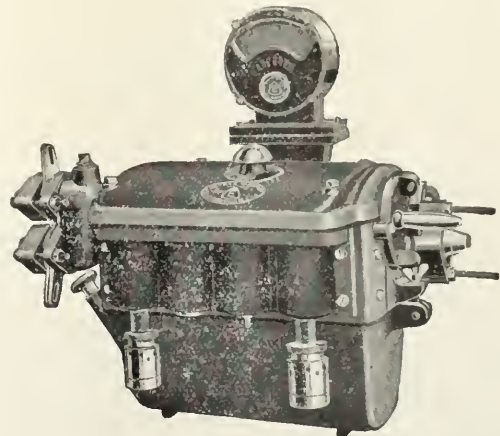
Established about a quarter of a century ago to manufacture control panels for induction motors, the firm has not once deviated from the clearly defined industrial path it was founded to tread. Even during the war, when many manufacturers made radical departures and turned, almost literally, ploughs into swords, Ellison's only speeded up output to meet the national demand for its specialities. Changes there have been, but these come as developments in directions indicated by scientific research. Of the wisdom of this policy there is abundant proof. Ellison control gear has gained a world-wide reputation.

When I was at the works a day or so ago, 700 employees were completing orders destined for despatch to near and distant lands. After hearing so much of idle benches and silent lathes, it was decidedly refreshing thus to confront a scene of intensified industrial activity. As for the works themselves, they are, as one would expect, the last word in modernity. A single-storied, glass-roofed building covers an area approximately 600 feet by 250 feet. The view from end to end is unobstructed. A job commenced at one extremity will probably pass from stage to stage and from hand to hand through the entire length of the building until, as the finished article, it ultimately reaches the packers and then the loading deck of the motor lorry. The poetry of systematised efficiency could hardly find more eloquent exemplification.

In making my round of the works I had as guide Mr. Ellison's general manager, Mr. Robertson, who told me much concerning the methods of his firm. It was interesting to

learn that to them strikes are almost unknown. Mr. Ellison controls his employees by methods as original as those upon which he has developed his business. Each employee, each member of the staff, is an individual, and as such is treated. The human element enters largely into the routine at Perry Barr. Mr. Robertson, who spent some of his earlier years in South Africa, tells me that Mr. Ellison may shortly be contemplating a visit to the chief industrial areas of the Union.

The following technical descriptions concerning three main lines of Mr. Ellison's manufacturers are of special interest to South African mining undertakings:—



Oil Break Star-Delta Starter.

These starters are similar in appearance and construction to the oil-break circuit breakers, and are suitable for the same industrial purposes. The contacts are mounted on a slate base in a cast-iron case, and take the form of a change-over oil-break switch. Full automatic releases are fitted, with time lags on the overload trips; thus the starters contain all that is necessary to start, stop and protect squirrel-cage motors. They are mistake-proof in operation, being fitted with a patent "Gradatum" device which ensures that the handle is moved in a proper sequence, with a pause at

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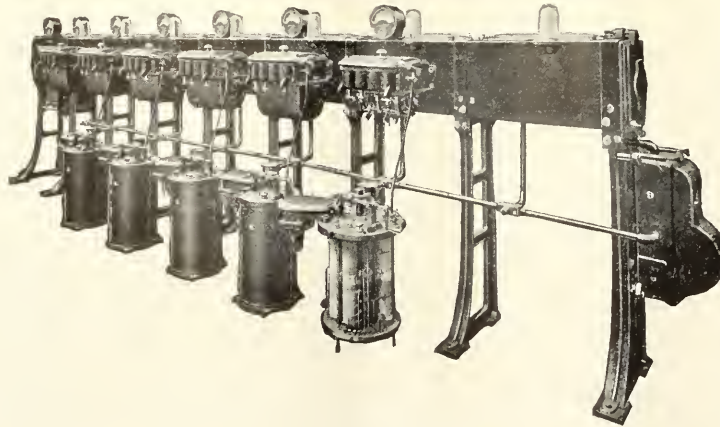
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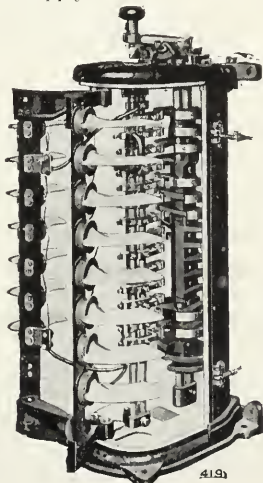
the starting position and quick change over to the running position. The overload trips are operative only in the running position, and the time lags permit reasonable overload trip settings, whilst preventing the starter opening by the current rush caused at changing over from start to run. The Oil Star-delta Starters are made for currents up to 200 amperes working load. A series-parallel starter of the same design is made for two-phase induction motors.

Drum type controllers are made for A.C. and D.C. motors for cranes, or for any purpose requiring frequent operation, where an ordinary starter intended for operation at long intervals cannot meet the conditions of service. Experience and experiment over a number of years has resulted in designs which have proved their suitability for onerous conditions. The barrels have contact segments which are readily accessible and replaceable when worn. The fingers are of



" Unit " Type Switchgear.

Unit type switchgear is made for all industrial applications and intended to cover the field between the ordinary switch and fuse distribution board and the elaborate cellular switchboards for large power stations. The standard oil-break circuit breakers and starters lend themselves to the building up of quite complicated arrangements, yet each part is of simple robust construction. The units are supported by cast-iron stands, and are bolted together to form a compact, totally enclosed, weather and mistake-proof switchboard which safely withstands the roughest use. The breakers are bolted to a steel-plate chamber which contains the isolating switches and bus-bars, and carries the necessary instruments. Interlocking devices are provided between the isolating switches and the breakers. The illustration shows a seven-unit switchboard which was installed in a mill to control a group of five slip-ring motors, each driving a section of the mill. An oil-cooled rotor starter is included in each unit, mechanically interlocked with its circuit breaker. All the units are electrically interlocked to ensure that the various sections are started up in correct sequence, and if one section is stopped, the others dependent on it are automatically shut down. Many of these switchboards have been installed in mines, where they have been subjected to very hard wear and tear, and have withstood falls of roof without causing interruption of the supply.



Drum Type Controllers.

patented design, adjustable for wear, and with renewable tips. The arc shields are effective and magnetic blow-outs are fitted to the D.C. pattern. The illustration shows a D.C. controller with cover removed and arc shields and blow-outs withdrawn for inspection. The contact fingers are disposed radially to the barrel and have roller tips, which are pressed on to the barrel contacts by spring. This design is a departure from existing types and has several advantages. The roller is mounted so that it can rotate, oscillate and lift, and consequently beds perfectly on the segment. The barrel contacts are shaped to prevent the possibility of an arc being blown inwards and spreading from finger to finger, a trouble which is sometimes present with a magnetic blow-out field parallel to the barrel. The handle lever is very strong and fitted with a device shaped to set itself correctly, so that no matter how the handle is left, it always comes to the right position to arrest motion, and cannot be moved from "forward" to "reverse" accidentally. Controllers are made in practically every type for series, shunt, and compound D.C. motors and for squirrel-cage and slip-ring A.C. motors.

An Electrical Pioneer.

A link with the great Faraday, who was the scientific founder of the electrical industry, has been broken by the death recently in England of Mr. S. A. Varley at the age of 90. Varley received his first inspiration from the lectures of Faraday at the Royal Institution, London, and he played an active part in the laying of the first Atlantic cable. During the Crimean War he laid, for the first time in military history, a field electric telegraph for war purposes. He was also the originator of the time ball at Greenwich Observatory and elsewhere, for giving time signals visible to the public. Still more important was his invention of the compound wound dynamo.

Electric Welder for Large Work.

The process of spot welding, as it is called, has been employed extensively for small work such as fixing handles to pots, but until the recent invention of a British machine it was not applied to large articles such as the ventilating cowls of steamships. The process consists in pressing two pieces of metal together by electric terminals through which a current is passed, thus melting the metals together at the spot between the terminals. In the new machine, the metal is supported on a long rigid arm carrying one set of electric terminals and the other set is pressed on the metal from above. Very large sheets of metal can thus be handled with great facility and expedition.

The Electric Steel-Making Process.

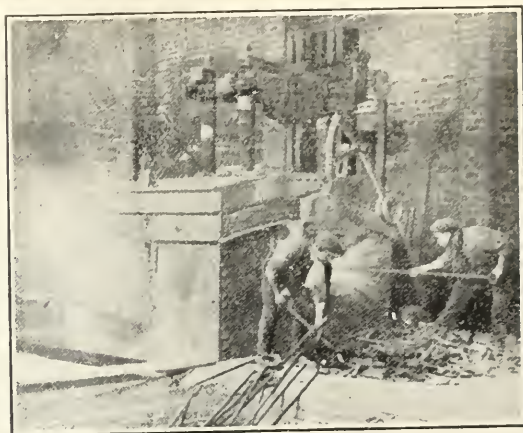
By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Etna Works, Sheffield.

There are several successful types of electric furnaces now in use, and in all cases they are capable of being tilted. The furnaces are of sheet steel and lined with refractory materials. The material used for melting may be any kind of scrap, its chemical composition does not matter, as the electric furnace refines or purifies the steel. This refining can be carried out so that the finished steel contains only traces of sulphur and phosphorus. Whatever kind of steel scrap be used as a base for melting, it is first of all melted under a slag of lime and oxide of iron (iron ore, mill scale, etc.). This slag is an oxidising one, and by allowing it to float on the surface of the molten steel in the furnace it picks up and removes the phosphorus, carbon, silicon and manganese, the phosphorus being converted into phosphate of lime, which floats on the surface of the metal as slag. When dephosphorisation has been carried out to the desired extent, the slag is raked off and the metal is now almost pure iron containing some sulphur and considerable quantities of oxide of iron. A calculated quantity of anthracite coal is next thrown on to the bare surface of the metal so as to give the desired carbon content. A new slag is then formed by throwing into the furnace lime mixed with fluorspar and sand. These all melt and form a fluid slag. On to this slag small quantities of powdered coal and ferro-silicon are thrown so as to produce a reducing and desulphurising slag. A reducing slag is one which tends to remove oxygen from the molten metal. When first melted this slag is quite black, but as the refining proceeds it gradually becomes lighter in colour, until at the finish it is almost snow white. This white slag indicates that the steel is in good condition and that everything is proceeding satisfactorily.

If additions of special alloys such as ferro-manganese, ferro-chromium, ferro-vanadium, etc., be now made, they can be added in the theoretical amounts, as no loss occurs through oxidation. In all other processes of steel making, considerable and unavoidable losses of the special alloys take place, due to the oxidising conditions present, so that large excess is always added to allow for this. From time to time the melter examines the steel by withdrawing a small quantity from the furnace by means of an iron spoon, and the steel is not cast until it is quite sound and at the right temperature. The composition of the steel is controlled by taking samples and analysing as often as necessary, suitable additions being made to bring the steel to the right analysis. A few of the advantages of electric steel over other steels are as follows:—

1. The chemical composition of consecutive heats, most notable when handling easily oxidisable metals like vanadium, chromium, silicon and manganese, can be held more closely to a standard than with any other process.
2. Successful heat treating is improved accordingly as composition can be controlled.
3. Electric steel is usually chemically purer than any other steel.
4. The segregation of sulphur and phosphorus are not to be feared as they are practically absent.
5. Low sulphur in electric steel usually indicates a prior reducing condition favourable to complete deoxidation, sound ingots, freedom from blow-holes and resulting seams.
6. Alloy additions may be made in the furnace itself rather than in the ladle, which increases the probability of thorough assimilation, diffusion and homogeneity.
7. Results indicate that electric steel is less easily injured by overheating than other steels. It has a wider heat range, will withstand variations in forging and heat treating without injury.
8. Electric steels are always free from slag and non-metallic inclusions than Bessemer and open hearth steels.

For the production of castings the electric process has very many advantages over other processes. The electric process is the only one of all processes of steel making where the temperature can be controlled at will, and the metal can be got as hot as required for the particular kind of casting being made. As all electric furnaces are capable of being tilted, it is not absolutely necessary to pour all the steel from the furnace into the ladle at once, and if required only a small quantity need be used at a time. When working any other process with, say, 2 or 3 tons of steel, the whole of



Electric Steel Furnace.

the steel must be poured into a ladle from which the casting is done by taking small quantities in small laddles from the larger ladle. It will be perfectly obvious with this way of working that the steel first used will be very much hotter than that used when the ladle is nearly empty and the steel has had time to cool. The importance of correct casting temperature cannot be over-estimated, particularly when large numbers of the same type of casting are being made and where uniformity is vital.

One may sum up the advantages of electric steel castings as follows:—

1. Great purity of steel and consequently no segregation of impurities.
2. Good, clean castings, due to correct casting temperature.
3. Freedom from blow-holes, giving sound castings.
4. Increased toughness, due to the almost complete absence of dissolved gas in the steel.
5. Castings of any composition can be made.

Oil Fuel for Ships.

At a recent engineering exhibition held in London, many forms of oil burners for marine and land purposes were exhibited, thus reflecting the rapid progress which has been made in converting coal-using British ships to oil burning. The pre-eminence which British engineering firms have secured in this field is illustrated by the fact that a large French liner has been equipped with oil burners by a British firm which, by the way, began its experiments in oil burning no fewer than 40 years ago. A special feature of the equipment is the means taken to ensure so efficient a mixture of oil and air that combustion is complete and the furnaces remain perfectly clean.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

DULL BUSINESS WEEK—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—PREMIER ON RAILWAY POSITION—RAILWAY EARNINGS FOR WEEK ENDED SEPTEMBER 17—WHITE'S CEMENT CO. AND CRUSHING RAILWAY RATES—UNION'S IMPORTS AND EXPORTS. JANUARY-JULY, 1920-1921—OIL FUEL IN BRITAIN—UNION'S £5,000,000 LOAN—LATEST METAL QUOTATIONS.

General Review.

The past week, being the last in the month, has, as is usually the case, been a poor one as regards business activity. August, like its predecessors, started well owing to the demands from the mines, and showed indeed better promise of improvement than has been witnessed for many months, merchants being fairly busy during the first week or ten days. Business, however, gradually slackened off and left things much in the same position as before. Owing to the depreciation of prices the total of sales is very small—probably about one-half for the same amount of material disposed of as compared with the corresponding period of last year. The general business outlook at the moment is not too bright, nor has the position been improved, but rather the reverse, by the recent speech of General Smuts on the financial position of the country in general and of the railways in particular. As a matter of fact, there has been a feeling of depression this week in commercial circles, contrasting greatly with the optimism ruling about a fortnight ago. The financial stringency appears to be as acute as ever, and is apparent in every direction. In former times the farmer could and did come to the storekeepers and obtain six to twelve months' credit. To-day he is unable to obtain these facilities because the storekeepers have to pay cash for what they buy, and are therefore unable to accommodate their clients as heretofore. The banks to-day are not encouraging speculative business of any kind whatsoever, and business everywhere is languishing. The present commercial atrophy may, however, be relieved to some extent when the £5,000,000 loan now being raised in London shall have been effected and diverted to the purposes intended, viz., to develop as far as may be our railway and harbour resources, irrigation and P.W.D. works throughout the Union. At any rate, this loan (which is understood to be the first instalment of a much larger one) should be a good "kick-off." There are no especial reductions in material to report (apart, of course, from forced liquidations). Stocks are being gradually reduced and getting to normal, and very few merchants are at present indenting. In the opinion of one authority this country will, within a month or two's time, be short of goods for a period, which will have a stabilising effect on prices. The general opinion is that no big revival in general business here can be expected until conditions in Europe become more settled. Merchants say that business (turnover) is undoubtedly better than it was, say, three to four months ago, but this means only that to-day goods can be realised at a price, whereas previously they were unsaleable at almost any quotation. But the present sacrifices! Next week's Jewish holidays are also tending to depress things. Altogether the past week's activity has been characterised by extreme dullness.

Iron and Steel.

The volume of business transacted during the past week has been exceedingly small. On the Commercial Exchange there have been further forced sales at prices below standard. The improvement noted in the early part of last month has quite vanished, and the financial pressure seems to have become more acute. With few exceptions, however, merchants anticipate a turn for the better about the end of the year.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{2}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{4}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 35s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 35s.; steel, 38s.; $\frac{1}{2}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{3}{4}$ in., $\frac{1}{2}$ in. and $\frac{1}{4}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{2}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{4}$ in., 9d. to 1s. a lb.; $\frac{1}{2}$ in., 47s. 6d. to 52s. 6d. per 100 lbs.; $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{4}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{4}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{3}{4}$ in., 5 $\frac{1}{2}$ d.; $\frac{1}{2}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{1}{2}$ in., 9d.; $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{4}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{1}{4}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{4}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{1}{4}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{4}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{1}{4}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; drill steel, 7d. and 8d.; hollow, 9d.; 1 $\frac{1}{2}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

African Iron and Steel Products Co., Ltd.

We understand that Mr. W. Martin, late resident engineer of the Simmer Deep, has been appointed business manager, and Mr. D. R. MacLachlan secretary, to this company. The organisation of the company is proceeding apace and things should shortly be running smoothly. One of the directors remarked that the Government are very keen about the establishment and development of iron and steel industries in the Union, but said that deeds rather than words were necessary if the Government were really anxious to establish such industries which mean so much to the country. A little more sympathy, he said, is required on their part.

The Board of Trade Journal predicts large developments in the production of pig iron and steel in the Union, which it thinks will lead to an industrial revolution in South Africa. The conditions in the way of skilled European labour and the low standard of unskilled labour may, in its opinion, limit our advance for a time, but our development should

go on increasing gradually. But, as pointed out by Dr. H. J. van der Bijl, the expert adviser to the Government Board of Industries, such development must be built upon sound foundations, and must be built upon the country's own resources. Melting down scrap was, on the face of it, unsound, and it was impossible to establish a big iron and steel industry in this country upon such insecure foundations. Dr. Van der Bijl pointed out the three essentials requisite for the making of iron: (1) the iron ore; (2) coal that could be coked; and (3) the flux. All three the Union possesses in abundance in the Pretoria, Rustenburg and other districts of the Transvaal, in Natal (Newcastle and Dundee), and in the Cape Province. The Transvaal and Natal deposits are close to coal measures where a good coking coal is mined close at hand. For flux, dolomite, and even the poorer limestone are found in the immediate neighbourhood of the iron ore beds. In Mr. Van der Bijl's opinion there was no reason to assume that the unskilled whites of this country, judging from past experiments by the Pretoria Iron Works and the Union Steel Corporation, Ltd., Vereeniging, among others, were lacking in ability. As far as native labour was concerned, he said it had been proved on the gold mines that the native could be trained to do fairly complicated work without much difficulty. The great trouble, of course, was their habit of leaving at short intervals and others having to be trained in their place. But practically the only great difficulty was capital. The erection of an iron and steel-producing plant is an expensive matter, but if that were surmounted he saw no reason why a steel works should not be able to supply South Africa with the (approximate) 200,000 tons of rough iron and steel manufactures which we are at present importing, and saving thereby about £1,500,000. He thought a further 50,000 to 175,000 tons could be absorbed annually by local manufacturers, such as agricultural, mining and railway machinery, pipes and pipe fittings, galvanised iron, etc. Coal and iron were the foundation not only of an iron and steel industry, but was the key industry upon which many other industries would be built. Cheap iron and steel would benefit the whole country in many ways at present unrealised.

Engineering Shops.

There is nothing new to report this week; business remains fairly good, and the tendency, judging from recent inquiries, is towards gradually improving conditions.

Surplus Brass War Stores.

Negotiations between the Government and the British Metal Corporation are proceeding regarding 180,000 tons of brass surplus war stores.

Timber and Building Materials.

Business, in the continued absence of any forward move in building operations, has been quiet this week. The biggest drawback at present to increased activity in this direction is of course the prevalent financial stringency. Merchants are unanimous that as soon as money becomes easier, with the accumulated arrears of building to be made good, a very busy time should be witnessed here. 3 x 9 deals are ruling at 1s. to 1s. 1d.; scantlings, 1s.; floorings, 7d. to 7½d.; ceilings, 5½d. to 5¾d.; beaver board, 5d.; pitchpine, 8s. to 8s. 6d.; Oregon, 7s.; corrugated iron, 24 ft. gauge, 9½d. to 10d.

Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality 14s. 9d. for second at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per eub. ft. at the mills; Honduran mahogany, 30s. per eub. ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks, in the absence of any activity in the building trade, are unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster line, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 37s. 6d., 47s. 6d., 55s. 3d. for 1 to 3-ply.

Second-hand Iron and Timber Yards.

Owing to the Jewish holidays next week business is rather quiet, with, however, a good undertone. Prospects are now brighter than they have been for many months. Iron is 5d. to 6d., timber 10d. to 1s., with a firming tendency. Dealers in second-hand material report that the only drawback to increasing activity is the continued financial stringency, which is causing would-be builders still to hang back, pending more favourable conditions.

Electrical Goods.

Dealers report that more inquiries are coming to hand and that the tendency of business is decidedly better, although failing any great activity as yet in the building trade, orders are not very numerous. Prices generally remain much about the same, but it is generally expected that the present month will see some further declines. Electrical materials are arriving regularly from Britain, America and the Continent. Trade at the moment with Germany is rather slack, but orders in one or two lines for that country are still being taken. Of course, wherever the raw material for wares cannot be obtained in Germany and has to be obtained from the Allies, the price of such goods is going up, but where indigenous to that country, quotations are conversely much below other competitors, particularly with regard to porcelain manufactures, where the price is very low indeed.

The Premier on the Railway Position.

General Smuts, in replying to the deputation of civil servants which waited on him last week in Pretoria regarding the extinction of the war bonus, made a masterly though gloomy survey of the general financial position of the Union. In regretting his inability, in face of the grave financial position of the country, to be able to accede to the withdrawal of the war bonus, he referred, *inter alia*, to the most vital of the public services—the Railways. The Premier said that for years past the administration of the railways had resulted in deficits, which had accumulated by the end of last year to £2,500,000. Although railway rates had been continually raised, the expenditure on railway services had risen more rapidly. The revenue had fallen far below the estimated figures, and from April 1 to September 10 had declined approximately £500,000 below the estimate. During the first four months of the financial year the railways had built up an additional deficit of £737,000. If one compared the position to-day with that in pre-war times, when the railways showed a surplus and were one of their finest assets, one could see the parlous plight in which they were. The total expenditure for this year was estimated at £28,348,000 as against a total expenditure for 1913-1914 of £14,491,000, showing an increase over the war period of £13,800,000, or 95 per cent. Of this increase £7,250,000 represented salaries, wages and allowances, apart from cost of living allowance, since the beginning of the war. The cost of living figures were £2,900,000. Increased cost of stores and material amounted to about £3,000,000. Much of the item of £7,250,000 was attributable to the introduction of the universal eight hours day. They could not contemplate indefinitely raising railway rates. The increase as compared with pre-war rates was approximately £7,000,000. They were coming to a state of affairs in the country when railway traffic would not bear any further increase in rates. On the contrary, remissions had to be made, more especially in connection with the coal traffic, without which certain foreign markets which South Africa could supply would be lost, and even with such remissions they were losing the coal market to a large extent. Railway rates could not be raised beyond a certain limit, especially in a time of depression, when produce prices had fallen without killing traffic. If they were raised, foreign markets could be cut off and things brought to a standstill. General Smuts pointed out that, after the abolition on the railways of the remaining 50 per cent. of the war bonus, the position of the railwaymen would still be much better as regards substantive pay than it was in pre-war days.

South African Railways and Harbours Earnings.

These during the week ended September 17 were £407,746 as compared with £454,008 during the corresponding week in 1920. The total earnings from April 1 to September 17, 1921, were £10,036,251 as against £10,583,705 last year. The revenue from harbours during the week ended September 17 was £21,215, against £32,749 during the corresponding week in 1920. The total earnings of the harbours between April 1 and September 17 amounted to £472,727 compared with £673,143 during the corresponding period of 1920.

White's S.A. Cement Co.: Crushing Railway Rates Crippling Cement Industry.

Mr. William Pott, the chairman of this company, at a meeting at Ventersburg Road last week of the employees met to talk over the position of the concern, explained why it had been necessary to curtail the company's operations and consequently reduce employment. Mr. Pott said that for months past they had been manufacturing more cement than they could sell, caused principally by German and Continental cements being delivered at coast towns cheaper than their company could deliver it, because while freight from European ports was 17s. 10d. per ton, their railrage for 446 miles was 41s. 10d. This rate, due to the absurd railway labour demands, is, he said, iniquitous and is killing local industries such as theirs. The railway labour bill had increased 181 per cent. since 1912, and £10,000,000 a year more is paid for no compensating gain of revenue. The second cause was the altogether inadequate protective duty levied on British and Continental cement of 5s. and 6s. 3d. respectively per ton. Other local industries had the benefit of a duty of from 15 per cent. to 20 per cent. ad valorem as against their less than 7 per cent. He hoped that if the Government, either by a reduction of railway rates—which to-day are 250 per cent. higher than pre-war rates—or by increase of duty against Continental cements, would assist in restoring trade, the company would be able to resume normal manufacture. A committee of employees was appointed to consider the retrenchment scheme proposed by the company.

Union's Imports and Exports, January to July, 1920-1921.

The comparative totals for the seven months, January to July, are as follows:—Imports, 1921 £30,985,347, 1920 £49,768,378; exports, 1921 £31,214,228; 1920 £52,970,712. The factors in the big fall in values of export are that the value of diamonds fell by seven millions compared with last year; wool by 10 millions; 3 millions in hides and skins; and 2 millions in gold. With regard to imports, the more noticeable declines were 3½ millions in cotton manufactures, 1 million in iron and steel, 1½ millions in hardware, cutlery and leather goods, and 1½ millions in motor cars and motor cycles.

Oil Fuel in Britain.

As illustrating the development of oil fuel for many purposes in Great Britain, large storage depots are being constructed at various points. In one of the latest, on the Tyne, there are two tanks of 8,000 tons capacity each, together with one of 4,000 tons capacity, forming the first instalment of a very large depot. The tanks have been erected near the jetty, with which they are connected by means of pipe lines, and vessels requiring supplies of fuel will berth in deep water alongside the jetty. Following on this development in oil storage, there is at present a remarkable advance in the production of oil-engined ships in British yards, and some of these oil-propelled steamers have achieved most marked economic results in working.

Union Loan.

London announces the successful flotation of a 6 per cent. Union of South Africa Loan of £5,000,000 at the price of 96 per cent., redeemable in 1940, for the purpose of railways, harbours, irrigation works, land settlement and other public works. The "Morning Post," in referring to the loan, considers that it will be a most attractive one.

British Engineers & Shipbuilders: Withdrawal of War Bonus.

The negotiations between the engineering and shipbuilding employers and men on the question of the withdrawal of the war bonus on October 12 have broken down. The intervention of the Minister of Labour has been sought to prevent the dislocation of industry.

Cornish Tin Mines Closed.

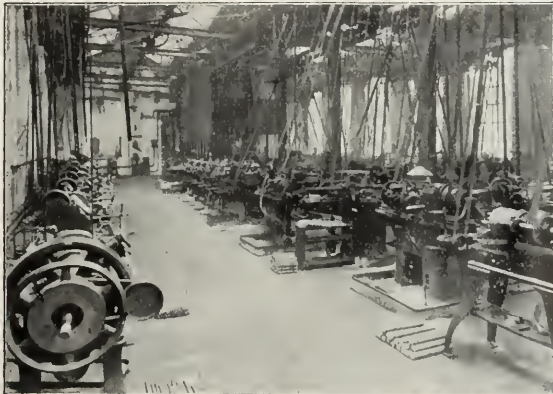
In consequence of the industrial depression, it has been found impossible to work at a profit, and every Cornish mine has been closed down. The mines are now being flooded, and the miners are starving.

Reported Gold and Silver Discoveries in America.

It is reported from Los Angeles that the gold strike in the Santa Monica Mountains, Southern California, is a very rich one, yielding, it is said, £15 to the ton. There are stated to be millions of tons of this high-grade ore. A rich silver-bearing area is said to have been discovered in the Yukon 1,000 square miles in extent, assays of which vary from 200 to 700 ozs. to the ton.

Metal Market.

Latest London quotations: Standard copper, £67 16s. 3d. cash, £68 11s. 3d. forward; electrolytic copper, £72 cash, £74 forward; Straits tin, £156 6s. 3d. cash, £158 6s. 3d. forward; English lead, £22 15s. cash, £22 10s. forward; bar silver, 41½d.; and fine gold, 110s. 9d. per oz.



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Diamonds in Arkansas.

Diamonds are not usually enumerated among the products of the United States. From a correspondent of *The Literary Digest*, Miss Ruby E. Livingston, we are in receipt of the following information regarding the Arkansas diamond field: "From the surface of the ground, with the crudest of working materials, already more than 2,000 diamonds have been taken, submitted to every known test by diamond experts, and pronounced the equal in quality of the diamonds of South Africa. The diamonds have also been worthy of note in size, the largest weighing eighteen carats. This stone was found on top of the ground. The field of peridotite was discovered some thirty years ago by Dr. J. C. Branner, then State geologist, later president emeritus of Leland Stanford University, and now a resident of Arkansas; but no diamonds were found until a few years ago. An effort was made to interest London financiers, who agreed to help in developing the field, provided that they were given controlling interest; this the Arkansas promoters refused, for fear the field would be kept closed until the South African supply is exhausted. Recently, London bankers have financed a 10,000,000-dollar corporation; modern machinery, identical with that used at Kimberley, has been installed, being completed in October, and work has begun in earnest. I recently had the pleasure of holding in my hand a rare canary diamond in the rough, which would cut about two carats, which had been found by one of the officials in September. As to their abundance, we can only conjecture, but a diamond mine gets better with depth (?). John T. Fuller, former manager of the Du Toit Pan Mine, of the De Beers Consolidated, Kimberley, in his report of the field, says: 'We may therefore, with a large degree of confidence, expect to be limited in depth only by economic and engineering conditions, and not by a failure of continuity of deposit.'

The British Manufacturers and South African Technical Education.

Mr. W. G. Wickham, H.M. Senior Trade Commissioner in South Africa, has done an excellent service to education in this country, and possibly an even greater service to British industry, in his report to the Department of Overseas Trade for last June. He draws pointed attention to the fact that very important developments, particularly in regard to University education, are in progress in this country, and says that in the case of both the new Cape Town and Johannesburg University buildings excellent opportunities are afforded to British manufacturers of being first in the field with donations of apparatus, machinery, and other equipment for scientific work and engineering training. "There is," he writes, "probably no form of advertisement—to put it on its lowest plane—so remunerative as making sure that the rising generation of chemists and engineers are taught as household words the names of the makers of plant and apparatus, Optical instruments, laboratory supplies, assay apparatus, testing machines and in-

struments, engines, machine tools of all kinds, all find a place in such educational institutions, and the makers of such who are fortunate enough to obtain a place for their makes in college laboratories have an obvious advantage over their rivals in all succeeding years, as young chemists and engineers go out into the world with the names of those manufacturers as familiar as those of standard editions of Greek and Latin authors are to classical scholars. On a higher plane it may be said that special scope for generosity is afforded by these institutions, and it is to be hoped that the excellent precedent of recent gifts of machinery towards technical education in Nottingham will be followed in the case of South African Universities and other educational institutions throughout the Dominions. It is indeed lamentable to find instances of British manufacturers demanding the full retail price for such equipment . . . when American and German manufacturers are presenting their makes free of charge.

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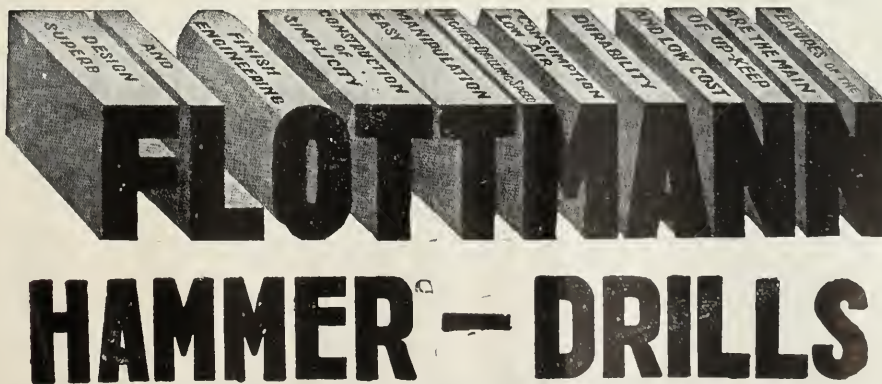
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Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, OCTOBER 8, 1921.

No. 1567

The New Union Geological Museum.



GENERAL VIEW OF THE NEW MUSEUM.

Market Street, Pretoria, where the collections of the Union Geological Survey are housed.

A specially written article descriptive of the Museum appears elsewhere in this issue. The splendid collection of specimens should prove a place of pilgrimage for all students of geology in South Africa.

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The Museum of the Union Geological Survey.

BRIEF DESCRIPTION OF THE WORK OF THE SURVEY AS EXEMPLIFIED IN ITS VALUABLE COLLECTION OF MINERALS, ROCKS AND FIELD MAPS.

The following account of the Geological Survey's valuable and interesting Museum at Pretoria has been specially written for this journal, as the result of a visit paid by our representative.

The Geological Survey Museum forms the Department of Geology and Mineralogy of the Transvaal Museum, and is accommodated in a single gallery, 115 x 60 feet in size, forming the first floor in the northern wing of the New Museum in Market Street, Pretoria.

Systematic State-aided geological investigation in South Africa began in 1895, when the late Geological Commission of Cape Colony was instituted. This was followed almost at once by the appointment of a State geologist to the South African Republic. In 1902, when the Geological Survey of the Transvaal became organised, a substantial nucleus of the present collection of minerals was already established.

About the same time arose the Geological Survey of Natal and Zululand, which was maintained for several years, and gave a further impetus to the investigation of the mineral resources of South Africa.

Owing to the gradual extension of field work and the increasing number of donations from mining men and others, the material brought together at Pretoria began to increase at too uncomfortable a rate for the limited space available. As a result of Union, the Geological Commission of Cape Colony and the Transvaal institution became merged into the Geological Survey of the Union, with Pretoria as its headquarters. The survey of Natal and Zululand had ceased a few years before Union.

New Accommodation.

The necessity, since this amalgamation, of illustrating the stratigraphy and mineral resources of the several provinces severely accentuated the lack of exhibition space in the old building, but the difficulty was solved by the completion of the New Museum Buildings in Market Street, to which place the offices of the Survey and its collection were transferred in 1913.

The main objects of the collections are to illustrate as fully as possible the geology and mineralogy of the Union, including the leading characters of its different formations, as well as the various occurrences of economic mineral deposits and examples of articles manufactured from them. In short, the ideal is aimed at to build up a complete museum of theoretical and applied geology.

Some Uses of the Museum.

The value of an institution of this nature to the prospector and student of geology need hardly be mentioned. It furnishes the former with examples of all the minerals occurring in the country, and the forms in which he is likely to find them when in the field. Very often valuable mineral occurrences are passed over simply because they may be obscured by some external cause unknown to the prospector. As an example of this nature may be quoted the number of different rocks which contain gold from the northern and eastern Transvaal. The student of ore deposits is well aware that there is nothing so instructive as having a particular deposit represented by a large series of rocks for comparative study. In this connection a special collection (comprising some 500 exhibits) represents the stratigraphical series arranged in order of age and drawn from all parts of the Union. In another collection the minerals are arranged in the order in which they are mentioned in Dana's Mineralogy, and form an exceedingly valuable collection for comparison when identifying unknown minerals.

Geological Survey Maps.

The many maps published by the Geological Survey are arranged in continuous series on the walls, and furnish valuable evidence of the field relationships of many ore deposits. The boundaries of all the formations are shown, and prospectors can obtain valuable information regarding the localities where certain minerals are most likely to be found. Photographic enlargements of views of particular geological and mining interest are also arranged around the room.

Collections of special interest from their economic point of view are arranged in the following groups:—

Precious Metals Deposits.—Gold Reefs, Diamonds, Diamondiferous Deposits, Precious and Semi-precious Stones.

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Non-Metallic, Earthy Deposits, etc.—Fluorspar, Felspar, Monazite and other rare earth minerals, Kaolin, Kieselguhr, Phosphates, Glass Sands, Asbestos, Corundum, Cement-making raw materials, Ornamental and Building Stones, Gypsum, Salt Deposits, Mica, Magnesite, Saltpetre, Coal and Oil Shale, Graphite, Moulding Sands, Barytes, Limestones, and Tale.

Some Special Features.

Some outstanding features of the collections are the corundum and asbestos exhibits to be seen. The former mineral is represented by several hundred exhibits, including

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ruby-coloured and sapphire-coloured corundum. South Africa now includes the largest corundum fields of the world (some 1,800 square miles in the Zoutpansberg District and south of Leydsdorp), and their output between 1912 and 1918 rose from 111 to 3,875 tons. Here may be seen many commercial samples of crystal, boulder and reef corundum ranging from a fine gravelly deposit up to the tremendous crystal weighing 335 lbs. from the neighbourhood of Leydsdorp.

Asbestos is well exhibited by some 110 specimens, which demonstrate the three principal varieties, namely: Cape Blue or crocidolite; Amosite, a new variety from the Lydenburg and Pietersburg district; and Chrysotile from Carolina, Barberton, etc. The visitor is immediately struck by the magnificence of the exhibits representing the three varieties, and more especially the last named. An example of this kind from Kaapsche Hoop in the eastern Transvaal has the remarkable fibre length of $4\frac{1}{2}$ inches.

The mica exhibits from Leydsdorp also form an exceedingly interesting collection. The district produces a very fine quality of muscovite.

Industrial Exhibits.

Various industrial activities such as the manufacture of cement, brick and pottery works, and glass manufacture, are represented by well laid-out specimens of the raw materials used in each case as well as the various stages passed through and the final products obtained.

To further aid in the industrial development of this country a corner of the museum has been walled off where the enquirer can examine his mineral or rock undisturbed, and, if he so desires, carry out some simple tests. A small collection of the commoner minerals for the public to handle and examine is also provided. The publications of the Geological Survey and a bibliography of mineral resources are

also available for consultation. The museum also provides facilities for the assaying and analysing of minerals at a moderate charge.

An object of historic interest to the mining world which strikes the visitor on entering the museum, is a primitive ore grinding mill. It was used at the Erstelingen Gold Mine near Pietersburg in 1868, and consists of a huge dolerite boulder weighing 1,100 lbs. This boulder was placed on a natural rock foundation, and ore crushed by placing it under the boulder and rocking it to and fro by means of iron bars secured in the boulder. The rocking motion crushed the ore between the boulder and stone floor.

A complete and appropriate description of the work of the Geological Survey as exemplified by the Geological Museum is a most difficult if not impossible task. To those who are interested in the immense mineral wealth of South Africa a trip to the Capital would be amply repaid by a visit to the Geological Museum.

American Trade Increasing.

The foreign commerce of the United States, both exports and imports, is on the increase, according to cable advice to the American Trade Commissioner, Mr. P. J. Stevenson, from the American Department of Commerce at Washington. August exports to British South Africa were \$1,600,000, an increase of \$200,000 over July, while imports from British South Africa were \$355,000, a drop of almost \$100,000 as compared with July. Since imports on the whole are increasing, the effect on trade with South Africa should soon be reflected in the statistics. The general tone of business has been quiet during September, with wage reductions still continuing. Conditions in the steel industry have been marked by sagging prices and a slight improvement in production.

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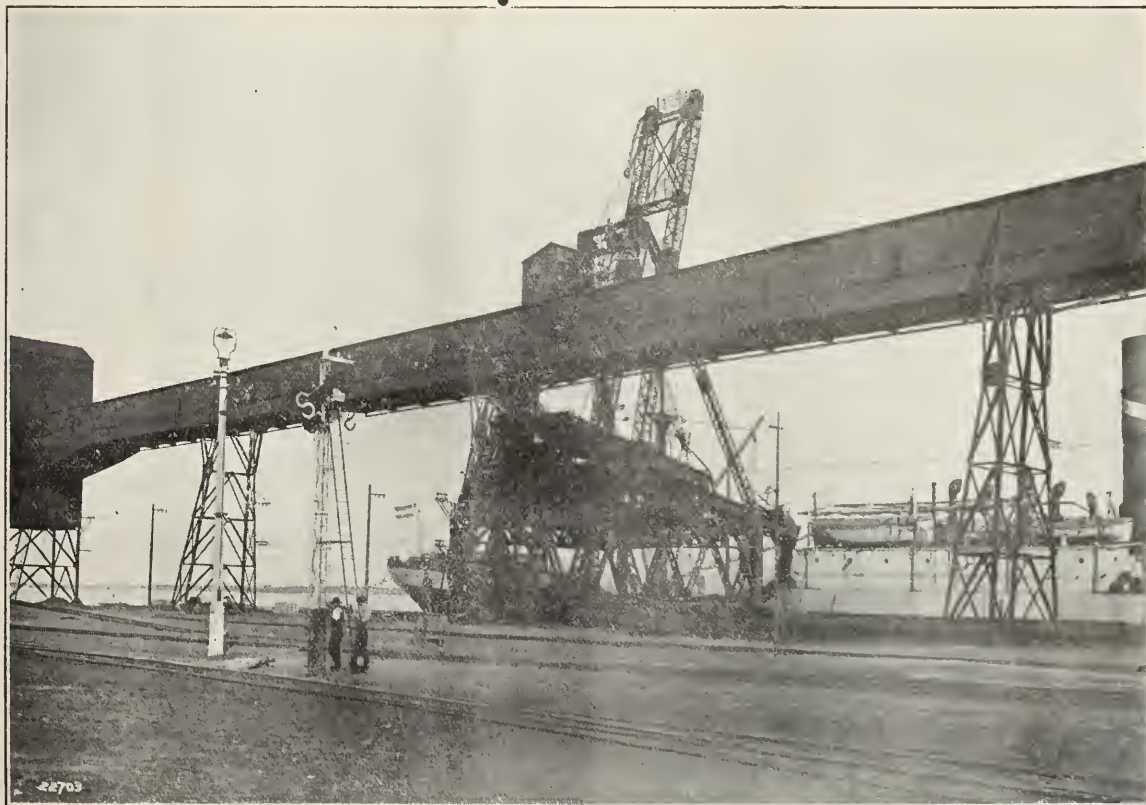
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The New Crisis in the Union's Coal Trade.



Coal Loading at the Port Side, Durban.



In view of the plight of the Union's coal trade, the S.A.R. Administration has now made a further reduction in rates for the transport of bunker and export coal to Durban and Delagca.

Two Views of Coaling Facilities at Durban, which is determined to make a fight for its share in the world's markets.

Cornish Miners for the Rand.

THE QUESTION OF PRE-DISPOSITION TO MINERS' PHTHISIS—PRELIMINARY EXAMINATION IN ENGLAND.

Last week the Minister of Mines and Industries received a deputation from the Cornish Association of the Transvaal, consisting of Messrs. A. Gribble (president) and W. Jenkin (past-president). There were also present Sir Robert Kotze (Government Mining Engineer), Dr. Watkins Pitchford (Director Phthisis Medical Bureau), and Mr. H. Warrington Smyth (Secretary general Department of Mines and Industries).

The deputation presented the following memorandum relative to the medical examination of miners overseas:—

"May we draw your attention to a serious matter arising out of the application of the present Phthisis Act?"

"It is provided that no person may be employed underground in a schedule mine who, in the opinion of the Phthisis Medical Bureau, is suffering from a disease of the respiratory organs, or whose general health," etc.

"With the Act, or the Medical Bureau's interpretation of the clause, we have no quarrel. On the contrary, we endorse the principle and the Bureau's decisions.

"The matter which we wish to bring to your notice is that miners are arriving in South Africa and coming to the Witwatersrand who, after presenting themselves for examination by the Medical Bureau, are informed that they have failed to pass the necessary standard of health required by the Act, and consequently may not work underground in a schedule mine. These men are then faced with the problem of how to exist, and, in many cases also, how to support their wives and families. Their small capital spent in the expense of travelling, they are dependent on their friends or charitable organisations; subscriptions lists may be opened, and they eventually return to England, broken in spirit and penniless.

To Obviate Hardships.

"To obviate these hardships we suggest a medical examination overseas by doctors approved by the Medical Bureau, Johannesburg. The Director might arrange with one of the London hospitals—say St. Thomas's—to make the examinations, the Bureau supplying specimen X-ray photos of the minimum standard acceptable at Johannesburg, and also a diagnosis of general health, certificates granted by the London hospitals to be subject to review by the Bureau at Johannesburg.

"But we suggest that, in the case of unsatisfactory review, the applicant be granted a six months' provisional certificate by the Bureau. We think that the percentage of unsatisfactory reviews would be small, and that in any case the defect would not be tuberculosis.

"Consequently the Bureau, in granting a certificate, would not be prejudicing the health of the holder's fellow-workmen. The six months' period would allow of his earning the return passage money or making some arrangement for the future. Several instances have come to our notice of men being accompanied by their families; consequently, in these cases there are three or four or more persons to repatriate.

"The reports of recent speeches made at mining company meetings regarding the efficiency of miners have been published in Cornish papers. There are some 4,000 unemployed miners in Cornwall, and naturally the men, on reading the reports, are fired with a desire to go to South Africa, especially as in some of the mining news reports there were suggestions that they would be welcome.

Association's Duty.

"We do not wish to be a party to preventing miners coming to South Africa, but on the other hand it is our duty as a county association to warn our fellow-men of the possibility of not only being unemployed, but unemployable. The Cornish Associations of London, New York, Boston,

Detroit, South Australia and Vancouver will be notified of any arrangements made. In asking for your favourable consideration of the suggestion, at your earliest convenience, we would point out the urgency and seriousness of the matter.

"For the purposes of this suggestion a miner may be any person employed underground. The suggested examination may apply to any person proceeding to South Africa with a view to employment in the Witwatersrand mines."

After discussion, the Minister expressed his acceptance of the memorandum in principle, with the reservations that the examination must be voluntary on the part of the applicant, that the expense of the examination must be borne by the applicant, that the examination must be regarded as preliminary to the examination at the Medical Bureau, Johannesburg, and that no certificate granted shall have precedence over the Bureau's certificate, and that the provisional certificate for six months is a matter for Parliamentary decision.

Further, the Minister promised that, on the Medical Bureau having drafted the procedure of the overseas examination, it should be forwarded to the association for distribution to the associated Cornish Associations and the Press.

Coal and Cheap Power.

Coal and the possibilities of its scientific use formed the text of the address given by Sir John Cadman to the Institution of Mining Engineers in mail week. The speech contained some valuable reminders. Ours, the new president of the institution told his hearers, is a coal civilisation, and coal, the foundation of Great Britain's manufacturing advancement, is still its mainstay. What of the future? In the opinion of Sir John Cadman, one of the prizes held before the Old Country by science, if bold enough to seize it, is "a smokeless Britain, possessing the cheapest power resources in the world." It sounds a tall order, but, on the other hand, while Germany before the War raised 70,000,000 tons less coal a year than Great Britain, she produced twice as much coke, 16 times as much patent fuel, and one and a half times as much ammonia sulphate. It is clear, therefore, that there is ample room for improvement, and that Great Britain is on the wrong road in thinking that lack of science, sense and care can be made up by Acts of Parliament. Sir John Cadman looks for the salvation of the industry to the mining engineer and the chemist. Legislation has already been overdone. In 1900 the British production was 290 tons a year per person employed, in 1913 it had dropped to 253 tons, and in 1920 to 183 tons. With fall in output went a falling off in grading and quality and a huge advance in cost. Reduction in output, increase of cost, fall in quality—these are not good omens for a "coal civilisation." Past mistakes, however, are beginning to cure themselves through their own consequences. Coal is a wonderful product, capable of being resolved into a hundred by-products of the widest usefulness in manufacture, and yet of being employed as much as now as a heat source. Past waste has been beyond calculation. There is no great point in complaining of hard times when the "mainstay" is treated in such a fashion. As to increase of output by the greater use of mechanical means and electrical energy, the progress, the president of the Institution of Mining Engineers thinks, will, if steady, be, in the face of prejudice, inertia and economic ignorance, slow. No doubt but the problems of coal are no longer looked upon with common indifference, and it is "up to" the mining engineers and chemists to show the way.

Natal Colliery Outputs. Flotation on Rand Gold Ore.

COAL AND LABOUR RETURN.

The official coal and labour return for Natal Province for August, 1921, is as follows:—

Colliery.	Whites Employed.	Coal sold. Tons of 2,000 lbs.
Dundee Coal Co.	112	45,332
Enyati	60	44,531
Hlebane	74	43,772
Natal Navigation	140	37,605
South African	75	22,099
Durban Navigation	91	18,004
Northern Natal Navigation Collieries, Ltd.	27	17,924
Buffalo	25	15,845
Tendega	37	10,780
Wallsend Natal	31	10,641
Natal Cambrian	32	10,358
Natal Steam	14	9,156
Utrecht	21	8,404
Ballengeich	19	8,300
Bernica	15	5,921
Newcastle	13	5,455
Elandslaagte	12	5,238
Tshoba	6	4,291
Vryheid Coke Co.	8	1,572
New Tendega	32	1,278
Dewar's Anthracite	6	838
Avon	1	496
Natal Ammonium	2	201
Star	1	1
Parksville	1	—
Doon	2	—
Totals	857	328,942
Corresponding Month, 1920...	705	275,186

The Statistical Summary of the Mineral Industry of the British Empire and Foreign Countries.

Reliable information on the production, exportation and importation of minerals and metals is of very great assistance to mining men engaged in the flotation of mining companies. It furnishes statistics on what has been done in the past in the particular proposition with which they are engaged, and also shows how demand stands in relation to supply. The work under review very fully covers all the above points, and deals in detail with no less than 39 different minerals and mining products. The production, amounts imported and exported, by each of the leading countries between the years 1913-1920 are carefully tabulated. The statistics on gold production, etc., are very carefully set out and should afford valuable material for the student of the gold premium. It is interesting to note that the contribution of the Union of South Africa to the world's gold output has progressively increased since 1913 as follows:—South African percentage of total in 1913, 38 per cent.; 1914, 38.2 per cent.; 1915, 39.8 per cent.; 1916, 42.2 per cent.; 1917, 43.7 per cent.; 1918, 45.6 per cent. Although the annual gold production of the world has been falling since 1913, the South African output has not been falling at the same rate. This accounts for the gradual increase in the Union's contribution to the world's total. Other minerals dealt with in this work, and of importance to South African producers, are Asbestos, Chromite, Coal, Copper, Lead, Magnesite, Mica, Silver, Tale, and Tin. Copies of this valuable work are obtainable from H.M. Stationery Office, Imperial House, Kingsway, W.C.2.

Attention is directed to an article on the above subject which appeared in the September 3 issue of this journal. The article was based on a paper read before the Chemical and Metallurgical Society by Mr. F. Wartinweiler. A discussion by Dr. W. A. Caldicott on that paper throws further light on the subject of concentration practiced on Rand ore. An extract from the discussion is reproduced hereunder:—

Flotation concentration, as described in the previous article, produced the following concentration on pulp from the Ferreira Deep:—

	Gold value, dwts./ton.	Percentage Recover., by wt.	Percentage Recover., by value.
Cyanide pulp before flotation	2.4	—	—
Concentrate from pulp	36.2	5.81	87.5
Tailing from pulp	.32	94.19	12.5

In this case 87.5 per cent. of the gold in the pulp is accounted for in the concentrate, while by the old method of concentration only 31.8 per cent. was recovered.

Although the old method of treating gold ore tailing by means of concentration has long since died a natural death, in view of the much greater recoveries which can be obtained by flotation concentration, the subject becomes one to which considerable importance can be attached.

It is somewhat remarkable that so many years should have intervened before further progress, since early in this century the important subject of gold distribution in blanket ore products was investigated in some detail by means of other classification methods.

In considering the relative proportions of gold and pyrite separated by oil flotation, the fact that the author crushed all sand samples to pass a screen of 150 meshes per linear inch is of great importance, an effective oil segregation being thereby rendered possible of the gold and pyrite released from attachment to larger quartz particles. It does not, however, follow that the pyrite carried the gold, as galena does silver, in the original ore or sand grains, but merely that the fine crushing set free from the siliceous matrix many individual and separate gold and pyritic particles, and thus rendered the former available for amalgamation, or capable of separation together with the pyrite by oil flotation. This consideration is of great importance as it explains the failure of attempts in earlier years, accompanied by very large capital expenditure, to profitably employ, on blanket ore tailing, concentrators of the vanner and Willey type.

From a report by Messrs. W. Bettel and J. H. Johns, published by the Witwatersrand Chamber of Mines on 2nd September, 1896, upon concentration by vanners in the Ferreira Mill, the following results are calculated:—

Products.	% Pyrite.	Dwt. Gold per ton.	Dwt. Gold per 1% Pyrite
Tailing pulp before vanners	2.178	11.37	5.22
Tailing pulp after vanners...	0.825	7.75	9.39

Hence the vanners recovered 62.1 per cent. of the pyrite, but only 31.8 per cent. of the gold.

T.G.M.E. September Output.

The following are the particulars of the output for the month of September, 1921, in respect of the above company:—Central Mines: Tons crushed 12,00, yielding 3,470 fine ounces; Elandsdrift Mine: tons crushed 1,520, yielding 966 fine ounces; Vaalhoek Mine: tons crushed 1,925, yielding 726 fine ounces; estimated value of month's output, £27,998; estimated profit for month, £6,009. Note.—The month's results are based on value of gold of £5 8s. 3d. net per fine ounce.

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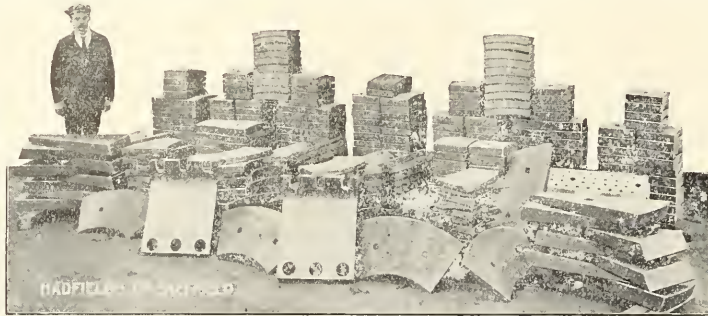


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Light in the Mine.

ITS BEARING ON ACCIDENTS AND REDUCED COSTS.

The mine casualty list is said to be on the up-grade during this present year. Moreover the economy in the use of stores is more pronounced than ever before on the mines of the Witwatersrand. Is it not just possible that there may be some connection between these two occurrences, that a too severe economy in the use of mine stores may conceivably lead to a heavier accident roll and as a consequence to an increase and not a decrease in the actual cost of mining? This is not by any means a plea for relaxation of control in the allotment of mine stores, nor for the issue of such stores without full and careful inquiry as to the necessity for such issue. It is more particularly the purpose of this article to consider whether, in the desire to cut down mining costs it may not be possible to proceed too far in such a direction and thus to defeat the end in view. We have all heard of the man who tried a restrictive diet on his horse and what became of it. It may be equally useful to consider whether in the matter of illumination the desire for economy has not resulted in an addition to, and not a subtraction from, the costs of mining.

Given that other things are equal, the better the light is the better is also the work performed. We all know that in fiery coal mines the need of safety lamps with their feeble lighting effects has resulted in the creation of a new industrial disease known as astygmatisis, an affection of the eyes which prevents miners from following their occupations. It was proved in Great Britain that where mines changed over from open lights to locked lamps the accident rate was also raised and that the cost of mining was increased; this was conclusively proved by statistics published by the Home Office; and it also affected the rates of pay given for coal cutting, a higher price per ton being paid to the collier when using safety lamps than when using open lamps or candles, because it was found that the earning power of the miner was directly affected by the absence of light in his working face.

There has never been a thorough investigation into the minimum amount of light essential to safe and economical working of the Witwatersrand gold mines. It is scarcely too much to assert that the adequate lighting of the mine has not figured in any inquiry relative to working costs. In most cases the prominent factor has been how to reduce the consumption of candles and carbide so as to make an apparent reduction in cost of stores, and this without any reference to the vital bearing on costs of the absence of a sufficient amount of light throughout the mine.

We hear much about organisation as applied to the working of the Rand mines, but where is the organising power which takes no account of the lighting factor in mine costs? As an actual fact it does not exist. Each mine is a law unto itself so far as its arrangements for lighting are concerned. We know that a co-ordinated plan exists for the watering of the working faces, etc., in each mine, and as this is enforced by statute it may be assumed that it is fairly efficient. Lighting is in even a worse plight at present. Owing to the causes referred to above, *i.e.*, the absence of statistical records on lighting efficiencies, the apparent conflict of good lighting with cost of working—it is only reflected at present in lower costs of candle and carbide—we have no evidence on record of the evils of our neglect of this matter. Indirectly, however, there is abundant evidence on the subject, and this of such a nature as to make the need of investigation a matter of urgency.

It would be very interesting to know, for instance, which mines are most and least economical in the consumption of candles and carbide. Coupled with this should be appended tables showing their relative accident records. Of course, one would necessarily allow for circumstances which would

operate in favour of or against any such mine—such as age of mine, its general layout, the amount of electric light installed, and such like.

One fact, however, stands out unchallenged, and that is the supreme importance of adequate lighting as a necessity for efficiency.

How many daily cases of minor injuries are treated in the mine hospitals, entailing a small expenditure in materials and possibly in time lost by the native labourer or possibly the white man? This time lost is a real addition to working costs, since the person injured does no more work for the shift in most cases, and there is always the disruption of the routine work, if only for a few minutes, but which in the aggregate is a factor in the actual working cost of the mine. The native with his candle, or sometimes a half-candle, is apt to overlook the element of danger due to his being unable to see clearly his surroundings. In the hammer gang he may have shattered and loosened rock above his head hidden from him in the darkness, his time is occupied with his task, the rock falls and he is injured more or less severely. The lashing boy cannot see clearly many yards around him, he himself is only a dim shadow to others. Without being in the least blameworthy, he may quite easily cause injury to himself or others through his being unable to see clearly the surrounding objects.

The tramping boy is very often the cause of injury to himself or others for the same reason. Coming along in the dark or with his candle throwing out a feeble beam, he is unable to see clearly what lies ahead of him. Usually he is lucky and pulls through, sometimes he is not; and then the resulting accident may incapacitate himself or others for a time. All these are routine cases which are considered inseparable from and incidental to mine work, and call for no comment from anyone, but are taken as a matter of course.

Inadequate light is further responsible for the fact of much time and labour being wasted in many directions owing to the need of concentrating several lamps or candles on an important piece of work, or perhaps because it is dangerous and light is essential to show a quick means of escape if needed. It is surely high time that special efforts were made to supply a better illuminant than the ordinary candle or carbide lamp. For one thing the extension of the arrangements already in force for lighting shaft bottoms, engine chambers, pump houses, and such like, should be extended very considerably. In some of the newer mines long stretches of main haulages are lighted, with manifest advantages to efficient working and comfort in travelling. What is wanted is the extension of the system to the working faces generally.

The cost need not be excessive in the first instance, and that is at any rate partly balanced by the saving in candles and carbide possible.

Cables could be run along the drives with coupling arrangements at convenient points from whence small cables coiled on drums to be worked by hand and with attachments on the cables at suitable intervals for lamps would radiate. These cables would be unwound at the commencement of the shift and be carried up through the stope face and connected where necessary. The lamps, suitably protected, would be attached, and in this way a flood of light could be obtained which would undoubtedly make for safety, comfort and efficiency of those workers concerned. If such a method were in operation there would certainly be a far better chance of detecting bad ground in the stopes and of minimising the risk of accidents due to the condition of semi-darkness of the workers. The working face could be examined more closely, likewise the hanging wall and the general state of the stope. If the miner were further furnished with an electric torch of suitable pattern, he would then be able to supplement the general examination of the working face by a particular examination of the hanging wall and thus, so far as is humanly possible, ensure the safety of himself and his gang. The drives would have sufficient lighting power to enable tramping to be carried on under the best possible conditions and with the least

fear of accidents. Similarly with regard to the lashing, timbering and waste packing gangs. One must not omit the fact of better supervising results, since the officials and supervisors would each be so much better able to see exactly what the workers were doing.

Altogether we may assert that the advantages accruing from a proper and sufficient supply of light would not only offset the actual first increased cost of installing the system, but would enormously increase the comfort of the workers, improve their efficiency, better the supervision, and reduce the accident rate very materially. The result of such a combination of improvements would necessarily be a reduction of working costs in the mine, and this would be reflected in additions to the profits of mining and in an extension of the lives of the mines of the Rand with mutual benefits to the workers, the shareholders, and the community.

W. H. JONES.

Accidents Due to Rock Falls.

G.M.E.'s VIEWS.

The following extract from an article appearing in *The Reef*, by Sir Robert Kotzé, is of special interest. The question of falls of hanging is one which has occupied the minds of mining men all the world over, and one which appears to affect Rand mining to a greater extent than mining in other parts.

During the year 1920 falls of hanging accounted for 582 accidents on the Witwatersrand and 161 deaths. The percentage death rate was 33·13 of all deaths, and represented 81 persons killed for every 1,000 employed as against a total death rate from all causes of 2·45 per 1,000. This class of accident therefore accounted for the deaths of one person out of every three who met their death by accident on the Witwatersrand mines. The next highest class, falls of material, accounted for 16 per cent., or 79 deaths, and the two together are the cause of half of the fatalities on these mines.

During the six months January to June, 1921, there has been a large increase in the number of deaths due to falls of ground, the total being 117 for the half year as compared with 161 for the whole of the year 1920. This alarming increase is fortunately compensated for by a reduction in the number of deaths from all other sources, but it draws renewed attention to the need for care in guarding against accidents from this source of danger.

An analysis of the time at which fatal accidents occurred is shown in the following figures:—

Time of Day.	Fatal Accidents.	Deaths.
1—6 a.m. inclusive	1	1
7 a.m.	2	2
8 a.m.	7	8
9 a.m.	10	10
10 a.m.	15	18
11 a.m.	12	14
12 a.m.	11	24
1 p.m.	10	26
2 p.m.	12	3
3 p.m.	—	—
4 p.m.	1	3
5—8 p.m.	—	—
9 p.m.	2	3
10 p.m.	1	1
11 p.m.	—	—
12 p.m.	3	4

The distribution according to the hour of day shows that most fatal accidents occur towards 10 o'clock in the morning. Accidents of which each causes the death of a number of persons are more numerous about noon. One is inclined to infer from these results that immediately after the early morning examination working places are comparatively safe, but that progress in movement in the hanging takes place. Within a few hours the danger has unnoticeably increased, leading apparently to the maximum of small falls about 10 o'clock, and later on to the maximum of heavier falls about noon or after. No doubt a further increase in falls takes place after that time also, but, owing to the gradual withdrawal of men from the working places, fewer persons are exposed to risk and the number of fatal accidents decreases accordingly.

In all mining countries falls of hanging account for more fatalities than other source of accident. The Witwatersrand is therefore not unique in this respect. But the Rand has on the whole such a good hanging in its mines that one would be inclined to expect that this source of danger would lead to fewer deaths than elsewhere. Such is by no means the case, for on the Rand the accident death rate from falls of hanging alone is more than half that from all sources in the most advanced European countries. Many reasons may be advanced for this unsatisfactory state of affairs, but on this occasion attention is drawn to only one, and that is the false sense of security into which persons are lulled by the very strength of the hanging.

Another example of the way in which one is easily lulled into a sense of security is instanced by what happens when systematic support is provided. This proves so safe that the hanging does not receive the close attention it ought to, and fatal falls take place which would have been avoided if such absolute reliance had not been placed on the systematic support.

The lesson to be drawn from all such occurrences, and one that is especially needed on the Witwatersrand, is the necessity for ceaseless and eternal vigilance. The piece of rock that may be sound or tight in the early morning may become, in the course of the shift, loose and dangerous owing to imperceptibly small movements and vibrations, and may come down unexpectedly a few hours after starting work. Therefore take no chances, but accustom yourself to look upon the hanging as an ever present source of danger which can only be met by constant carefulness.

Tenders for the purchase of the machinery, stores and equipment of the Kroonstad Coal Estate are being called for, and soon there will be no trace of the mine except the dump, which is not advertised for sale, but even that with a series of east winds will soon dwindle away, and nothing will be left except a few yarns and old tins to denote that a prosperous coal mine was ever in existence there.

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**SOUTH AFRICAN MINING AND
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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

VIII.

By Arthur Stenhouse.

In 1887, as agent for Mr. Edward Lippert (the Dynamite Concessionaire), I had leased an old farm house on the outskirts of Pretoria for the storage of dynamite at a modest rental. Soon I discovered that there was a large quantity of this dangerous compound stored promiscuously all over the township, so I at once interviewed the Editors of the various local newspapers and described the situation. Next morning sensational leaders appeared in the papers pointing out the dangers of this proceeding. The "Kruger" Government became alarmed, and at once issued a proclamation that all dynamite must be removed beyond the town boundaries within forty-eight hours. I was prepared for this announcement, and notified the merchants that I would remove the dynamite in ox-wagons and store same in the magazine at a rental of half-a-crown per case per month. Promptly I obtained contracts, and transported the dynamite to the store. It was quite a payable proposition, and at the same time I probably saved the ancient city of Pretoria from total annihilation, and the citizens from sudden death! Years afterwards there was a terrible outcry in Johannesburg about this concession, so Mr. Lippert gracefully retired to his palatial mansion in Germany with about a million pounds in his pocket!

At this period of our history we must confess that the main portion of our time was devoted to pleasure. At Christmas time one of the "belles" of Pretoria graciously requested me to make arrangements for a dance. She said if I did so, all the girls in Pretoria would adore me! How could I resist such a pleasing prospect? At once I set to work, hired the Masonic Hall and got young Albrecht Jeppe to assist me. We engaged a one-legged man to play the piano, and "hustled" around generally. On the eventful night my pianist imbibed too freely, and we had to dispense with his services. However, charming ladies came freely forward, and the dance was pronounced a brilliant success! The true definition of happiness is to make other people happy, and our efforts were amply rewarded.

In the early days there was great excitement when the coaches, with their magnificent teams of ten horses, and with bugles sounding, raced into Pretoria. The excited population rushed to see if any of their friends were amongst the new arrivals, and to obtain letters by the incoming mail! A dense crowd assembled in Church Square to hear the latest news, and to welcome the new arrivals from all the centres, and when J. B. Robinson, Barney Barnato, Beit, Knight and other "big" Kimberley men arrived, their movements were carefully watched. Nearly everyone carried a piece of gold-bearing quartz in their pockets, and we were all prospective millionaires! A vivid contrast to the pessimistic tone prevailing to-day.

Pioneering undoubtedly has some compensations!

Gazing at the motley throng, I recalled the opening stanza of Shakespeare's poem on the seven stages of man:

"All the world's a stage,
And all the men and women merely players.
They have their exits and their entrances,
And each man in his day plays many parts."

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S.-W. Transvaal Diamond Returns.

The returns from the various alluvial diamond diggings in the South-Western Transvaal for the month of August amounted to 5,687 carats, value £41,990, as compared with 5,919 carats value £38,640 in July, and 5,353½ carats value £27,444 10s. in June. The returns for August are officially given as under:—

Name and No. of Farm.	Carats.	Value.
Blesbokfontein 63	901¾	£6,513
Bloemhof 130	404¾	2,781
Bloemheuvel 171	66¾	839
Biesjeslaagte 23	3½	10
Boskop 115	16¼	136
Brandywynkuil 37	11¾	64
Boschplaats 14	28	250
Christiana	111¾	845
Cawood's Hope 79	13¾	108
Dievedraai 245	32¾	180
Diamantdoorns 131	19¼	146
Doombult 93	30½	476
Eerstebegin 290	34	256
Ganspan 86	34½	314
Grootpoort 125	35¼	144
Goodhope 78	34½	314
Goedgenoeg 593	9¼	73
Holloway's Rust 142	14¼	67
Kareepan 137	432¼	3,293
Kareepan 164	247¾	1,714
Kameelkuil 142	699¾	4,968
Klipkuil 104	65¾	567
Katdoomkraal 163	1¼	7
Kaalpan 205	5	25
Kromellenboog 108	44¼	280
Kareeboom 158	467½	3,552
London 33	202¼	1,471
Leeuwfontein 143	190¾	1,469
Mooifontein 128	82	722
Mimosa 75	8¾	70
Middelbosch 326	4¼	52
Makouwskop 83	7¾	42
Olivenfontein 376	42¼	180
Oersonskraal 43	3	9
Palmietfontein 109	5¼	20
Plessisdam 121	275¼	1,837
Rietkuil 138	162½	1,102
Schweizer-Reneke	259	2,506
Syfergat 150	82¼	486
Syferfontein 107	155¾	1,093
Sandringham 25	25	80
Vechtvallei 329	2	13
Vuurfontein 61	10¼	86
Welgevonden 52	1	2
Welverdiend 13	7¼	57
Weltevreden 136	5¾	73
Zoutpan 147	3	2
Zevenfontein 165	52¾	303
Zwartlaagte 68	335½	2,316
Total	5,687	£41,990

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Mining in the Outside Districts.

POINTS FROM THE REPORT OF MR. T. G. TREVOR, INSPECTOR OF MINES—VALUABLE REVIEW.

The following are extracts from the annual report of Mr. T. G. Trevor, Inspector of Mines, Pretoria:—

The general progress of mining work in this inspectorate during the year under review has been extremely satisfactory. The value of the mineral output increased from £4,130,688 in 1919 to £5,489,108 in 1920, being an increase of £1,358,420. For the purpose of showing the steady advance made by the industry since 1910, the figures for that year have been included in Section III. under the head "Mineral Output," and it will be seen that the value of the output for that year was £3,290,803, which was exceeded in 1920 by £2,198,305. From the above figures it is obvious that the mineral industry in this inspectorate is advancing steadily in the right direction, and the output for 1920 actually showed an increase of 67 per cent. over 1910, and this notwithstanding the closing down of the great Sheba Mine, the Worcester Mine, etc., and a decline in the output of the Transvaal Gold Mining Estates and several other fairly large producing gold mines. The increase in the mineral output is due largely, it is true, to the expansion of the collieries, but a most satisfactory feature is that in 1910 only eleven different minerals were on the production list, whereas to-day there are twenty. Formerly, very little, if any, attention was given to any minerals save gold, diamonds, or coal, and the general opinion was that the country had been thoroughly prospected and that no fresh developments were probable. The experience of the last ten years has completely negated this point of view. Several very rich, if small, gold mines have been discovered, mostly by accident and in places which were supposed to be worthless. The small attention which has been directed to the base metals and non-metallic minerals has been so successful that I have every confidence that in the future as more attention is paid to the matter the advance of the last ten years will not only be maintained for an indefinite period, but greatly excelled. In fact, the longer experience one has of this inspectorate the more optimistic one becomes of its future. It is a curious fact, however, that the discovery, exploitation, and proving of the value of nearly all the minerals placed on the list during the last ten years, or even twenty years, has been left to private individuals of no or very little financial standing, who have usually received no encouragement, but often have had very severe opposition to overcome before attaining success. It is astonishing to note what little success the big land companies and mining corporations have met with and of what little use they are in the initial stages of the development of any industry.

Gold.—The value of the gold output for the year under review was £569,229, being a decrease of £61,846. The decline of the gold output has been going on steadily during the past ten years, and a comparison of the output for the years 1910 and 1920 shows a decrease of approximately £290,000. However, the diminution has been gradual which is due to the discovery of new and payable mines. The output of alluvial gold remains stationary in the neighbourhood of £5,000 per annum.

Diamonds.—The value of the diamond output has increased by £902,834 over 1919 and by £1,079,842 over 1910. This is due to the increased price of stones, as the actual amount of ground washed is about one-fourth of what it was in 1910 and one-half of what it was in 1919. The output of alluvial diamonds has decreased slightly during the year, and is likely to decrease largely in the near future owing to the difficulty experienced in disposing of the stones.

Coal.—A great advance took place in the value of this output, an advance which will be considerably exceeded during the next year. In 1910 the coal output was valued

at £704,755, in 1919 at £1,380,271, and in 1920 at £1,712,603, being an increase of £1,007,848 and £332,332 over the years 1910 and 1919 respectively. Over and above the actual increase in production of the collieries, coal is now being opened over a vastly extended area in the high veld; good coal has been struck in boreholes in the North Waterberg and Zoutpansberg districts, showing that the extent of our coal measures is very much greater than is usually supposed. With regard to the coal in the northern Waterberg district, this to-day is valueless owing to its position, but the fields lie only fifty to eighty miles from the Rhodesian railway at Pala Road, and it is quite probable that in the future, either near or distant, the construction of a railway from Pretoria to the iron mines at Buffelshoek and its extension to connect with the Rhodesian railways may make this a national asset of great importance. For the fields will be approximately only 480 miles from Kimberley, as against Witbank at 427 miles, and 250 miles from Bulawayo, as against Wankie at 212 miles.

Coke and Tar.—For the first time for some years there was an output of tar, valued at £3,074, and of coke, to the value of £81. These only occurred in the latter months of the year and are an earnest of a regular supply in the future.

Copper.—Notwithstanding the fact that the Messina Copper Mine ceased production in May, the actual output was in the neighbourhood of £190,000. The above company is busy erecting a new plant, and it is believed that the above output will be maintained in the future, although everything depends on the price of the product, which is at the present moment below the economic limit of the mine. No new copper mines started during the year, but good developments are proceeding at Arton Villa, in the neighbourhood of Messina, which may in the near future justify the opening of a mine.

Tin.—The tin output increased from the value of £267,489 in 1919 to £439,823 in 1920, an increase of £172,334, and surpassed that of 1910 by £111,339. The recent great fall in the price of tin may, however, if sustained, cause a corresponding fall in the output for the next year. However, the present prospects, as far as the production of ore goes, are more favourable at Lecuwpoort than they ever have been in the past. At Rooiberg, Zaaiplaats, and Groenfontein, which may be described as hand-to-mouth mines, the prospects are just about the same as in recent years, though perhaps slightly more favourable. No new mines opened nor was any serious prospecting carried on during the year.

Lead.—The value of the lead output was £3,859, a slight increase over the previous year. There was, however, a great boom in properties containing this mineral, especially near Argent, where the Transvaal Silver Mines are developing their properties and equipping a plant on a basis of an output of 500 tons per month metallic lead. As this lead contains approximately 80 to 100 ozs. of silver per ton, this output, if attained, will add materially to the general value of the output of the country. In any case, whether that output is attained or not, it seems certain that the mine will be a success in a smaller way, and that a constant production of lead and silver may be looked for in future.

Corundum.—The output of corundum from the Zoutpansberg district received a rude shock at the end of the European War, when it appeared likely that there would be no future demand for it. It is, however, recovering in a most satisfactory, if gradual, manner, though the output for 1920 was only valued at £1,290. At the present time two responsible parties are engaged in organising a trade in this mineral both in Europe and America, and it appears to me certain that they will be successful and that a regular output of increasing value may be looked forward to.

Arsenic.—The production of arsenic remains constant at a value of about £660 per annum. The Consort Mine remains the only producer. Notwithstanding the demand for the mineral and all our inquiries, we have not yet been able to find a satisfactory deposit of this mineral in the country.

Magnesite.—There is still only one producer of this mineral, but the output increased from the value of £2,723 in 1919 to £3,780 in 1920. The iron companies at Pretoria, Vereeniging, and Newcastle have been inquiring for magnesite properties during the year, but though they have been unsuccessful, there is no reason to suspect that the properties at Kaapmuiden are not capable of supplying all their requirements.

Nickel.—Though there was no output of nickel ores, and though no further developments took place in the Rustenburg district deposits, a very interesting discovery of rich ore was made in a totally unsuspected locality in the Barberton district. This is now being developed, and, as the ore is exceptionally rich and very conveniently situated, it is probable that more will be heard of the discovery.

Graphite.—The Transvaal Graphite Mine in the Spelonken remained the only producer with a small output valued at approximately £2,400.

Mica.—The mica sales, which for the year 1919 were valued at £369, increased to £500. This is an earnest of a considerable improvement which is taking place both in the production and demand for this mineral, and I look forward to a considerable permanent increase in its output.

Talc.—The value of the talc produced remained constant at about £2,000. A new talc mine on the railway at Barberton has developed extremely well, and attempts, which there is reason to believe will eventually be successful, are being made to establish a trade with European markets. There is every reason to hope that this industry will take a permanent place on our lists.

Asbestos.—The asbestos output, which in 1910 was valued at £1,648, had increased in 1919 to £7,699 and in 1920 to £41,193. This extremely favourable result is, however, only the beginning of a great expansion in this industry. The Transvaal mineral (amosite) has now established for itself a recognised place both on the European and American markets. The deposits have developed extremely well and are capable of indefinite expansion. At present, however, the output is strictly limited by transport difficulties. As these difficulties are diminished by the approach of the railway, the output may be expected to increase step by step. It is satisfactory to note (4th February, 1921) that work is now being commenced on the railway extension from Lydenburg. During the year some new deposits, which appear very valuable, of chrysolite asbestos have been discovered in the serpentine underlying the Black Reef formation at the Kantoerberg. These are developing well and may be expected to add to the value of the output in the oncoming years.

Soda.—There was no output of soda from the Pretoria Salt Pan (S.A. Alkali, Ltd.) during the year, but continuous experiments have been going on in the hopes of discovering a process for its extraction from the material of the pan. So far as the natural liquor goes, a satisfactory process has, it is believed, been attained, though some details, more especially the drying on a commercial scale of the decahydrate produced, are giving trouble. It is only a matter of time before these questions will be solved and when an output of very great value will be added to the list.

Manganese.—There has been no output of manganese for the past few years, but the iron mines have secured properties capable of supplying all their needs as they arise.

Iron Pyrites.—Notwithstanding the increasing demands from the Sulphuric Acid Works, which now amount to over 1,500 tons per month, the production of pyrites did not increase, but remained stationary at a value of £5,000. I am confident that good deposits could be found if the gossan outcrops of the bushveld and Barberton areas were systematically opened. No attempt has been made to do this, and

it looks highly probable that we will not be able to supplant the importation of this mineral.

Iron Ores.—The preliminary blast furnace of the Pretoria Iron Mines ran quite successfully for the last five months of the year, producing 2,467 tons of first-class pig-iron. Mr. Delfos, managing director of the company, visited Europe with the idea of getting a certain amount of capital taken up in England and of getting some of the English iron masters interested in the venture. He was not altogether successful in his object, but he received sufficient support to determine the directors to proceed at once with the erection of a plant capable of smelting about 200 tons per day with an appropriate converter and rolling plant for the manufacture of steel. The high class iron ores which were discovered at "Buffelshoek," on the Crocodile River, some ninety miles north of Pretoria, have been acquired by the company. These ores have been geologically surveyed by Dr. Wagner of the Geological Survey, and proved to be of great size and extent, though not so extensive as was originally supposed.

Marble.—The development and exploitation of the marble deposits at Marble Hall still await the advent of a railway, but such work as has been done and all the information we have obtained about the stone is quite up to our most sanguine expectations.

Districts: Pilgrims Rest.—The mining industry in this district remains very much where it was and no perceptible difference is apparent, though the appearance of the country is altering in a surprising manner owing to occupation and tree-planting. Towards the end of the year a departmental committee was appointed to inquire into the water-power question at Sabie. The committee very strongly recommended that a hydrographic survey should be made by the Irrigation Department and the most attractive scheme put up for public tender.

Pietersburg.—Gold mining and prospecting is at an extremely low ebb, if not at an actual standstill. Mr. Ford, at the Ellerton, has an attractive prospect which may develop well and reattract attention to the district. The falling-off of the gold mines is, however, compensated for by the arrival of the asbestos and corundum fields, the output from which will be greater than any ever attained by the goldfields.

Barberton.—Gold mining now takes quite a second place in the economy of this district, its place having been usurped by the farming and citrus-growing industries. However, mining will probably continue on at least its present scale for very many years, for unexpected surprises, such as the Maid of De Kaap Mine and the asbestos mine on the Kantoerberg, continue to turn up and to compensate for those dropping out. The Sheba Gold Mine, after being closed down for some years, has restarted, and in the Zwartkoppies section extremely good ore has been discovered in a short continuation of the original abandoned development. The history of this mine is most extraordinary; every manager works it to a standstill and can discover nothing fresh, and every new manager finds fresh deposits or shoots which give it a new lease of life.

Wit. Deep September Return.

The estimate of results for the month of September, 1921, is as under:—Tons milled, 33,630; gold recovered, 9,717.039 ounces; average of stamps running, 180; stamps running time, 21,289 days; tube mills, 5. The working expenditure, including head office charges for the month, is £12,368, or 25s. 2d. per ton. The estimated working revenue based on an estimate of £5 10s. per fine ounce (less 1s. 6d. realisation charges) is £52,715 or 31s. 4d. per ton. The estimated working profit is £10,347 or 6s. 2d. per ton, from which is to be deducted the capital expenditure for the month of £1,976, leaving a surplus of £8,371.

The Week in the Sharemarket.

LONDON MARKET CONDITIONS IMPROVING—GOLD SHARES STEADY BUT QUIET—DIAMONDS SLIGHTLY BETTER—SILVERS DECLINE.

The market has been very dull and unattractive during the week. Gold shares are very quiet, though steady. Nothing further is known regarding the ex-enemy share question, and the price of gold remains almost unchanged. The September profits of the mines and the excellent annual reports published in our last issue have, of course, been discounted, and the market still awaits a lead from London. According to the latest cables from that side, although there is a general complaint as to the paucity of business, conditions are mending. Despite wide discussion of unemployment problems, there is no doubt trade is quietly and steadily improving. Moreover, the market is free of heavy liquidation. There is a brisk demand for the new Union Loan, which advanced 1 per cent. premium, finally closing at $\frac{1}{2}$ per cent. premium. Industrial shares were disturbed by the passing of dividends by prominent companies. Kafirs have been almost lifeless, but later were rather better on improvement in the price of gold and the absence of selling tendency. They further improved on Paris support and this offset the lower price of gold. Diamond shares fluctuated under Paris influences, but closed stronger. Rhodesian shares are quietly steady. Replying to a communication from the Stock Exchange with reference to the possibility of a return to the fortnightly settlements, Sir R. Horne, while sympathetic, declines to repeal the temporary regulation, but suggests that particulars should be obtained of the total pre-war account still open. That the turn of the tide has come for Government stocks is indicated by the announcement of the immediate issue of 5½ per cent. Treasury bonds at 98 instead of 97 as at present. The feature of the week on the local Exchange was the drop in Transvaal Silvers, which had been firmer on reports that smelting was about to start. Forced liquidation seems to be the cause of the present slump. Tin shares are easier, and Collieries a little better on the railway rate reductions. Two additions to the list under this head are Buffalo and Enyati Collieries, full particulars of which have already appeared in our pages.

	Fri. 30th.	Tues. 4th	Wed. 5th.	Thurs. 6th.
Natal Navigation Collieries	—	—	—	£11½
National Banks	—	—	—	27 6
New Eland Diamonds	—	27 6	27 6*	27 6
New Era Consolidated	—	7 6*	7 6*	7 9
New Geduld Deeps	1 1*	1 4*	1 4*	1 4*
New Kleinfonteins	6 1*	6 6*	6 6*	6 7
New Modderfontein	73 0	73 3	74 0	73 9
New States	24 3	24 0	24 6	23 6*
Nigels	—	4 0*	4 0*	—
Nourse Mines	9 0*	9 9	10 0	9 3*
Pretoria Cements	44 0*	44 0*	45 0a	43 9
Princess Estates	1 0*	1 0	1 0*	1 1†
Rand Nucleus	1 0*	—	1 0*	1 2
Randfontein Estates	16 9*	17 6*	17 6b	16 9b
Roberts Victors	9 0*	—	—	—
Rooibergs	3 6*	3 6*	3 0*	3 3*
Rodepoort Uniteds	0 3	—	—	—
Rouxville	1 7*	1 6*	1 6*	1 6*
South Africa Lands	4 6†	—	4 2*	4 1
Southern Van Ryn	1 0	1 0*	1 2*	1 6*
South African Townships	10 9*	10 6*	10 6*	10 9*
South African Alkali	15 0*	15 0*	15 0*	15 0*
Springs Mines	42 3*	42 6	43 0	42 3
Sub Nigels	11 3*	11 3*	11 3*	11 3*
Swaziland Tins	9 0†	9 0†	9 0†	9 0†
Transvaal Gold Mining Estates	—	8 0*	8 0*	—
Transvaal Silver	24 0	23 3	22 9*	18 0
Union 5 per cent.	£100½*	£100½	£100½*	£100½
Van Ryn Deeps	72 6*	73 0	72 6	73 0
Village Deeps	—	9 0*	—	9 6†
Western Rand Estates	2 9*	2 11*	3 10*	3 10
West Springs	12 3	12 0	12 3*	12 0*
Witbank Collieries	—	38 3*	—	—
Witwatersrand	—	15 0†	—	—
Witwatersrand Deeps	8 9*	8 6*	8 0*	8 6*
Wolhuters	4 1*	4 0*	4 0*	4 3*
Zaaiplaats Tins	3 6*	3 6*	3 6*	3 6*

BARNATO GROUP.

Operations for the month of September, 1921:—

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte	44,000	£72,037
Government G.M. Areas	140,000	318,760
Langlaagte Estate	41,600	68,912
New Primrose	20,700	25,715
New Unified	10,000	13,958
Randfontein Central	130,000	202,792
Van Ryn Deep	46,400	144,960
Witwatersrand	40,000	56,758

Totals and averages ... 473,600 ... £903,892

August totals ... 496,700 ... £954,918

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte	£51,026	23/194	£21,371
Government Areas	149,420	21/346	170,053
Langlaagte Estate	53,486	25/715	15,641
New Primrose	20,975	20/265	4,951
New Unified	11,012	20/216	2,097
Randfontein Central	171,256	26/347	32,730
Van Ryn Deep	67,853	29/247	78,005
Witwatersrand	44,421	22/211	14,247

Totals and averages ... £569,449 ... 24/047 ... £330,995

August totals ... £588,625 ... 23/701 ... £372,497

Note.—The above results are arrived at by calculating the gold at £5 10s. per fine oz.

Van Ryn Deep, Ltd.—Reduced tonnage and increased working costs due to the strike of reduction workers.

Monthly Gross Profits.—January, £269,638; February, £187,423; March, £253,627; April, £261,506; May, £250,900; June, £281,801; July, £331,703; August, £372,497; September, £339,995.

	Fri. 30th.	Tue. 4th	Wed. 5th.	Thurs. 6th.
Anglo-American Corporation	22 6	22 6*	22 6*	21 6
Apex Mines	7 3*	7 3*	7 0*	—
Bantjes Consolidated	5 6*	5 6*	5 6*	5 6*
Brakpan Mines	—	—	32 0*	32 0*
Bushveld Tins	0 6*	0 6*	0 6*	0 6*
Cinderella Consolidated	—	2 6*	2 3*	3 3*
City and Suburbans	2 3*	2 3*	2 3*	2 3*
City Deeps	—	48 0*	48 6*	48 6*
Clydesdale Collieries	26 6*	27 0†	26 0*	27 0†
Consolidated Diamonds	17 4½	17 3*	17 6	16 9†
Consolidated Langlaagtes	12 6*	12 6*	12 6*	—
Consolidated Main Reefs	9 9*	10 3*	10 3*	10 3*
Coronation Collieries	40 6†	35 0*	40 0†	—
Coronation Freeholds	1 0*	—	0 11*	—
Coronation Syndicates	6 0*	6 6	6 9	6 10½
Crown Diamonds	3 9*	—	3 9*	3 9*
Crown Mines	41 0*	40 0*	40 0*	40 0*
Daggafontein Mines	—	3 0*	3 0†	2 4
East Rand Coals	2 0	1 11*	2 1†	2 0
East Rand Deeps	—	0 8	0 7*	0 7*
East Rand Proprietary	5 6*	5 11	5 9*	5 6*
East Rand Debentures	—	£80*	£83½*	£83*
Eastern Golds	—	0 8*	0 6*	—
Ferreira Deeps	—	—	9 0*	—
Frank Smith Diamonds	4 2	4 5	4 1	4 1
Geduld Proprietary	46 6*	47 0*	47 3	46 9
Glynn's Lydenburgs	8 0*	—	7 0*	7 6*
Government Areas	81 6*	82 6*	81 6*	82 6b
Hume Pipes	16 0	16 3*	16 6*	18 6
Knight Centrals	4 3*	4 3*	4 3*	4 2*
Lace Proprietary	7 6*	7 6*	7 9*	7 9*
Leeuwpoot Tins	8 3*	8 3	7 6*	7 9*
Luipaardsvlei Estates	3 0†	2 1*	—	—
Lydenburg Farms	5 3*	5 1*	5 3*	5 3*
Middelvlei Estates	1 3*	1 3*	1 3*	1 5*
Modder B's	27 0*	27 6	28 3	27 3
Modder Deep	44 0*	44 0a	44 0	43 6*
Modder Easts	9 6*	9 9	9 10½	10 0a

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EDITORIAL.

THE EIGHT HOURS DAY IN SOUTH AFRICA.

The Union Government, like the Imperial Government, has found itself unable to ratify the draft Convention regulating the hours of labour, adopted at the Washington Labour Conference. Some time ago the Imperial Government published in detail the reasons for its attitude, and the Union Government has now followed suit. The correspondence issued by the Union Government a few days ago shows that though it is "in sympathy with the general principles laid down," it is unable to give them universal application. In a letter from the Department of Mines and Industries to the International Labour Office, dated 7th June, the provisions of the Convention were discussed in their reference to the four classes of employment to which the limitations of an 8-hour day and 48-hour week, with certain specified exemptions, were applied, viz., mines, manufacturing industries, constructive works of an outdoor

character, and transportation. With regard to mining, the position in the Union is governed by Section 9 of the Mines and Works Act (1911). Under this Act an 8-hour day and a 48-hour week constitute the limit prescribed for underground work in the gold mines by adults. In the coal and base metal mines the general practice at present, as laid down in agreements between owners and workers, is founded on a 48-hour week. Surface work on the gold mines is also carried on under a like agreement. Manufacturing industries are dealt with under the Factory Act of 1918. The limit there laid down is that of 50 hours per week, or 9½ hours per day, for adults. So far, however, as regards the skilled trades carried on in connection with such undertakings, arrangements have been come to between the organisations of employers and workers respectively making the 48-hour week general. The limitation prescribed by the Factory Act constituted in the case of many industries a considerable reduction, and the letter points out that in the less skilled trades, where the rougher classes of coloured labour are employed, it is thought that a further reduction would at present be undesirable. It is also shown that the Factory Act provides for exemptions in regard to hours where the supply of raw material is intermittent or subject to seasonal variations, where raw material is liable to deteriorate if left untreated, or continuous processes are carried on, or where the exigencies of the case at certain periods render special hours necessary. These exemptions, it is felt, comply with the spirit, and almost the letter, of the Convention. With regard to general constructive work of an out-door character, the letter went on to show that a very large proportion of the works included under this heading are carried on in this country by native and coloured workers. A strict limitation of hours under the circumstances applying to these operations, would at present be impracticable. Regarding the transportation services, the letter emphasised the very strong objections presenting themselves in this country to a hard and fast 48-hour week or 8-hour day, owing to the scattered position of the population centres, and the great distances covered by the system. While accepting the principle of a 48-hour week and 8-hour day in the larger centres, where work and responsibility are continuous, the railway administration is unable to tie itself down to the maintenance of an 8-hour day, with the strict limitation of overtime, provided at Washington. In its attitude the Union Government has been guided solely by the practical difficulties that have to be taken into account. That this fact is fully realised by the International Labour Office is clearly evidenced by the nature of its reply. The careful consideration given by the Government, and the interest it is taking in the improvement of labour conditions in South Africa, are there highly appreciated. The International Labour Office, the reply states, recognises that special geographical and social conditions in South Africa complicate the question of giving effect to certain of the recommendations. It notes with satisfaction, however, that the Government generally approves the principles adopted. The following explanatory remarks are added by the Secretary for Mines and Industries:—"It will be seen from the above that the Government of the Union while sympathetic to the principles embodied in the 8-hour day and 48-hour week Convention, and while willing to apply those principles as far as is consistent with practical and economic results has not ratified the Convention, nor has the Convention been ratified by the Parliament of the Union, although the full terms of the whole of the Washington Convention and recommendations were duly placed before both Houses of Parliament in the Blue Book containing the report of the Union Government delegate on the Conference. The practical difficulties in the way of its ratification in all its details are shared by other members of the League of Nations, notably by Great Britain and Canada, whose Governments for the same reason have found it impossible to ratify the Convention." It may be hoped, therefore, that nothing more will be heard of the charges made in numerous Labour speeches of late to the effect that the Union Government had gone back upon any obligations entered into by its representatives and endorsed by the Union Parliament.

SWAZILAND MINERAL LEASES TAX.

Though we are all for penalising holders of dormant mineral rights who refuse to make them productive, we must sympathise with the unfortunate owners of mineral leases in Swaziland who have lately been notified of a new tax of an unusual description. This tax amounts to 5s. per 100 morgen on all mineral concessions in that territory not worked during the previous twelve months, irrespective of how much work has been done in the past. Under the able presidency of Mr. William Pott, of Henderson's, who are the largest concession holders in the territory, the matter has been energetically taken up, and a petition has been prepared for submission to the High Commissioner praying for the repeal of the tax, or alternatively, for the right to surrender those concessions that the holders cannot afford to retain. Mr. William Pott made a very explicit statement of the case for the leaseholders, which has appeared in the papers, and he has since written amplifying his remarks. *Inter alia*, he says: "The holders of many of these concessions, or to use the proper term, leases, spent much money in years gone by in prospecting. I know of the discovery of magnificent iron ore equal to Lake Superior ore, anthracite coal of high value, which discovery was communicated to the Admiralty some twenty years ago, and its importance in time of war pointed out. Gold was found and worked until it petered out. Almost the whole country has been open to private prospectors for years on more generous terms than the Government grant in the Union." Mr. Pott also points out that the present tax means that lessees who had a perfect right to accept the terms of their leases as defining their full liability for the rights leased are now by a legal quibble called on to triplicate or quadruplicate their liability by spending further unlimited sums in finding again each year what they found years ago, or to reprove annually that what they leased the right to work could not be worked because it did not exist. This penalty is imposed for the unexpired periods of concessions, in most cases ten to fifteen years, and the unfortunate holder can neither go back nor forward, as even abandonment of all his dearly bought rights is denied him. Another point made by Mr. Pott is that the new proclamation leaves to the discretion of the Resident Commissioner to decide whether property has been "adequately exploited." The Resident Commissioner is not a mining expert, nor is there any department of mines in Swaziland to provide him with advice and information on such an important matter, yet upon his in-expert decision the tax has to be paid or remitted. We may not have done justice to all the objections raised by the leaseholders, but enough has been stated to show that they have made out a very reasonable case, which, it is hoped, the High Commissioner will favourably consider.

Notes & News.

World's Stopping Record Broken at Van Ryn Deep Gold Mine.

We have received information that during the period September 2nd to October 1st, 1921, the following very fine performance was achieved in Stope 3 East 9, Eastern Shaft, Van Ryn Deep Gold Mine: Working shifts, 26; machine shifts, 78, total fathoms broken, 248; fathoms per machine shift, 3.18; stope width, 69 inches; contractor, B. T. Lellyett; type of drill, "Holman" eradle hammer (C.H. 2); number of machines, 3; steels used, 5 jumpers to set (10 ft. chisels). Next week we hope to publish figures showing the progressive work leading up to this truly remarkable performance.

Engineering Standards.

The South African branch of the British Engineering Standards Association have issued a copy of the British Standard Electrical Pressures for New Systems and Installations, which has been published by the British Engineering Standards Association. These standards have been recommended for adoption in South Africa by the Electrical Section of the South African branch of the Association. In addition to the standardising of electrical pressures, the frequency of 50 cycles per second for all alternating current systems has been recommended.

* * *

Planet-Arcturus.

In the report for the quarter ended 30th June of the Planet-Arcturus Gold Mines, which are at present being operated by the Gold Fields Rhodesian Development Company in order to recoup itself for substantial cash advances made, the following important change of policy is announced:—"As there has been no reduction in the cost of mining material and requisites and working costs having, owing to the increase in white employees' wages, risen far higher than at the date when the lessees took over, they have had to reconsider the policy hitherto pursued, and have decided for the present and until working costs decrease to confine the treatment of ore to such blocks as are considered payable under existing conditions. The estimated balance of ore reserves at 31st March last was 268,004 tons of a value of 11.8 dwts., which, after allowing for the ore crushed during June quarter, would be reduced to 251,034 tons of about the same value. A revaluation of this ore as at 31st May, after leaving out of account ore considered as unpayable under present circumstances, would consequently reduce that figure to 139,600 tons, averaging 13.27 dwts. per ton." From the treatment of 16,970 tons of ore yielding 9.39 dwts. per ton, the report shows that a surplus was earned of £17,173 (including gold premium) in the June quarter.

* * *

Progress at the Falcon.

The interim report of the Falcon Mines for the half-year ended 30th June shows an estimated surplus of £787 from the treatment of 92,312 tons, yielding copper (valued at £63 per ton), gold (109s. per ounce), and silver (3s. per ounce) of an estimated value of £201,550. Working costs averaged 43s. 6d. per ton. The estimated ore reserves at 30th June were:—

	Tons.	Value taking gold at 5s. per dwt. and copper at £50 per ton. £65 per ton.	
		Per ton.	Per ton.
Sulphide ore.....	417,000	44s. 7d.	50s. 9d.
Do., lower grade	52,000	32s. 8d.	38s. 4d.

As mentioned in the annual report in April last, development work in the mine was stopped during March. The working costs given above include the usual charges for redemption of the amounts previously expended on development and broken ore in stopes, but since March little or no expenditure has been actually incurred on development work, and further reductions in the actual expenditure have also been effected by the utilisation of stores in hand, which at end-June had been reduced to the minimum consistent with safety. In addition to the cash savings effected by reason of this advance expenditure and by the consumption of stores, economies have been effected wherever possible, and the white and native labour forces have been reduced to the effective limit. "As the result of these steps the liabilities for debenture redemption and income tax, amounting in April last to some £50,000, have been substantially diminished, in addition to meeting current expenses, and it is hoped under present conditions to discharge the balance of indebtedness in a few months, this being subject to any material rise or fall in the price of copper or gold in the meantime." The realised value of the output for six months to 31st December, 1920, was £212,360, as against the estimated value of £193,626.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining

The Accident Prevention Campaign of the Algoma Steel Company.—*Iron and Steel of Canada*, August, 1921, p. 199.

The Ventilation of Dead-Ends in Mines.—*The Mining Magazine*, September, 1921, p. 149.

The Human Machine in Mining.—*The Mining World and Engineering Record*, September 10, p. 245.

Pumping Fluctuations in Unwatering a French Colliery.—*The Colliery Guardian*, September 9, p. 726.

Heat Treatment of Rock Drill Steel.—*The Iron and Coal Trades Review*, September 9, p. 362.

Coal and Fuel.

The Analysis of Coal.—*The Colliery Guardian*, September 9, p. 725.

Retort for Assaying Oil Shale for Oil Yields.—*The Colliery Guardian*, September 9, p. 728.

Oil Fuel Burning.—*The Iron and Coal Trades Review*, September 9, p. 363.

Engineering.

The Testing of Electricity Meters.—*The Electrical Review*, September 9, p. 331.

Electrical Vehicle Results.—*The Electrical Review*, September 9, p. 339.

The British Association.—*The Electrical Review*, September 9, p. 353.

An Experimental Investigation of the Mechanical Properties of Steel at High Temperatures.—*The Iron and Coal Trades Review*, September 9, p. 332.

Metallurgical.

The Manufacture and Use of Manganese Steel.—*Iron and Steel of Canada*, August, 1921, p. 189.

The Canada Metal Co., Ltd.—*Iron and Steel of Canada*, August, 1921, p. 200.

Segregation in Steel.—*Iron and Steel of Canada*, August, 1921, p. 205.

The Dressing of Wolfram Ores in Queensland.—*The Mining Magazine*, September, 1921, p. 182.

The Principles of Copper Leaching.—*The Mining Magazine*, September, 1921, p. 175.

Joining Material for Refractories.—*The Iron and Coal Trades Review*, September 9, p. 362.

The "Characteristic Curves" of the Heat Treatment of Steels.—*The Iron and Coal Trades Review*, September 9, p. 335.

The Iron and Steel Institute.—*The Iron and Coal Trades Review*, September 9, p. 323.

Economics.

What is Wrong with Cost Accounting?—*Iron and Steel of Canada*, August, 1921, p. 203.

The Economics of Coal Production.—*The Colliery Guardian*, September 9, p. 733.

The next monthly meeting of members of the Geological Society of South Africa will be held in the Main Hall, 1st Floor, Scientific and Technical Club, 100, Fex Street (between Rissik and Loveday Streets), Johannesburg, on

Monday, 10th October, 1921, at 8.15 p.m. Business: The minutes of the ordinary monthly meeting of members held on 29th August, 1921, will be read. Election of new members. The following papers will be open for discussion: "The Nepheline Rocks of Sekukuniland," by S. J. Shand, D.Sc., Ph.D.; "The Geology of a Small Area East of Bulawayo," by A. M. Macgregor; "The Nature of the Tin Deposits near Kuils River, Stellenbosch District, and their relation to other occurrences in the neighbourhood," by A. V. Krige, M.Sc.; "On Some Mineral Occurrences in the Namib Desert," by P. A. Wagner, D.Eng., B.Sc.; "On the Occurrence of Oil in Madrid, No. 281, in the Bethlehem District of the Orange Free State," by A. L. Hall, M.A., F.G.S. The following papers will be read: "On the Asbestos Occurrences near Kaapsche Hoop, in the Barberton District," by A. L. Hall, M.A., F.G.S.; "On a New Occurrence of Stichtite, from the Barberton District," by A. L. Hall, M.A., F.G.S.; "The Carboniferous Glaciation of South Africa," by A. L. du Toit, D.Sc., F.G.S.

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Early History of De Beers.

COTTY'S—CECIL JOHN RHODES AND BAXTER'S GULLY—A LADY DIGGER.

(By W. P. Taylor.)

The name Cotty may mean little, or it may mean much. It came from the old country a good many years ago, and there are still a few who remember "Cotty." Cotty and De Beers went together in the seventies, and Cotty was as well known as De Beers itself, for Cotty was De Beers; at least when you went to De Beers you found Cotty. Sidney Cotty was the universal provider of De Beers. He provided the diggers and their wives with practically all they required; he provided the diggers themselves with drinks at "Cotty's Bar," and then he provided John Birbeck with gold, and not only John Birbeck, but all those that ran out on Saturdays, for Saturday was a golden day, not only at De Beers, but everywhere at the mines. The Kafir boy had to get his 10s. on Saturdays, and there was always a rush at the banks. Gold ran to a premium. Men came to town in their best clothes, and those that sold their diamonds late had to be provided with plenty of gold to pay boys, and that's why Cotty was always terribly busy on Saturdays and spent most of his hours counting gold. Cotty was English. He lived English, eat and drank that way, and did sound English as he was born. He never could have competed in the Taal. First of all, he ran on strictly English lines; one of the most conservative of men. After he had been many years in Africa he lost nothing of his English mannerisms or speech; never answered a question without long moments of deliberation; never discarded his black bowler hat. If he could have continued life in his grandfather's collars and black stock, he would never have worn other; but in a white shirt and black tie—a small stiff bow tie, and sound English clothes, Cotty came to stay at De Beers. In course of time he sent £2 for his father, and there was an earlier edition of Cotty: a Gladstone collar, a black stock, and a Gladstone face shaved clean, and under his chin, there, reminiscent of Pegotty, was the old, old fringe of hair that men wore when Charles Dickens wrote his glorious descriptions of British character in the forties of last century. There were other members of the Cotty family; they were all more or less up to the old conservative British standard. Miss Cotty answered to a Dickens maid, who reticently went through life with silent purpose and unchanging garb. She was one of the few who we admired for industriousness, but, I fear, beyond that there was no note of romance. Amongst these Cottys we moved for many seasons. In this atmosphere there were men who responded nationally. There was a Swede, an American, and some Australians, but Cotty's daily course, like a vessel sailing under the Union Jack, had passengers and crew logged British.

It is fitting that I should introduce the chief character that for several years dominated Cotty's. Cecil John Rhodes first took an interest in De Beers when "Baxter's Gully," a long triangular depth cut into part of the mine by one Richard Baxter, was flooded. Baxter worked this claim in De Beers, on shares, for William Dudgeon. The ground was fabulously rich, but a great spring of crystal water suddenly flooded his workings and gave him and De Beers a long rest. It was then that Rhodes became interested. He concluded a contract with the Diggers' Committee, and Johnnie Ramsbottom brought his engines and started to pump out water. There was more water than they thought, and incidentally, there were more diamonds. The contract lengthened, and as the water subsided and the ground became workable, William Dunsmore secured Dudgeon's ground, Rudd and Rhodes bought claims adjoining, and very soon the nucleus of the great De Beers Company came into life. Like all mining concerns, it had its vicissitudes, but its origin was simple and essentially British.

John Birbeck's office adjoined Cotty's Bar. John was a handsome Welshman, tall of stature, and with a great soft beard. If he had lived a few thousand years ago he would have worn the old true Welsh garb and carried a mighty club, but as it was, he showed his nationality in his face, just as a Scotchman does in his shaggy beard and brow, or an Irishman in his tongue's wit. In the mornings the sunshine poured into office and bar, and when the shadows moved to the east a Cape cart invariably brought two men from Kimberley. One was thin and had a scanty beard; he had long been associated with Rhodes, and in the partnership I had marked him down as the silent member. If one heard conversation between Rhodes and Rudd, it was invariably Rhodes' falsetto pressing a point or arguing from various facets. Rudd invariably was silent, but monosyllably answered Rhodes' appeals. The Cape cart stopped at Cotty's, and Rudd and Rhodes walked to the headgear and peered down the mine. I have seen these two men stand silently gazing into the mines of Kimberley and De Beers. Rhodes in a brown coat with white flannel trousers; a characteristic brown bowler hat—it was not a hat that could have come out of the hunting field, but it had never come from the city, or even the West End; it was simply Rhodes' hat, and from what I recollect of it, I should never accuse it of ever having been new. I don't think Rhodes liked new hats. I'm certain he hated new clothes, and like my old master of the pack I hunted with, had no great love for new people. Rhodes, as I knew him, was reminiscent of old-fashioned English county. If he had followed his father and been a parson, he would have stuck to old county fashions. I rode next to an old country squire in the "Old Berks" for several years. He always wore a brown hunting coat; it might have been twenty or thirty years old, and showed its wear, but it showed its historic master in alienable country colouring. Rhodes' coat and hat matched dear old Squire Lenthal's coat. In all the years that I knew Rhodes, he never lost his county colouring. I saw him on the mine, in the town, on the veld, and, lastly, in the House of Parliament at the Cape. Wherever he was there was not only that commanding air that was his throughout, but there was ever a something reminiscent of an English county. All the Rhodes showed public school characteristics, and perhaps none of them more so than Colonel Frank Rhodes.

Cotty's had a yard as well as a bar. In the yard was a quoit pitch. It was customary not to "stand drinks" as we do at the Rand Club. From 4 to 6 the gathering played four-handed quoits for drinks. Captain Stanley Louw, C. D. Rudd, and one or two others invariably looked on, but most of them took their turn and played. William Anderson, Rhodes' partner, had a glass eye. He never played quoits but once. Thinking himself alone at the pitch, he ventured to throw a quoit, and his glass eye, not seeing Myers, who was at the opposite end, caused the direful tragedy of Myers' death, for the quoit fairly caught him on the brain, and he succumbed. In Birbeck's office a good many important matters connected with the early business of De Beers was transacted. Birbeck had Rhodes' confidence, was as close as a clam, and never speculated. I never knew him to own a claim or a share. Rhodes had the greatest regard for Birbeck's judgment and often acted on his advice. As De Beers developed, so did Birbeck's business, for until the company opened its offices in Kimberley, Birbeck bought all its finds. I am afraid I have not given as clear a picture of those days as I should. Some years earlier we sifted and sorted the soft yellow ground. There was a lady, a little lady, who had a table on a high mound of gravel. Every day she would walk to it from her tent, a coloured sunshade shading an old-fashioned print sun-bonnet, old-time mittens covering her hands, and a rather fat King Charles spaniel following in her wake. When too tired to sort, she would peer from the winch, where they hauled up the ground. I often wondered what her dreams were. For although dia-

mond digging serves you with the most delicious dreams, yet one cannot always go on with the same old dream. It was, however, a delightfully quiet life. Sorting for hours and hours, your mind could wander where it would, so long as your eye kept on the spread of gravel that your scraper flung over a clean space. But though our new life has brought every disturbing contraption that science and manufacturers could devise for man's annoyance and mortification, in the seventies we revelled in peace and contemplation and days of dust and gravel. I left the fair lady looking down into the depths of her claim. It was a rich claim; not large, but it served its purpose. She worked it well for several years. John Birbeck bought her diamonds, and whenever she went to sell a parcel of stones, the boys hung around. She had a slim figure; it might have been the waist of a girl of eighteen. I have no intention of disclosing her name, but she was our one lady digger. Many a time have I taken a scraper and helped her sort. Many a time have I walked up and down the little footpath that led from tent to mine. She was not of the modern mining class, nor of its day, and our conversations took us over wide fields. And then, when she was no more, I sold her claim to Alfred Beit. It was the first that he bought in De Beers. I bought many claims for him, but none richer. This purchase was the first rung on his ladder of fortune. It cost little; it was her all. She died without fortune; she died without debt; her mite went to found the fortunes of a millionaire—a little stepping stone such as this has often led to greatness. Faded from memory with the many parting years, and as you fade, little lady, I still see journeying to your claim the mince figure shaded with sunshade, the kerchief's colouring, and your mittened hand. What your heart carried during those years I will not tell. Creditors claimed your all, and they were satisfied. You took your greatest asset with you; it was worth more than the diamonds of all the mines to you, and you kept that wealth. Man may amass gold—mountains of it—and when he dies his soul's aeroplane cannot take even its shadow with him; but a heart that can cherish carries love, and the burden of it is so light that it will travel to eternity, and beyond, with what is called the soul.

Age had not yet marked their brows. In ruddy youth they tossed the quoit. They quaffed with health and mirth. The quoits' clink will sound there no more; the sunshine glinting through the narrow passage will never touch those forms. Think not as you pass by that in these shadows there lurk nought but deadly ghosts. Mercurio's ghost could never be deadly. And those that have gone from that old spot were of his kin. We cannot bring it all back again, but there is a joy in reviving old recollections, and though their sounds are silent, there is in memory the one connection that alone can take you back, and those old friends who still live and remember can glance back to Cotty's and see Rhodes, Dunsmore, Palmer, Maine, Wright, Rowe, Slatter, Robinson, Meyer, Alderson, Rudd, Birbeck, English, Compton, Gardner, Ted Slatter, Breda, Stigling, Rivas, Niekerk, Hull, Shields, Anderson, Wolhuter, Harris, Parker, Gray, and Walter Ward, the mine inspector, on his grey Basuto pony—that flea-bitten grey. His master, with a great wide pith helmet, incessantly cantering over dumps from mine to mine. There were two ponies that had many friends—one was Walter Ward's, the other O. J. Skill's. Dear old O. J.; whenever you met him he said, "You haven't such a thing on you, perhaps, as a match?" Then, when you gave him the match, "Oh, I say, I forgot, you haven't such a thing as a pipeful of tobacco?" Skill and Cator smoked from many pouches.

The certificates issued by the Mines Department for the period ending 30th September, 1921, were as follow:—Mine Overseers (Metalliferous Mines): P. A. Corbitt, E. Marks, C. W. T. Pittendrigh. Mine Surveyors: T. M. Bremner, H. A. T. Child.

Mr. Victor Kent, who has been associated for the past 25 years with Messrs. Geo. Cradock & Co. (S.A.), Ltd., is relinquishing his position in order to start up in business on his own account at No. 31, Ground Floor, Cullinan Building.

Concerning Mines and Men.

Mr F. W. Mills, Chief Electrical Engineer to the South African Railways, has returned to the Rand.

Mr Jonas Bethell, who is writing the series of articles on steel now appearing in this journal, has expressed his willingness to give technical advice and will, to the best of his ability, endeavour to help readers out of difficulties in the heat treatment or handling of steel. Mr. Bethell comes direct from Sheffield, and as a specialist in steel is so rarely among us, we hope that advantage of his generous offer will be taken.



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Letters to the Editor.

"THE REAL VALUE OF GOLD."

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—*The S.A. Mining and Engineering Journal* of the 10th instant contains an article by Mr. S. J. Speak, A.R.S.M., M.Inst. M.M., entitled "The Real Value of Gold," the said article taken over from the *London Mining Magazine*.

It is the first practical solution I have yet read, and I have read several suggested solutions of the currency problem. I am quite in agreement with Mr. Speak's suggestion that the price of gold should be fixed at six guineas per ounce. There is just one point in Mr. Speak's article which I should have worded differently. Under the heading of results of the scheme, he says "the immediate results would be somewhat as follows: (1) Wages need be little disturbed for some time. I should have worded it "wages need not be disturbed at all." No one really wants to disturb wages. Certainly not the miners. Certainly not the merchants, storekeepers and shopkeepers. And certainly not the mine-owners and controllers of the mines, for they all have enough money to buy food and drink and cigars and wearing apparel, and any spare time they may have they would rather spend playing golf and doing things like that than spend hours, if not days, at the offices of the Transvaal Chamber of Mines debating why wages should be reduced.

People who have written and spoken on the currency question may ask on what grounds I claim to be an authority on a subject like "The Real Value of Gold."

So, Sir, I suppose I must give my credentials. I assisted in the production of gold which was sold in London through Messrs. Sharp and Wilkins at the price of 84s. 7½d. per ounce "fine."

I went to Swansea early in the year 1875 in the employ of Messrs. Vivian and Sons, who at that time smelted more than 75 per cent. of the gold and silver ores produced throughout the whole world, including the United States of America. The whole time I was in the employ of Messrs. Vivian and Sons I acted as assistant to the general manager, the late Mr. James Nettell.

I left Messrs. Vivian and Sons' employ some time about 1883, to become managing director of the South Wales Smelting Co., Ltd., at the Landore Silver Works (Gioth Bach).

As a mine-owner I have been the sole owner of a copper mine out of which I made money.

The sole owner of a colliery, where I lost money, and the sole owner of an iron ore mine, where I also lost money. Every mine does not yield profits; to quote an old South African sporting saying, "One cannot make every post a winning post." I have also been a director of several other mining companies, my co-directors being leading men in Paris, Rome, Florence, London, etc. my London co-directors including men like Mr. Edmund Davies, Mr. Edward Jekyll, the late Mr. Percy Tarbutt, and others.

I also claim to understand English, French, Italian and Spanish workmen, for I have performed manual labour with all four.

I have fought a Cornish miner in Cornwall, in a skittle alley, and a Welsh collier at Llangefelach Fair, near Swansea. I have been a large employer of labour practically all my life, or have had the supreme direction of mines and industrial concerns employing labour. These are my credentials. Sir, for claiming to speak "as one having authority," for I can quite understand the questions between the mine-owners and the miners from both standpoints.

Personally, I would like to be in a position to pay any miners I employ five pounds per day, and the mine-owners and controllers of the Johannesburg gold mines, not being

fools, would no doubt like to be in a position to do the same, for in practice it would mean more money for them and no trouble and annoyance by strikes and industrial disputes.

It may also be said that a lot of what I have just written is irrelevant, but it is not; it is material, and very material to a proper understanding of the present-day position.

When the amiable and highly-respectable old gentleman or gentlemen fixed the price of "fine" gold no workman in any part of the world received a "living wage"; they lived under appalling conditions as regards housing, food, raiment, etc. The younger generation have read of these things, but I also speak from my own knowledge.

We are now told that according to the laws of political economy the price of gold must remain at 84s. 7½d. per ounce "fine," and that wages must come down and the standard of living be reduced.

We are not living in an age of superstition and people nowadays will not do a thing or submit to a thing because an amiable and highly-respectable old gentleman in days long gone by said so-and-so; put up a monument to the dear old soul in the market place by all means, if it so please his worshippers, and I will contribute my "mite," but for gracious sake do not let superstition and veneration for the learning and authorities of a dead and gone past, whose circumstances and conditions bear scarcely the slightest resemblance to the surroundings and level of thought of to-day, cause us to try to perpetuate such a monument of folly as keeping the price of "fine" gold at 84s. 7½d. when, except in the case of a few rich mines, it costs more than one hundred shillings (100s.) per ounce to produce it.

I am not trying to pose as a modern Jonah crying "woe" in the streets of Ninevah, but if it is attempted to reduce wages and lower the standard of living, as the political economists and the 84s. 7½d. gentlemen desire, there is going to be trouble, and lots of it.

Some authorities say agriculture is the backbone of every country and that the gold mines will die, that even Methuselah died; quite true, my friends, but if the price of gold is fixed at six guineas per ounce "fine" South Africa will be producing gold in large quantities when aeroplanes are as plentiful as natives on push-bikes in the streets of Johannesburg.

Of course everything in this world is a matter of comparison. When authorities speak of South Africa as an agricultural country I agree with them to the extent that it is an agricultural country when compared with the southern part of Patagonia and places like, but it is not an agricultural country when compared with England or France or Italy. Do not get on your hind legs until you have looked up the Government agricultural statistics. If you call a country an agricultural country which has an average yield of two point two (2.2) bags of mealies per acre and 4.3 bags (four point three) of wheat per acre, I do not. Save perhaps Natal (the garden Colony) and a few spots in the western part of Cape Province and parts of Zululand, South Africa is a ranching country, and not too good at that.

In the early days the country which is now the Union of South Africa could have been described as a good ranching country, for the Boers fed their flocks on the high veld during the summer and trekked with them to the low veld during the winter.

The Union of South Africa, with the exceptions mentioned, will remain and be only an indifferent ranching country until the scheme of Professor Swartz to bring the waters of the Zambesi into the Union is "un fait accompli."

South Africa is a rich mining country. I am speaking from my own knowledge, for I have travelled the Union from north to south and from east to west. It is not an unsupported statement.

The Government mining engineers say the Transvaal is the richest mining country in the world.

South Africa will be a rich mining country when the present rich American mines have followed our old friend Methuselah.

I, like thousands and thousands of others, am anxious to see ex-officers and men comfortably settled in life. Well, follow Mr. S. J. Speak's advice and make the price of gold six guineas per ounce, and there are hundreds of spots in the north of the Transvaal and Rhodesia that would give them something more than a comfortable living and be the means of greatly increasing the general prosperity of the country. It is by sound practical suggestions like that of Mr. Speak that normal conditions and the general prosperity of the world will be restored; it will not be restored by leagues and conferences and clinging to ancient shibboleths. We people of the year 1921 require money to buy food and drink and wearing apparel and smokes and things like that. Some people have money, but many more haven't, and those that have not intend getting it and being in the great majority, who is going to stop them? If the battle cry at the next election were increase in the price of gold and no reduction of wages, General Smuts would have no alternative but to visit his friend, Lloyd George, and I bet that those two very able gentlemen after luncheon would do more to settle the currency question and in consequence the unemployment question than all the leagues, conferences, ancient shibboleths and superstitions between Timbuctoo and Mesopotamia.

To revert to the demand for a reduction in wages and a reduction in the standard of living, I remember a different standard of living among workmen to that which obtains to-day.

At a Board meeting of the South Wales Smelting Co., Ltd., Mr. Joseph Gordon Gordon, one of the directors, asked me the rate of wages we were paying the various workmen. My answer was: Blast furnace or Cupolo furnacemen 4s. to 5s. per day, reverberatory furnacemen the same, Calciner men 2s. 6d. to 3s. per day. Mr. Gordon, who is a nephew of the late Sir William Siemens, and who at that time was acting as managing director of the Landore Siemens Steel Works, said: "I am paying furnace forehands six pounds per week and others in proportion." Then he turned to me and asked: "Cannot we improve our rate of wages, which I consider disgraceful."

I replied that I agreed with him, but that our rate was somewhat higher than that paid by the other smelting works and that unless we altered our system of smelting it was impossible to improve the rate of wages.

Mr. Gordon then asked if it was possible to do so. I replied I was certain it was, but that it would require more capital. He answered: "You work out the system and I undertake to find the capital."

If the furnaces and calciners of to-day had been at my disposal we could have paid our furnacemen and calciner-men one pound (20s.) per day.

Unfortunately at that time the price of silver was on the down grade. When I went to Swansea in 1875 the price of standard silver was sixty pence per ounce and had been so for quite a long time. At sixty pence per ounce for standard silver the intrinsic value of the shilling is one shilling. I am speaking of the shilling minted a few years ago, not the debased thing of to-day. I do not suppose the Chancellor of the Exchequer gleefully debased it, but in the words of the old saying, "Needs must when the devil drives."

When we commenced smelting at the Landore Silver Works the price of standard silver was fifty pence (50d.) per ounce. When we closed down the price of standard silver was less than thirty pence (30d.) per ounce. This fall in the price of silver upset all my plans for improving our methods of smelting, for who would provide capital on a falling market?

If Mr. Speak's suggestion is adopted, the currency question and the question of the low-grade mines will both be solved, and very satisfactorily solved. Johannesburg will continue to increase in size and prosperity.

To enable the practically unlimited quantities of low-grade ores in South Africa, I say South Africa and not only Johannesburg, to be worked at a profit, miners' wages must

be reduced at least ten shillings a day; that is, if the price of gold remains at 84s. 7½d.

By low grade gold ores I mean ores containing only 3 dwts. of gold, the mineral mentioned by Mr. Samuel Evans at the last meeting of the Crown Mines, Ltd.

Is there any sane man in the whole length and breadth of the land who believes for a moment that the miners of the Rand would accept a ten shilling per day reduction in their wages without a long and bitter strike, which would mean disaster not only to Johannesburg, but to the whole of the Union?

I also ask does any sane man dream that the controllers of the mining industry or that the Government would allow such a state of affairs to come to pass?

So-called high wages and so-called high living have come to stay just as natives and push-bikes have come to stay.

I am afraid that some of the good people who write and speak on the currency question and political economy and things like that remember only what they have learnt in their youth.

"The times are changed, my masters"; these are the days of raising up, not levelling down.

It is no more possible to go back than it is to "raise spirits from the vasty deep."

The controllers of the mines know it as well as the labour leaders, the man in the street knows it also, but he does not possess the special knowledge to enable him to write on such a subject as "The Real Value of Gold," but all the same he is thinking what I am now writing.

Is there any modern intelligent man who can give intelligent reasons why Mr. Speak's suggestion should not be adopted?

Political economists, exchange and currency experts do not get stranded on the bank; move with the times and let us have the benefit of your knowledge and experience, or I fear the pendulum will swing to the other extreme. The people, that is the voters, can fix the price of gold at ten pounds if they so decide, and make it a serious criminal offence to be possessed of a bank note or bill; there would then be such a demand for gold as the world has never seen and the price of ten pounds per ounce would not be too high to enable the demand to be satisfied.

Well, before I conclude there is another matter connected with the gold industry which I must mention, and one that will provide employment for a large number of men, viz., the working of mines containing so-called refractory gold ores.

When I came to South Africa about twelve years ago I first heard the expression refractory gold ores. I had, of course, heard of complex gold and silver ores, that is gold and silver ores containing also copper, arsenic, antimony, zinc, etc. I have smelted thousands of tons of such ores and I like them, for these are the ores that give smelters their profits. To a smelter such a thing as a refractory gold or silver ore does not exist. I have been called refractory and other things when I was a boy, but I never heard the word refractory used in any other sense until I came to South Africa. I am informed, and I also know from my own knowledge, that there are large quantities of so-called refractory ores in Rhodesia and the Transvaal. These ores have a good commercial value. The owners and shareholders in properties containing the said ores are at the present moment regarded as having been unfortunate in their speculations. This is not my view. Again, I speak as "one having authority." I will endeavour to express my meaning so that the non-technical man who is the owner of such properties may understand me. I will take a gold ore containing, say, one ounce of gold per ton, also antimony, arsenic and copper. The copper may, of course, be any figure, the more the better, and the antimony and arsenic may be as much as 30 per cent.

For such an ore on the basis of "fine" gold at five pounds (100s.) per ounce I could pay f.o.r. at a smelting works £2 10s. (twenty shillings) per ton. For higher gold

contents I could, of course, pay more money. Antimony, arsenic, etc., have nothing to do with the case. I would also pay for all copper contents over 2 per cent. (2%). The price per unit of copper would depend on the market price of copper and also on the percentage of copper contained.

In concluding, permit me to say, as a mining engineer and geologist of over forty years' experience in various countries, the last twelve being in various portions of the Union, including the South-West Protectorate, that you have in South Africa a very old country from a geologist's point of view, but a very young country from a commercial point of view. As a place for immigrant workmen it has a life of less than fifty years.

Speaking metaphorically, it is for miners and men of good physique "a land flowing with milk and honey." I have been in several countries, but I have never been in one to come near it in the matter of commercial mineral occurrences.

You have the richest gold occurrences in the world with a practically indefinite life. They have scarcely been scratched yet. You have practically a monopoly of diamond occurrences; you have important coal fields and oil shale deposits, and I say with a due sense of responsibility and after close and careful investigation and study that you have the largest and richest copper deposits the world has ever seen.

As far as I know, after the great American mines are exhausted, Africa, and particularly South Africa, is the source from which the world's supply of copper will come. Only in exceptional cases can a copper mine be brought to the commercial or producing stage in less time than three years, and, generally speaking, to do so, requires the employment of a considerable capital. There are other minerals, but those I have mentioned are the ones of leading commercial importance.

Permit me in the penultimate portion of my letter to say: Give up worrying about trifles and don't have sectional disputes and strikes; they cost you and others money and cause discomfort, and who in a young country like South Africa, where everyone must hustle, can remember, say, in six months, what the trouble was about.

If Mr. Speak's suggestion is adopted and the price of "fine" gold fixed at six guineas, there will never be a general strike.

To the port towns and the farming districts I would say: Your prosperity, nay, your very existence, is dependent on the mining industry.

Do not be pessimistic at the present moment: your social conditions and material conditions are better than in any other country in the world, and there is none to compare with you in future prospects.

Recently it has been suggested to me that I should select a site, design the works and furnaces, etc., and act as managing director of a "Customs" smelting works having also its own mines to ensure a regular tonnage for the furnaces.

So-called refractory gold ores, copper ores and other ores will be purchased there for cash. Immediately the ores in question have been weighed, sampled and assayed, the cash will be at the seller's disposal. Think the matter over and try to realise what a difference such a works will make to the whole of the Union!

The "small" man will only have to purchase a few picks, shovels, explosives, etc., and engage with a Boer farmer to transport his output or production to the railway. There will be no occasion to erect batteries, etc., or to wait months for his money while his produce is being realised in Europe or America.

If necessary, we shall establish subsidiary works in districts that justify such a step.

At these works the mineral will be concentrated; that is, partially treated and the product sent to the main works.

If the suggestion had been made, say, three months ago, I should with pleasure have agreed to it.

Since then some friends, on my recommendation, have purchased two farms which I consider contain mineral occurrences of great commercial importance.

I have undertaken to test these properties and, without their freely given consent, I shall confine my attention to these properties until I feel justified in engaging assistance to carry on the development.

I very much regret the suggestion was not made three months ago, for smelting is not only a part of my profession; it is one of my "hobbies."

I would mention that a smelting works cannot be established at or near Johannesburg or any other residential centre, for the furnace fumes are principally sulphurous and arsenic gases; the former would destroy all vegetation within a wide radius, and the latter is detrimental to animal life.—I have the honour to be, sir, your obedient servant,

G. H. BLENKINSOP.

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CONCRETE PIPES.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—As a news item we think the following will be of interest to your readers:—In connection with the City of Kimberley new sewerage and drainage scheme, which is giving relief to many unemployed, and for which a large loan was recently raised by public subscription, it is interesting to note that the first contract for concrete pipes has been awarded to the firm of J. Wright & Sons, Ltd., of Jacobs, Natal, and this on open tender and against keen competition.—Yours faithfully,

J. WRIGHT & SONS, LTD.

WITBANK COAL AREAS.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—On page 137 in your second special Coal Number, July, 1921, is a map showing the principal coal areas of the Witbank district. Wakefield Siding is shown as being on the farm Elandsfontein, when it is actually on Rondebult and *not* on *Elandsfontein*. I enclose plan of the farm Rondebult, on which you will see the position of Wakefield Siding.—Yours faithfully,

W. HAMPSON.

FAR EAST RAND GEOLOGY.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Would Mr. Bleloch, through your journal, enlighten me on the geology of the Far East Rand, that is as far as his correlation of the different reefs is concerned.

First, Mr. Bleloch states: Langerman's Kop, Reitfontein and Van Ryn Reefs are one and the same, leaving Langerman's Kop out of it. How does Mr. Bleloch account for Reitfontein Reef underlying Hospital Hill formation, and Van Ryn Reef overlying Hospital Hill formation?

Second, placing Central Rand and Reitfontein Series back into position before faulting, would this not put Reitfontein to correlate with Orange Grove—its true position? Central Rand would be in place near Reitfontein Station and correlate with Modder West, and our great mystery, the Van Ryn, would correlate them with the upper Bird Livingstone Series.

Why this correlation, which is mine, on the Far East Rand? We are practically undisturbed, and the Central Rand, having been pushed forward about a mile, would then leave Central and Reitfontein to be picked up further north-north-east of the Blue Sky. When this break occurred, which, no doubt being at one with the upheaval at the back of Reitfontein, a dyke went through the country from Reitfontein through Blue Sky and continued south, Central Series would then have been standing far above the Far East Rand Series, allowing the coal area to come in and bank up against this wall; hence no coal formation west side of dyke. The Hospital contorted beds may be found two miles north of Benoni Township, and the large pebble reef overlying Reitfontein is to be found at this point underlying the contorted beds. Van Ryn is certainly not Central Main Series and certainly not Reitfontein. Can Mr. Bleloch put forward any other theory? Is Langerman's Kop not the portion of country connecting Reitfontein with Orange Grove carried in on top of the diabase. I wonder?—Thanking you,

MINER.

THE "PASSING" OF THE GRAVITATION STAMP.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—In the *South African Mining Journal* of October 1 appeared a paragraph which foreshadowed the "passing" of the gravitation stamp in the new economy of the Springs Mines, Ltd. Well, everything and everyone in this world must come to an end; even Methuselah died. No

longer will "Cousin Jack," when he awakes in the still night, hear the batteries roar reminding him of the roar of the ground sea beating on the western shore of his native Cornwall. Like a great many institutions in Johannesburg, the gravitation stamp has long outlived its day of usefulness. It has died a hard death, the final agony being prolonged by professional jealousy, which refused to recognise that simpler and cheaper methods of crushing must take its place. It's the old, old story, "history repeats itself." Even the Transvaal Chamber of Mines discovered this when they threatened to oppose an application for a patent on the part of Mr. G. H. Blenkinsop, on the grounds that the process in question had been described in a book entitled *Agricola's "de re Metallica"*, published in 1556 (Hoover's translation). The opposition was not proceeded with. Maybe the Transvaal Chamber of Mines, on full consideration, decided that an opposition founded on this hoary publication might fail, and they therefore refrained from calling on this testimony of a bygone age. The Transvaal Chamber of Mines clearly thought that the process described in the venerable publication of 1556 bore a resemblance to the one for which I had applied for a patent. On the face of it no doubt they were right, but my patent agents are of opinion that my application of the process constitutes a distinct novelty.

The process, briefly, is this. I heat the ore or mineral under treatment to a maximum temperature of 600 C. and then plunge it into cold water. The expansion caused by the heating and the contraction caused by the sudden cooling render the mineral extremely friable, in fact so much so, that two pieces of Rand blanket from a depth of, say, 3,000 feet, can, after being subjected to this treatment, be crushed in the hands as easily as two walnuts. This simple test can be made by anyone with the aid of the kitchen fire. This process does away altogether with the gravitation stamp and makes the all slining of the ore and the consequent improvement in extraction a positive certainty. Like the new system foreshadowed at the Springs Mines, it does away with plate amalgamation with its heavy losses caused by pilfering.

In addition to the increased gold recovery, there will be a further substantial gain in the matter of increased duty to be obtained from the tube mills. I do not think I am over-estimating the gain under this head when I put the increased duty as 3 to 1. This process will be a boon to the "small" man of Lydenburg and Barberton. It will no longer be necessary for him to impoverish himself, his friends and relations for funds wherewith to erect a five-stamp battery. An outlay of a few pounds will provide for the construction of an efficient heater, and a mortar mill will efficiently do the crushing or slining.

I propose to charge only a nominal royalty for the use of the process. In the case of mines treating a tonnage equal to the average Rand mine, I propose to charge a royalty of one halfpenny per ton. This small amount of royalty would scarcely pay the cost of collecting in the case of small mines, and in such cases, as the extraction would also be increased by, say, 2 dwts., I propose to charge a royalty of threepence per ton.

Every mine on the Rand that adopts this process will at once lessen its crushing costs to the extent of from two shillings to half-a-crown a ton, and they will at the same time increase their gold extraction to the extent of from one to two dwts.

What have the low-grade mines to say to this? No intelligent reason can be advanced why this very simple process should not be adopted. Now that the Springs Mines have shown the way in a tentative fashion, will not the low-grade mines take their courage in both hands and show the consideration due to their shareholders and the mineworkers by adopting a process which is simplicity itself and will give practically immediately beneficial results. In the interests of all concerned, it would be better if the heads of the mining industry relied more on their own intelligence and less on that of their technical advisers. If they had done so, the superstition which has so long preserved that primitive symbol of early metallurgy, the gravitation stamp, would long ago have been swept away.—Yours, etc.,

G. H. B.

AN APPRECIATION OF THE GEOLOGICAL SURVEY.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I should be pleased, through the medium of your valuable paper, to be allowed to express an opinion on the various comments appearing in the journal on Witwatersrand geology. The various letters and articles are interesting, but the disrepute the Government geologists are put in is very unfair. Having an intimate knowledge of the Witwatersrand system of rocks and the accompanying reefs, I can speak with some knowledge of the system, and also of the method in which way the geological surveys have been carried out. The work done by Dr. Mellor in mapping the Witwatersrand area has been done very accurately, and he has also given the correct reading of the system. I have carefully examined Dr. Mellor's map and find the work thereon is a true representation of the outcrops as one sees them in the field. Dr. Rogers' work I do value in the same measure as Dr. Mellor's. Though I am not acquainted with the entire Heidelberg district, I find Dr. Rogers' work there in the areas I know to be accurately mapped. His description of the Witwatersrand rocks from that district is in agreement with the system here on the Rand. The series of the upper system I know from depths as well as the surface outcrops, and were there any inaccuracies they would easily be detected. It is regrettable that the services of geologists of the high training and experience of both Dr. Mellor and Dr. Rogers have not been more fully appreciated. Their work is a great credit to the geological survey and a lasting benefit to the community.

PETER MACADAM, JUNR.

Review.

MINERAL OIL PLANT.

At a time when widespread interest is being centred in the oil shale industry, publications on the technology of oil shales and plant required in their treatment are of great help to the parties concerned. The catalogue issued by A. F. Craig & Co., Engineers, of Paisley, Scotland throws much light upon the subject of mineral oil plant.

Their connection with the mineral oil industry for over forty years has enabled them to keep in touch with all the advances made in the oil shale industry, and has resulted in their producing a most up-to-date and efficient plant. Their well-illustrated catalogue gives the principal parts of oil plant manufactured by them. Their oil shale retorts are of the Pumpherson type erected in ovens of four retorts each. The capacity per retort varies with the quality of the shale treated, but on an average shale yielding, say, 20 to 30 gallons of oil to the ton, the throughput may be taken as about 3½ tons of green shale per 24 hours per retort.

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), 15 Metal Certificates were granted in South Africa, and of this number our students secured 10 certificates. Previous examination we secured 7 certificates from 8 entries, and in two other recent examinations 15 passes from 19 entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured 3 certificates from 6 entries.

OVERSEAS EXAM.: 21 certificates secured 1920, and 14 certificates to date, 1921.

SURVEY EXAM.: We have secured practically all the certificates granted by the Mines Department during recent years and have obtained 60 certificates to date.

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CAPE DIGGINGS RETURNS FOR AUGUST.

The following is the official statement of the output of diamonds from the public diggings in the Cape Province during the month of August, 1921:—

Barkly West.

Area.	No. of Diggers.	Weight Carats.	Value.	
			£	s. d.
Bap Hope	2	5½	31	0 0
Blauwbank	13	73½	717	10 0
Delport's Hope	36	186½	1,587	2 6
Eland's Hoek	1	27½	237	10 0
Fool's Rush	2	7½	67	15 0
Forlorn Hope	2	2½	7	10 0
Gong Gong	37	24½	2,306	12 6
Good Hope	42	19½	1,141	10 0
Groot Kop	1	2½	30	0 0
Harrisdale	20	136	1,242	10 0
Hebron	75	263½	2,053	0 0
Holpan	20	104	613	5 0
Holsdam	1	13	2	0 0
Jonas Kop	2	4½	19	5 0
Kieskama	3	6	29	5 0
Kilmorey	1	8½	75	15 0
Klipdam	44	270½	1,569	5 0
Klipdrift (Barkly W. Common- age	48	162	758	4 0
Last Hope	1	2	18	10 0
Longlands	57	401	3,817	5 0
Niekerk's Rush	16	161	1,610	14 6
Rickett's Prospect	10	23½	157	15 0
Scholtz's Prospect	8	47½	276	15 0
Snyder's Rush	14	76½	557	10 0
Sweetwater	2	6½	67	10 0
Van Zoelen's Laagte	12	78½	487	10 0
Waldeck's Plant	35	272½	2,350	15 0
Windsorton	7	20½	162	10 0
Winter's Rush	18	143½	1,737	10 0
Zwaartand	1	12½	151	10 0
Totals	531	2,943½	£28,885	13 6

N.B.—The number of claimholders in the Barkly West district during the month of August, 1921, was 1,383.

Herbert District.

Boomplaats	8	21½	165	15 0
Brypaa	11	64½	534	10 0
Davidsdrift	1	1½	3	10 0
De Bad	1	44½	555	0 0
Douglas Kopjes	4	3½	16	15 0
Mosesberg	10	150½	922	15 0
Platdrift	1	1½	15	0 0
Schmidt's Drift	7	16½	214	17 6
Sevonelles	1	3½	5	0 0
Totals	44	304½	£2,433	2 6

Kimberley District.

Best Pan	1	66	350	0 0
Robinson's Kopje	17	103½	1,064	15 0
Wedberg	21	137½	931	0 0
Totals	39	307	£2,345	15 0

Taungs District.

Doyle's Prospect	5	30	230	0 0
Home Rule	9	34	221	15 0
Killarney	4	18	171	17 6
Tlapeng	4	31½	374	11 3
Totals	22	113½	£998	3 9

Private Estates.

Amantia	162½	1,922	15 0
New Vaal River D. & E. Syndicate	646	5,278	15 0
Pniel Estate	158	1,210	10 0
River View Diamond Syndicate	144½	812	19 6

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September Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of September, 1921:—

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	89,000	35,729	£193,831	£69,526	27/ 11
Cons. Mn. Reef ...	50,000	17,719	96,125	19,399	30/ 8
Crown Mines ...	193,000	58,984	319,988	83,443	24/ 6
Dur. Road. Dp. ...	24,350	9,502	51,349	7,797	35/ 9
E.R.P.M.	124,000	33,652	182,560	19,607	26/ 3
Ferreira Deep ...	32,200	10,296	55,857	16,068	24/ 8
Geldenhuis Dp. ...	49,526	12,686	68,717	3,564	26/ 3
Knight Central ...	27,600	6,473	35,118	3,966	22/ 6
Modder B.	59,000	30,736	166,745	92,289	25/ 2
Modder East ...	25,000	9,791	53,034	11,087	33/ 6
New Modder ...	101,000	46,994	254,942	142,939	22/ 2
Nourse Mines ...	41,200	15,062	81,712	11,888	33/ 10
Robinson G.M. ...	40,000	7,701	41,780	2,599	19/ 7
Rose Deep	54,000	13,676	74,193	15,445	21/ 9
Wolluter G.M. ...	32,200	7,939	43,071	5,956	23/ 0
Village Deep ...	48,100	15,308	82,941	14,042	28/ 7
Tls. & averages ...	990,176	332,248	£1,801,963	£519,615	25/ 10

General Note.—The valuation of gold has been taken at £5 8s. 6d. nett per fine ounce, being 1s. 6d. per ounce less than previous month.

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of September, 1921:—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	120	57,500	25/ 6.183
Springs Mines	80	36,250	31/ 1.179

Totals and averages 200 93,750 27/ 8.086

	Value of Gold declared.	Yield per Ton.	Working Profit based on stand-ard value of Gold.	Working Profit per Ton.
Brakpan Mines	£93,217	32/ 5.081	£19,861	6/ 10.898
Springs Mines	67,874	37/ 5.375	11,509	6/ 4.196

Totals & averages £161,091 34/ 4.393 £31,370 6/ 8.307

	Estimated Premium taking Gold at £5 10s 0d. per fine oz. less exchange on remittances.	Total Estimated Profit.
Brakpan Mines	£26,199	£46,060
Springs Mines	19,212	30,721

Totals and averages £45,411 £76,781

Notes.—Brakpan: Placed to gold reserve, 1,602 fine ounces; total reserve at date, 7,818 fine ounces.

Springs: The profit for the month was adversely affected through the breakdown of the winding engine at No. 2 Shaft, which resulted in the mill tonnage being reduced by 5,000 tons, with a consequent high standard of costs, which is accentuated by the inclusion of expenditure on repairs.

Glynn's Lydenburg.

The following are the particulars of the output for the month of September, 1921, in respect of the above company:—Tons crushed 3,675, yielding 1,321 fine ounces; estimated value of month's output, £7,162; estimated profit for month, £1,314. The month's results are based on value of gold of £5 8s. 3d. nett per fine ounce.

UNION CORPORATION GROUP.

Particulars of operations on the producing mines of this group for the month of September, 1921:—

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Revenue (Including Sundry Total)	Rev Per ton
Geduld Prop.	100	45,000	16,185	£89,667	39/ 10
Modder Deep	70	43,000	23,355	127,070	59/ 1
Totals and averages	170	88,000	39,540	£216,737	49/ 5

Company.	Total Costs	Per Ton.	Profit Total (Incl. Sundry Rev.)	Per ton
Geduld Prop.	£51,442	22/ 10	£38,225	17/ 0
Modder Deep	46,227	21/ 6	80,843	37/ 7
Totals and averages	£97,669	22/ 2	£119,068	27/ 3

The above results are arrived at by calculating the gold produced at £5 10s. 0d. per fine ounce. Realisation charges in excess of normal are debited direct to revenue.

GENERAL MINING & FINANCE GROUP.

The September operations of the producing mines of this group were as follow:—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	10,800	£13,953	25.84	£15,229	£1,276
Meyer & Charl. ...	13,200	17,360	26.30	12,367	25,007
New Goch	17,000	18,912	22.25	20,379	1,467
Roodepoort Un. ...	22,600	25,153	22.26	23,133	*1,720
Van Ryn Est.	31,630	42,570	26.92	50,588	8,018
West Rand Un. ...	32,000	43,112	26.94	48,125	5,313

127,230 £161,060 25.32 £200,421 £11,081
Less loss 1,720

* Loss.

In calculating the revenue, gold has been taken at a value of £5 10s. 0d. per fine oz., less estimated realisation charges.

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ENGINEERING SECTION.

The Wilson Plastic Arc System of Electric Welding.

Electricity as a means for the joining of metals in repairing cracks or breaks, salvaging defective castings, and for metal cutting purposes, all included under the general heading of electric welding, although comparatively simple in theory, has been slower in development in this particular field than in any other service in which it has been applied. This slow growth is probably due to two causes—the scarcity of skilled operators who could manually control the arc, and reliable apparatus suitable for performing the actual operation of controlling the heat at the weld and relieving the operator from holding a fixed arc length. During the last five years, however, arc welding has made great strides, and undoubtedly a great stepping-stone, by means of which it has obtained greater prominence and the confidence of the engineering world in general, was through the successful welding of the damaged parts (principally of cast iron) of the German ships interned in American harbours at the outbreak of the War between the two countries in the spring of 1917. The work that was done on the engines of the damaged German ships demonstrated to the engineering world in general that electric welding could be depended upon to make permanent repairs, no matter how large the part to be welded, or the character of the metal. In the past cast iron has been a stumbling block for welding engineers. The welding together of many of the more ductile metals, such as wrought iron, boiler plate and parts, etc., has been accomplished successfully, in fact easily, as compared with the difficulties encountered in welding cast iron.

The Wilson Plastic Arc Welder, which was exclusively used in repairing these ships, is of the constant potential automatic control system type. It is designed to work on a voltage of 35, thus limiting the operator's arc and ensuring accurate results. A distinct advantage of low voltage at the arc is that it becomes impossible for the operator to draw out a long arc between the electrode and the work, thus eliminating oxidation of the molten metal by the air, and ensuring the metal being deposited in the correct place. With a low voltage supply, the external appearance of a weld is a certain guide to its value, and it can be safely reckoned to be free, internally, from any dangerous slag or oxide inclusions. The low voltage used also ensures better penetration of the original metal by the concentrated arc than is the case when a longer diffused arc of the higher voltage systems is used. The Plastic Arc System, by means of a special flat compound 35 volt generator feeding a special automatic constant current control panel, delivers and maintains a critical degree of heat at the weld, and thus ensures proper fusing of the original and added metal. The automatic current control of the Plastic Arc panel eliminates guesswork or fluctuating heat at the weld. Thus it is claimed that the Wilson Welder complies with all the requirements for successful welding of all classes of work to an extent which no other system has been able to approach. Demonstration plants have been imported by Messrs. Bellamy and Laubie, and a skilled demonstrator from the English works is in Johannesburg to carry out the demonstrations.

A trial run on a plant of the above description was conducted at the engineering works of Wright Boag and Co., Ltd., last week, and the claims made for the plant were

fully demonstrated. The plant was of the portable type, built to be independent of an external source of power. The welding current was generated in a specially constructed low voltage direct current dynamo. The dynamo was driven by a petrol-driven internal combustion engine. The generator delivered current at 35 volts, and the current after passing through the automatic control system was led by insulated cables to the spot where welding was conducted. In a direct current arc metallic ions are continually being carried from the positive pole to the negative, and being deposited on the latter. This effect, combined with the melting of the electrode due to the heat generated at the arc, makes welding by the electric current possible. In practice the best conditions for the deposition of the electrode metal on the part to be welded are those which will subject the deposited metal as well as the article welded to the least amount of chemical change. Internal homogeneity at the weld is essential, otherwise the join is a spot of weakness, and places a doubtful safety factor on the welded article. Over-heating during the process of welding is undesirable, as it produces structural changes in the article welded. The inventor of this system of welding has successfully coped with these difficulties by employing the short low voltage arc produced in his plant. A short arc minimises the risk of oxidising the deposited or electrode metal, due to the shorter distance it has to travel through before deposition. A short arc also concentrates the operation on a smaller area, resulting in more rapid working. This means that the metal welded is subjected to the intense heat of the arc for a much shorter time, and is thus less liable to structural and chemical change. The composition of the electrode or metal deposited can be varied to suit the article welded. This gives the plant a very large range of application, and the welding of cast iron has been made possible thereby. During the demonstrational run several articles were welded in a very short space of time, and work on cast iron was conducted with as little trouble as on wrought iron. During welding the deposition of metal is controlled by a skilled operator, who holds the metal to be deposited in a special holder by hand, and watches the operation through a specially prepared glass light filter.



Underground Electric Loco. on the Rand.

Heat Treatment of Steel.

By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Etna Works, Sheffield.

The heat treatment of steel covers the following: Annealing, normalising, hardening, tempering, and case-hardening.

Annealing.

In annealing the steel is sometimes heated below the lower critical point, sometimes to a temperature between the upper and lower critical points, and sometimes above the upper critical point, according to the objects in view (usually retained at the maximum heat for, say, 3 hours for a single bar up to, say, 6 hours for a furnace full), and is cooled very slowly (12 to 18 hours) in the furnace. Annealing is used: (1) To remove internal stresses and/or to induce softness; the maximum temperature may be above or below the critical points according to the degree of softness required. (2) To refine the crystalline structure in addition to the above, in which case the temperature must exceed the upper critical point (to secure a complete diffusion) as in normalising. Annealing is necessary before and after machining high carbon tool steels, high speed steels, air hardening nickel chrome steels, etc. High speed steels should also be annealed before forging. Some steels are first normalised to refine the structure, then allowed to go cold, and then annealed at a lower temperature.

Normalising.

In normalising the steel is heated to a temperature of 20 to 50 degrees Centigrade above its upper critical point (for, say, 15 minutes) and allowed to cool freely in air. Normalising is used to bring all bars of a batch (which have left the rolls at different temperatures and consequently vary) to a uniform condition to refine the structure (and consequently toughen) and to relieve the strains set up in rolling, etc. It has very little softening effect and is employed chiefly on the ordinary alloy steels for aircraft and motor work, etc. (All such steels should be normalised before hardening.)

Hardening.

This operation consists essentially of heating and cooling with the object of producing in the cold condition the hard constituents of the steel. There are many types of furnaces used for heating, the blacksmith's hearth, the muffle gas furnace, the flat hearth gas furnace, the salt bath, etc. In this country the blacksmith's hearth is almost in general use, but for intricate work this is without doubt the worst type of furnace in existence. However, for the general class of work done here it answers the purpose and is very cheap. The application of the heat is a very important factor; regular and uniform heating can be obtained by turning the tool constantly in the fire. Sharp edges and corners always tend to heat up more quickly than the mass of the tool. To equalise, withdraw the tool from the fire

at intervals and hold for a second or two, when the corners will rapidly lose their heat and become the same temperature as the mass. To learn how to harden steel correctly take a short piece of steel, say 12 in. long by $\frac{1}{4}$ in. by $\frac{1}{2}$ in. and nick this fairly deeply at intervals of about $\frac{1}{2}$ in. Heat this in the fire so that one end is considerably over the correct hardening temperature, the heat gradually tapering off to the other end, which is much below the correct hardening temperature. Withdraw from the fire, study the hot bar carefully, and note at which notch you consider the temperature is about correct for hardening. Quench the bar and break off the notched pieces one by one. At the over-heated end the fracture will be very crystalline and of a "sugary" appearance, gradually becoming less so and finer, until a beautiful fine and silvery fracture is obtained, which indicates the correct temperature. Repeat the experiment until you find you can regularly judge at which notch the correct fracture will occur. Then repeat again and again, now trying to get the whole bar the correct temperature; break off the notched pieces as before, to test whether correct by the fineness of the grain.

I will deal with tempering and case-hardening in detail in my next article, and would wish to point out that although hardening and tempering are often confused by workmen and others they are essentially two different processes of heat treatment.

A Correction.

The photo of the headgear and crusher station on page 123 of our last issue was incorrectly described as that of the New Modder. It should have been the Modder "B."

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Masticon and Flexolac.

There are to-day on the market two interesting new asbestos products, Roofing and Rust Plastic Compounds. These materials are British manufactured by the Industrial Engineering, Ltd., Poland House, 167, Oxford Street, London, W.1.

Masticon is a plastic asbestos repair compound for making leaky roofs permanently waterproof, and is guaranteed for 10 years. It is made of the finest South African asbestos impregnated with plastic gums, and is, therefore, imperishable and indestructible. The asbestos fibre gives to these plastic gums the same interlacing strength as steel bars to reinforced concrete. It is very easily applied by any handyman with the aid of an ordinary plasterer's trowel, tar brush, or putty knife. For general purposes it is laid $\frac{1}{4}$ in. thick. It adheres immediately and permanently to any surface, whether corrugated iron, concrete, zinc, felt, glass, slate, asphalt or lead, and expands with heat and contracts with the cold, always ensuring perfect contact with the joints.

Rust and Its Prevention.

Flexolac.—The terrible ravages of rust have been forcibly evident ever since the application of iron and steel to constructional and industrial purposes. Since the life and strength of these metals depend on their not rusting, the introduction to the engineering world of a material which will efficiently prevent oxidation or rusting will be welcomed. Iron and steel rust in varying degrees upon exposure to atmospheric moisture, sulphurous fumes or saline matter, much depending upon the condition of the metal surface, rough surfaces rusting much more rapidly than smooth or burnished surfaces.

Wherever moisture (oxygen and water) is found, rusting takes place, and since our atmosphere contains moisture we find rust everywhere. Under this influence a combination of iron and oxygen is formed and the metal is stated to be rusted. Several paints and other compositions which are termed rust preventatives only fulfil their mission in a

limited sense and under a limited type of conditions—their life is short. Flexolac is a material designed to protect the metal parts of constructional work from all known actions which give rise to rust. It is actually a rust-resisting paint which maintains its purpose for many years. It is therefore eminently suitable for the preservation of all types of metal roofs, chimneys, ridges, piers, railings, fire escapes, pipes, etc., etc. It is a scientifically prepared compound. Its base is fibrous asbestos rock as it comes from the mines in South Africa fire-proof and imperishable. This indestructible fibre is impregnated with plastic waterproof gums producing an adhesive, penetrating, durable and elastic coating which is unaffected by climatic conditions and which will not crack or peel as the result of heat or vibration. It never sets hard enough to become brittle, yet it dries hard enough to eliminate all possibility of its being washed or rubbed off. This is due to the fact that it sets by chemical action and not by evaporation. This is why water has no effect on it.

The South African agents are Messrs. Sedgwick & Luckhoff, Box 978, Capetown; and the distributors are Messrs. Hunt, Leuchars & Hepburn, and Rogers Jenkins & Co., Durban, Johannesburg and Capetown.

Oil Fuel in Great Britain.

The development of the use of oil fuel for many purposes in Great Britain is illustrated by the construction of large storage depots at various points. In one of the latest which is being constructed on the Tyne, there are two tanks of 8,000 tons capacity each and a similar one of 4,000 tons capacity forming the first instalment of a very large depot. The tanks have been erected near the jetty, with which they are connected by means of pipe lines. Vessels desiring to obtain supplies of oil fuel will berth in deep water alongside the jetty. Along with this development in oil storage there is proceeding a very active production of oil-engined ships in British yards, and some of the ships have achieved remarkable economic results. One of them on her maiden voyage across the Atlantic consumed only 130 tons of oil. This was 200 tons less than the amount which the engineer had calculated would be necessary.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

A QUIET OPENING—HOLIDAYS RESTRICT BUSINESS—COAL TRADE PROSPECTS—LOCAL METAL PRICES—OVERSEAS IRON AND STEEL OUTLOOK.

Business on the Commercial Exchange was even quieter this week than last. The holidays and the beginning of the month made for inactivity, and there is really little to report. The reduction in the railway rates on coal is hailed as a good augury for a revival in the colliery trade, which lately has been drooping.

The Coal Trade Outlook.

The prospects of the Union's coal trade are, of course, of vital interest to business men. If our coal industry survives the conflict successfully, the outcome will certainly be a vastly increased volume of traffic over our railways, a greater influx of shipping at our ports, and an all-round improvement in railway revenue, which will leave the Administration relatively much better off than before the present rate reductions were made. The railway rates on coal are still, however, about 250 per cent. above pre-war level. Between 1911 and 1921, for example, the railway rate from the Transvaal collieries to Delagoa Bay soared from 6s. 1d. per ton to 36s. per ton—an increase of 500 per cent. At the time the last rise was made, world conditions were abnormal; coal was selling at famine prices, and the industry could well afford to let the Railway Administration have a lion's share of the profits, which it well deserved. But at the beginning of 1921 the boom burst; prices avalanched downwards. The Union collieries, which at the end of 1920 jumped their pithead price for 1921 export contracts to 17s. 6d.—the price in 1910 was about 4s. a ton, and at the end of 1919 13s. 6d. a ton—got caught on a slumping market, and for some weeks the export trade ran a real risk of disaster. But pithead prices soon slumped, too, and successive reductions of railway rates to 300 per cent. above the 1911 level successfully tided things over till the recent coal strike in Great Britain, which once more gave the South African coalowner the opportunity of regaining a sound footing in the Eastern markets. And now, just in time, Mr. Jagger has consented to the rate reduction essential to enable our coal to compete with the British article, under post-strike conditions.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{2}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{4}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 35s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 35s.; steel, 38s.; $\frac{3}{4}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{3}{4}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{4}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{3}{4}$ in. and $\frac{3}{4}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{4}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{3}{4}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{4}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{3}{4}$ in., 5 $\frac{1}{2}$ d.; $\frac{1}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{4}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 15s. per 100 lbs.; brass rods, round, $\frac{3}{4}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{3}{4}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{4}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{3}{4}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{4}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in.,

2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{4}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{3}{4}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; drill steel, 7d. and 8d.; hollow, 9d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

The Johannesburg Chamber of Commerce announces that as a result of further representations to the Union Government, it has been arranged that permits for travellers to Portuguese East Africa will in future be available for any number of journeys during a period of one year from the date of issue. It is hoped that this extension of the validity of the permits will remove to a very great extent any inconveniences suffered by British subjects who have to travel frequently to the adjoining territory. With regard to the Portuguese visa, it is understood that the Portuguese authorities do not insist on these permits being vise-ed, except when the holder lives in a town in which a Portuguese Consul resides. The Government points out that the conditions in South Africa are different from those obtaining in France, Belgium, and other parts of Europe, inasmuch as there is a strict police surveillance of all travellers on the Continent which is absent in South Africa, and also in most countries in Europe there is a systematic registration of all persons at police offices.

Trade and Finance.

The general managers of the Standard Bank of South Africa, Ltd., have received the following cable advices from the London office of the bank:—The following views are expressed in financial circles: There is much complaint about trade depression and the number of unemployed is still very large. There are, however, signs of improvement because the collieries are working freely and prices are still falling. Economies of many kinds are being practised by manufacturers with the result that contracts are possible where before they seemed to be out of the question. The August trade figures are distinctly in advance over those of July, and it is evident that business is improving, but only to a moderate extent. Much depends upon further economies in productive costs. Meanwhile disordered exchanges tend to complicate the position. The money market has been very easy because the poverty of the Exchequer caused considerable borrowings on ways and means. Another fall in the bank rate is expected, although there may be some pressure for money just before the end of this month. Until the last day or two day-to-day loans have been fluctuating between 2 per cent. and 4 per cent., whilst the rate for additional Treasury Bills has been lowered to 3 $\frac{1}{2}$ per cent. This caused ordinary discount rates to rule between 3 $\frac{1}{2}$ per cent. and 4 $\frac{1}{2}$ per cent.

American Trading in East Africa.

America seems to be making determined efforts to capture the East African market—a fact which should engage the serious attention of South African firms engaged in the export trade. According to the *Board of Trade Journal*, H.M. Trade Commissioner in East Africa reports that in his area a large amount of commercial propaganda is being carried on by United States firms. Many East African firms regularly receive free copies of United States trade journals, but some United States firms, notably those engaged in the hardware and motor accessories trade, are writing to East African houses offering the sole agency of their products on the following very liberal terms, provided that a certain amount of business is contracted for, viz., 30 per cent. approximately on imports direct to the agent and 10 per cent. on imports in the area other than those on account of the agent. Commenting on these facts, the *Journal* remarks that the interest displayed in the East African market by the United States firms is worthy of note, but that whether the condition imposed can be accepted in that market, where prosperity is dependent on a variable agricultural production, remains to be seen.

H.M. Senior Trade Commissioner for South Africa advises us that the settlement of the coal dispute has not so far resulted in a general resumption of work in the iron and steel trades. Up to the present only two or three blast furnaces have been restarted and the output from these is not intended for the open market but is reserved for associated steel plants. Pig iron producers feel that it is useless to resume operations until fuel costs have fallen to a level which will permit of iron being made and sold at a profit, and it would appear, therefore, that some weeks must elapse before a general restarting of the furnaces occurs. In the meantime, stocks of Cleveland foundry iron are becoming still more scarce, but No. 4 and mottled iron, grades for which there appears to be no demand at present, are available in considerable quantities.

A few of the finished steel works which, when stocks of fuel were exhausted had uncompleted orders on their books, have restarted, but a feature of the stoppage has been that there has been no accumulation of orders, and makers are now disposed to defer a resumption until such time as the state of their order books makes it worth their while. How long a period this will be depends upon the time it will take for production costs to fall to the point which will enable British steel material to be sold in competition with the products of Continental works, and here again the principal

factor is the price of fuel. At the present time the world's price for iron and steel is fixed by the Continent. There has lately been a tendency for quotations to become firmer, and it is reported that the French and Belgian producers are considering closing down rather than continuing to manufacture at rates which, they state, yield them no profit. It is said that the Germans, who appear to be taking the greater portion of the business at present offering, are selling for export at figures below the cost of production, even allowing for the depreciated German exchange.

There would thus appear to be some grounds for assuming that higher prices all round for Continental material will be seen before very long.

Tinplates.—A number of South Wales mills have restarted and plates are being offered for delivery. The demand, however, is still very weak, and there is some disappointment that the big curtailment of production during the stoppage has not created a better market.

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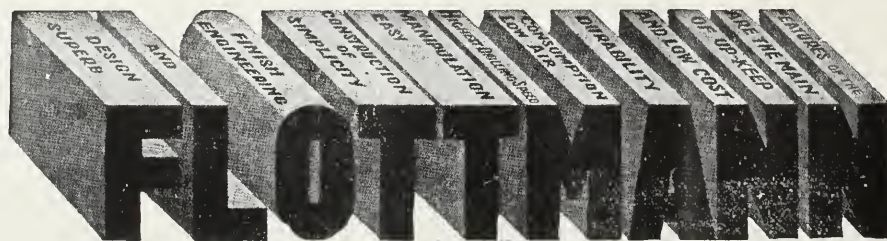
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Established 1891.

Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, OCTOBER 15, 1921.

No. 1568.

The First Completed Block of Buildings of University of the Witwatersrand.



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"Wake Up, South Africa": Plea for Mining Development.

FAR WEST RAND POSSIBILITIES—THIRTY NEW MILES OF REEF—CORONATION POSSIBILITIES—
EXAMPLE OF THE AFRIKANDER—GOLD MINING STILL OUR PREMIER INDUSTRY.

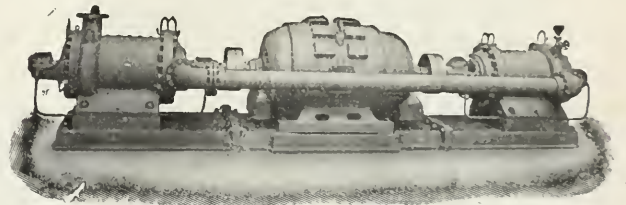
In the following eloquent appeal, Mr. W. P. Taylor, voices his support of our efforts to re-arouse interest in the vast dormant mining possibilities of the country. He re-states many of the accepted facts of the position, and argues from the case of the Afrikander, the Coronation, and the Western Rand Estates, that there are still great undeveloped mineralized areas in the country.

I have recently been asked why I have not written further on the active prosecution of gold mining here. This at least is an indication that my articles have been read with some interest, but the fact that they have been taken over and circulated to the millions of people in Great Britain is perhaps more significant. My desire is that they should become far-reaching, because the matter is of importance, as I have said, not only to mining men here, but to everyone interested in the development of whatever nature in this great country. There is to-day in Johannesburg, and perhaps throughout the country, a regular hang-dog, rotten, despairing attitude amongst a lot of the people which should not be there. General Smuts is perfectly right in his continual optimism, the country is dead right, it has got the goods, every time, but it is a question of the handling. Now, where we are all going wrong is in getting away from our main business. The idea of neglecting to develop gold and harassing a poor old Dutchman with a tax on growing tobacco is absolutely drifting from civilisation to the ante-diluvian. Such drivel will never appeal to me. What is wanted here is some good sound sense and honest co-operation, and it won't be long before men will be holding up their heads and saying "This is God's own country"! Well, it is God's own country. Although engineers and geologists may say there is no more gold worth looking for in the strata of this Rand, beyond the Main Reef series, I cannot help saying they are wrong. There is any amount of gold to be found, and a good deal of it will be worked very soon. The results of the Coronation Company's second borehole will be made within a few months, and it should add, they say, eight miles of reef at once to the Rand. If the Western Rand Estates were compelled to work, it should, probably, assist with twenty more, and if boreholes were put further west, another Rand of greater dimensions might be proved within a year. This is infinitely more interesting than worrying my friend the tobacco farmer for his useless mite. Did the brains that conceived that tax realise that if it were collected, citrus, cotton, maize, wool, sheep and cattle would all have to be taxed, and such perniciousness would have changed supporting S.A.P.s into Nationalists without number? As I have said before, I in no way desire to embarrass the Government, but I cannot get away from what is so perfectly obvious. Now, Cecil Rhodes loved globular figures; so do I. There are endless globular figures of quite a long string in what I am writing about, but it requires an enterprising mind to follow the lines. All over the Transvaal—Witwatersrand, Heidelberg, Potchefstroom, and Klerksdorp—there is gold in reefs, white reef and black reef, all low grade except in places on black reef. In the Northern Transvaal there are numbers of low-grade properties. In the Lydenburg, Barberton, and Carolina districts there are fields of low-grade ores. All the above statements are accepted by mining men to be more or less correct. Recently two new appliances for reducing ore have been tried successfully so far. It is not impossible that in the near future, with such an innovation and the use of oil separation, instead of cyanide, that thousands of small concerns will produce gold all over this country. If one

looks at the list of producing companies to-day and sees that it has dwindled down to some fifty concerns or less, you can at once realise the significance of such an innovation. Spread all over the country's surface, opening up local markets, buying produce at the farmer's door. Can anything be more ideal? Since I last wrote advocating co-operation to carry out development in the Potchefstroom district, three of the Rand's most prominent engineers have taken up the Afrikander mine at Klerksdorp, and it will very soon be producing gold; but there should be many Afrikanders, miles of them, and look at the resurrection that will take place. Why, Klerksdorp is already smiling. Anyway, it is the individual who will come to the rescue, for there is much more money to be made out of gold mining than growing mealies at 6s. 6d. a bag! I do not desire to belittle agriculture, but in this country, at present, it is putting the cart before the horse to put it first. I can quite understand love of country, sentiment, and perhaps political necessities pushing men, clever men, to do all sorts of things, but in the eyes of the practical man, the mechanic, the miner, all this is bumble puppy. It is getting away from the first true work of the country. It is gold that we have to centre on. It is this stretch of auriferous strata and the scattered gold, to take up the appliances put before us, to test it all and put it to work at once and have a renewed industry which can lend agriculture and industry its support to all the great things we should mightily dream about. The watchword of "Wake up, England" did a lot. We certainly want waking up here.

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The Position at the Transvaal Silver Mines.

NOTHING WRONG WITH THE PROPERTY—PLANT AND EQUIPMENT ALMOST COMPLETED—EXCELLENT PROGRESS MADE.

What's wrong with Transvaal Silvers? was the question of last week on the Rand. and we are glad to be able to show in the following article that everything is all right at the mine and that the splendid reduction plant and equipment are nearing completion. Shareholders will be reassured to know that whatever may have depressed the quotation for the shares, the trouble, at any rate, is not at the mine.

The property of the Transvaal Silver and Base Metals, Ltd., was the subject of a long and detailed account published in the June 11 and 18 issues of this journal. The technology and the prospects of the company were very fully treated, and the development reached by the beginning of the month of May was given. Since then several additions have been made to the plant, and considerable underground development achieved.

Situation.

The property is situated a few miles to the north-west of Argent, a station on the Springs-Witbank line. This proximity to the railway is a feature of not inconsiderable economic importance to an industry of this nature. The cost of transporting raw materials, supplies and products from and to the railway is thus reduced to a very small figure. In comparison with other successful mineral propositions, the Transvaal Silvers have been greatly favoured in this respect.

Mineral Occurrences.

The outcrops of the silver-lead bearing lodes have been traced at surface for considerable distances. The following figures give the lengths proved:—

Main lode	...	...	...	...	7,000 feet.
Main cross lode	...	...	...	...	1,000 "
East lode	...	...	...	...	3,000 "
Brakfontein lode	...	...	...	...	5,000 "
Spies lode	...	...	...	...	3,000 "
Le Grange lode	...	...	...	...	2,000 "
Boschpoort lode	...	...	...	...	800 "
Total					21,800 "

The extent of the ore deposits is thus immense, and should provide ore reserves lasting for very many years. Underground exposures of the lodes have been made in the case of the main lode as well as the Brakfontein lode, and ore of high grade exposed. The workings at Brakfontein were under water at the time of the writing of the first account, but since then work there has resulted in the unwatering of the first level. Sampling along this level proved ore of high grade to exist. This confirms the conclusions drawn from the appearance of the lode at surface in this neighbourhood. The following cablegram despatched by the company to its London offices bears out the facts

stated:—"Brakfontein workings unwatered and lodes exposed; first level sampled distance 130 feet, of which 70 feet is payable, containing 12 per cent. lead and 12.6 ounces silver per ton, value 97s. 10d. per ton."

From the last quarterly report of the company we have recorded:—Total footage accomplished, 3,219½ feet, of which 750 feet were payable, and averaged 13.2 per cent. lead and 12 ounces silver per ton, and 1,450 feet were unpayable and averaging 1.5 per cent. lead and 1.4 ounces silver per ton.

Plant, Lay Out, etc.

The property has been laid out on ground which lends certain natural facilities to the disposal and transportation of products. It is situated conveniently close to a stream of water, which supplies the boilers of the power plant. Housing accommodation has been conveniently arranged for both married and single employees, and a supply of domestic water is obtained from a well.

The assay office has been completed, and samples need no longer be sent to Johannesburg for assay. The electric generating plant has been completely installed and is in working order. The reduction plant has been completed in all respects excepting for the concentrating units, which are under erection. It is hoped that these will be completely installed before the end of the year.

Considering the short time that has elapsed since the publication of the last article, when the only evidence of the presence of a reduction plant was the excavations and some foundations of the smelting house, a considerable amount of work has been accomplished under most trying conditions. A close study of the flow sheets published in the May 7 and June 18 issues of this journal will furnish the reader with an idea of the amount of work in connection with the erection of the plant.

The crusher house and its equipment is completed, as well as the conveyor belt for transporting the crushed ore to the wash trommel. Ore from the mine can be treated up to the hand-sorting stage at present. The further additions cannot come into commission till the erection of the concentrating units has been completed.

The roasting plant is in operation and running satisfactorily on hand-picked ore. The first unit of the smelting plant has recently been started up and is now producing lead bullion from the desulphurised ore.

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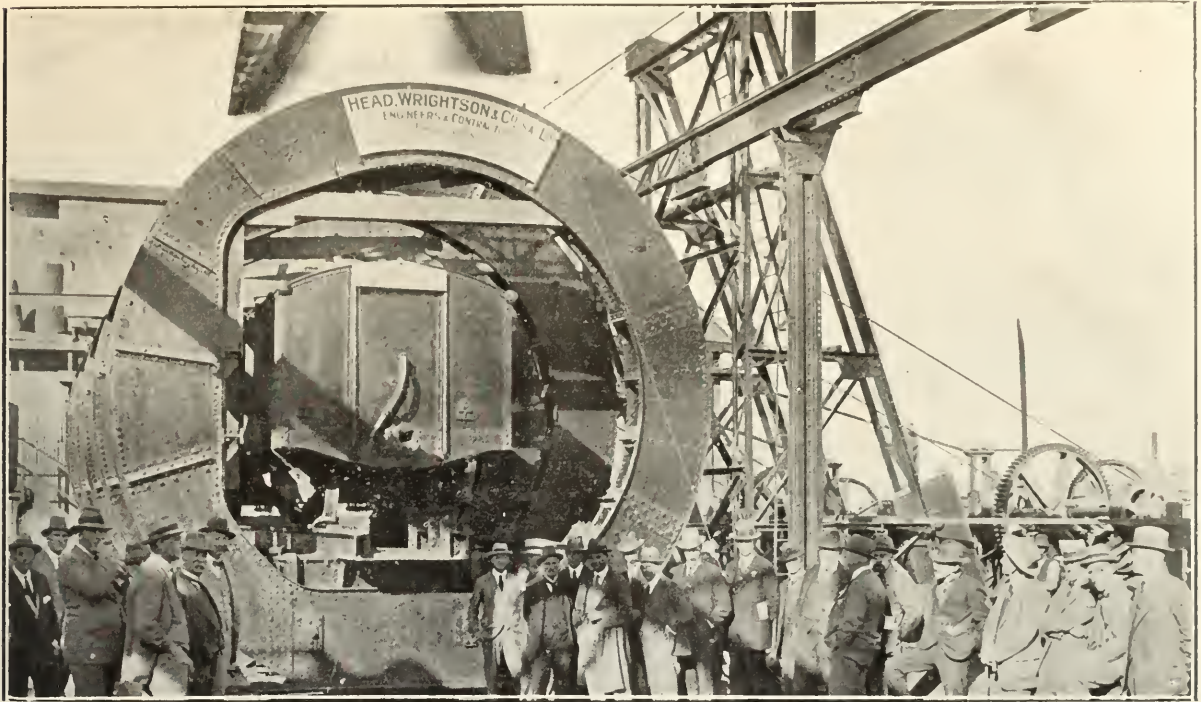
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Illustrations show part of an incline gantry for the Delagoa Bay Coaling Plant, under construction.

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Some Facts Regarding the Victoria Falls and Transvaal Power Company.

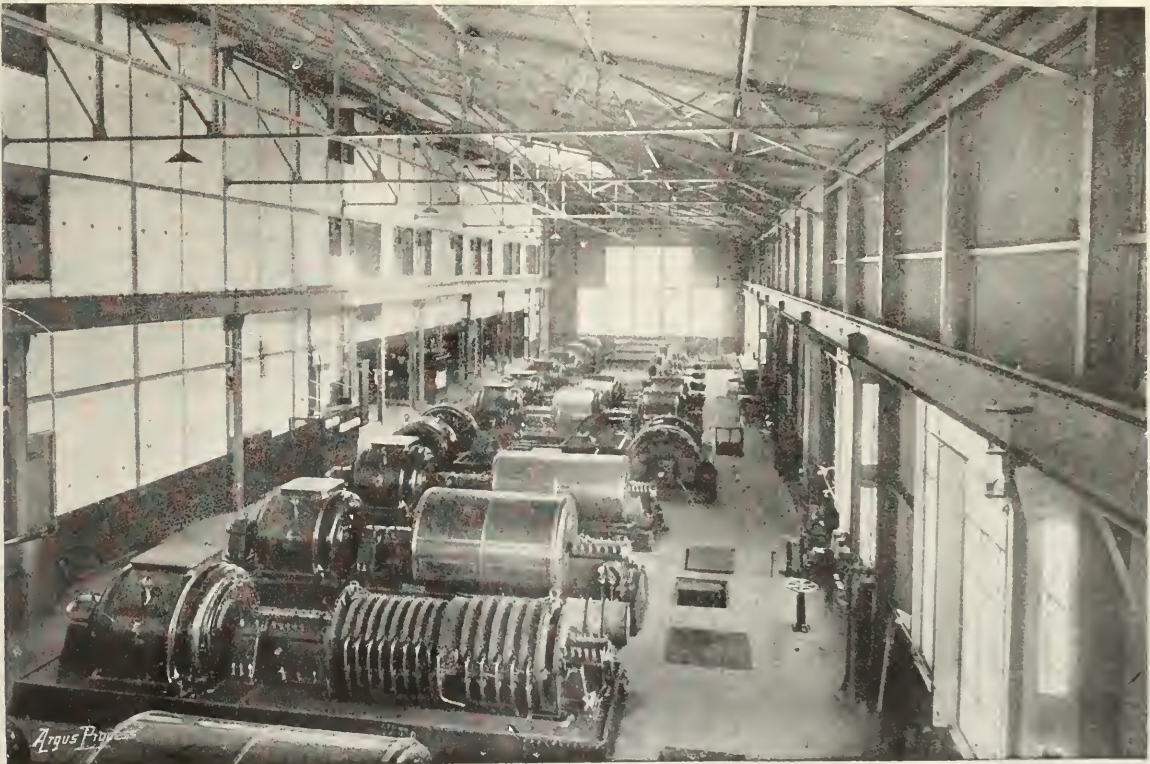
In view of the controversy regarding the Municipality of Johannesburg taking a supplementary supply of power from the V.F.P., the following facts regarding the latter undertaking are of interest.

The Victoria Falls and Transvaal Power Company, Limited, was formed in 1906 with the object of supplying electrical energy to the gold mines and other consumers in the Witwatersrand area, excluding the Johannesburg Municipality. In the year 1908 the largest group of mines, now controlled by the Central Mining and Investment Corporation, Ltd., decided to electrify its mines and to purchase all its power, both electric and compressed air,

50,000 h.p. air compressors; Simmerpan, 56,000 h.p. electric generators; Brakpan, 40,000 h.p. electric generators; Vereeniging, 58,000 h.p. electric generators; Robinson, 24,000 h.p. electrically-driven compressors; total capacity of plant installed, 302,000 h.p.

Cycle of Operations.

The cycle of operations resulting in the finished product of electrical energy is as follows: The raw material, coal, is delivered in S.A.R. trucks, which are shunted on to a number of sidings outside the power stations, from which the coal is off-loaded. There is a gallery underneath each of the sidings in which a bucket conveyor and elevator work. The buckets are filled automatically and convey the coal to the overhead bunkers above each of the boiler houses, the coal not being handled by hand at any part of its journey. From the overhead bunkers the coal is discharged, also



View of a Victoria Falls Power Supply Station, whence, it is urged by competent authorities, that the town should take a supplementary power supply.

from the Rand Mines Power Supply Co., Ltd., a subsidiary company of the Victoria Falls and Transvaal Power Co., Ltd. There are, therefore, two separate power companies working under separate licences granted by the Government in terms of the Power Act passed in 1910, but both concerns are controlled and operated by the same management and staff. Capital: Ordinary shares, 1,000,000 (issued as fully paid); preference shares, 2,000,000 6 per cent. cumulative and participating; debentures, 3,000,000 5 per cent. first debentures, 1,650,000 5½ per cent. second debentures; total capital, £7,650,000. Power stations installed capacity: Rosherville, 64,000 h.p. electric generators; Rosherville,

automatically, into a chute which conveys it to a hopper or receptacle at the front of each boiler, from which it is again automatically fed on to the stoker grate. This consists of an endless chain of links conveying the coal from the front to the back of the boiler during which it is consumed and discharged as ash into a receptacle at the back of the boiler, where it falls through a door at intervals into a hopper, from which it is again discharged into cocopans or trucks which are handled by natives in the basement of the boiler house and afterwards hitched on to an endless rope haulage and taken up to the dump at a short distance from the station.

The Rosherville Power Station.

The Rosherville Power Station is typical of the other three power stations. The boilers are of the marine water-tube type. Forty of these are installed at Rosherville, each capable of evaporating about 40,000 to 50,000 lbs. of water per hour into steam. The normal steam pressure is 220 lbs. per square inch and it is superheated to a total temperature of about 340 degrees centigrade. A special form of induced draft is used, known as the "Pratt ejector draft" system. Steel chimneys in the form of an inverted cone are used as being necessary with this type of plant. The electric generating and air compressor plant is all steam turbine driven, the five electric generators being each of a capacity of 9,600 kw. (12,800 horse power), five compressors, each of 4,000 h.p., and three compressors, each of 10,000 h.p. The steam turbines driving the electric generators and the air compressors are of the "impulse" type and revolve at 1,000 revs. per minute in the case of the electric generators and 3,000 r.p.m. in the case of the compressors. The steam, after doing its work in the turbine, passes into the condenser, where it is condensed and returned as water to the hotwells or feedwater tanks, from which it is pumped back into the boilers. The condenser consists of a large cylinder filled with brass tubes through which cold water circulates, the steam passing over the outside being condensed, and as a consequence a vacuum being produced. All the circulating water and feed pumps are steam driven, the turbines being of the "impulse" type and run at 1,400 to 1,500 revs. per minute.

Air Compressors.

The five 4,000 h.p. air compressors, at the time they were installed, were much the largest in the world. The three 10,000 h.p. compressors, which were added at a later date, are to-day the largest units of their kind in existence. The air is compressed to a pressure of about 120 lbs. per square inch and delivered through the pipe network to the mines over an area extending about 15 miles east and west.

Electric Generators.

The electric generators are direct driven by the turbines and generates 3-phase alternating current at a pressure of 5,000 volts. This is transformed to a pressure of 20,000 and 40,000 volts for distribution by the overhead lines and underground cables to the consumers' sub-stations.

Water.

The circulating cooling water is obtained from the Rosherville dam, on the banks of which the station is built. This dam contains at the present time about 900,000,000 gallons of water. Canals are cut leading the cold water to the pump suction. After doing its work in the con-

densers the water is discharged into the outlet canal from which it again passes into the dam, the cooling taking place by natural evaporation.

Network.

The main transmission lines of the company extend from Randfontein on the west to Sub Nigel on the east, a distance of about 56 miles and 36 miles due south to the Vereeniging Power Station. Transmission pressures are 80,000, 40,000, 20,000 and 10,000 volts. The mileage of main transmission line circuits is: 80,000 volts overhead, 136 miles; 40,000 volts overhead, 82 miles; 20,000 volts overhead, 93 miles; 10,000 volts underground cable, 49 miles; 10,000 volts overhead, 40 miles; miscellaneous low tension circuits, 21 miles; pilot and telephone cables, 202 miles; telephones overhead, 55 miles.

Auxiliary Power.

The auxiliary power used at this station in the way of steam and electricity is about 11,500,000 units per annum, which is, roughly, equal to the whole of the sales of electricity in the City of Capetown. It will be noted that there are no reciprocating steam engines in this station, all the auxiliary plant being driven by steam turbines or electric motors.

A Few Interesting Facts.

Approximately 837,000,000 units, or 1,120,000,000 h.p. hours were sent out of the generating stations in the year 1917. This involved burning over 1,000,000 tons of coal, a large proportion of which consists of duff, and is a by-product from the collieries. The Victoria Falls and Transvaal Power Co. is the largest power undertaking in the British Empire. The year's operations involved the heating and evaporating into steam of about 6,500,000 tons of water and this quantity was passed through the turbines and condensed in the surface condensers, which required the circulation of approximately 78,000,000,000 gallons of water. The total number of units sold for lighting, power and tramways by the Public Utility Companies and Municipalities of Greater London for the year 1916 was approximately 450,000,000 units, or about 40 per cent. less than the units sold by the Victoria Falls and Transvaal Power Co., Ltd., to the mining industry on the Witwatersrand. The compressed air supply is much the largest in the world. During the year 1917 no less than 2,000,000 tons of air passed through the main pipe network from the two compressor stations to the mines for use in driving rock drills, etc. At the time of maximum load each day air is delivered at the rate of about nine tons per minute. Approximately 20,000,000 tons of air were passed through the boiler furnaces and up the smoke stacks in the year 1917.

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Defunct Rand Mines: History in Brief.

The following particulars regarding exhausted mines as compiled from various sources of information are taken from the annual report of the G.M.E. The figures given should be looked upon as only approximately correct:—

Company.	Reef-bearing Area in Claims.	Tons milled. Total.	Per Claim.	Gold Recovered.			Dividends declared.			
				Standard Total. £	Value. Per Claim. £	With Premium. Total. £	Per Claim. £	Total. £	Per Claim. £	Per Ton Milled. s.
New Heriot Gold Mining Co., Ltd.	47.54	3,000,317	63,111	5,575,745	117,285	5,644,373	118,729	1,483,277	31,201	9.887
Village Main Reef Gold Mining Co., Ltd.	144.47	7,005,952	—	12,249,101	—	12,332,568	—	4,080,143	—	11.648
Wemmer Gold Mining Co., Ltd.	29.03	1,038,364	—	2,647,327	—	2,647,327	—	839,180	—	16.164
Village Main Reef and Wemmer	173.50	8,044,316	46,365	14,896,428	85,858	14,979,895	86,339	4,919,323	28,353	12.231

Small Gold Producers.

A YEAR'S RETURNS.

The following list of gold concerns run by small syndicates or private individuals is given by the G.M.E. in his annual report. The returns made to this office show the following comparative figures from gold mining concerns on which less than ten stamps were run:—

	1919.	1920.
Number of concerns which produced during year	45	49
Average number of whites employed during year	109	100
Average number of coloured employed during year	1,770	1,518
Average number of stamps dropping during year	111	87
Tons of ore treated	88,230	78,442
Gold won: fine ounces	21,022.070	19,275.381
Value of gold won at £4.24773 per fine ounce	£102,039	£81,877

Taking all the concerns which may be considered as run by small syndicates or private people, the following comparisons are arrived at for the two years:—

	1919.	1920.
Number of concerns which produced during year	60	63
Average number of whites employed during year	232	196
Average number of coloured employed during year	3,376	2,901
Average number of stamps dropping during year	236	*197
Tons of ore treated	232,812	186,108
Gold won: fine ounces	60,419.583	48,883.833
Value of gold won at £4.24773 per fine ounce	£256,646	£207,645

*In addition, 1 Whittaker Pan mill and 1 Huntingdon mill were in use.

Rouxville Diamonds.

THE POSITION TO-DAY.

Mr. G. A. Chalkley, the Superintending Engineer of the Consolidated Goldfields, has written a very complete report on the position of the Rouxville diamond mine to-day. We take from it the following:—The total number of loads mined during the year amounted to 15,545, and in addition 17,241 loads of surface gravels were removed to dump.

Number of diamonds recovered was 3,488; weight in carats was 4,405½.

If reference is made to the Superintending Engineer's report of last year it will be seen that he draws attention to the richness of portions of the black conglomerate, and refers particularly to the phenomenal results obtained from a wash on the 9th of September. The material for this wash was taken from the south-east corner, which was by far the richest area in the pothole, and from this point in every direction the values in the black conglomerate decreased. By the middle of October practically all the black layer originally stripped had gone through the plant, and from this date it became necessary to remove the overburden and underlying layers in benches, and to treat the thick brown layer before reaching the black conglomerate. The yield of diamonds from the brown bantam layer proved to be considerably less than had been expected, and the few loads of black conglomerate available also gave disappointing returns. These facts, taken in conjunction with the considerable drop in the price of diamonds in February, 1921, made it impossible not to feel uneasy as to the future of the venture. Following on the poor results obtained from the upper or brown bantam layer, the pothole was thoroughly tested, and the results obtained can be summarised as follows:—At the south-east corner the footwall of the pothole was found to dip very steeply up towards the dyke, and further rich discoveries at this point under such conditions could not be expected. On the west wall, although the bantam layers looked promising, the diamonds were few and small in size. Equally poor results were obtained from tests made in the neighbourhood of the north wall and also of the south wall. It was thus realised that it was impossible to even meet the cost of working, in view of the low price offered for the output of this class of diamond, and it was therefore decided to close down the mine until the price of diamonds or other circumstances might justify the re-opening. The dump of diamond-bearing conglomerate oversize from the trommel was put through the plant during the months of April and May, and work was finally suspended on the 24th May, 1921. The whole of the staff were paid off with the exception of a caretaker.

Mr. Hoover, Secretary for Commerce, addressing the American Export Manufacturers' Association, said national industry during the early spring underwent a recovery, having entered a period of easier credits which was marked by a rise in price of bonds and a decrease in the federal reserve and interest rates generally. It must not be thought, however, that the country was on the threshold of a boom and the return of economic stability was still remote. There was little hope of foreign trade between America and any other country becoming normal, while violent fluctuations in the foreign exchanges continued. Steps to secure some stabilisation of the German mark must take priority before the stability of any European country was possible.

Barberton Asbestos.

DEVELOPMENTS IN THE DISTRICT.

At the monthly meeting of the Geological Society, held last Monday, Mr. A. L. Hall, the Assistant Director of the Geological Survey, gave an account of the chrysotile deposits near Kaapsche Hoop in the Barberton district. The deposits occur in the serpentines of the Jamestown Series and lie from 12 to 15 miles from Godwan River Station. The fibre line extends from the eastern slopes of the Drakensberg eastwards for some three miles and is up to 15 feet thick. The seams are distributed both along the contact between two varieties of serpentine or in a green rock immediately underlying a thin quartzite. The principal development work has so far been done on Joubertsdal No. 99, by the Amianthus Mines, Ltd., and in Messrs. Myburgh and Munnik's workings on adjoining Government ground. The most striking feature on Joubertsdal, where the fibre line is opened up continuously for 800 yards along the strike, is the association of a very large number of almost strictly parallel seams over a width of from 5 to 15 feet, with occasional seams up to 7 inches thick. The fibre has that peculiar snow-white fleeciness and high tensile strength combined with the delicate olive green tint of fibre lumps, characteristic of superior quality chrysotile. A plant for milling and screening is now in working order, and furnishes seven grades of fibre down to a quarter of an inch, while the proportion of spinnable fibre (three-quarters of an inch and over) is uncommonly high.

Mr. Hall concludes as follows:—

1. Within the serpentine belt of the Jamestown Series near Kaapsche Hoop chrysotile deposits are found in payable quantity and quality.
2. These deposits extend roughly for some 3 miles along the strike and follow a horizon generally corresponding to the contact between two varieties of serpentinous rocks, and through a thickness of up to 15 feet.
3. The seams are crowded together in large numbers and are as a rule almost strictly parallel to one another and to the contact plane, so as to produce a "banded" or "ribbon" type of distribution, in which the occurrence of 30 parallel seams per linear foot is not uncommon. This type of deposit leads to rocks with up to 40 per cent. of fibre.
4. While the number of seams per linear foot decrease away from the contact plane, there is a tendency towards a progressive increase in seam width in the same direction.

5. The economic importance of these deposits lies in the large quantities of ribbon rock available, in the high flexibility and general superior quality of the fibre, and in its high proportion of spinnable length.

6. The origin of the chrysotile horizon probably depends upon the association of two varieties of serpentine, and the general appearance of the seam distribution recalls that of banded agate and is probably due to the principle of rhythmic precipitation.

7. Development has not proceeded far enough to give any definite indications as to persistence of fibre in depth, but the field relationships favour the view that the fibre formation does not depend upon changes within the belt of weathering.

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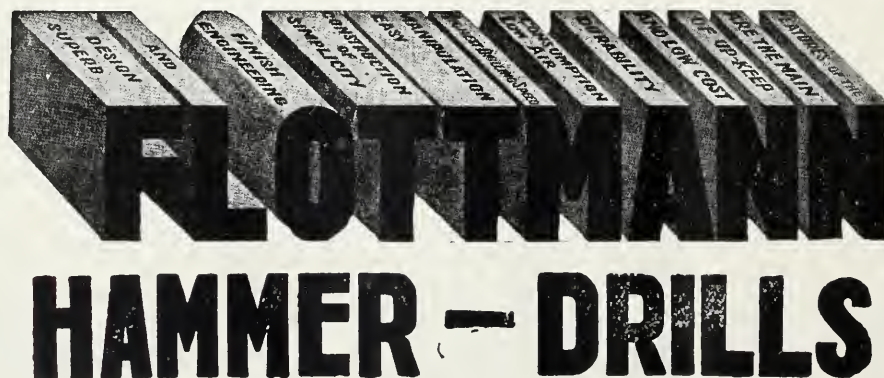
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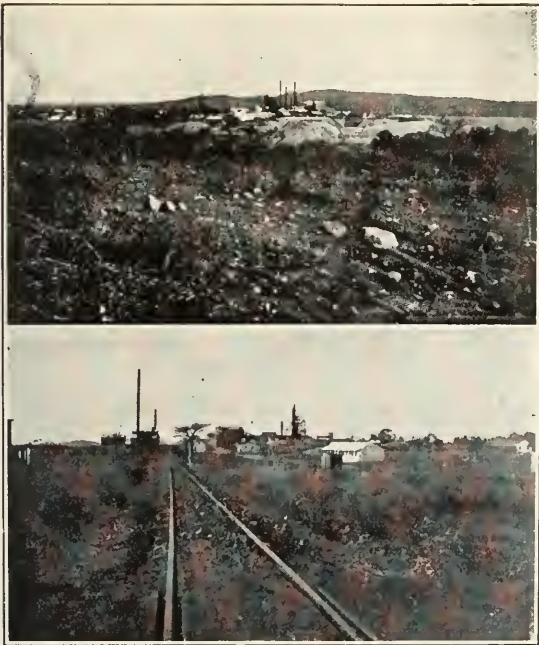
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Northern Transvaal Progress.

A PROSPECTOR'S NOTES.

A journey from Johannesburg to the Rhodesian border is one of luxury compared with the old transport wagon or coach of bygone days. Thanks are due to the Messina



Two Views of the Messina Copper Mine to-day.

copper mines for the change that has taken place adjoining the railway line. Farming with all its different branches, from cattle raising to citrus growing, houses and orchards, beautiful reservoirs, well-fenced lands, happy children, make one wonder if this is the veld we knew a few years ago.

A pleasing incident that helped to secure the firm footing now enjoyed by these people of the north happened during the war. As beginners with limited capital, their participation in that struggle was in the profitable production of corundum ores, which local agents readily bought and shipped to different destinations, where they were used by the Allied Powers as abrasives. There are still available enormous supplies of excellent quality situated along the line between Pietersburg and Sandrivierspoort. The production of this commodity, like copper and many other base metals, has had a restricted output by conditions of world-wide depression prevailing. However, it may be safe to conjecture, when the clouds clear and the world's markets again open to take supplies, that good times for producers will be restored. There is also graphite of good quality and workable quantities known to exist within easy access of rail, which should in time prove an asset to residents near the localities of occurrence. Towards Messina, some distance further and eighteen miles from that place, we arrive at the Liliput coal pits situated on the Sand River, where the copper mines of Messina have secured an unlimited supply of fuel. This is the only coal mine opened up on this formation. Adjacent to the Messina ground and near the siding is Potash Hill, yielding a high and uniform percentage from extensive bodies owned by the Dominion Syndicate.

Again, nearer to Messina is the Messina Extension Syndicate, where considerable work has been accomplished and their claim holdings carry promising copper values. In the district chrome iron, asbestos, limestone of high grade, salt, etc., also occur. From the Rhodesian border the Messina copper mines are distant seven miles, and form the terminus of the railway in the Northern Transvaal.

JOHN HUTT.

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Letters to the Editor.

THE REAL VALUE OF GOLD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Under the above heading a long letter appeared in your last issue, over the signature of G. H. Blenkinsop, who was so particularly anxious to be accepted as an authority on the subject that he favoured your readers with a very interesting autobiography. I have always been of the opinion, considerably strengthened by Mr. Blenkinsop's letter, that currency and exchange, never having been reduced to an exact science, has baffled all those economists and others who have endeavoured to understand and expound its intricacies and vagaries; the war and its aftermath have clearly proved this. And so we are witnessing the collapse of those theories so dear to economists who would have us believe that they *do* understand what they lay down in their "Wealth of Nations" and other volumes of a similar esoteric nature. But one may still hope. Where all the orthodox economists have failed Messrs. Speak and Blenkinsop are going to rescue the world from financial chaos by—of all remedies in the world of imagination!—increasing the price of gold permanently to £6 6s. per fine ounce (why the odd shillings?). Let us put this precious remedy to a simple test: In 1914, and well on into the war period, an ounce of fine gold could have been exchanged for coins to the value of £4 4s. 10d.; to simplify the illustration and to eliminate the decimals, 10,000 ounces of fine gold could have been exchanged for 42,116 sovereigns. Does Mr. Blenkinsop really think that by increasing the value of gold to £6 per ounce that he would get 60,000 sovereigns in exchange for 10,000 ounces of gold, or, in other words, that he would get, roughly, 50 per cent. more gold in the form of coin than the amount of rough gold deposited?—ridiculous. Why fix the increase at £6 6s.? Why not at one jump double the value of gold and thus simplify the conjuring trick; our sovereign would then become £2 and the half-sovereign would take the place of the pound piece; but how much would these coins buy. Why just as much as they buy now—no more, no less. Your correspondent asks—one can almost hear the triumphant note—"Is there any modern intelligent man who can give an intelligent reason why gold should not be six guineas per ounce? Well, sir, here is one very intelligent and cogent reason: To-day America holds 80 per cent. of the world's gold and would hold the other 20 per cent. if the allied nations were able to liquidate their indebtedness to that country; is it not apparent to the densest intellect that a gold premium spells ruin to England and France should America demand a settlement of her account? America holds £1,000,000,000 in gold. Mr. Blenkinsop's proposal would mean that this amount would be increased, by a stroke of the pen, to £1,500,000,000 without increasing the wealth which the sum is supposed to represent. It is nothing short of madness to delude our workers with a vision of the millenium by the mere fixing of a gold premium, and any proposal to tamper with our currency is a chimera. I would remind Mr. Blenkinsop and those who think with him that "money is the article agreed upon as a common demonstration of value, in terms of which all commodities may be expressed with a commensurate amount of which any commodity may be purchased, for a commensurate amount of which any commodity may be sold. Gold being the standard governing the exchange of all commodities, it must follow that its value cannot fluctuate, and it also follows that whether an ounce of gold is minted into four or eight coins it is not the number of coins but the quantity of gold contained which fixes the price of commodities. In conclusion, Mr. Blenkinsop should know that England is in a very bad way financially, especially as regards her indebtedness to America, and any permanent increase in the price of gold,

that is, making it more difficult to get gold, would result in enormously adding to the trials and tribulations of England and her allies.

Yours faithfully,

LEWIS WATKINS.

INCOME TAX RELIEF TO RESIDENTS ABROAD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—It is quite apparent, from the information constantly reaching me, that many individuals not resident in the United Kingdom fail to claim the reliefs from British Income Tax to which they are now entitled. This failure to claim repayment of tax doubtless arises through lack of knowledge of the nature of the reliefs, the chief of which are:—(1) Exemption in respect of dividends on certain British Government securities where the beneficial owner is ordinarily resident abroad. (2) Exemption in respect of interest or dividends on Foreign or Colonial securities, stocks, etc., owned by a person not resident in the United Kingdom. (3) Reduction or exemption from tax on income from sources within the United Kingdom in the case of a British subject, Crown servant, ex-Crown servant, widow of Crown servant, employee of Missionary Society, resident of the Isle of Man or Channel Islands, or resident abroad for sake of own health or health of a member of the family. (4) Reduction of tax where Income Tax has also been paid on the same income in another part of the Empire. I shall be glad to reply to inquiries from any of your readers who consider they may be entitled to claim repayment of tax suffered.—Yours faithfully,

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The Gold Basis.

By R. E. Barker.

The currency and credit problem is now under almost ceaseless discussion, and, however much the real issues involved in its solution may be side-tracked or disguised, the matter is probably the most important which this generation has to consider. In South Africa there is, under its circumstances, a pardonable bias towards reversion to the gold basis as an objective of national policy. And, although the conflict of opinion as to how this purpose can best be achieved is often bitter, men of all parties seem persuaded that the anchorage of currency to gold is essential to the proper functioning of production, distribution, and exchange. The implications of this doctrine are sometimes curious. Mr. Tielman Roos, for an example, defines "capital" as a "mixture of money and credit on a gold basis," and, as a means to restoring the gold basis of our currency here, advises Government to prohibit the export of gold. Seeing, however, that nearly half the world's annual supply of the metal comes from the Witwatersrand, it is clear (though not to Mr. Roos) that, were such a prohibition applied, the return of other countries to the desired basis would be retarded or made impossible; and the amount of their "capital," on Mr. Roos' definition of the term, would shrink proportionately. No doubt this may be flattering to our sense of importance, as it involves the admission that the narrow crescent of reef between Heidelberg and Randfontein is the spinal-cord of the world's industry, and that if an earthquake ruptured it civilisation would immediately dwindle or collapse.

Politicians and the Question.

The views of Colonel Creswell and Mr. Kentridge, even if in complete alignment with one another, are certainly in opposition to the measures which either the Government or National Party favour for restoring the gold basis. Yet they agree that a gold basis is desirable, but recommend a State Bank as a substitute for private credit institutions. Bankers in all parts of the Empire continue to affirm their faith in gold as the right foundation of credit and currency, and are deflating to restore it. The unity of opinion, touching this one matter, expressed by such different schools of thought, must be gratifying to conservative economists. If the world is unsafe for democracy it should, apparently, be safe enough for gold, when the Socialist echoes the financier in applauding it as the rock upon which money and credit must repose. "To get back to a gold basis we shall gradually deflate," says Sir Felix Schuster. And Mr. Kentridge across the ocean, and Heaven knows what sundering gulfs of philosophy, answers him: "The evil of inflation could be checked by the restoration of the gold standard." Such concord is charming; and is, perhaps, the prelude to that "co-operation of all classes" and "pulling together" which, we are told, is the first step towards healing the wounds of humanity. In the meanwhile it is well to subject the term "inflation" to a brief analysis.

Deflation.

Bankers and, it seems, communists too, consider that the currency is inflated when the monetary tokens available exceed the gold, into which they are convertible on demand, by more than a certain proportion. Hence, in the words of Hawtry: "Deflation is the weapon the banks use to protect their gold reserves." If currency were tied to wheat, it would be inflated when, for instance, there were 10,000,000 notes in circulation each carrying the right of conversion into a bag of wheat when the banks had only 1,000,000 bags in their possession. Similarly, if financial credit, money, buying power—whatever you choose to call it—were based upon commodities in general, both in *esse* and *potesse*, it would be inflated only when it furnished the means to acquire goods more rapidly than they could be produced. Under such circumstances we should suffer from over consumption. And the remedy would doubtless be the raising of price levels. In fact, under an ideal credit system, prices

would fluctuate automatically as the power to produce commodities increased or diminished. But that Utopia is far off. It is obvious, however, that a system, under which the amount of buying power issued is governed by the available supply of any one commodity, does not, and cannot, furnish means adequate to induce the full and steady employment of the world's productive capacity. Financial credit based upon gold can have no scientific relation to commodities in general—to real credit and ability to create wealth.

Whatever the supposed merits of a gold basis may be, it is at the deadly disadvantage that it must always collapse when subjected to the strain of a big war. War initiates a tyrannous demand for commodities, to gratify which huge financial credits are released when, of course, the currency, at once breaks moorings from its bed of gold. So that if, by drastic restriction of credit, the world ever does return to a gold basis, it will only remain there until the next armed conflict between the nations, which the growing competition for foreign markets makes almost inevitable. The vast output of munitions during the recent war period was induced by the issue of more buying power. Because, although prices rose, they were subject to some control. Hence there actually was a great enhancement of effective demand, and consequently of production. It would have been impossible to finance the war on a gold basis. It was financed on the credit of the nation. Now, if a currency and credit system founded upon gold cannot support the intenser national activities during war, we might infer that, even during a peace, it would not be the best possible system to induce the maximum output of commodities. If it is the best, then our prospects are desperate indeed. We must always suffer from the alternating phenomena of inflation and deflation, with corresponding fluctuations in price levels, from under consumption, from booms and depressions—chiefly the latter—from want, destitution, unemployment, and all the rest of it. The gold basis is unable even to assure the stability which its advocates claim as its most conspicuous virtue.

The Douglas Scheme.

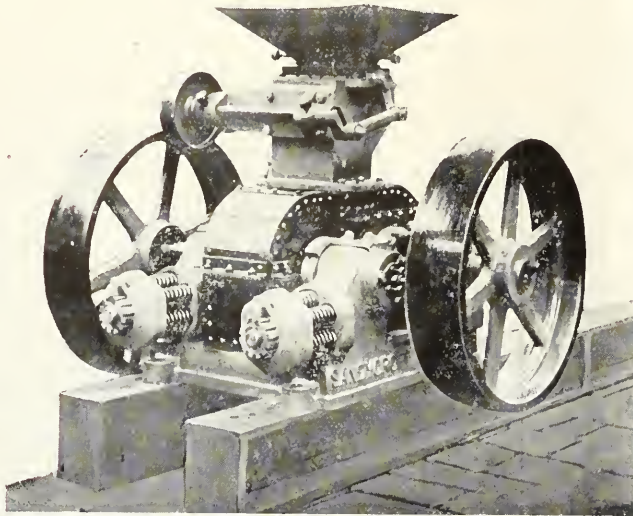
There is no attempt here to solve the highly technical problem of how to establish financial credit on a broader and more rational basis. Some scheme has been worked out in detail by an English economist—Major Douglas—but his book on credit power, which embodies it, is not procurable in Johannesburg. Price fixing, however, and the foundation of producers' banks, and the issue by them of financial credit based upon the productive capacity inherent in the machinery development and personnel of the various industries are essential features of the Douglas scheme. Presumably it has something to recommend it, because it is approved by Professor Pigou, the very distinguished successor to M. Daguin as Economics professor at the University of Bordeaux. But whether or no Major Douglas has revealed the road out of our difficulties, some road must be found. In essence, the problem is to devise a mechanism which will bring financial credit into some proper relation to productive capacity. When this is accomplished, as it will be by the next civilisation if not by ours, every advance in progress will be a benefaction and not, as now, too frequently a curse. Surely a system is gravely defective which makes no provision for expanding the means to acquire commodities as improvements are effected in the means to producing them. Yet how is this feasible if the operative force of demand for commodities in general is to be determined by the available supply of only one commodity—gold—and the ratio it bears to the buying tokens? It is not suggested as a remedy for this disease of under consumption which afflicts us, that there should be an unregulated issue of paper money. For such an issue would constitute no increment of buying power, if it provoked an equivalent rise in price levels. But I submit that some device must be found for instrumenting the consumer to acquire and induce an output commensurate with that latent in mankind's splendid productive capacity. Another and far more devastating war will be the consequence of our economic distress; and then it will be too late to find a cure. When a civilisation is in convulsions it is not the best time for calm thinking; men do not see clearly in the blood-shot light of its decline.

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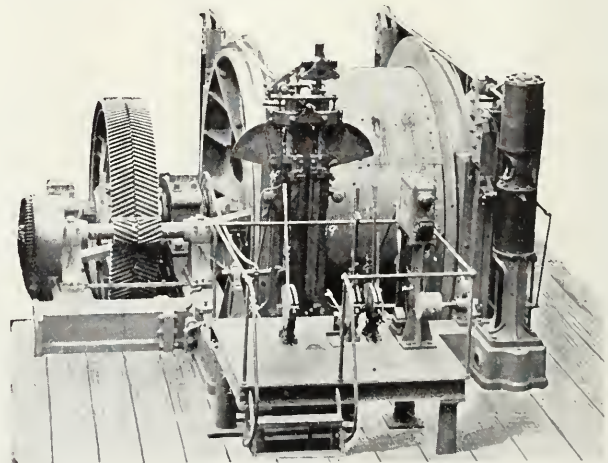
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Miners' Phthisis.

SOME REASSURING INDICATIONS.

In the course of his annual report for last year, Sir Robert Kotzé has the following on the vital question of miners' phthisis:—

The report of the Medical Bureau for the year 1919-1920 shows that the number of miners who during that year contracted miners' phthisis in the primary or secondary stage was 398, as compared with 319 in 1918-1919 and 153 in 1917-1918. The average period of work was nine years and eight months, as compared with nine years six months and nine years five months for the two preceding years. During the year, the number of cases of men in the anti-primary stage was also determined, but as there was no previous determination, the production rate of this class cannot yet be ascertained. The figures quoted appear to show that there has been an increase in the number of new cases, and it might be concluded that the preventive measures are proving inadequate. The chairman of the Bureau does not, however, consider this conclusion justified, and attributes the increase to the miners who have returned from military service, and who had not previously been examined on any occasion. A considerable number have had silicosis for years past, and they have now to be included amongst the new cases, and thus bring up the production rate. The Bureau considers that the length of the average period of work of the miners who have contracted silicosis is at present a more reliable criterion of the effectiveness of the combative measures, and the slight increase in this period is therefore satisfactory. A far more reassuring indication of such effectiveness is, however, to be found in the evidence of the Chairman of the Medical Bureau before the Miners' Phthisis Commission, and quoted by the President of the Chamber of Mines in his address at the annual meeting on the 31st March, 1921. The figures advanced for the seven months since 1st August, 1920, showed that the production rate since then had fallen off very substantially as compared with the previous two years. I am informed by Dr. Watkins-Pitchford that this decline has been maintained up to the date of writing (June 14th). Of the miners who have passed the initial examination of the Bureau in the four years following 1st August, 1916, 3,592 adopted underground work, but not one had contracted silicosis in a recognisable degree up to August, 1920. This also is a satisfactory feature, but the period is so short that undue weight must not be attached to it. Although the indications support the contention that in the main the combative measures are effective, there is no justification for slackening off in the stringency of the preventive campaign. There are still too many new cases of silicosis, and inspectors' reports prove that slackness is still too prevalent, and that conditions are too often found to be unsatisfactory to permit of any such relaxation.

Machine Drills.—The annual report of the Chairman of the Medical Bureau draws attention to the continued greater evidence of the disease amongst machine drill men as compared to other miners, emphasising the need for still greater attention to the operations in this class of work. Machine drills of which the dry jack hammer is the type, and which clear the hole by passing compressed air only down the hollow jumper, have been prohibited by regulation since 1st March, 1920, but further improvements in the machine drill work generally are necessary. In my previous annual report, I indicated several directions in which this can be effected, and the report of the Miners' Phthisis Commission, now in print, makes recommendations towards the same end. Voluminous evidence on preventive measures was led before the Commission, and its suggestions will no doubt serve as a jumping-off point for the inauguration of improvements in conditions. Attention has frequently been drawn to the faulty features of various types of machine drills. Many of these defects are inherent in the machine, but they are frequently and unnecessarily aggravated by the use of faulty material, such as inferior

hollow steel or by inattention to details in sharpening the steel or in repairing, for which the designers and maker of the machine cannot be held responsible. The remarks of inspectors of mines quoted below will furnish instances.

Miners' Phthisis Commission.—During the year, a commission of five members, presided over by Mr. Justice J. de Villiers, was appointed, principally with the object of devising improvements in the Miners' Phthisis Act of 1919, but charged also with the duty of inquiring into the methods for the prevention of the disease. The Commission has issued an interim report, in which it deals at some length with various preventive measures, but intimates that its work in this direction was still incomplete. The Commission has now been dissolved, so that we are deprived of the benefit of its judgment in several matters on which evidence was presented to it.

Systematic Inspections.—In September the staff of inspectors of mines on the Witwatersrand was strengthened by the appointment of four additional assistant inspectors of mines, mainly with the object of undertaking the systematic inspection of the phthisis mines described in my last annual report. A number of mines have already been thus inspected and reported upon, the intention being to have each mine overhauled once a year if possible. Further work has shown that it will probably be necessary to modify the original scheme in some respects, so as to do the work more expeditiously and to render the inspection more effective. Experience will indicate the weak points of the scheme and suggest improvements, but the knowledge already gained of the conditions on the inspected mines is considerably in advance of anything the department had before. In the course of inspection there is opportunity for discussing every point with the officials of the mine, and rectifying faults wherever possible, and a copy of the completed report is presented to the manager, so that he also is placed in possession of a general review of the conditions, and can give his attention to any matters which the report indicates as being in need of it.

Ventilation.—Comment has been made on a previous occasion on the necessity for improving the atmospheric conditions underground, and especially for suitably distributing the available air supply. It is becoming increasingly clear that the removal of the finest and most dangerous dust is dependent upon ventilation, and that unsatisfactory dust conditions are frequently due not so much to the nature of the work being performed, as to the relative inadequacy of the ventilating currents. Close places through which there is no air-current, and backstops with sluggish currents or stagnant air, are generally found to be unsatisfactory. The dust in the air must be considered and treated like a deleterious gas, and removed like it; that is, by displacement of the air containing it. A corroboration of this contention is to be found in the circumstance that a high CO₂ content is frequently accompanied by unsatisfactory dust results. When the amount of CO₂ is lowered by replacing the foul air by fresh, there is also, as one would expect, an improvement in the dust conditions. During the year returns have been secured of the ventilating systems of all the mines of the Witwatersrand, giving particulars of the system of ventilation and of the quantities of air in circulation. These have been compiled into a tabular statement. The quantities of air circulating have not in all instances been checked by the inspectors, but in the course of the systematic inspections now in hand, such a check will naturally be made. The amount of air called for by regulation is 30 cubic feet per person per minute, and a few mines do not reach this standard, and steps will have to be taken to bring them up to standard.

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EDITORIAL.

CO-PARTNERSHIP IN MINING.

Although there is an ominous silence regarding the progress of the Roodepoort U.M.R. co-partnership proposals, of which we wrote some weeks ago, the matter continues to excite so much discussion in mining circles that we may be pardoned for returning to it. Since last we wrote we have been enabled to consult the informative work on the subject of co-partnership by Mr. L. L. Price, and on "Profit-sharing" by Mr. L. V. P. Gilman. We have also had the advantage of perusing the data published in the valuable Board of Trade report on the subject issued just before the Great War. All these works bear out the conclusions already published in these columns, notably the hostility of organised labour to all such schemes and the difficulty of bringing them to successful fruition. For a practical example of co-partnership applied to mining, however, we need go no farther back than the recent settlement of the strike in the British coal industry, and several of the facts brought out

in the discussion of that settlement have an important bearing on the principle as applied to the Rand. For the best examination and analysis of the position in the British coal mines to-day, we are indebted to Mr. W. L. Hitchens, of Messrs. Cammel, Laird & Co., Ltd., who is well known in South Africa. Mr. Hitchens, in the course of a long and closely reasoned paper read the other day before the British Association, shows himself in favour of making some reasonable experiments to reconcile the interests of capital and labour. In this category he reckons profit-sharing, though he thinks it will never solve the problem of the fair distribution of the proceeds of industry between labour and capital. His views on the new agreement in the coal mining industry are worthy of special note. He points out that the objection that under a profit-sharing system there might be glaring inequalities as between one mine and another has been anticipated under this scheme; but he observes that in the first place it is not a profit-sharing scheme in the proper sense of the term, because individual companies may make a loss and yet be obliged to pay the increased wages. In the second place, he believes that the mines in each district will be obliged to amalgamate, in order that the poor mines may not be too heavily penalised by the rich ones, and the range of profit and loss still further accentuated. He is not very sanguine, however, about the scheme as a whole; it is more probable, he thinks, that "there will be no average profits during the next few years, since substantial reductions in the price of coal are essential and inevitable," and that the scheme will prove to be stillborn. Should it, however, turn out to be a vigorous infant, and lead on to district amalgamations, a further consequence, Mr. Hitchens thinks, will be that the miners will make a strong demand for a voice in the control of the industry. This natural consequence of effective profit-sharing he believes to be unworkable, as the ultimate control in any business must always rest with those who bear the financial responsibility. In this respect, it will be noted, he supports the view taken by the directors of the Roodepoort U.M.R. That this may prove to be an accurate diagnosis seems undoubtedly the view held by the majority of those concerned in the management of the British coal industry, and there are grave disadvantages in the method suggested by Mr. Hitchens of "trying out" each such nebulous scheme that the mind of man may devise; every failure inevitably causes disappointment, sours by a suspicion that the workmen have been "had," and we are not sure that this danger does not far outweigh the educational advantages of proof by concrete example, which some of these derelict schemes undoubtedly may give. To the discussion that followed upon Mr. Hitchens' paper, a valuable contribution was made by a well-known employer, Mr. A. Hopkinson, M.P., who said that profit-sharing, from his own experience, as a solution of industrial troubles, was not of very great direct importance, although indirectly he had found it important. The introduction of profit-sharing into his own works had turned the works into a school of economics for trade-unionists. After a year's experience, a small finance committee, which consisted of men experienced in trade union finance, went through the balance sheet with him, and one of them suggested extending the works. When he explained that money would be needed for the purpose, they wanted to know where the money had come from when the works had been extended previously. The money had been provided out of profits, whereas the men were under the impression that the employers had squandered it all. When this was explained to them they were taken aback, and gradually a few men began to realise that to keep a business healthy some of the profits must go back in the form of new capital. The few workers, therefore, came to the logical conclusion that it would be better if the employers took more profit year by year. He appealed for the provision of more capital by labour itself, which would result in raising wages and reducing the capitalists' share of profits. If the money which went to bookmakers and publicans were saved for a few years, companies should be able to get capital at 2 per cent. or even 1½ per cent. It may be a far cry from the debates of the British Association pundits on profit-sharing to the modest scheme proposed at the R.U.M.R., but we believe the points we have quoted have a very direct and practical bearing on the problem at our doors.

MONEY AND MINES.

The past few days have been unusually prolific in suggestions from politicians of the Nationalist and Labour Parties in regard to economic matters. In one quarter is advocated the creation of more paper currency, in another the declaration of a moratorium, in another the prohibition of the export of gold. It is a little difficult to discuss these bucolic nostrums with patience after all that has been said and written in regard to them in the past few years. An inflated paper currency can but add to our difficulties, and bring down on South Africa the troubles under which the paper-ridden countries of Europe are now groaning. A moratorium is, of course, but another name for bankruptcy, and bad as the position in the country districts may be, it scarcely warrants the adoption of that expedient. The last suggestion is perhaps the most foolish of all. If the product of the mining industry is not to be exported, imports cannot be paid for, trade must come to a standstill, and, bereft of supplies, the mining industry must close down. If there is a shorter cut to bankruptcy, we certainly don't know of it. As it is, the position, quite apart from these desperate expedients, is bad enough. The renewed discussion in London on the question of cancellation of war debts has had the effect of depressing the dollar exchange value, and as a consequence reducing the premium on gold. Nothing could better illustrate the delicate nature of the latter. Already Presidents Wilson and Harding have set their faces against war debt cancellation, but it seems possible that the coming disarmament conference may revive the question. Everyone is agreed that were the war debts cancelled between the American and Allied nations, it would go far to stabilise exchanges and make foreign trade again possible. But public opinion in America does not yet seem educated up to this heroic form of trade restoration, and the gold premium seems safe for a little longer from this danger. As one London contemporary well puts it: "In an attempt to stimulate exports America is said to be contemplating a commission to inquire into the means necessary to stabilise foreign exchanges, but the prospects of success are doubtful. Depreciation in currencies may be said to be due to foreign debts and unbalanced budgets, and no commission can remedy the latter, because it would mean the imposition of fresh taxation, and when local Governments are afraid to do that, recommendations from any commission is apt to fall on stony ground. Nor must it be forgotten that the real purpose of the commission is less to stabilise exchanges for the benefit of the Allies than to find out a way to sell American goods. Further, to stabilise exchange means in effect that a solvent country will be unable to derive any benefit from her improving position, while an insolvent nation, making no effort to cover expenditure by revenue, will be able to disguise her real position for a time. The after effects of stabiliment of exchange would be just as disastrous as other Governments' experiments in interfering with economic laws. It would, however, be a different matter were America to agree to the debts of the Allies being payable at a fixed rate of exchange which would approach normalcy. Outside this country there is very little likelihood of any of the Continental Powers being able to liquidate their American indebtedness while the present New York valuation of local currencies continues. Such a concession might more than halve the face value of some of the loans, but the creditor would benefit quite as much as the debtor, because so long as the debts remain unsettled international business cannot be restored. Cancellation of the debts altogether would be the best way, but failing that the acceptance of payment at normal valuation of currencies, both by this country and America, would be of very material benefit towards the restoration of the world to prosperous peace conditions."

Notes & News.

Rhodesian Diamonds.

Recent issues by the Southern Rhodesia Geological Survey include a report on "The Geology of the Diamond-bearing Gravels of the Semabula Forest," by A. M. Macgregor, B.A. The work embraces much valuable information on the various aspects of the mineral deposits found in the area named.

Blue Asbestos.

Blue asbestos producers in British Bechuanaland have joined hands in the formation of a Blue Asbestos Producers' Association, by which it is hoped to place the industry on a sound and business-like basis. A deputation consisting of Messrs. W. H. Addison and J. P. Frylinck recently waited upon the Minister of Mines and Industries in Pretoria, and the Government, as an outcome, has consented officially to recognise a grader of the fibre appointed by the Association. The latter has agreed upon a standard grading and minimum prices.

A Stopping Record!

Further to our announcement last week of the world's stopping record, which was broken at the Van Ryn Deep during September, we now publish the figures showing the three previous months' work performed by Mr. B. T. Lellyett with Hohman drills:—

Contractor: B. T. Lellyett.

Type of Machine: Hohman H.W.3 and Hohman C.H.2.

Period (inclusive)		Square Fathoms	No. of Mchns.	Length of Steel Chisels	No. of Working Shifts	No. of Machine Shifts	Fathoms per Machine Shift
From	To						
1/6/21	25/6/21	160	4	6 in.	22	87	1.84
27/6/21	26/7/21	207	4	6 in.	26	103	2.01
27/7/21	1/9/21	234	4	6 in.	32	118	1.98
2/9/21	1/10/21	248	3	10 in.	26	78	3.18

Co-operation in Oil Prospecting.

Replies have been received by the Home and Territories Department from several of the State Ministries with reference to the encouragement of prospecting for oil in Australia (says the *Melbourne Argus*). New South Wales decided late last year to increase to £10,000 the reward for the discovery of oil in that State. Applications were also invited for assistance from the prospecting vote to bore for petroleum on approved sites, on the basis of half costs, each case to be dealt with on its merits. In February, the Premier of New South Wales suggested the inadvisability of granting the proposed reward at present as no indication of commercial oil deposits had been found. It was also stated that a reply had been received from Victoria to the effect that the Victorian Government did not consider that any good purpose would be served, so far as that State was concerned, by supplementing the reward offered by the Federal Government. The policy of South Australia is that the best encouragement for prospecting is a bonus on actual production rather than a subsidy towards prospecting operations. Five applications have been received by the Federal Government for the reward of £50,000 offered for the discovery of oil in payable quantities in Australia. Three of these are sending regular monthly reports to the Department of Home and Territories, but no definite indications of large deposits of oil have yet been announced. No applications have been received from prospectors in Victoria. There are two from New South Wales. A Queensland Oil Company has also lodged a claim. One of the other applicants refused to indicate the location of the bore, or to furnish any particulars, though demanding payment of the £50,000. An offer was recently received from an American firm offering to locate oil in New Guinea and Papua by the aid of a divining rod. This offer was not accepted as the Federal Ministry has experts prospecting in those parts.

Important Insurance Deal.

It is announced that Mr. I. W. Schlesinger has, on behalf of the African Life Assurance Society, bought the entire African business of the New York Mutual. This incurs the transference of over one million pounds sterling, bringing the policy reserve fund from New York to the African Life Assurance Society. Thus the sum becomes available for investment in this country. In estimating the value of the deal, so far as South Africa is concerned, it has to be borne in mind that, according to its articles of association, the African Life can only put its moneys in Government and Municipal stocks or lend it on first mortgage. It is rumoured that Mr. Schlesinger has also purchased the whole of the African business of two or three other American insurance companies, which would result in the transference of a further two millions sterling from New York to the African Life. These later rumours, however, lack confirmation.

* * *

World's Record and the Rock Drill Hose.

In connection with the world's record established by the Holman rock drill, it is of interest to know that the drill was equipped with the well-known "4810" unarmoured rock drill hose. Records of this character can only be established with absolutely the finest equipment it is possible to procure, and one of the most essential details is, of course, that the air drill hose used should conduct 100 per cent. air. A cheap grade of hose which is susceptible to the action of mineral oil would have been useless, due to the fact that fine particles of rubber would come away from the inner tube and choke up the ports of the drill, materially affecting the drilling speed. "4810" hose is constructed of such material that it is impervious to the action of mineral oil, and the tube will not flake or come away under the severest possible conditions. It is a tribute to the fine reputation of this hose that it should have been selected as equipment for the Holman drill in the establishing of the world's record.

* * *

The Afrikander Annual Meeting.

The annual meeting of the Afrikander G.M. Co., Ltd., was held a few days ago, Sir William Dalrymple presiding. *Inter alia*, the Chairman said:—The report of the directors and the accounts for the year ended 30th June, 1921, are before you for consideration. The total expenditure was £1,868; £550 was received on account of sundry revenue and interest, leaving a net expenditure of £1,317 for the period. £1,306 was paid to the Government for claim licences and nuyapacht dues. An amount of £1,074 was realised by the sale of certain stores and buildings, and after allowing for sundry creditors, the cash in hand at the end of the year was £9,188. The property remains in the hands of a caretaker, and all machinery, plant and buildings have been maintained in good order and repair. During the year an agreement was entered into with a tributing syndicate for the treating of the surface ore dumps on the property. This syndicate, however, discontinued their operations, and a 30 days' option has since been given to another syndicate to lease the whole property for a period of six years on a royalty basis agreed upon. This option is still in force. The report was adopted.

* * *

Hydro-Electric Power in South Africa.

The above subject formed the basis of an exceedingly interesting paper read by Mr. H. W. Miller before the South African Institution of Engineers on Wednesday night. A full and detailed account of the hydro-electric plant installed by the S.A. Rubber Manufacturing Company at Howick was given, and some interesting discussions arose out of it. Although South Africa is a country which is not well supplied with an abundant and constant supply of water, it does possess potentialities of not inconsiderable importance in this direction. A comprehensive survey of available sources of water power in South Africa has been made by the Irrigation Department, and although numerous cases are brought to public notice, the majority of them are unfavourably situated in the country's present state of development. The harnessing of the waters of the Howick Falls is an excellent example of what can be done with the more accessible of these sources of water power. A more detailed account of Mr. Miller's paper appears elsewhere in this issue.

Victoria Falls and Transvaal Power.

It is noteworthy that the report for 1920 states that in December 31 last the issued share capital amounted to £3,000,000 and the debenture capital to £3,351,870 a further £328,210 of 5 per cent. first mortgage debentures and £63,380 of 5½ per cent. second mortgage debentures having been purchased for redemption during the year. After providing for interest and premium on debentures (£183,895) and for depreciation and income-tax, etc. (£409,941), the net profit is £173,161, and £91,321 was brought in, making £267,482. Dividend of 6 per cent. on preference shares for year, less tax, absorbed £84,000, leaving £183,482. In respect of this surplus the directors on June 16 last declared a dividend of 5 per cent., less tax, on ordinary shares for the year, and as the preference shares are entitled to share *pro rata* with the ordinary shares in the surplus profits distributed until the preference shares have received a total dividend of 10 per cent. for the year in respect of which the distribution is made, the directors also declared a further dividend of 4 per cent., less tax, on preference shares in respect of 1920. These dividends absorbed £91,000, leaving a credit balance of £92,482, which will be carried forward.

* * *

The Silver Position.

Standard silver spurted 1½d. in mail week to 41½d. per oz., which brings it up to virtually the level at which it started this year, after being down to 30½d. on 5th March. Last year's extremes were 89½d. on 11th February and 38½d. on 10th December. Just before the War the metal ranged between just under 2s. and not quite 2s. 6d. per oz. The latest rise is ascribed to further Indian buying and bear covering in a market temporarily short of supplies. In their weekly report on silver Messrs. Samuel Montagu & Co. state that the market preserves a steady tone. Indian sentiment is bullish and purchases have been made freely for cash and for forward delivery, notwithstanding the inquiry for gold which has set in from the same quarter. China has not been an active factor, probably because of the direct shipments of silver which are being made from time to time from the result of the Royal Mint operations in reducing the quality of home coinage. The prospects of silver depend more than anything else upon whether the phenomenal inquiry which has arisen this year in India will be prolonged indefinitely. In view of the fact that silver derived from the partial demonetisation of United Kingdom silver coin is now finding its way to the Far East, there to be utilised as currency, it is not surprising that China is not much in evidence as a buyer. Indeed, it is rather surprising that, notwithstanding the slack movement of goods from that country, exchange rates are so well maintained. The amount likely to be released by the reduction of the quality from '925 to '500 must be very large, but it is not easy to ascertain. A rough guess of 40,000,000 ozs. as the amount likely to be added from this source to the world's supplies during the next year or so is not unreasonable.

Concerning Mines and Men.

Mr. W. T. Anderson, M.I.M.M., has returned to South Africa.

* * *

Mr. Arthur French, Manager of the General Mining and Finance Corporation, sailed for England last week.

* * *

Mr. J. W. Kirkland has returned to the Rand after a business trip of six months to England and America.

* * *

Mr. M. H. Turner, of the "J.C.I." engineering staff, has been placed in charge of the extensive coal interests of that group.

* * *

Mr. Ross Macartney, the General Manager of Rhodesia Broken Hill, has left on six months' leave. His place is being filled by Mr. Barton.

* * *

With deep regret we record the death, which took place last week at Durban, of Mr. J. H. Richardson, the well-known stockbroker. Mr. Richardson was buried at Johannesburg last Tuesday, the funeral being attended by a large and representative body of friends.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

De Beers' Annual Meeting.

The annual meeting of De Beers will be held at Kimberley on December 9.

Mining and Metallurgy.

Nevada Consolidated Copper Co.—Mining and Scientific Press. September 3, p. 323.

The Geologist's Part in Road Building.—The Scientific American. September 10, p. 180.

Electric Resistance Furnaces.—The Electrical Review. September 16, p. 364.

Institution of Mining Engineers.—The Iron and Coal Trades Review. September 16, p. 393.

Suggestions for the Standardisation of Geological Sections of Strata in Boreholes, Shafts, etc.—The Iron and Coal Trades Review. September 16, p. 399.

Engineering.

Die Casting.—The Engineer. September 16, p. 281.

Developments in Power Station Design.—The Engineer. September 16, p. 282.

The British Association.—The Engineer. September 16, p. 286.

Notes on Water Power Developments.—The Engineer. September 16, p. 301.

Armature Winding and Induction Motor Diagrams.—The Electrical Review. September 16, p. 366.

The Electrification of Railways.—The Electrical Review. September 16, p. 371.

The Centrifugal Purification of Oil.—The Electrical Review. September 16, p. 388.

Coal and Oil.

American Pipe Lines for Pumping Oil.—The Engineer. September 16, p. 285.

Coppic Coke Ovens at Port Talbot.—The Colliery Guardian. September 16, p. 793.

The British Association.—The Colliery Guardian. September 16, p. 796.

The Absorption or Solution of Methane and Other Gases in Coal, Charcoal and Other Materials.—The Colliery Guardian. September 16, p. 809.

Coal Mining by Steam Shovel in Alberta, Canada.—The Iron and Coal Trades Review. September 16, p. 401.

Powdered Coal Under Steam Boilers.—Coal Trade Journal. September 7, p. 1003.

Economics.

The Use of Metals.—Mining and Scientific Press. September 3, p. 318.

Wages Systems.—The Colliery Guardian. September 16, p. 805.

Wages Problems.—The Iron and Coal Trades Review. September 16, p. 395.

Prices and Inflation.—The Iron and Coal Trades Review. September 16, p. 409.

London Market Review.

On the Stock Exchange during last week there was a good deal of forced liquidation, notably in oil shares, says the latest cable. This is attributed to commercial and financial conditions in the commodity. The markets are also clearing up the balance of pre-War speculative accounts. Later pressure showed signs of relaxing, some support being forthcoming at the lower level. The best feature of firmness were gilt-edged securities, which is noteworthy in view of the revenue return showing a deficit of forty millions sterling for the half-year. There was also a rush for the new issue of the New South Wales loan of three millions at 6 per cent., price 95½, now being underwritten. Allotments were made of Ceylon issue on the basis of 25 per cent. dealings at ¼ per cent. premium. In Kafirs business was limited to weaker selling, believed to provide funds to meet differences in other directions. The weakness of gold is the reflex of the depreciation of the dollar, which is attributed to the fact that speculators in exchange fluctuations were scared into closing commitments by renewed talk of funding Allies' debts to the United States.

* * *

The ordinary general meeting of the Chemical, Metallurgical and Mining Society will be held in the Scientific and Technical Club, 100 Fox Street, Johannesburg, on Saturday, the 15th inst., at 7.45 p.m. Research Endowment Fund; Presentation of medals. Chemical Research, Dr. James Moir. Metallurgical Research, Dr. W. A. Caldecott and H. A. White. Mining Research, John Innes. Papers for reading: (1) Presidential Address, by F. Wartenweiler; (2) "Coal Pillar Extraction from two Seams, and Surface Effects," by W. T. Heslop; (3) "Some Notes on the Pilgrims Rest Goldfields," by H. C. F. Bell. Symposium: "Miners' Phthisis." Reply to discussion: (1) "Notes on the Influence of Soluble Silica and Calcium Salts on Precipitation," by J. Hayward Johnson; (2) "Treatment of Antimonial Gold Ore at the Globe and Phoenix Mine, Southern Rhodesia," by V. E. Robinson; (3) "Occurrences of Fire Damp on the Far East Rand," by T. N. Dewar. Final discussion: "Methods used in the Detection and Investigation of Vitamines," by Dr. E. Marion Delf. Under the auspices of the Associated Scientific and Technical Societies of South Africa, Dr. H. J. van der Bijl, Scientific and Technical Adviser to the Union Government, will deliver an illustrated lecture entitled, "Recent Developments in Wireless Telegraphy and Telephony," at the above address on Monday, the 17th October, 1921, at 8 p.m. Dr. van der Bijl is a specialist in the subject, and his lecture, which will be of a popular nature, should be of great interest. Members and their friends are cordially invited.

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Witbank By-Products.

A SUCCESSFUL INDUSTRY.

Few people are aware with what success tar is now being produced by the By-product plant of the Witbank Colliery. An illustration on this page shows the magnitude of the plant, and the following extract from some views of the manager of the plant (Mr. W. T. Burton), given in our Coal Number, may be of interest:—

Mr. Burton wrote, *inter alia*:—Having been in the country a few months only, one naturally feels at a disadvantage to give a definite opinion on such an important subject. But at the outset it seems to me that the potential value of waste coal which costs sixpence to dump has not up to now been realised with the exception of one of our great mining houses. I know of no other in the sub-continent who have made any serious attempt to utilize any of the



The Witbank Colliery By-Products Plant.

enormous quantity of unsaleable coal which in every colliery is mined daily. When one realizes the fact that tons of tar, wood and iron preservatives and other bitumistic compounds are imported annually and that we have the raw material at our disposal (material which is very often an expensive nuisance), one is given furiously to think. To my mind the non-development of this industry is due to concentration on the gold and diamond industry, whereby other national resources were ignored, and justly so perhaps. But any empire or country which concentrates all its energies and capital on one or two sources of revenue, is in the long run bound to come to a dead end.

Wherever one industry is created, obviously products are required to help in its own particular line to maintain it. In the case of South Africa the position is unique, both in natural resources and, compared with other nations, cheap labour and raw material, and can manufacture any or all of the by-products of coal at a competitive price with the imported article. My short stay in this glorious country has firmly convinced me of this. I feel it would be inadvisable at this juncture to go into technical details. I hope, however, to do so at a future date, and that the by-product industry of South Africa will before long be more than in the experimental stage is my fervent wish.

Technical Equipment for the Rand University.

The desirability of ensuring that supplies of British technical equipment should be available for educational institutions in South Africa has lately been dealt with in these columns, and in this connection we note that Mr. W. G. Wickham, H.M. Senior Trade Commissioner, has the following in his latest annual report. He points out that:—

Capetown is building a university on an ample scale. Johannesburg has converted its School of Mines and Technology into a University College, and is hoping for a charter

to create an independent university. In both cases new buildings and new equipment are involved, and excellent opportunities are afforded to British manufacturers of being first in the field with donations of apparatus, machinery, and other equipment for laboratories, both scientific and engineering. There is probably no form of advertisement—to put it on its lowest plane—so remunerative as making sure that the rising generation of chemists and engineers are taught as household words the names of the makers of plant and apparatus. Optical instruments, laboratory supplies, assay apparatus, testing machines and instruments, engines, machine tools of all kinds, all find a place in such educational institutions, and the makers of such who are fortunate enough to obtain a place for their makes in college laboratories have an obvious advantage over their rivals in all succeeding years, as young chemists and engineers go out into the world with the names of those manufacturers as familiar as those of standard editions of Greek and Latin authors are to classical scholars.

On a higher plane it may be said that special scope for generosity is afforded by these institutions, and it is to be hoped that the excellent precedent of recent gifts of machinery towards technical education in Nottingham will be followed in the case of South African universities and other educational institutions throughout the Dominions. It is indeed lamentable to find instances of British manufacturers demanding not only the full retail price for such equipment, but treating unendowed colleges, which usually have to collect subscriptions before ordering plant, as ordinary customers; and taking orders only for indefinite delivery and charging prices 50 per cent. or more above the sum collected for purchase. It is all the more to be regretted at a time when American and German manufacturers are presenting their makes free of charge.

It would be only reasonable and natural under the circumstances if professors responsible for equipping the laboratories and workshops of universities and technical schools in the Dominions not only accepted all proffered gifts from foreign countries instead of vainly endeavouring to induce British manufacturers to give a discount off their full list prices, but left England out of their inquiries altogether.

British manufacturers may rest assured that were it not for the loyalty of the professors themselves, and for rare instances of generosity on the part of a very few British firms to provide a justification, inquiries would no longer be sent to the United Kingdom except purely as a matter of form.

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September Output in Detail.

LOWER TOTAL—LABOUR SUPPLY IMPROVES—CROWN MINES AND GEDULD INCREASES.

In September the Transvaal mines produced 691,096 ozs. of fine gold as against 711,526 ozs. in the longer month of August, a decrease of 20,430 ozs. The value of the September output (£5 10s. per oz.) is estimated at £3,801,028, showing a decrease of £165,729 compared with the August return, which was valued at £5 11s. 6d. per oz. A gain of nearly 3,000 is shown by the native labour returns, the total number of boys employed on the gold mines being as follows: August, 169,008; September, 171,912. The group profits for September show a decrease of £73,007. The following are the individual increases and decreases for September:—

Individual Returns.

	Increase.	Decrease.
Aurora West	—	130
Brakpan	—	465
City Deep	—	1,935
Con. Langlaagte	93	—
Con. Main Reef	—	339
Crown Mines	1,147	—
Durban Deep	—	106
E.R.P.M.	262	—
Ferreira Deep	—	1,032
Geduld	564	—
Geldenhuis Deep	—	907
Government G.M. Arcas	—	818
Knight Central	—	755
Langlaagte Estate	—	85
Meyer and Charlton	—	500
Modder B.	—	716
Modder Deep	—	1,463
Modder East	—	2,525
New Goch	—	156
New Kleinfontein	—	662
New Modder	—	1,150
New Unified	46	—
New Primrose	—	334
Randfontein	—	2,305
Rose Deep	235	—
Roodepoort United M.R.	—	275
Robinson Deep	616	—
Simmer and Jack	—	474
Springs	—	2,103
Van Ryn Estate	—	339
Van Ryn Deep	—	3,317
Village Deep	—	1,188
West Rand Consolidated	—	203
Witwatersrand	—	223
Wolhuter	—	278
Witwatersrand Deep	291	—
Miscellaneous	145	—

Outside Districts.

Glynn's Lydenburg	21	—
Sub Nigel	22	—
Transvaal G.M. Estates	180	—
Miscellaneous	420	—

Native Labour.

	July.	August.	September.
On gold mines	106,900	169,008	171,912
On coal mines	14,688	14,446	14,244
On diamond mines	1,246	1,207	1,219
Totals	182,963	184,661	184,661

Group Profits.

	July.	August.	September.
Central Mining	£518,252	£538,321	£519,615
Barnato	331,703	372,497	339,995
Gold Fields	45,173	42,122	42,907
General Mining	44,440	44,919	39,361
Mines Selection	89,922	88,967	76,781
Union Corporation	120,660	123,908	119,068
Totals	1,150,150	1,210,734	1,137,727

Monthly Output Totals.

	Ounces.	Value.
January	651,593	£3,420,363
February	558,137	2,895,336
March	671,123	3,481,450
April	681,382	3,534,370
May	687,776	3,567,838
June	678,490	3,646,336
July	689,555	3,878,747
August	711,526	3,966,757
September	691,096	3,801,028

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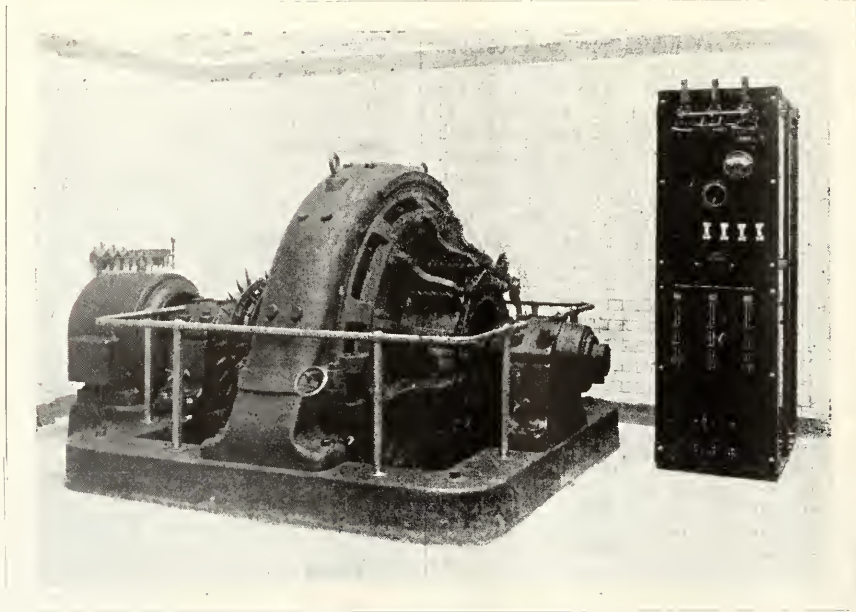
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The Week in the Sharemarket.

GOLD SHARES EASIER ON REDUCED GOLD PREMIUM—DIAMONDS AND INDUSTRIALS WEAKER—A WAITING MARKET.

The latest price for gold, dated London, October 11, is given at £5 6s. 9d., and as a consequence gold shares are easier. The explanation given for the drop in gold is that speculators in exchange have closed commitments in view of the talk about cancellation of international debts. The whole market took its tone from gold shares, and both diamonds and industrials were weaker. Colliery shares which have hitherto stood the strain very well also fell away on the depressing news of the coal export trade. Wednesday was a Stock Exchange holiday and on the Call on Thursday prices reached the lowest for some time.

Liquidation on a large scale continued, and prices were marked down all along the line. The decline ranged from 1s. in the case of New Modders at 71s. 6d. sales to 1½d. in Main Reefs at 10s. 6d. sales, and was in most other stocks about 6d. Modder B, however, were steady at 26s. 3d. and 26s. 6d. sales, Nourse Mines unchanged at 9s. 6d. sales, and Coronation Syndicates at 6s. sales. Natal Navigation Collieries were obtained at the low price of 28s., the lowest point for a long period. Consolidated Diamonds were 7½d. lower at 14s. 9d. and 14s. 7½d. sales, and Frank Smiths were easier at 4s. sales and sellers. P.P. Cements were fairly steady at 42s. 6d. and 42s. 9d. sales. Transvaal Silvers easier at 16s. 9d. and 16s. 6d. sales. Hume Pipes and Alkali inactive. Nothing was done in tin shares, and Union Loans were steady but inactive.

In a speech at Kimberley, delivered during the week, Sir David Harris took a more cheerful view of the diamond outlook, and the opinion is gaining ground that there may be a revival by Christmas. As it is, people are content to wait and hope that better news from London, a settlement of the ex-enemy share question, and good dividends at Christmas may make for a better market.

Latest Cable Quotations.—Buyers: Springs, 39s. 6d.; Springs West, 10s. 9d.; New Kleins, 6s.; Johnnies, 21s. 9d.; Crown Mines, 38s. 3d.; City Deeps, 46s. 3d.; Gedulds, 44s. 3d.; De Beers Deferred, £11 7s. 6d.

	Fri. 7th.	Sat. 8th.	Mon. 10th.	Tues. 11th.	Thurs. 13th.
Anglo-Amer. Corp.	21 3*	21 0*	21 0	20 7½	19 0
Apex Mines	7 3*	7 3*	7 3*	7 3*	7 3*
Bantjes Consolidated	5 9*	5 9*	5 9*	5 6*	5 7½
Brakpan Mines	52 0*	52 9	51 0*	—	50 0*
Bushveld Tins	0 6*	0 6*	0 6*	—	—
Cinderella Cons.	2 6*	2 6*	2 6*	2 6*	—
City and Suburbans	2 3*	2 3*	2 0*	2 3	—
City Deeps	48 6*	49 0*	47 6*	48 6*	46 6*
Clydesdale Collieries	25 9*	25 9*	25 9*	26 0*	25 0*
Con. Diamonds	—	16 3*	16 3	15 3	14 7½
Con. Investments	21 0*	—	—	—	—
Con. Langlaagtes	—	12 6*	12 6*	12 6*	13 6*
Con. Main Reefs	10 3*	10 7*	10 7*	10 7½	10 6
Coronation Collieries	—	—	40 0†	—	—
Coronation Freeholds	—	—	0 11*	—	—
Coronation Syndicates	9 6	6 6	6 0	6 0*	6 0
Crown Diamonds	3 9*	3 9*	3 9*	3 9*	3 9*
Crown Mines	40 0*	40 0*	—	13 0†	—
Daggafontein Mines	—	—	2 11	2 6*	3 0†
East Rand Coals	2 0	2 0*	1 11*	2 1†	2 1†
East Rand Deeps	0 7*	0 7*	—	—	—
East Rand Props.	5 9*	5 9*	5 6*	5 4†	5 3*
East Rand Debentures	£81	£83	£83	£83	£85
Eastern Golds	—	—	9 0*	0 9†	0 9†
Ferreira Deeps	—	—	—	—	—
Frank Smith Diamonds	4 0*	4 1*	4 2	4 2	4 0
Geduld Props.	46 6	16 0	16 0	45 6	44 9
Glynn's Lydenburgs	—	—	—	—	8 0*
Government Areas	82 3*	82 0	—	81 9	80 0*
Knight Centrals	4 3*	4 3*	4 4*	4 3*	4 3*
Lace Props.	7 3*	7 6*	7 6*	7 6	7 6
Leeuwpoot Tins	7 9*	8 0†	7 6	7 0	6 10*
Luijpaardsvlei Estates	—	—	—	—	1 9*
Lydenburg Farms	5 3	5 0*	5 0*	5 0*	5 0*
Middelvlei Estates	1 3*	1 3*	1 5*	1 5*	1 5*
Modder B.'s	27 0*	26 9	26 6*	26 6	26 6
Modder Deeps	44 0	43 9	43 3	43 3	42 9
Modder Estates	9 10½	9 9*	9 9	9 7*	9 7½
Hume Pipes	18 6†	19 0†	18 6†	17 6*	18 6†

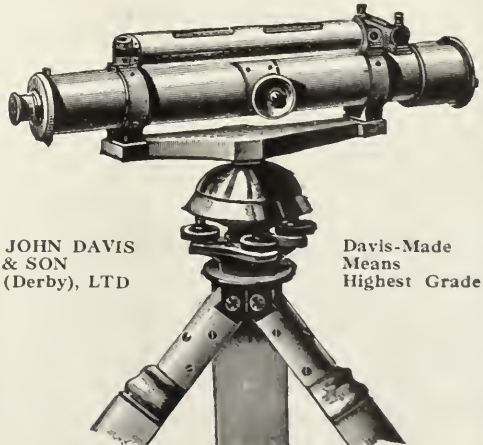
	Fri. 7th.	Sat. 8th.	Mon. 10th.	Tue. 11th.	Thurs. 13th.
New States	24 3	24 0	24 0	23 9	23 0
New Eland Diamonds	—	25 0†	—	28 0†	25 0†
New Era Cons.	7 6*	7 6*	7 6	7 6*	7 3*
New Geduld Deeps	1 4*	1 4*	1 4*	—	—
New Kleinfonteins	6 3*	6 3*	6 0	6 0*	6 0
New Modderfonteins	73 9	74 0a	72 9	72 6	71 6
New Priunrose	—	—	—	3 3*	—
New Unifeds	—	—	—	3 6*	—
Nourse Mines	9 6	9 9	9 6*	9 6	9 6
Pretoria Cements	43 0a	42 6*	42 6*	42 9*	42 9
Princess Estates	1 1*	1 2†	0 9*	0 10†	1 0
Rand Nucleus	—	1 1*	1 1*	1 1*	1 1*
Randfontein Central	—	—	—	10 0*	10 6*
Randfontein Estates	16 3*	16 3	16 0	15 9*	15 3
Roberts Victors	8 6*	8 6*	8 6*	8 6*	—
Rooibergs	3 3	3 0*	2 9*	3 0*	—
S.A. Lands	1 2	1 1*	4 0*	4 1	4 0*
Springs Mines	12 0	41 6*	41 0	40 0	39 6
Sub Nigels	—	11 3	11 0*	11 0†	10 6†
Southern van Ryn	1 6*	1 6*	1 6*	1 6*	1 6*
S.A. Townships	10 6*	11 3†	10 3	10 9†	9 6*
S.A. Alkali	15 0*	15 0	15 0*	15 0*	14 0*
Transvaal Silver	15 9	16 3	16 9*	16 9*	16 6
Swaziland Tins	9 0†	9 0†	9 0†	9 0†	9 9†
Transvaal G.M. Estates	—	8 0*	8 0*	8 0*	8 0*
Union 5 per cent.	£100½	£100½	£100½	£100½	£101
Van Ryn Deeps	73 6	73 6	72 6*	72 0*	72 0*
Village Deeps	9 0*	9 6†	—	—	—
Western Rand Estates	3 10	4 3†	4 3†	3 6*	3 0*
Witbank Collieries	38 0*	—	37 6*	—	38 6†
Witwatersrand Deeps	9 0*	9 0*	9 0†	9 0†	9 3†
Wolhuters	4 3*	4 3*	4 3	4 3*	4 1
West Springs	12 0*	11 9*	11 9	11 3*	11 0
Zaaiplaats Tins	2 6	2 3*	3 3*	3 3	3 3*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

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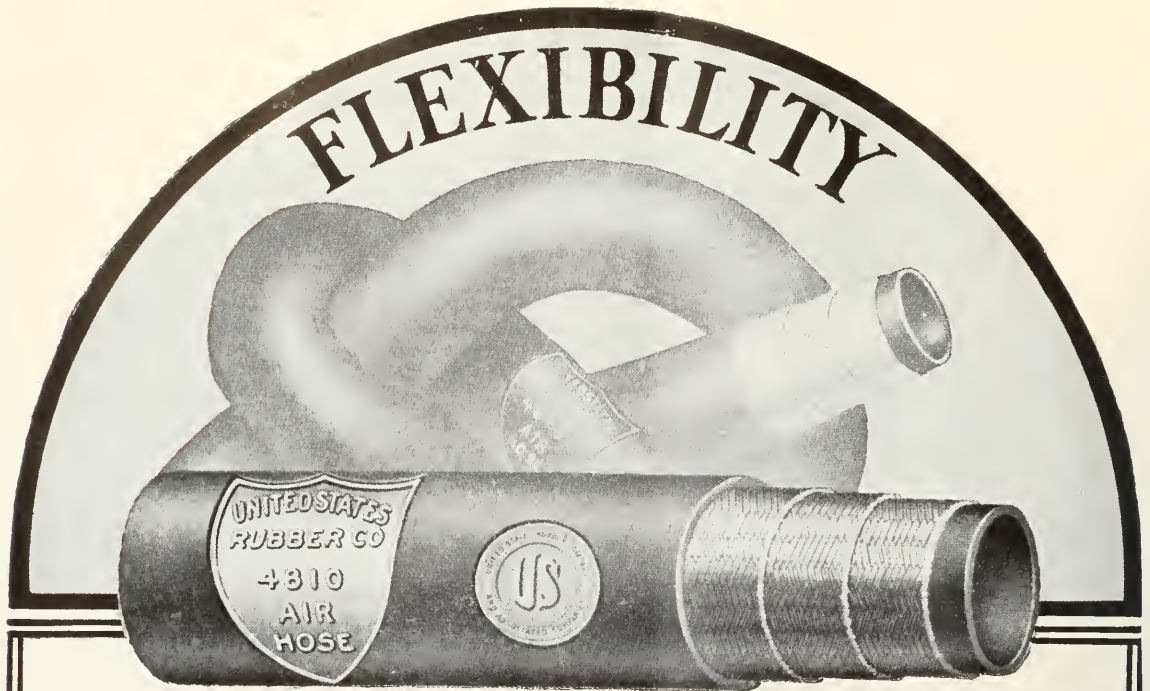
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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

X.

By Arthur Stenhouse.

Vividly, clear-cut against the summer sky, stand out events of 1886—thirty-five years ago! It seems but yesterday when my esteemed friend, Richard R. Hollins (who at the time represented Kynoch's, Ltd. (the gun people), and who was also a director of the first gold mining company registered in the Transvaal, the "Kromdraai"), in exuberance of spirit, persuaded me to accompany him, on "Guy Fawkes' Day, in the mad project of painting Pretoria "red" to enliven the sluggish town. Filling our pockets with dynamite cartridges, we started out on our adventure and carefully placed the cartridges (without caps) on the tops of the fencing poles surrounding the Dutch Reformed Church in the centre of Church Square, also on the stoep of the Standard Bank and other semi-public buildings. When our mines were prepared we set fire, and the whole town was at once brilliantly illuminated. We now thought it time to clear. Richard, being short-sighted, fell into a sluit of clear running water and beneath the kerb stones lay half hidden in the cooling stream. He advised me to make myself scarce also, so I sought safety in flight. The Z.A. Police were after us, so I made for home like a streak of lightning, and was soon in bed, apparently asleep.

Next day there was great commotion in the city! The newspapers, in big headlines, asserted that an attempt had been made to blow up the church, the bank, and other buildings, and the police were on the track of the perpetrators.

Fortunately for us, the mystery was never solved by the ruling authorities. A year afterwards the papers recalled this mysterious occurrence, which had never been solved. Confession is good for the soul, so after a period of 35 years we must confess that we were the guilty parties who woke up the City of Pretoria on that eventful night.

The coach journeys before the advent of the railways were interesting. On one occasion I travelled by coach from Pretoria to the Rand by the first of Hollins & Dow's coaches. The late Captain Dow was a very handsome man, wore a big sombrero hat, and drove the coach himself. I sat on the box-seat beside him. We started late from Pretoria, and it soon became quite dark. Suddenly the team swerved, the captain pulled up, and descended to see what was wrong. He discovered that we had come bang up against a wire fence in the darkness. We had lost the way. Nothing was said to the passengers as we crawled beneath the coach and laid us down to sleep. There were some ladies in the coach, and they inquired why we were not going on! No one replied to their inquiry; we were filled with mirth and hardly dared to breathe! Soon the inmates realised the position and patiently waited for the break of day, when we resumed our journey and eventually arrived at our destination.

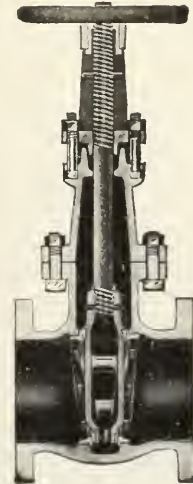
To-day (1921) on the hill tops overlooking the fertile valleys and rugged kopjes towards Pretoria, the old Adam dwells with his beloved Eve in their Garden of Eden. Sweet are the memories of joys that are past, but sweeter still is the modest hope of securing two back seats in the pit of a permanent Paradise.

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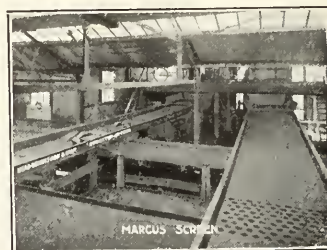
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ENGINEERING SECTION.

Heat Treatment of Steel.

By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Etna Works, Sheffield.

Tempering.

The object of tempering is to remove the strains produced in hardening and or to reduce the brittleness to a degree suitable for that particular type of tool and the work it has to do. The temper is usually judged by the formation of colours on the surface of the steel, these colours being due to oxidation of the surface of the steel. As soon as the correct colour appears the tool must be immediately quenched out. These colours will not appear unless the steel surface is free from scale, for this is an already oxidised surface, therefore after the initial quenching (hardening) the part to be tempered must be cleaned with a stone to produce a bright surface. In the case of alloy steels, however, the steel must be maintained at the correct tempering temperature so that the heat thoroughly penetrates to the middle of the bar. Another important point is that the tempering furnace must be cooled down as low as possible before putting in the hardened bars and then brought up slowly to the correct heat. If hard alloy steels are placed into a hot furnace they will invariably crack. All nickel chrome steels tempered between 350 degrees and 525 degrees Centigrade must be quenched out immediately after tempering. The furnaces used for tempering are varied. We have the ordinary gas furnace for alloy steels (*i.e.*, nickel-chrome, chrome-vanadium, etc.), the oil bath, fusible salts, lead pot, gas heated hot plate and hot sand bath. For tools such as picks, drills, cold chisels, etc., one heating is sufficient for both hardening and tempering, the heat in the unquenched portion of the tool being sufficient to temper the hardened portion when allowed to run down.

Case-hardening.

Where a hard wearing surface and a tough centre is required such as in the case of camshafts, gear wheels, etc., case-hardening is the method adopted to produce the desired qualities. The operation consists of adding carbon to a low carbon steel, by means of heating in the presence of a compound capable of supplying the steel with the necessary carbon. The outer surface of the steel therefore after carbonisation has a greater carbon content than the core and on subsequent heat treatment, the core is toughened and the case is hardened.

For plain carbon steels the actual process is as follows: Pack the articles to be case-hardened in an iron box, into which a case-hardening compound has been placed, and close carefully with fireclay to make airtight. Heat up uniformly to 900 to 950 degrees Centigrade and keep at that temperature for a pre-determined period, this period to depend upon the depth of case required. The object of this is to add carbon to the steel. Cool the articles either in air or quench out in oil or water. If the articles were quenched out, and fractured to see the grain of the steel they would appear very crystalline and give obvious proof that the steel had been overheated. Therefore to refine the steel, heat up to 870 degrees Centigrade and quench in water. The object of this last treatment is to refine and harden the case. Reverting to the length of time at which the carburising temperature must be maintained, this varies greatly, depending on the depth of penetration required, the

temperature, the packing, the compound used, the analysis of the steel, etc. A point which is very often overlooked is that the articles to be case-hardened should be free from rust, scale and dirt. The question, "Why does steel harden?" is very often put to me, and I am confident that the following few notes will be easily understood by even the non-technical man.

Steel is crystalline—like sugar. Crystals, however, of the same steel when examined under the microscope vary considerably in their size and constitution according to the condition of the steel. The effects of hardening, tempering, annealing, etc., are brought about by alteration of size, form and microconstituents of the crystals. Just as ice when heated to a certain definite temperature becomes water, just so the microconstituents of the steel crystals when heated to a fixed temperature (critical point) change, and if the steel is quickly cooled or "trapped" in that condition the steel is hardened: just as the melting point of ice varies somewhat if it contains foreign substances, so the hardening temperature of different steels varies according to their composition, but it is always the same for the same steel. Unless steel is quenched from above the hardening critical point it will not harden and so long as it is over the critical point there is no advantage (and there are considerable disadvantages) in increasing the temperature. If heated considerably above the hardening steel becomes "burnt" and is spoiled. Steel in the hardened state is too brittle for use and if hardened steel is heated up again, or "tempered" the crystals gradually tend to go back to their original "soft" state. The loss of hardness and increase in toughness varies according to the amount of tempering given.

The Bradbury patent rubber-lined valve is an interesting novelty recently introduced on the Rand. It is manufactured locally and seems well worth a trial.

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SOUTH AFRICAN MINING AND
ENGINEERING JOURNAL.

The Howick Falls Hydro-Electric Power Plant.

By H. W. Miller.*

A little while ago, Mr. W. R. Eales read a paper describing the plant of the South African Rubber Manufacturing Company, Ltd., and in the early portion of his paper he mentioned that this plant was operated by means of a hydro-electric installation situated at the base of the well-known Howick Falls. I propose to describe this plant in detail this evening, as it presents, I think, features of interest.

It has been recognised that the Howick Falls are one of the sights of South Africa, and when the authorities gave the company the necessary permission to use the water of the falls for power purposes, they made certain conditions to safeguard the scenic beauties, as well as to control the water supply within reasonable limits. In a very low river, which occurs at long intervals, it would be possible to take so much of the available flow through the turbines as to detract from the appearance of the Falls, and provision has been made to prevent the drying up of the river so far as the crest of the Falls is concerned. The distance of the intake and the discharge into the river from the turbine tail race is so little that there is no danger of any riparian interests below being jeopardised from this cause, but it is obvious that if all the water were diverted and allowed to pass through the turbines during an abnormally dry season, it certainly would affect the scenic beauties, and possibly the interests of the Howick residents, who are naturally interested in the visits of people from all parts of this country. Through the courtesy of the Borough Engineer of Pietermaritzburg, I was allowed to see the records of the flow of the river for a series of years before a specially heavy flood tore away the measuring weir, and a perusal of these figures convinced me that the chances of the river falling to such a low ebb as to prevent the hydro-electric plant being temporarily operated were very remote indeed. In 1903, the readings indicate that this was an abnormally dry year and for 7 days in August, 10 days in September, 28 days in October, and 7 days in November, a total of 52 days, the flow of the river fell to $12\frac{1}{2}$ cusecs, but as the requirements of the company when operating the two units installed on full power amount to 11 cusecs, for 10 hours out of the 24, and when the storage capacity of the pond formed above the falls from which the water is diverted into the intake of the tunnel is considered, it is obvious that the risks of any shortage of water are very remote indeed. Over this period of $8\frac{1}{2}$ years, there were only 52 days when the supply in the river fell as low as the above figures, and in this specially dry year of 1903 there were only 151 days when the supply fell below 40 cusecs, and in 1904 there were 96 days when the flow of the river was below that quantity. For the whole of the remaining period there were only 79 days when the flow of the river was below 40 cusecs, and then for only short periods, aggregating the above length of time, and from this one would infer that this shortfall was due to riparian owners above the Falls being engaged in profusely irrigating their lands. These figures are led to show that the risks incurred by the company in deciding upon this system of power for the operation of their factory were insignificant so far as a shortage in the supply of water in the river was concerned. In a country like South Africa, where droughts are of common occurrence, it is well to have a contingency of this nature well in view before decision is arrived at.

Operations were commenced by the building of a concrete diversion weir above the Falls on the right bank of the river. This caused the flow into the mouth of the tunnel, which pierced the ridge on the right bank of the river and led the water to a suitable point on the flank of the hill, below which it was decided to place the power station. The building of this weir caused silting of the

river, and this choked the mouth of the intake, so a covered channel was built above the diversion weir, with a deep mouth forming a catch sump. At the same time, suitable silt traps were provided at the entrance to the tunnel, this being controlled by a grid of large surface and the necessary sliding sluice gate, operated by a screw-lifting device well above flood water level and available at any and all times.

The tunnel is driven through shales a distance of some 650 feet and comes out on the flank of the hill, on the other side of the dividing ridge through which this tunnel is cut. Advantage was taken of the tunnel being in close proximity to a gorge in the side of the hill, to drive a cross-cut and tap the tunnel somewhere about the centre, thus giving two more points of attack, and enabling the bulk of the spoil to be dumped into the river at a convenient point and where its deposition was not objectionable, as it was obscured by the profuse vegetation characteristic of the spot. From the point where the tunnel emerged, the pipe line that supplies the turbines was led down the hill at a mean angle of 30 degrees to the power house in which the turbines are installed. At the end of the tunnel a suitable silt trap was formed, and here another grating was fixed, with the bars closer together than the one at the tunnel entrance in the river, to prevent any large substances getting down the pipe. An air vent was formed by raising a small shaft through to surface near the entrance to the mouth of the pipe line, but owing to the contractors having made the tunnel of generous dimensions, there is little fear that any hydraulic surges of a dangerous character are liable to be encountered. The fall in the tunnel being about 15 to 16 inches, the velocity of the flow of the water will be so moderate that any silt likely to be brought down in the water will have every chance of being deposited in the tunnel, from whence it can easily be cleaned out at suitable times. Suitable pipes and valves are provided for flushing the tunnel and clearing out any deposit of fine silt that may accumulate, but, as mentioned before, the area of the tunnel is so much in excess of that required for the full power likely to be developed even in the distant future by the company, that there is no risk of silt being a source of danger to the turbines, provided the most elementary precautions are observed.

The pipe line, which is some 600 feet long, is made of mild steel pipes in three sections, to permit of their being nested to effect economy in ocean transport. The first or upper section is 34 inches diameter by 200 feet long, and is connected to the tunnel by special angle bend, cemented into the mouth and well anchored at its end, which connects with the first expansion piece. These are telescopic expansion pipes, with glands packed with suitable grease packing. The next section consists of pipes 30 inches diameter, there being a taper piece between the 34 inch upper section and the expansion piece, which forms the top of the second section. Then another tapered piece reduces the diameter from 30 inches to $26\frac{1}{2}$ inches, the diameter of the third or lowest section of the pipe line. This pipe is connected at the bottom to a very heavy bend that is securely anchored in a massive concrete block, which has to withstand the thrust of the pipe line and its water contents, and in the case of a hydraulic surge, is called upon to withstand considerable stress. Consequently, great care was given to this important anchor, which is heavily reinforced by strong rods and angles.

(To be continued.)

S.A. Alkali.

The headquarters of the S.A. Alkali, Ltd., were changed, as from October 1, to Clewer House, the home of the Bailey-Jeppe Group. Details of the contemplated debenture issue are not yet available.

* From a Paper read before the S.A.I. of E.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS AGAIN RESTRICTED BY HOLIDAYS—UNDERCURRENT, HOWEVER, FIRM—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—RAILWAY EARNINGS STILL FALLING—BRITISH TRADE IN SEPTEMBER—COAL MINES IN BRITAIN—SOUTH AFRICAN OIL ACTIVITIES—FINANCIAL—METAL MARKET.

General Review.

Owing to the Jewish holidays business this week has again been restricted. On the Commercial Exchange, although the cutting campaign has declined of late, the volume of business has been small. The gold premium has dropped somewhat during the week under review, but in the opinion of authorities most competent to judge, no great fluctuation is anticipated between now and the end of the present year, which means, of course, breathing time for our lower-grade mines and enhanced profits for those better circumstanced. The world conditions generally, as reflected by the Exchanges, are still in a case of flux, and it is difficult to gather an inside view as to the immediate future. Sufficient unto the day is, however, enough; the commercial community, without undue optimism, is unanimous in the opinion that we are on the eve of better things.

Iron and Steel.

The week has been a short one on account of holidays, and even within its limits little evidence of strength was apparent. In the opinion of experts, however, we may expect gradually improving business conditions shortly.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 35s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 35s.; steel, 38s.; $\frac{7}{8}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{3}{4}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{3}{4}$ in., 5 $\frac{1}{2}$ d.; $\frac{7}{8}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{3}{4}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{3}{4}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{3}{4}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; drill steel, 7d. and 8d.; hollow, 9d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge,

20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Second-hand Mining Machinery.

Second-hand steel plates are ruling from £10 to £12 10s. Good second-hand loco-type boilers are maintaining their high price; compared with pre-war levels the price is about three times that which it was to-day; those coming in from the country are all being absorbed by industrial concerns; the big difficulty to-day is to procure the exact thing. There is an enormous amount of diamond drilling being done just now all over the country for coal and gold prospects, with a great deal of activity in the Free State for diamonds. All kinds of second-hand machinery are quiet just now, certain classes being unobtainable except new. It is generally anticipated that as soon as the machinery and material from those mines which have lately closed down have been absorbed and the limit of exhaustion been reached, there will be a big scarcity with enhanced prices. The mines are still economising and practically only buying from hand to mouth. Second-hand pitch pine is becoming scarce, at about 4s.—4s. 6d.

Engineering Shops.

The opinion in engineering circles is that business is mending; no great things are expected this year, but that the tendency is towards betterment is undoubted.

Cut in Iron and Steel Wages.

Under the sliding scale adopted by the Board of Conciliation and Arbitration in the manufactured iron and steel trade in the North of England, wages have been reduced 25 per cent., making the total reductions since January 1921 132 $\frac{1}{2}$ per cent. Even with this reduction the present wages scale is 97 $\frac{1}{2}$ per cent. above the pre-war scale. The Villiers Spelter Works at Swansea have restarted operations and are the only spelter works in South Wales working to-day. This has been made possible only by the reduction in wages.

The Humboldt Machine Construction Institute has declared a dividend of 10 per cent. compared with last year's declaration of 6 per cent. The company reports an unprecedented number of orders from abroad. The Offenbach Rubber Works has increased its capital from 8,000,000 to 17,000,000 marks. It is semi-officially stated in Berlin that, owing to the depreciation of the mark, the surcharge on import duties will be raised on October 20 from 900 to 1,900 per cent.

Base Metals and the Prospector's Lot.

In the course of a chat with a well-known prospector, he said that initiative with determination needs a man who weighs with foresight his chances, fights for the place necessary to give him the requisite financial aid to meet expenditure month after month for the carrying on in respect of wages, licences, foodstuffs, etc. Local requirements were, he said, as heretofore, advanced development of the outside mineral discoveries, with all encouragement to prospecting. One's knowledge of mineral wealth in the land we live in is limited to a select circle. The prospector's lot in the Transvaal is not a coveted one; he knows that the race is not to the swift, not to the strong, but to the "slim."

There are too many hindrances in the way of the mineral resources of the country being adequately developed, among which, he said, are the unsympathetic prospecting development laws, with pinpricks of officialdom and no encouragement to the attraction of foreign capital for legitimate progressive mining activity. As a matter of fact, he stated, the opposite law to this is in operation, cooling and killing the ardour of the genuine worker and prohibiting capital being spent, meaning also the cessation of search, doubtful titles, abandonment of promising prospects, loss to the general community, also of concentrated energy of capable, experienced prospectors, and possibly loss of new mines. Town builders, railway makers and farmers are the advance guard pioneers of industry and civilisation. A change, he said, was necessary for courageous action towards a sphere of active work for the sake of all members of the community. This change, he thought, we needed and must have to fill up our vacant and stagnant land. It is through the prospector that we are here, and reversal from the growing deficits in public works and political claptrap to the practical exploitation of our mineral resources is our only cure.

Timber and Building Materials.

Business has been fairly good, but in the slow resumption in the building trade there is nothing of importance to record. 3 x 9 deals are ruling at 1s., 1s. 1d.; scantlings, 1s.; floorings, 6 $\frac{3}{4}$ d., 7d.; ceilings, 5 $\frac{1}{4}$ d., 5 $\frac{3}{4}$ d.; Oregon, 7s.; pitchpine, 8s., 8s. 6d.; corrugated iron, 9 $\frac{3}{4}$ d., 10 $\frac{1}{4}$ d. Stocks of timber are satisfactory; indications from the Baltic as to future prices are more towards a firming tendency than otherwise. Bricks are unchanged in price at 70s. for blue stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed, per 1,000 at yards; white lime, 7s.; unslaked, 9s. 6d.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. per bag.

Second-hand Iron and Timber.

Second-hand dealers report a somewhat better tendency than has prevailed for some months past. Although actual business remains much about the same, there are now more inquiries for material, which is the first tentative step towards improving conditions. Second-hand iron rules at from 6d. to 7d., timber 10d. to 1s.

Electrical Goods.

Business in town and along the reef is a little better, not so much in respect of actual transactions, but in the matter of inquiries, which dealers look upon as the prelude to improvement very shortly. In the meantime there are no reductions to report from Britain and the Continent, where it seems that the question of raw materials is making itself more and more felt. Nevertheless, dealers think it not unlikely that a slight fall in prices generally may be witnessed within a few weeks.

Railway Earnings.

According to the latest bulletin issued by Sir William Hoy, the General Manager of the Railways, the loss on the railways for April, May, June and July, after providing for depreciation and interest, was £653,866, while the net loss on the harbours was £46,139. In the same period the working expenditure increased by £43,310 compared with the total for the corresponding months of 1920. As a matter of fact, the actual outlay in this direction was no less than £5,867,534; in other words, notwithstanding economies effected on all hands, the cost of running the system has risen by 74 per cent. It is gratifying, however, to note a revival in the export trade, which it is hoped will continue.

Shipbuilding Slump.

Lloyd's Register records the continuation of the heavy slump in shipbuilding throughout the world. At the moment there are only two million tons actually under construction. The countries most affected by suspensions in shipbuilding are Italy and the United States.

British Trade in September.

Imports during the month amounted to £87,118,507, showing a decrease of £65,638,629 compared with September, 1920. Exports were £55,247,578, a decrease of £62,208,335.

American Cotton Crop.

The Bureau of Agriculture, states a message from New York, estimates the cotton crop of the United States for 1921 at 6,537,000 bales, compared with 12,123,000 last year. The season has been a very disastrous one, August and September alone showing a shortage of 1,666,000 bales, owing to a plague of boll weevils.

Coal Mines in Britain.

Lord Aberconway states that there is little prospect of coal prices falling while wages and working conditions remain as they are, and says, further, that it is a question whether it would not be more profitable for owners to close their collieries and stand the expense of overhead charges from their own pockets in preference to letting the mines run at a loss. On the other hand, it is satisfactory to note that the North Wales Collieries mines have been re-opened.

British Rubber Industry.

According to a bulletin issued by the Federation of British Industries, it appears that the process of vulcanisation and the essential operations of compounding, moulding and spreading have made a very rapid expansion, and during the last twenty years the industry has increased by something like seven times its former dimensions. In other words, the value of the world's consumption of manufactured rubber goods has increased from approximately £50,000,000 in 1900 to £350,000,000 in 1920. In Great Britain the capital invested in india-rubber manufactures totals about £25,000,000, with an estimated turnover of £30,000,000. One specialised section of the india-rubber industry is the making of cycle, motor-cycle, and motor pneumatic tyres. The possibilities of the tyre industry are tremendous and will, under anything like normal conditions, mean a further expansion for the high quality British product.

Oil: South African Activities.

In the matter of crude oil storage in Durban, the Vacuum Oil Company has two huge oil tanks of 9,000 and 9,500 tons capacity; the Anglo-Persian one tank erected and another planned; the British Imperial Oil Company is erecting a complete tank in sections; and the Texas Company is on the point of commencing developments. This oil station will be in a position to handle 50,000 tons of oil, but later on this may be greatly augmented. It is thought that very soon now petrol tanks will be erected and tank steamers requisitioned to meet the growing requirements in motor fuel for inland transport.

Financial.

The Finance Committee of the Johannesburg Town Council has delegated the matter of the £1,500,000 loan offered from America, which has met with a somewhat mixed reception, to a sub-committee with instructions to endeavour to secure a reduction of the proposed rate of interest from 7 $\frac{1}{2}$ per cent. to 7 per cent.

S.A. Reserve Bank.

On October 8 the ratio of cash reserves to public liabilities was 72.6 per cent.

Metal Market.

Latest London quotations:—Standard copper, £67 7s. 6d. cash, forward £70 6s. 3d.; electrolytic copper, £73 10s. 6d. cash, forward £75 10s.; Straits tin, £156 cash and £158 forward; English lead, £23 5s. cash, forward £23 2s. 6d.; bar silver, 12 $\frac{1}{4}$ d. per ounce; fine gold, 109s. 8d. per ounce. No special feature was noticed during the week, but the feeling was that the worst of the trade depression had passed and a recovery could be confidently anticipated. Under the influence of American advices and a better demand from consumers in Britain, there was considerable activity in copper. Tin was steady to fair. September figures indicate an increase in the visible supply of 1,600 tons. Local and American demand has slackened. The lead trade at Home is improving and the export for the Continent has expanded. The spelter market is active. Increasing orders for galvanised sheeting have been placed by India and the East. Gold has slackened off in the Indian demand, but America is taking all offerings.

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A Carbon Monoxide Gas Mask.

The development of a carbon-monoxide mask is announced from the United States, and if this device should prove capable of protecting the wearer against deadly percentages of this poisonous gas it will find ready application in many industries. Such a mask will, of course, be of no value where the atmosphere to be respired in addition to containing an actively poisonous gas like monoxide is deficient in oxygen. The possession of a mask protecting men against comparatively small percentages of carbon-monoxide would in many cases have enabled men to escape from fire-damp poisoning after coal mine explosions, as in some cases the atmosphere that killed the victims did not put out the light of oil lamps. There would seem to be possibilities of a self-rescue apparatus in the carbon monoxide mask that one may hope will be further developed. Carbon monoxide, in addition to being a quick and sure poison in percentages exceeding half of one per cent. in respired air, is in smaller quantities a cumulative poison, and if men are constantly exposed thereto deterioration of the blood constituents takes place and is incapable of remedy.

Gas Mask for Carbon Monoxide Perfected.

The first public demonstration of the gas mask for protection against carbon monoxide, manufactured by the Mine Safety Appliances Company, Pittsburg, Pa., and in which is utilised the special mixture called Hoppelite, developed by the U.S. Bureau of Mines and Chemical Warfare Service, U.S. Army, was given on the afternoon of May 26th in the special smoke room of the United States Bureau of Mines, Pittsburg, Pa. The U.S. Bureau of Mines, in its research of various types of gas masks, including the carbon monoxide mask, has a very large smoke room especially adapted for testing purposes, and the courtesy of the use of this smoke room was extended for this demonstration. In addition, the first public demonstration was also given of the U.S. Bureau of Mines gas mask for city firemen, also containing Hoppelite, for carbon monoxide protection.

In this test two men entered the smoke room, which contained 1 per cent. carbon monoxide gas in the air. One of the men carried a canary bird into the room to indicate to the observers the poisonous nature of the atmosphere. The canary bird collapsed in 45 seconds, and it was immediately removed to fresh air, where it was revived with oxygen.

Tests were also frequently made with the M-S-A Carbon Monoxide Detector to show the observers the strength of the gas. The wearers of the mask remained in the atmosphere

for 30 minutes doing vigorous work part of the time, and experienced no ill effects whatever from the poisonous carbon monoxide gas. The gas masks gave perfect protection through the entire period of the test.

The carbon monoxide gas mask is of special interest to iron and steel industries, fire departments, industries using gas producers, illuminating gas plants, coal and metal mines and to all other persons who are apt to encounter carbon monoxide gas in their work.

Carbon monoxide occurs frequently in dangerous quantities around blast furnaces, gas producers, etc., and is a constant hazard because of its poisonous nature. A simple protective device, light in weight, devoid of all complicated mechanisms, has long been needed for the protection of men engaged in such work.

While the gas mask used will give protection in higher percentages of carbon monoxide, 1 per cent. of carbon monoxide will kill a man in a few minutes time. The percentage found in working places where there is ventilation usually amounts to considerably less than 1 per cent.

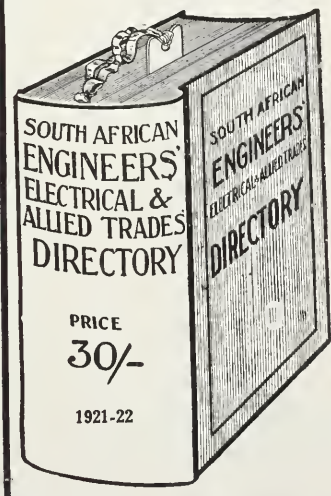
One-tenth of one per cent. of carbon monoxide, however, will seriously affect a man who is working and, therefore, breathing hard in about one half hour's time, while two-tenths will affect him seriously in about 10 minutes' time.

The Metal Market.

According to a Reuter cable dated August 20, the Metal Market during last week was dull, with little confidence anywhere. As regards copper, the immediate outlook is poor. The market relapsed on a large arrival of copper from New York, and cheap offers of electrolytic copper. An American report suggests that some mines belonging to the Anaconda Company will resume operations in September. German competition in manufactured copper is pretty aggressive. Tin declined on selling by tired bulls, while the news that large parcels of tin have been sold in Batavia helped to shake the confidence of operators. On the other hand, the bears took advantage to cover themselves, and the Continent and America were inclined to purchase at lower levels. Lead was dull, possibly in anticipation of an early revival of shipments from Australia. The demand from consumers was quiet. Spelter declined on realisations. The fall in the German mark led to anticipations of increased German offerings, which have not at present materialised. Consumers buy small parcels for immediate delivery. The iron blast furnaces are starting again in every area, but the large majority are still idle. Before any substantial quantity of iron is sold on the open market there will have to be a drastic cut in prices. The position as regards steel at the present moment is most unsatisfactory. Manufacturers are approaching the end of current contracts, which are not being replaced.

The Wolluter.

The report of the directors of the Wolluter for the quarter ended 31st July, 1921, shows: Total development footage, 852 ft.; total footage sampled, 626 ft. The payable reef disclosures were as follow: Main Reef, 12 ft., reef width 32 in., assay value 7.3 dwts.; South Reef, 75 ft., reef width 29 in., assay value 11.6 dwts.; Pyritic Lode, 341 ft., reef width 53 in., assay value 8.4 dwts. Tonnage mined, 105,926 tons; tonnage milled, 97,500 tons; total yield, 24,090 fine ozs.; total yield per ton, 4.942 dwts. Working revenue, £128,470, or £1 6s. 4d. per ton milled; working costs, £113,827, or £1 3s. 4d. per ton milled; working profit, £14,643, or 3s. per ton milled; amount received during current half-year above the monthly valuation placed on gold, in respect of sales realised up to 31st March, 1921, £3,863; total working profit, £18,506; sundry expenditure, £2,015; total profit, £16,491; Government and Provincial taxes, £3,221; capital expenditure, £2,259. The working revenue above mentioned, viz., £128,470, is arrived at by calculating the value of the gold produced at the following prices: May, £5 3s.; June, £5 6s. 3d.; July, £5 11s. 3d. per fine oz., after deducting realisation charges.



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The Solution of the Gold and Currency Problem.

IMPORTANT SUPPORT FOR "MINING JOURNAL'S" SUGGESTION—NEW RATIOS FOR GOLD AND CURRENCY—ENLIGHTENED OPINION VEERING ROUND—AN ALTERNATIVE TO DEFLATION.

In our issue of September 3, under the heading "A Real Solution of the Currency Problem at Last," we wrote strongly in favour of the proposals of Professor Cassel and Mr. Samuel Evans that the true solution of the gold and currency problem in countries with depreciated currencies, lay—in the words of the latter—in abandoning paper money for gold, no doubt with units containing far less gold than their pre-war money. Since then no less an authority than "Barclay's Bank Monthly Review" has come out with support for the proposal, and the Chairman of the Federation of British Industries, Sir Peter Rylands, has also put it forward as the only alternative to deflation. "The Statist," by this mail, has a long and closely reasoned article in favour of the idea; and we quote the following passages therefrom giving the arguments in detail for making "the paper currencies of all countries which were formerly gold using, convertible into gold, not at the pre-war gold ratios, but at the values as measured by the actual exchange rate with the United States dollar at the time chosen for taking this step, or the average exchange rate over a detailed period." Needless to add, the net effect of the adoption of this proposal, now backed in such influential quarters, would be to stabilise the "premium" on gold, to the direct and obvious benefit of the Rand gold industry.

Many economists, recognising the impracticability of deflation as a solution for the currency problem, have recently put forward other schemes of reform involving, for the most part, the introduction of an entirely new standard of value (says *The Statist*). These mark a distinct advance on earlier discussions of the currency question, in that they emphasise the international character of the problem. The most prominent of them are admirably planned from the theoretical point of view, but it is open to grave doubt whether in practice it would be possible to adopt a step so revolutionary as the introduction of a new and untried standard of value. In this respect they savour too much of empiricism, and even if the change proved possible it would necessarily take a long time to come about, whereas the currency problem is one of the most pressing urgency. Many of the supporters of schemes of this nature criticise the gold standard as not making for currency stability before the War, but the changes in the price-level caused through the use of gold as a basis for currency and credit were generally imperceptible, except over long periods, and, while admittedly imperfect, the gold standard is infinitely preferable to the present currency regime.

Our Proposals.

We would not, then, favour total rejection of the gold standard. On the contrary, our proposals embody its restoration, without, however, any preliminary deflation of existing paper currencies. In other words, let the paper currencies of all those countries which were formerly gold-using be made convertible into gold, not at the pre-war gold ratios, but at the values as measured by the actual exchange rate with the United States dollar at the time chosen for taking this step, or the average exchange rate over a selected

period. The new ratios between gold and the currency unit would, of course, be made statutory in each country. To illustrate by an example: suppose it were decided to repeal the old Coinage Act relating to gold, and make the £ sterling convertible into gold at the new rate determined by the average level of the New York exchange during, say, last month, which was \$3.656 to the £. The United States dollar is equivalent to 23.22 grains of fine gold. This would make the £1 sterling worth 84.89232 grains of fine gold, as compared with a former equivalent of 113.0016 grains, so that if this rate were adopted the £ sterling could be made convertible into a standard gold coin containing 84.89232 grains of fine gold and 7.71748 grains of alloy. When the new ratio is in force the now undervalued gold in the Bank of England and in the Currency Notes Reserve, instead of, as at present, covering £155,012,000, would cover £206,181,000—that is, its paper equivalent would be increased in the ratio of, roughly, 85:113. The outstanding total of Bank of England notes and Currency notes on the 14th inst. was £421,879,000, so that the gold reserve would form forty-nine per cent. of the note issue, or, after setting aside a reserve of thirty per cent. against notes in circulation, £79,617,000 would be available as a backing for deposits. The new par of exchange with the dollar would be \$3.656 to the £, and when the new system would be fully in operation the rate would vary from this level by only a fractional amount, determined by the cost of shipping gold from London to New York on the one hand and from New York to London on the other. It will be understood, of course, that the figures in this example are selected purely by way of illustration, and are not suggested as those which should ultimately be adopted.

The Principle Involved.

On perusing the foregoing paragraph, which gives the main general outline of our proposals, many questions of detail will doubtless occur to the reader. Before proceeding to discuss these, however, it is necessary to comment on the main principle involved—namely, that Governments which, through the exigencies of War and post-War finance, have allowed the value of their currencies, expressed in terms of gold or commodities (and, of course, the value of their Public Debts), to depreciate by the process of inflation, are to be allowed to fulfil their obligations by repaying them at the depreciated value. In this connection we cannot do better than quote from Mr. Chamberlain's Budget speech of April 25, 1921. Dealing with the question of Debt redemption, he said: "The first observation I would make is that it is obviously desirable that we should redeem as much Debt as we can while prices, though lower than they were, still remain above the level which we expect them to reach in a comparatively short time and to maintain over future years." As far as we are aware, nobody took exception to this statement, which assumes precisely the same principle as that embodied in our proposals. If it were possible to pay off the bulk of our Debt last year, when prices were at the peak, and when, consequently, the commodity value of the Debt was greatly depreciated, it is hardly conceivable that the repayment would occasion a general outcry among the holders, though in reality the Government would be paying back much less than it received. As prices have fallen heavily since 1920, the commodity value of the Debt has increased, and on the same showing it ought to be legitimate to repay the Debt at its present commodity value. We do not suggest, of course, what is obviously impossible—that the Debt should be redeemed in the near future—but if our proposals are carried into effect the real value of the Debt will be more or less permanently fixed, so that the payment of a given nominal amount of the annual interest charge or of the principal would over a number of years represent approximately the

same effort on the part of the Government. Under existing conditions it is impossible to foretell with certainty the course of prices during the next few years. If the present inflationary finance of the Government should, in conjunction with a trade recovery, bring about a rise in the price-level, the commodity value of the Debt would decline, to the disadvantage of the holder. If, on the other hand, prices should fall, the real burden of the Debt would be correspondingly increased. The same applies to private as well as to public debts. The question of debts owing abroad must be postponed.

Price Movements and Public Debts.

The foregoing discussion is closely connected with the question of deflation or inflation, to which we must revert for a moment. It is of the utmost importance to recognise that deflation always entails a sacrifice on the part of the Government no less than of industry, as the real burden of the Debt is being increased while prices are falling. But, it might be argued, as the Government was itself mainly responsible for the inflation which lowered the value of the Debt, it is but just that it should repay to its lenders by means of deflation the same value as it received, excluding, of course, the question of interest and whatever premium on redemption it originally undertook to pay. In strict justice this argument is indisputable, and for this reason *The Statist* originally supported the deflation movement. As already shown, however, while not denying the possibility of rigid deflation in Great Britain, it must be admitted to be practically impossible in the case of most Continental nations, and as no currency scheme is acceptable which does not apply to all countries alike, the point of equity must be waived in favour of the requirements of moment, which demand above all things stable Foreign Exchanges.

Cost of Ventilating Drives and Tunnels.

Mr. Hutton, Inspector of Mines, Germiston, has made a comparison of the cost of ventilating a long tunnel by means of electric fan, compressed air fan, and compressed air direct. The typical case of a drive is taken which is to be 2,000 feet in length, with a cross section of 50 square feet, and the calculation is made for the whole of the ventilation from the commencement to the completion of the tunnel, a period of twenty-five months. The fan ventilation allows for capital cost of fans, of which two will be worn out if they are compressed air fans, for maintenance, cost of 16-inch piping, for power or compressed air, and incidentals. Compressed air cost is taken at the prices charged by the Victoria Falls Power Company—probably the lowest at which compressed air is obtainable on the Witwatersrand. The comparison is as follows:—

Method.	Total Air. Cub. ft.	Cost per	
		Total	1,000
		£	s. d.
(a) Electric fan	1,872,000,000	£638	0.082d.
(b) Compressed air fan...	1,053,000,000	£978	0.223d.
(c) Compressed air direct	224,125,000	£1,077	1.154d.

It will be seen that although the amount of air which is supplied by fan ventilation is many times larger than with compressed air supplied direct the cost is considerably less. The cost per 1,000 cubic feet of air supplied is, of course, greatly in favour of ventilation by fan.

The report of the Labour Department Employment Exchange, Capetown, for the month of September, states:—Engineering Trades: Still very slack, local orders falling off still further. Slight improvement in shipping repairs. The S.S. "Outinequa" is undergoing extensive repairs. These are being executed by Messrs. Tait and Stewart, South African Iron Works. H.M.S. "Thistle" has also been docked at Simonstown for overhaul, and these activities have been giving work to a considerable number of skilled artisans and helpers. There remain still a large number of fitters, turners and blacksmiths unemployed, and for these there appears to be no immediate prospect of work being found. In accordance with arrangements made by the Joint Board

of the engineering trades, a further reduction of 1½d. per hour operates as from the beginning of October. The rate will then be 3s. per hour. Materials are plentiful, costs remain practically stationary, excepting in the case of leather belting. An increase of 15 per cent. in this commodity is noted. Electrical Engineering: Trade fair, good supply of materials, with prices steady. There is considerable competition in quotations for light wiring. Small operators are cutting prices to the lowest point, and are using, wherever possible, materials of Japanese manufacture, the quality of which leaves much to be desired. Motor Engineering: Improvement reported last month maintained, though some of the smaller shops again complain of slackness in trade. A fair number of cars changed hands during the month, chiefly through auction sales. Comparatively small prices were realised. Sheet Metal Works: Slight falling off in trade; materials are plentiful, and show no alteration in prices.

U.K. Profit-sharing in 1920.

The report on Profit-sharing and Labour Co-partnership in the United Kingdom, prepared by the Intelligence and Statistics Department of the Ministry of Labour in 1919, gave an account of the progress of the profit-sharing system in this country up to that date, and of the results of schemes in operation in 1918. Inquiries have again been made this year, relating to the working of such schemes in 1920. So far as is known to the Department, 49 schemes of profit-sharing or co-partnership were started in 1919, and 40 in 1920, by far the largest totals hitherto recorded. Of the 49 started in 1919, 5 have since been abandoned. Since the end of 1920, however, as is usual in times of bad trade, the number of such schemes started has fallen considerably; up to June 30 last the introduction of only 3 schemes has been reported to the Department. Returns received show that at June 30 last 205 firms, with an aggregate of 300,195 work-people in their constant employment, were practising systems of profit-sharing or labour co-partnership. Of these 205 firms, 6 were reported to have two schemes each, so that the total number of schemes of profit-sharing in operation at the above date was 211. In addition to the firms referred to, two firms have schemes which are at the moment in abeyance; while 19 other firms are known to have practised profit-sharing within recent years, but no information is available to show whether these schemes are still in operation. Of the 205 firms practising profit-sharing at June 30 last, 29 (employing 84,832 workpeople) were in the engineering, shipbuilding and metal trades. It should be remarked that the figures given above tend to overstate the numbers of workpeople who are effectively employed under profit-sharing conditions, since in a number of schemes profit-sharing is restricted to certain classes of employees, or is enjoyed only by those employees who choose to deposit savings with the employing firm or to take up shares in the undertaking. Information has been collected by the Department relating the bonuses paid under profit-sharing arrangements in 1920. Of the 211 profit-sharing schemes in operation at June 30, 1921, a considerable number are schemes recently introduced. A further proportion consists of schemes of such a nature that the amount of the bonus, and the proportion which it bears to earnings, cannot be stated. As regards the 151 schemes for which statistics can be given, 109,580 employees participated, or were entitled to participate, in bonuses in 1920. Of these, however, 29,207 were employed under 32 schemes which failed to pay a bonus. The bonuses paid represented an aggregate addition to earnings of over £1,000,000, or £9 17s. 11d. per head; the average ratio of bonus to earnings being 6.3 per cent. These figures represent a very considerable increase when compared with those for 1919, in which year the results of 116 schemes yielded an average addition of £4 18s. 10d. per head, and an average addition to earnings of 4.9 per cent. It should be noted that the figures now given relate to the bonuses paid or credited in 1920; and that, in the great majority of cases, the bonuses so paid were based on the profits either of the year 1919 or of a financial year ending at or before June 30, 1920, and are not, therefore, seriously affected by the depression in trade which began in the latter half of 1920.

Modder East Position.

DEVELOPMENT AND ORE RESERVES.

GOVERNMENT INSPECTOR'S REPORT.

Following closely on the annual report by the Company's own Consulting Engineer, comes the report of the Inspector of Government Leases on the Modder East for the year ended June 30 last. It will be seen that the Government report is substantially in agreement with that of the Consulting Engineer.

Inter alia, the Government Inspector of Mining Leases writes in his annual report on the Modder East for the year ended June 30 last. The ore reserves as at the 30th June, 1921, are estimated by the company at 1,950,300 tons, of an average value of 7.2 dwt. over a stopping width of 56.8 inches. This represents an increase of 194,900 tons compared with the previous estimate as at the 30th June, 1920, when the value and width were 7.75 dwt. over 55.3 inches.

The minimum block value on which the reserve estimate has been based is the same as that adopted in the previous estimation, namely, 4.5 dwt. On the basis of present working costs and the normal or pre-war price of gold, ore of a minimum block value of between 6½ dwt. and 7 dwt. would require to be worked to avoid loss. Under these circumstances and assuming the block pay-limit was fixed at 6½ dwt., only about one-third of the total estimated reserve tonnage would be available. The following table gives the price fine gold must realise per ounce in order to make ore of a reserve block value of from 4.5 dwt. to 6.5 dwt. per ton payable based on present working costs of, say, 32s. per ton, together with the reserve tonnage available at the respective block values:—

Block value (in dwt.)	4.50	5.00	5.50	6.00	6.50
Gold realisation (per ounce)	135s. 7d.	120s. 6d.	108s. 6d.	98s. 6d.	90s. 3d.
Reserve Tonnage available	1,950,300	1,611,700	1,439,200	1,015,500	709,500

Of the total area of the company's property of between 2,250 and 2,150 claims, that portion on the farms Cloverfield No. 12 and Modderfontein No. 6, the boundary of which has been fixed, and to which mining operations by the present company have been confined, amounts to 1,449.42 claims. These claims, so far as is known, are practically all reef-



Modder East: No. 1 Shaft Buildings.

The average value, therefore, shows a drop of 0.55 dwt. and the stopping width an increase of 1.5 inches. The twelve months' development has resulted in a very satisfactory addition to the reserves in the Nos. 2 and 3 shaft areas, but the average grade in these areas is comparatively low. The reserves in the No. 1 shaft area, which average a higher grade, show a decrease. This is partly owing to the major portion of the tonnage mined during the year having been drawn from this area, and partly to the elimination of certain areas which have proved to be, or are now considered unpayable. The distribution of the reserves over the three shaft areas may be taken as follows:—

	Tons.	Value Dwt.
No. 1 shaft area ...	817,900	9.0
No. 2 shaft area ...	471,900	6.0
No. 3 shaft area ...	660,500	5.8
Total ...	1,950,330	7.2

bearing, with the exception of probably from 80 to 90 claims representing dyke. Of these 1,449.42 claims, 15 claims, or a trifle over 1 per cent., have been mined by stopping and development, while the ore reserves of 1,950,300 tons represent an area of 75½ claims, or 5.2 per cent. Compared with the previous year, there was a decrease of 4,806 feet in the total footage developed. The percentage payable of the footage sampled has fallen from 58.5 per cent. to 51 per cent., and the average value from 439 inch pennyweights to 395 inch pennyweights. During the early part of the year under report, which was shortly after crushing operations commenced, a portion of the underground native labour had to be diverted to stopping operations, and at that time the compressed-air supply was inadequate for all requirements, so that development became curtailed. Additions have since been made to the compressor plant, and during the last quarter of the year the rate of development increased considerably. The year's development has been fairly evenly distributed, and the property is being opened

up from those points of attack likely to prove the value of the ground, and although the development has resulted in a substantial increase of the payable ore reserves, yet no highly payable zones of ore have been located beyond that on the southern boundary adjoining the property of the Geduld Proprietary Mines.

MINING.

The rock broken in the mine according to survey measurements amounted to 293,199 tons. The rock broken came from the following sources:—

	Tons.	Percent.	Sampled age.	Dwt.
Payable ore reserves	189,222	64.5	12.5	
Other than payable ore reserves	1,374	.5	4.0	
Development	102,603	35.0	2.8	
Totals	293,199	100.0	9.0	

Average stope width ... 59 inches.
Average reef channel width ... 38 inches.

The average value and width of ore mined from the payable reserves, according to data adopted in the estimation of reserves, as at the 30th June, 1920, were 9.98 dwt. over 57.8 inches, whilst the payable reserves as a whole at that date averaged 7.75 dwt. over 55 inches. Overmining has, therefore, taken place to the extent of 148 inch pennyweights, or approximately 2.5 dwt. over the stoping width. The average face sampling value of the ore stoped on the whole has been considerably higher than the estimated value of the corresponding blocks, the difference amounting to 157 inch pennyweights, or an increase in value of 27 per cent. The areas of some of the blocks are of fair extent, and the values around their perimeters in some instances vary considerably, and in cases the point of attack has been in that portion carrying values higher than the average. Stopping operations are carefully carried out, the width mined being in close approximation to that estimated to be carried. The average width of external waste carried amounted to 21 inches, and a considerable portion of this waste rock is used in support of the workings. The broken ground in stopes is handled by means of winches, and in two instances short footwall crosscuts facilitate the handling. The mine is well ventilated by means of a fan installed in the No. 2 main haulage raise about midway between the Nos. 1 and 2 shafts. The Nos. 1 and 3 shafts are downcast, and the No. 2 shaft upcast. Considerable improvements have been carried out at the No. 1 shaft station, which has been extended. The ore bin has also been enlarged, and provision made for keeping separate the waste from the mill rock. The No. 1 incline has been regraded preparatory to the installation of mechanical haulage, which should shortly be in operation.

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New Kleinfontein.

The report of the directors for the quarter ended 30th September, 1921, shows that the results of development (excluding shafts) were as follows:—Number of feet driven, risen and sunk, excluding boxholes, 2,113 ft.; footage sampled, 1,585 ft.; footage sampled (payable), 760 ft.; mining width (payable), 59 ins.; assay value (payable), 6.33 dwts.

Frank Smith Diamond Options.

An extra-ordinary meeting of Frank Smith Diamond Estates and Exploration Company will be held at Johannesburg on 29th November to pass a resolution extending the option to subscribe for new shares from 23rd February, 1923, either by a period of two years or so long as the mine remains closed down, whichever period is the less.



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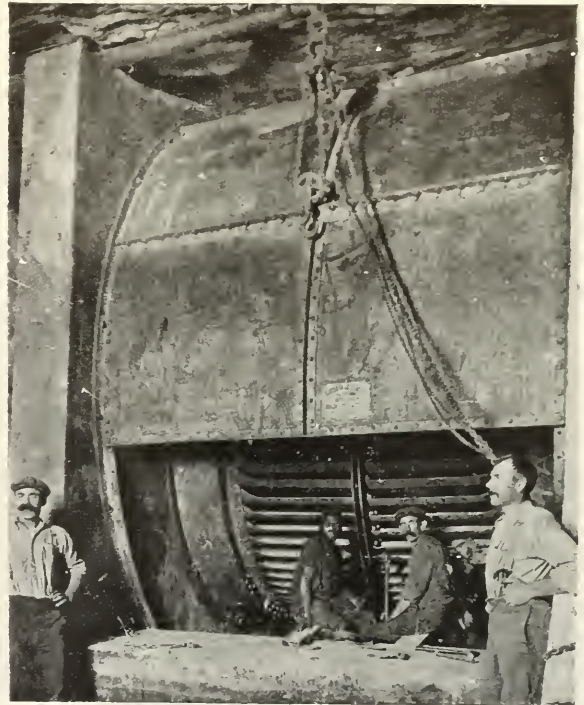
Ventilation and Miners' Phthisis.

Instructive and interesting remarks on ventilation and miners' phthisis are contained in the annual reports of the Government Inspectors of Mines.

Mr. M. Fergusson, I.M., Krugersdorp, writes:—There is little fresh to be added to what has been said in previous reports with regard to miners' phthisis. The periodical examinations of all classes of underground employees at the Medical Bureau, with the consequent elimination of those affected with silicosis, have without doubt brought home to every person concerned the grave dangers incurred as a result of exposure to dust or blasting fumes, and the majority of men appear now to take a keen interest in using to the fullest extent the appliances provided for dust prevention. Investigations with the komimeter and microscope have been carried out at all mines throughout the year, and it frequently happens that large quantities of extremely fine dust are indicated where the conditions of work would least lead one to anticipate such results. These unexpected results are almost invariably discovered in close places, and one can only conclude that the question of ventilation has a more important bearing on the elimination of dust than had previously been recognised. This, however, is a matter which is being dealt with by a Commission at the date of writing this report, and no doubt the subject will be fully dealt with by that body.

Col. H. Bottomley, I.M., Boksburg, writes:—It is pleasing to record that a tardy but distinct improvement is noticeable in the manner in which ventilation problems are now being met. The improvement is due to a progressive appreciation of the benefits and absolute necessity of a more healthy set of conditions underground, and to the constant pressure exerted by officials of this Department, wherever unsatisfactory features are revealed during the course of inspections. Confidential complaints from miners to this office have been more numerous during the past year than formerly, and although it is felt that such complaints should be made in preference to the management, they are at once investigated, whether by night or day, and the matters complained of adjusted. Faulty conditions in development ends have been discussed in previous reports *ad nauseam*, but, in spite of this, I feel that the subject is of such importance that nothing but unremitting attention will effect any improvement. It is, after all, only natural that managers should hesitate before incurring the heavy cost of numerous fans and tubing, especially where such expense is charged against working costs. Nothing but a legal obligation will bring about the desired results, and at present the Mining Regulations are not sufficiently definite in many instances to enforce compliance. There are many cases in connection with old producing mines where the only effective method of dealing with ventilation costs is by the appropriation of a special vote to cover the desired expenditure, charged to capital. I am pleased to record that this has been done in this district on one or two mines, notably at Brakpan Mines, where the problems were of a peculiarly obstinate nature. There are more long distance development ends in this district than anywhere else on the Reef, owing to the exceptionally large claim areas and to the increasing number of large mines in the development stage, which, owing to the present system of lay-out, entail unusually long drives. In the new mines which have either struck the reef, or which are in the immediate neighbourhood of the reef horizon, the question of adequate ventilation is receiving the close attention which it deserves. As an indication of what is being done, I may mention that the New State Areas have ordered the necessary fans and cables, and have placed an order for 41,000 feet of galvanised iron tubing from 22 inches to 24 inches diameter, made on the Springs pattern. The efficiency and proper maintenance of

this equipment will be the deciding factors in the consideration of the application to blast twice in twenty-four hours. It is apparent from repeated inspections that ventilation conditions on night shift are in need of closer supervision. This shift consists almost exclusively of trimmers and shovellers. The compressed air liberated during the day shift by machine drills is absent, and consequently the air currents are proportionately weaker. The staffs on this shift are not as a rule capable of dealing with ventilation problems, besides which their principal duty is to clean the faces for the oncoming shift and fill the ore bins. Managers rely to a great extent on complaints recorded in the book designed for that purpose, but it is now an established fact that this source of information cannot be relied on. As a general rule, when a trimmer finds smoke in his working place, he prefers to struggle through with his work rather than incur the penalty of being regarded as a "grouser." The obvious remedy is for the higher officials to go underground occasionally with the night shift and make personal



Fan 2,000 Feet below Surface, Village Deep.

investigation. This is done in very exceptional instances, but the practice is not regarded with any degree of favour. The statement issued by the Miners' Phthisis Medical Bureau dealing with the phthisis rate on individual mines is a most interesting document, and one which, in the interests of the mining public, might with advantage be published. The statement gives the degree of phthisis production for every mine on the schedule. It is interesting to note that the mines of the Far East Rand are more free from phthisis than those on the rest of the reef. This is doubtless due to the fact that more slate is mined here than elsewhere. The Far East Rand is a "one reef" area, with a low dip and a soft shale footwall, in which most of the development is accomplished.

New Machine Drill.—A machine called the "Turbo" has recently made its appearance on the mines, which in trials has proved itself superior to any other type at work, in actual drilling time and in steel economy. Like the deadly Leyner, it passes air and water down the steel to the cutting edge, and, unfortunately, appears to create more dust under normal conditions than other types. As an

indication, however, of what good results can be attained under ideal conditions, and under the direction of a careful official, it may be mentioned that at the Modder Deep dust samples were taken at short intervals throughout a drilling shift with one of these machines at work. That result proved that considerably less dust was being produced than is usual. The one departure from the usual practice in this test was the use of a separate water hose for spraying purposes round the hole when the machine was collaring. On this mine all machines are now similarly provided with an extra hose, and I would commend the practice to other managers as being likely to improve conditions. It has been found on a recent investigation that an unaccountable slackness has been the practice in the majority of mine drill shops, in connection with the hollow steel now in universal use for drilling machines. It was found that in most cases the perforation or tube had been reduced in area in welding or sharpening to such an extent as to seriously restrict the flow of water to the cutting edge. The natural result of this would be that air would be depended on for clearing out the sludge produced by drilling, and considerably more dust would be produced.

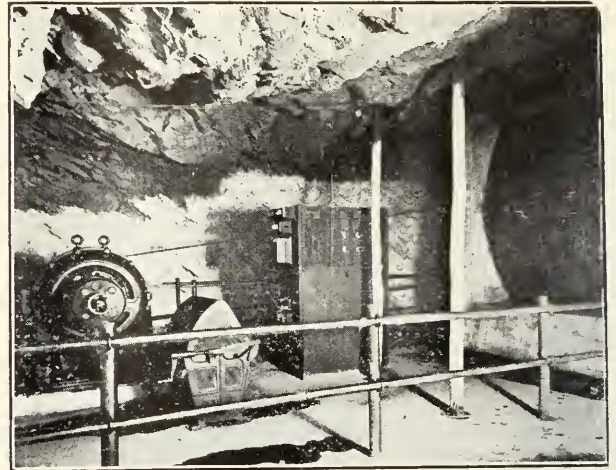
Mr. C. E. Hutton, I.M., Germiston, writes:—There are three prolific causes of the formation of dust in mines, namely: (1) Blasting operations; (2) shovelling operations; (3) drilling operations.

Blasting Operations.—The very fine dust created by blasting in a mine cannot be allayed, and must therefore be got rid of by means of ventilation. Ventilation is divided into two divisions, general and local. The term "General Ventilation" applies to workings in which a through current of air can be established by splitting and coursing the main air supply, and the term "Local Ventilation" applies to "close" working, such as back stopes and development tunnels. Except in very special cases, when the permission of the inspector of mines has been obtained, blasting operations are only permitted once in twenty-four hours. In a large number of mines the night shift has been abolished, and in other mines a small number of persons are employed on shovelling and tramming during the night shift. These persons go down the mine from four to seven hours after the blast. I may safely say that the dust from blasting operations is removed from all the workings served by the "general ventilating" current in a period varying between four to seven hours, but in many long development tunnels and back stopes, where the "local ventilation" is done by compressed air, the very fine injurious dust from the blasting operation remains in suspension for hours, which fact shows that such close places are inadequately ventilated. The elimination of dust in these places is at present engaging the special attention of a committee of inspectors. The presence of this very fine injurious dust in the atmosphere of development tunnels, hours after blasting, has been detected by the use of the konimeter, whereas the gravimetric method would have shown good results. From the foregoing it will be seen that as soon as the elimination of dust in "close" places is achieved, very little harm can result from dust from blasting operations if a reasonable period be allowed to elapse between shifts. Frequent surprise inspections are made of the stations in main travelling shafts at blasting time, and during the last twenty months no persons were found to be exposed to the fumes and dust created by the blast at the end of the shift.

Shovelling Operations.—If the provisions of Regulation 101, sub-section 2, are not observed to the letter, there is little doubt that shovelling operations may remain a cause of the creation of dust. The regulation may appear to be sufficient, but it would be impossible to obtain a conviction for a contravention thereof unless the ground being removed contained no visible signs of moisture. What is and what is not "effectively" wet would be most difficult to prove in a court of law. It can be said without fear of contradiction that in every mine day after day this regulation is in a sense contravened. Possibly in every instance the ground being moved had been wetted, but had not been kept "effectively" wet, although at the same time it was

not dry or dusty. To prove that in a court of law would be impossible; the offenders are merely instructed to apply more water.

Drilling Operations.—Now that the use of the dry jack hammer drill has been forbidden, and allowing that the Leyner type of drill is kept in proper working order, there should be practically no dust escaping into the air if the provisions of Regulation 101, sub-section 1, are observed.



Underground Fan on a Rand Mine.

It must be obvious that if the devices for dust allaying are properly used, and the regulations obeyed, the creation of dust from drilling would be reduced to an almost negligible quantity. The quantity of injurious dust formed by any sort of machine drill if used dry is so enormous that a few minutes of such drilling is sufficient to contaminate a very large volume of air in the mine. The opinion formed by inspectors is that this offence must be a daily occurrence in more than one working place of any mine.

(To be continued.)

Swazi Tin.

The following are the results of the operations of this company for the month of September, 1921:—Concentrate recovered, 17½ tons; estimated net loss for the month, including credit adjustments on previous shipments (taking tin at £155 per ton), £106.

Grootvlei Options Extended.

The head office of the Grootvlei Proprietary Mines announce that the directors have decided to extend for a further period of two years all options for shares granted in September, 1919, in connection with the issue of 250,000 new shares. Holders of option certificates entitling them to apply for and receive an allotment of shares at the price of 25s. per share up to the 30th September, 1921, are therefore now entitled to this option up to 30th September, 1923, and can have such extension endorsed thereon on presentation at the London office, 34, Bishopsgate, E.C. The Grootvlei Proprietary area is situated on the Far Eastern Rand, slightly to the south-east of the Geduld farm, but separated from the Geduld Proprietary's mine by a block of Government ground which was unsuccessfully put up for tender a few years ago. It was intended to restart shaft sinking on Grootvlei at the end of 1919, but the directors ultimately decided to postpone a resumption of operations until the necessary machinery could be obtained more cheaply. The shafts will have to be put down about 3,000 to reach the reef.

Sampling Analysis and Classification of Coal.

In a recent issue of the journal an extract from a paper by A. Trevor Williams, M.Sc., on the above subject, read before the Chemical, Metallurgical and Mining Society of S.A., was printed. The contribution to the discussion arising out of the paper by Mr. J. Q. Braidwood, reproduced hereunder, contains some noteworthy points pertaining to South African practice.

The first paragraph in the paper is one I take exception to. This paragraph is essentially one of the most important in the paper, as it shows that the value of the paper depends, apparently, on the reliability of the authorities quoted, and not on personal experience and research by the author.

With regard to the reliability or practicability of the methods mentioned by the author of the paper, or their applicability to this country, I am afraid I must disagree to a very considerable extent. I question whether they may be considered as an improvement on methods in use



The South Rand Colliery at Grootvlei.

here in 1908—gradually improved since, and standardised by the South African Engineering Standards Committee* (now the British Engineering Standards Committee, S.A. Branch). A similar but in my opinion unnecessarily elaborated system for commercial purposes with drawings and unnecessary multiplication of operations was published by the Bureau of Mines, Washington, in 1916, about four years subsequent to the South African publication, which gives one the impression that it is the work of a scientific gentleman who has lost sight of the fact that, however accurate a system of sampling may be, there are always small errors due to various well-known causes which make elaborate sampling methods and apparatus, unnecessarily expensive. No good purpose is served by such elaboration, as nothing kills a good idea quicker than unnecessary or high cost.

I must presume, for want of other and more certain knowledge, that the paper in question has been written with a view to assisting us in this benighted part of the world (or so it is generally assumed to be elsewhere); to give us an idea of what is being done in England so that we might gratefully follow the lead of the reliable authorities quoted, who have had one or two years' experience in selling coal on the calorific basis, as against a dozen years here. We are always pleased to know what others are doing elsewhere, but by past bitter experience we have found that

* Report, January, 1912.

to apply home methods here without very thorough investigation and experiment is courting disaster. I find that in the third paragraph of the second column, only English and American research Associations and authorities are mentioned. It is possible that no such remark as attributed to Mr. Sinnatt can be found in the pamphlet entitled "Standardisation of Coal Sampling," published here in 1912, which may be due to the fact that we assume that those entrusted with such work realise their responsibility and the necessity for carrying out intelligently the simple and effective methods in use here, or that they will immediately be replaced by someone who can.

I would like to discuss another quotation near the foot of the second column, "The principle underlying sampling and its possible errors."

"To be truly representative of the whole weight of any consignment of coal a sample should not only contain a portion from every different part of coal, but also the correct proportions of large and small coal, and of large and small pieces of foreign matter and impurities."

The foregoing has many objectionable features likely to cause trouble, particularly if in the hands of a non-technical person, perhaps a buyer of coal. It does not say that this should be, weight in sample, in proportion to quantity of such material present in the bulk, although some such idea is conveyed later with regard to large and small coal. This gives one the idea that all small coal is inferior in



South Rand Colliery—Headgear and Screening Plant.

calorific value to larger coal, which is not always the case, depending as it does a great deal on the friability of the coal and method of mining.

With regard to the engineer mentioned, I can only suggest that what we call a fitter in this country is meant.

I am in agreement with the statement about "errors" being traced "to an under-estimated notion of what the weight of a sample ought to be," yet lower down I note weight of original sample should be 39,000 lbs., and I would like to point out that it is easy to make rules which it would be absurd or impossible to carry out. For example:—If I went out to a mine and suggested that a 39,000 lbs. sample should be taken, it is quite probable that the resident engineer would say, "Why not take the whole blooming truck?" Engineers in this country often sacrifice the more cultured methods of speech to convey an incontrovertible fact in a few words.

From experience, I would say that to assume the smallest weight of a sample to be 1,000 lbs. or half a ton for 100 tons bulk is misleading. Such a large quantity has been proved to be quite unnecessary. Further, to give a sampler of the ordinary human man type instructions such as, "In obtaining the gross sample great care must be exercised to ensure the presence in it of the proper proportions of large and small coal, and large and small impurities" would result in hopeless muddle. I say that it is not humanly possible for anyone to accurately estimate the

quantity of large or small coal or impurities in a bulk consignment; in fact, such an instruction would wreck coal sampling if carried out, also if a coal sample of 39,000 lbs., or even 1,000 lbs., had to be sieved over a $\frac{1}{4}$ in. sieve, the gain would be infinitesimal.

We are told to "Run a shovel along the bottom of the wagon after enough coal has been unloaded to allow the coal to assume its natural shape" (I presume "natural shape" means angle of rest on the resulting slope due to removal of a part of the coal).

I am very definitely opposed to running a shovel along the bottom of the wagon unless I want to get a sample of coal to include any dirt there may have been in the truck previous to loading!

Again we are told that, "When cars or wagons are being dumped a scoop (size and shape are not given) may be held in the stream of falling coal." This, we are told, "essentially means collecting successive small increments from successive parts of the heap, and provided discrimination is used as to the relative quantities of lump and fines, the method has every claim to accuracy."

In my opinion if an accurate result were obtained by this method it would be by accident, as when coal is running, any large lumps will most probably fall off the scoop and an undue proportion of fines will be found in the resulting sample. If coal larger than nuts or peas size is sampled, that is for anything above nuts say from $1\frac{1}{4}$ in. to as large as 18 in. diameter, we must throw this system out.

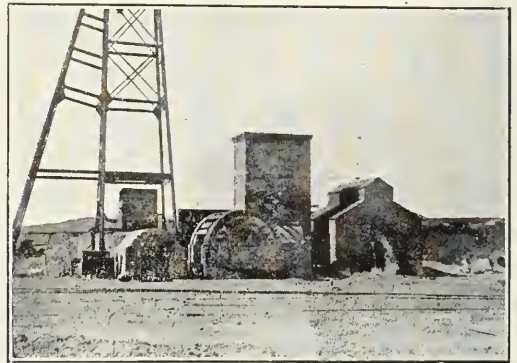
Under the sub-heading "Mine or Seam Sampling," the author of the paper again quotes Mr. Sinnatt, in what in my opinion is about the most unpractical and excessively and unnecessarily expensive method of sampling a seam that I should think it would be possible to imagine, and I should like to ask the author if this has ever been carried out in practice, or is it only the result of a fertile brain and unlimited spare time? If a specimen of a seam were required for exhibition purposes overseas, where expense, etc., were no object, perhaps one might consider the matter from that point of view, but in that case I would suggest a wider section than 6 in. to show more of the coal as a set-off against the cost of admission to the exhibition.

If the author of the paper has not used a pick underground or has not tried cutting pillars out of a seam, I should strongly advise him to try and make a note of the time required to make a calorific survey of a mine by his method. I particularly mention the use of the pick by the author himself, as experience in handling the pick is a very necessary part of the operation. The usual miners' method of using a pick, or the Kaffirs' for that matter, is quite unreliable. Making an accurate calorific survey of a mine requires considerable experience, and the personal factor and judgment are most important if real accuracy is the object in view, and not exhibition "pillars" packed in straw; this I think I am well able to state from a very considerable personal experience in this work.

In this country the miner mines the coal in quantity according to instructions, but only large stone or shale bands, or some continuous band not suitable as saleable coal, is left underground, the real picking or sorting taking place on the surface on a travelling belt constructed for the purpose, so that the American quotation in first paragraph on page 3 does not apply to the Transvaal. The American system published in 1918 is similar to the system published by the South African Engineering Standards Committee in January, 1912, which I had had in use since 1908, having devised it to suit necessity, and improved it by experience. It is in use to-day with marvellously accurate results at a minimum of labour and expense. It cuts out as far as possible all unnecessary apparatus, and reduces the time required for the operation (and the cost) to a minimum without sacrificing accuracy. This I feel sure has not even been thought of, far less attempted, with the system given us by the author of the paper.

In view of the multitude of things the sampler has to take underground, I think it can be said that here it is simplicity of apparatus and a knowledge of the work, as against multiplicity of apparatus to make up for a want of knowledge of the work as shown in the paper under discussion.

It would seem that the author has written a paper on other people's experiences, or the want of it, and therefore I hope will not bear me any ill will for what I have said, and I trust that if ever he goes to England that he will read a paper on South African methods, and then I think we shall have cleared the slate, and he will have had his opportunity. There is still another little point I would like to mention as showing the impracticable ideas conveyed. I will quote: "A second method is to place the whole of the sample in a thick canvas cloth sheet tarpaulin on which it may be crushed by means of the 'punner' or hammer. I have seen a similar method used for separating mealies from the cob by beating them inside a sack, but to break coal on canvas or tarpaulin would mean that both or one of them must be of practically no value after the operation, as I leave you to guess how



Fan at the South Rand Colliery.

long the operation would continue without holes being cut in the sheeting. In this country we have to buy any canvas or tarpaulin we require.

The system of coning when quartering the coal was early discontinued for large quantities—as the work is not done in the laboratory, nor is the usual sampler of coal in this country a man trained in the laboratory. We substituted after each mixing the following:—With samples of between 200 and 300 lbs. we lay out the coal in a square of 6 in. thick, it does not matter if it be 3 in. thick beyond the fact that it would cover too much space which is often limited; it is then quartered. The quartering is very expeditiously and accurately done by using a cheap quartering apparatus designed by Mr. Thomas, Chief Engineer of the Wolluter Gold Mine, which apparatus I commend to others as a time saver and insurer of accurate quartering in unskilled hands. No royalty I believe is charged for its use, only a grateful letter of acknowledgment is sometimes sent.

I will again quote, "When the weight falls to about 40 lb., samples may be sent to the laboratory or be crushed so as to completely pass through a sieve of four meshes to the linear inch when its weight may be reduced to 15 lb."

I can imagine that if all samples that were sent to the laboratory weighed 40 lb., some of these laboratories would soon be in competition on unfair lines with coal dealers who pay for their coal, besides the fact that the increased cost of storage in town would take a little of the gilt off the small amount of gingerbread allowed for the work. Surely the Home laboratories must have large spaces, cheap assistance in the way of pupils, etc., as well as get a good price for their work.

I cannot quite understand why No. 6 is given as "Nitrogen percentage," No. 7 as "Ultimate analysis," giving the percentage of C.H.O. and N. If N. stands for anything

else than nitrogen, what is it? nitrogen having already been mentioned in No. 6, but it may be only to extend the list and make it look more important.

I would specially commend the part dealing with "associated" moisture and water of composition for discussion between the author and my learned friends the analytical chemists; it is too deep for me in its present form with the time I have at my disposal.

I am afraid the author has given us nothing new; in fact, has lightly touched on a very serious subject, almost to belittle its importance.

So far as accurate determination of moisture goes, I am in favour of the U tube absorption test with dry calcium chloride, or a similar method with sulphuric acid, to determine the error due to the oven method for each class of coal, and so standardise an easy cheap method with an error factor instead of a continuous expensive method whose percentage of accuracy above the corrected one does not warrant the increased cost where large numbers of determinations are done on a commercial basis. This I hope will some day be the case, when the powers that be are converted to the benefits of reducing our results to a definite dry coal basis of sample and return.

With regard to the method of determination of volatile matter in a sample of coal given by the author, I can only say that the results would be quite useless to me in my work, as I make considerable use of the proximate analysis, perhaps new uses, in obtaining information not heretofore associated with chemical analyses.

I have corresponded with the American Bureau of Mines on the subject of the American method of heating the coal at a given temperature for a given period, a method which does not accurately show what the volatile contents are, but shows a result depending on the rapidity with which the coal gives up its volatile, including moisture, in a given time, which is not necessarily a true statement of the volatile contents.

The Agglutination Curve, or hit-or-miss method of determining the coking qualities of coal, does not commend itself to me since it depends on an outside factor or diluent, and since you don't know if the hit was a bull's eye, or the miss only just grazed the target, I think we might devise a better method if we had the money and time to spend on research that the people at Home seem to have.

Mention is made that "authorities" have judged "it essential that all classification of coal should be made on dry and ashless basis, or, in other words, on the pure coal substance."

It will depend a good deal for what purpose the classification is required, and how much use it is going to be when arranged. I am in agreement that all our returns of calorific value should be on the dry coal basis, the hygroscopic moisture being known; but ash is not separable from coal until burnt, a fact that must be considered when classification is considered. What is termed pure coal by the author is known here as combustible matter; pure coal to my mind is a term to be carefully used, perhaps in the future, when we know what pure coal is.

When we consider the great difference in age and composition of the coals of South Africa from those of other countries, it but emphasises my contention that we should do our own research work, lay down our own laws, and determine our own facts, and not blindly accept the dictum of others unknown to us, and unknowing our country, its difficulties and possibilities.

There is reference to a sample of "slack" in which small coal when separated showed 10 per cent. of ash, and the so-called large coal contained 40 per cent. ash; this is followed by the remark, "What would be the worth of the analysis as representing the heap from which the sample had been taken if the proportion of large and small received

in the laboratory had not been representative of the large and small in the heap?" Here follow a number of figures which can be read from the paper and then again I quote, "It will be seen at once that the calorific value as disclosed by the laboratory would vary tremendously in the two samples referred to." There would undoubtedly be a variation in coals having a difference of 30 per cent. ash contents, but if the sample of the whole bulk is properly taken by the method in use here and by a man who has been properly instructed, say, for a couple of hours, there should result a true sample without any unnecessary separation and calculation.

The author would perhaps be surprised if he knew the system in use here, including registration and other checks on sampling coal. Anything in the way of careless sampling is soon detected, errors of labelling and numbering of samples shown up as soon as made, the percentage of errors from any source being a negligible quantity.

Without going into further detail I may say that in my opinion the methods given by the author for sampling coal might perhaps be of use for some other purposes, but for coal in South Africa I must absolutely oppose the adoption of many of them, even in modified form, and would further warn others that there is plenty of "trouble sticking out" for whoever tries to obtain reliable results with some of these proposed methods. Most of the reliable information mentioned may be obtained from text books, but there is much of this that is not applicable to South Africa, and further, I find no hint in the paper as to costs, or who pays. Both are important items, particularly with elaborate and expensive systems.

I would like to take this opportunity of mentioning that the success of the systems in use and mentioned above for the detection of errors, etc., is largely due to the very valuable assistance ungrudgingly given, often under trying and worrying conditions, by the analytical chemists who carry out the work of analysis and sometimes of supervision.

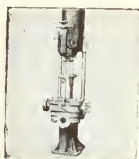
I have often thought that the training of the engineer should include sufficient of the chemist's and physicist's training to enable him to appreciate and discuss the work of the chemist, and likewise that the chemist should be able to appreciate the engineer in the same way, have similar training in engineering, and then the ideal collaboration would result to the benefit of both.

I would mention, for example, the bomb calorimeter, perfect as a physical instrument of a very delicate character, but rotten as to mechanical design and operation; here it is necessary for the engineer to know the apparatus, its use and purpose, before he could design an instrument to embody the necessary strength, accessibility of all parts easy to use, and so nearly perfect in its mechanical parts, as it is in its physical principles.

I wish to anticipate a question that may be asked, that is: Why do I not read a paper on coal rather than use destructive criticism of the work of others? It is a reasonable question, and my reply to this is weak, you may perhaps think. I am the engineer to the Transvaal Coal Owners' Association, as some of you know, and in that capacity I feel that I have knowledge in trust which I could not use except in a general manner, and a general paper is not suitable to the standing of this Society, so that I may do more good as a critic inducing discussion.

I hope I shall have helped to discussion on a large scale, and to the writing of fresh papers on the subject of coal with something South African about them.

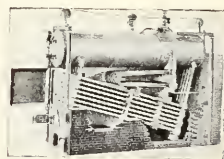
I have to propose a vote of thanks to the author of the paper for having opened up a subject that we should have opened up, and discussed ourselves, except for our retiring natures and somewhat shy dispositions. In some of this work we may claim to be pioneers; further, I think that the sale of coal on a calorific basis was better understood here than anywhere, at least up to a few years ago. I hope that shortly we shall keep ahead of the times by meeting again on a larger and more representative board, to revise, discuss, and add to our previous work.



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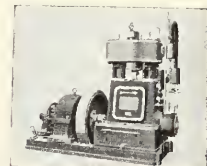


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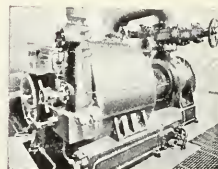


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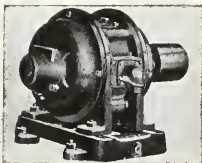


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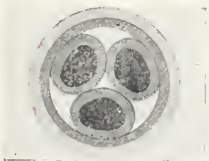
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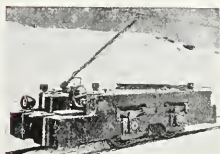
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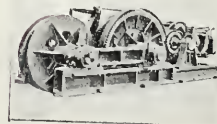
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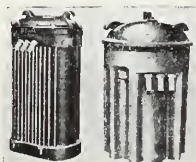
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Flotation Applied to Rand Ores.

Sir,—The following results of flotation tests on Rand ore, slimes and sand residues, made at our newly-opened laboratories, Flotation Buildings, corner of Kort and President Streets, may be of interest to your readers:—

1. Crude Ore from Mine: Assay value of ore, 9.9 dwts.; ore crushed to 80 L.M.M.; value of concentrates, 65.9 dwts.; percentage of concentrate caught, 14.8; residues, .42 dwts.; extraction, 98.5 per cent.; cost of reagent, 7d. per ton.

2. Slimes Untreated: Assay value of slimes, 1.34 dwts.; assay value of concentrates caught, 7.2 dwts.; percentage of concentrates caught, 16.4 per cent.; residues, 0.20 dwts.; extraction, 88.1 per cent.; cost of reagent, 4d. per ton.

3. Black Reef Tailings: Assay of crude sample, 2.45 dwts.; assay value of concentrates, 24.6 dwts.; percentage of concentrates caught, 8.6 per cent.; residues, 0.42 dwts.; extraction, 86.3 per cent.; cost of reagent, 8d. per ton.

4. Sand Residues from Rand Ore: (1) The first tests were on sand as received without further grinding. There was no difficulty in concentrating by flotation the free mineral consisting of iron pyrites. The concentrates averaged 10 dwts. in value and were about 6 per cent. of the bulk treated. The original value of sand in this test was 1.4 dwts. and the residues averaged .85 dwts. It was quite clear to us that a large proportion of gold was locked up in sands and could only be floated by further grinding. (2) The next test was made as follows: Assay of crude sand, 1.75 dwts.; concentrates, 12.6

dwts.; percentage of concentrates caught, 10.3; residues, .45 dwts.; extraction by flotation, 71.1 per cent.; crushing, 80 mesh L.M.M.; average cost of reagents was 4d. per ton.

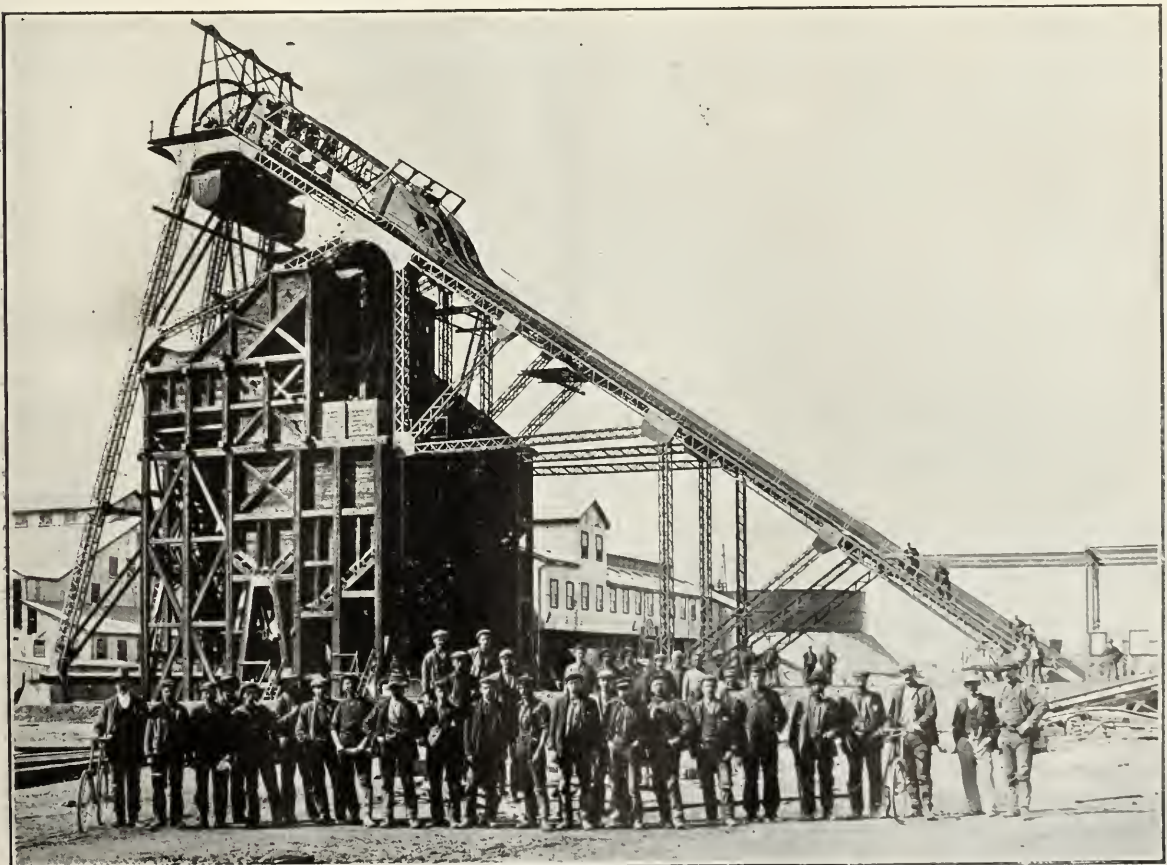
In view of the above results, even allowing for the cost of re-grinding sand, it appears probable that these particular sand residues can be profitably re-treated by flotation.

Flotation Tests on Crude Rand Ore done in our London Laboratory: A fairly large scale test of 1,870 lbs. run in London recently gave a .55 dwt. residue on a grade of ore assaying 22 dwts. If the ore had been of a lower grade, undoubtedly a far lower residue would have been obtained; as it is this result indicates a recovery of from 96 to 98 per cent. From tests done here and in London, it appears probable that on a 4 dwt. ore a residue of .15 to .2 dwts. may be looked for, the residue rising more or less slowly as higher grade ore is treated.

We believe that our process, if applied to current reduction works, would mean a large saving in working costs, and is worthy of most careful consideration. Instead of treating the whole of the crude ore by cyanide, we are fairly confident from the results we have obtained up to date that we can give a 10 per cent. concentrate containing from 93 to 97 per cent. of gold in the ore, and this concentrate can be easily treated by ordinary cyanide method.—Yours faithfully,

E. HOMERSHAM,
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Cason Shaft of the E.R.P.M. with its Complement of White Workers.



A disastrous strike at the E.R.P.M. this week was averted at the last moment by the resignation of the employee whose refusal to join the Union was the cause of the trouble.

Glencairn G.M. Co. Liquidation.

A SHAREHOLDER'S QUERIES.

FULL AND SATISFACTORY ANSWERS.

Sir,—I was glad to see from a recent article in your widely read journal that widespread dissatisfaction exists amongst shareholders on your side at the way in which certain liquidations are being carried out. I am interested in most of the gold mining companies now being liquidated but, with the exception of the above company and its stable companion, the Ginsberg Gold Mining Co., Ltd., cannot say that I have any reason to be dissatisfied with the conduct of affairs. Such companies as the Village Main Reef and Knights Deep have given their shareholders all the information possible.

But it is very different in the case of the Glencairn and Ginsberg, both of which were placed in liquidation towards the end of 1920, the former, I think, on the 31st December of that year. Is there any reason why a report and balance sheet should not have been issued for 1920? I should have thought that under the Companies Act (1908) the Directors were bound to issue reports. We shareholders on this side have been kept in complete ignorance as to what transpired at the liquidation meetings, and are not even aware who the liquidators are. We presume they are the late directors.

Another matter of more serious concern to the shareholders is the way in which the whole of the mining property and freehold area, etc., of the Glencairn Company has been disposed of for the paltry sum of £1,500, representing only a fraction of a penny to the shareholders. As the mine closed down some months before the mines were allowed the benefit of the premium on gold, it was only natural that the shareholders expected the liquidators would be in a position to dispose of the substantial amount of ore left in the mine for a fair sum, or get one of the neighbouring mines to work it on a profit-sharing or royalty basis.

The directors of the New Primrose, who, with one exception, were also directors of the Glencairn at the time of the sale, have certainly done a magnificent stroke of business for their shareholders. I understand the New Primrose profits for the months of July and August amount to nearly £12,000, and as its own mine is exhausted, the bulk of the ore must have come from the old Glencairn. What we shareholders on this side want to know is whether the mine, etc., was exposed for sale by public auction, or tenders called for before the sale for the above ridiculous sum took place.

I have made several applications to the Chairman of the London Committee for information, but have been told on each occasion that he is in exactly the same position as other shareholders on this side, and knows nothing. It is rumoured on this side that a large quantity of the mining machinery of the Glencairn and Ginsberg was disposed of to another mine of the same group, viz., the New State Areas, but I have no definite authority for stating it as a fact. Probably some of the shareholders on your side know the facts, and it would be interesting to have their views regarding this matter.

Apologising for taking up so much of your valuable space, I beg to subscribe myself,

DISQUIETED SHAREHOLDER.

London, E.C.,

15th September, 1921.

[With reference to the above, we have made inquiries and find that all the statutory requirements in connection with the liquidation have been complied with. Further, that a meeting of shareholders was duly advertised and held on the 4th August, 1921, when the liquidation accounts were submitted. The chairman of this meeting informed shareholders that the profit from the treatment of accumulated slime to 30th June, 1921, was £6,456 16s. 10d., and that the surplus cash at the same date amounted to approximately £25,000. He further stated that the treatment of accumulated slime continued, and that there remained to be sold the buildings and plant used in connection therewith, and certain houses on the property. Reference was also made at this meeting to the first liquidation distribution of 2s. per share made on the 31st March, 1921, absorbing £55,000.

With regard to the purchase of the Glencairn ground by the New Primrose Company, it was pointed out to shareholders at the meeting held on the 27th May, 1919, that mining operations could no longer be profitably carried out, and that the mine was consequently closed down, and as the New Primrose Company was the adjoining company, and was the only company that could work this ground, negotiations were entered into and the ground sold for £1,500, which, in comparison with the price paid by the New Primrose Company for ground purchased from the May Consolidated Gold Mining Company, Limited, was a fair price. The statement that the New Primrose Mine is exhausted is incorrect; as a matter of fact only a small proportion of the tonnage milled comes from the Glencairn section of the property.

Referring to the remarks dealing with the sale of machinery, we would like to point out that both in regard to the Glencairn and Ginsberg Companies a complete valuation of all machinery and plant was made by a well-known firm of mining and machinery brokers, who, after valuing them, issued a detailed catalogue, and the prices realised were highly satisfactory.—Editor, S.A. M. and E.J.]

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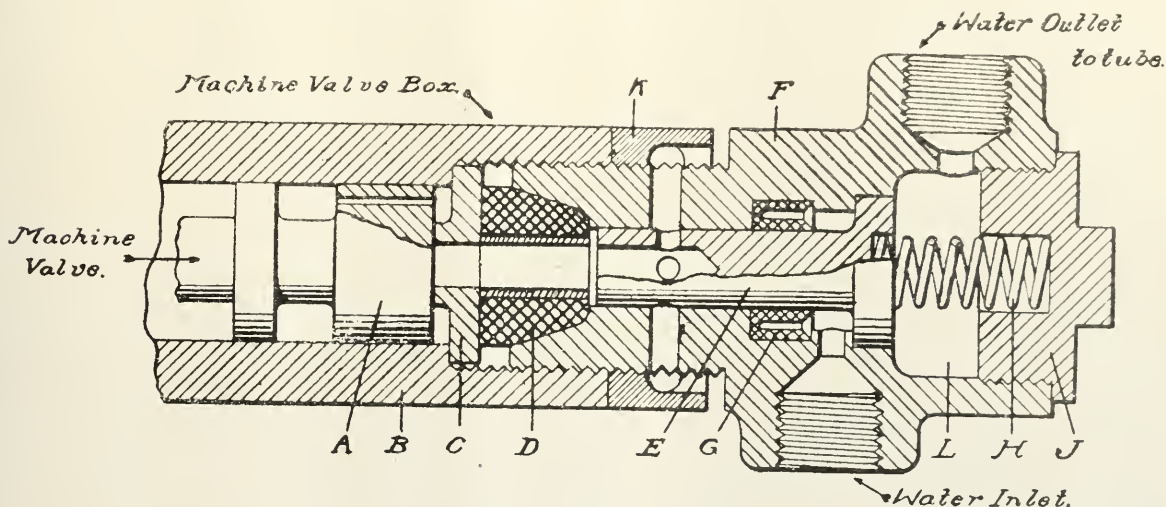
The Climax Rock Drill Control Actuated by Water Flow.

In designing this mechanism, the object in view was to prevent a rock drill from working if the water was not flowing, and further, to stop a rock drill from working if the water ceased to flow for any reason. It was decided that the most effective way of doing this was to upset the function of some vital part of the machine, such as the valve, which, in its turn, would prevent the machine from working. In the following description reference is made to the mechanism applied to the valve chest of a "Climax" Cradle Hammer Drill (Joburg No. 3) for which the experimental mechanism was made, but it should be borne in mind that the principle can be applied to all types of rock drills.

Mechanism Described.

The mechanism consists of the body F, the lock nut K, the piston E, the rubber packing G, the spring H and the cap J. The remaining parts shown, namely, the machine valve box B, the machine valve A, the valve chest buffer plate C and the valve rubber buffer D, are all parts of the

against the spring until the head of the piston is clear of its cylinder, and water flows freely past the underside of the piston head into the space L and out through the water outlet to the water tube. When the piston and piston rod are in this position, the holes in the walls of the hollow portion of the piston rod are blinded by the body of the mechanism, and therefore the end of the valve chest is no longer in communication with atmosphere, but is sealed, so that pressure can be set up in the end of the valve chest, which will allow the valve to function in its normal manner, and operate the drill. Assume for a moment that the water tube gets choked, and that the water ceases to flow. The water pressure at the water outlet will then build up until it is equal to the water pressure at the water inlet, and as far as the piston is concerned, these pressures will balance each other. The spring will then take control and depress the piston into its original position, thus placing the end of the valve chest in direct communication with atmosphere, and so stopping the valve and the machine from working as before.



THE CLIMAX ROCK DRILL CONTROL
ACTUATED BY WATER FLOW.

standard machine, and are only shown to illustrate the function of the mechanism more clearly. To enable the valve to operate and so the machine to work, pressure and then release has to be continually taking place in the ends of the valve chest, i.e., in the space between the machine valve A and the valve chest buffer plate C. It will readily be seen that if this space is connected direct to atmosphere, pressure cannot set up, the valve cannot operate, and so the machine cannot work. Assume, first of all, that the water is not flowing. The piston E is then held in the position shown on the sketch by the spring H. The lower end of the piston rod is hollow, and this hollow portion of the piston rod is in direct communication with the end of the valve chest, thus putting the end of the valve chest in direct communication with atmosphere through the holes in the walls of the hollow portion of the piston rod, and the air passages through the body itself. Therefore, when the piston is in this position, the valve cannot operate.

The water connection from the main supply is attached to the part marked "Water Inlet." From the part marked "Water Outlet," a connection is made to lead the water to the water tube. Now assume the water is turned on and that the water pressure is above the minimum at which it is desired that the machine shall work. The piston then rises

It is possible to have pressure without flow, but it is not possible to have flow without pressure. Although pressure enters into the working of the mechanism, it will be readily seen that the mechanism relies solely on flow for its successful operation.

Interesting New Device for Rock Drills.

In the course of his annual report for last year, Mr. C. J. Gray, the Johannesburg Inspector of Mines, says that a device invented some years ago by J. Berry for cutting off the compressed air supply, and thus stopping the drills when the water pressure fails, was tried at the Ferreira Deep during the year. It was not wholly successful, as dirt soon prevented the plunger from working; alteration in design might overcome that difficulty. Towards the end of the year, Mr. S. Fisher, Underground Manager of the Ferreira Deep, made an invention still more directly calculated to get over the difficulty arising from failure of the water feed in machines on the water principle. His device is attached to the machine itself, and stops it if the current of water through the machine falls off for any reason, such as failure of the water supply, reduction in pressure of the supply, or choking of the water tube or drill bit. Sufficient practical trial of the device has not yet been made.

Another Mine Closes.

ROODEPOORT U.M.R. PROFIT-SHARING PROPOSAL FAILS.

As anticipated in these columns last week, the failure of the men's unions to accept the profit-sharing terms offered by the directors of the Roodepoort United Main Reef has led the directors to decide on closing down the mine. Accordingly they have sent the following communication to the S.A. Industrial Federation:—

Dear Sir,—I am instructed by my Board to acknowledge the receipt of your letter of the 29th ult., and to express their regret that the various unions concerned are not yet in a position to notify their acceptance, or otherwise, of the profit-sharing scheme outlined by the chairman at the meeting held on the 3rd September last, and subsequently confirmed in his letter of the 8th idem.

My directors are most unwilling to close down the mine, and add to the existing unemployment, but at the same time they wish to point out to you that the matter has already been under consideration for nearly six weeks, and that in the meantime the mine continues to show heavy losses, which are likely to be increased substantially as a result of the recent fall in the price of gold.

Under these circumstances, since it is impossible to continue operations on the existing basis, they have most reluctantly decided upon a gradual suspension of operations, and instructions are being issued to the management accordingly.—Yours faithfully, (Sgd.) J. V. BLIXKORX (Secretary).

It appears that this decision had been arrived at with the utmost reluctance, but the directors had no alternative. The loss last month was £1,700, and since the beginning of October the price of gold has fallen very substantially (approximately 4s. per oz.), which will mean a still heavier loss for October.

"We feel," said one of the directors, "that even if we got a reply from the unions there would be many outstanding matters remaining to be discussed, and we should probably not be able to reach finality for some months to come; in the meantime the company would be getting still further into debt.

"The mine already has lost £380,000 and the General Mining and Finance Company cannot possibly go on carrying the burden, as they have done for years past, entirely for the benefit of the workers.

"We realise that shutting the mine down immediately—although the men have had very long notice—would throw 164 white men out of work, and that would be a great hardship at the present time, when there is a certain amount of unemployment in the country. Therefore we have decided to try to close down gradually.

"That is to say, we shall first of all immediately stop all development. We shall stop mining work on the lower levels of the mine, retaining one man and a gang of boys

on each of the levels where mining work is stopped in order to reclaim the material and clean up the stopes. In that way we hope to discharge the men gradually over a period.

"It is somewhat of an experiment. Whether it will be successful or not depends upon co-operation from the men who are left on the mine. If they are willing to help us during the struggle of running two shifts in the reduction works, instead of three, operations may continue for another two or three months, perhaps even a little longer, but, of course, if we find we cannot cover expenses on that basis the only thing for us to do will be to close down immediately.

"We want the men to realise the position, and we want them to see that if they do help us in this matter that they are helping themselves by avoiding a large number of men being thrown out of employment at one time."

The Currency Conference.

A conference was opened this week at Union Buildings by the Minister of Finance with reference to the currency question. The Conference comprises Mr. W. H. Clegg (Governor of the Reserve Bank), chairman, Sir David Graaf, Sir Ernest Oppenheimer, Col. Creswell, Messrs. Aiken, E. Chappel, S. Evans, J. P. Gibson (General Manager, Standard Bank), and J. R. Leisk (Managing Director, National Bank). The Conference considered (1) whether the provisions of sub-section 3 of section 7 of the Currency and Banking Act 1920 (whereby the inconvertibility of gold certificates terminates on June 30, 1923) should be carried into effect or amended so as to extend the period of inconvertibility, and (2) in either case what steps, if any, should be taken in advance to avoid undue disturbance of exchange and business.

The "All-Sliming" Process.

Mr. H. R. Whitehead (late mining editor of the *Statist*), who has just returned from a visit to Canada, writes to the *Financial Times* as follows:—"There is, as you say, nothing new in the process known as fine grinding, all-sliming and continuous decantation, but it has great advantages not hitherto recognised on the Rand. Probably you are right in questioning whether the older Rand mines will at this late date discard stamps in favour of less elephantine machinery for secondary crushing, but I do not think it will be very surprising if some of the long-life concerns do so. I learned while in Canada, whence I have just returned after visiting the Kirkland Lake and Porcupine mines, that the management of the great Hollinger mine, which has a mill capacity of 3,500 tons a day, has now decided, after exhaustive experiments, to replace their 100 stamps with roll crushers. Mr. A. F. Brigham, the general manager, was for many years associated with the management of the De Beers mines, and I should imagine his old friends can obtain from him, if they have not already done so, a good deal of informative data on the subject of the advantages of crushing ore without stamps. The Hollinger rock, I know, is relatively friable, but there is to be found the last word in milling without stamps at the new plant quite recently installed at the Wright Hargreaves mines on the Kirkland Lake field, where the ore is very hard indeed.

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CORRECTION.

With regard to the Prospectus of the UNION ASBESTOS CORPORATION (S.A.) LIMITED, published in the last issue of the "Sunday Times," we are requested to state that the reference to Mr. V. GRINDLEY FERRIS as Consulting Engineer of the Company appeared in error, and that his report was made in his private capacity as a Consulting Engineer only.

Old Kimberley Days.

DIAMONDS, BANKERS AND LAWYERS—SOME WELL-KNOWN NAMES.

By W. P. Taylor.

The world has grown hungry; in spots, terribly hungry. In this land of plenty mankind does not realise hunger. Russia and China are the hunger wolf's great hunting ground. There are degrees of suffering, just as there are degrees of temperature. The intense cold of the snow lands lulls the poor hunger-stricken sleeper to an unawakening slumber; but hunger and cold in its deepest degree are unknown here. Yet in this sunshine and plenty there are sufferers; yes, sufferers in their degrees. I could not relate my tale without some pathos. Our family had known poverty ere we reached diamond land. I remember as a very young boy finding my mother terribly nervous and overwrought. She had inflammation in her eyes and could hardly see; but it was not her suffering that agitated her. There was nothing in the house. Father had left early in the day, very worried, and the rent had to be paid that day. He had not returned to lunch, and as it grew late she was afraid. What was she afraid of? She never told me, but I read an awful fear in her face. As I said, she could not see, and I did not see her eyes. I saw her hands move, and I read a message, and without her breathing a word. I said, "I'll find him and bring him safe to you," and then, like a terrier, I was off on my quest. I had a search, and as the hours latened I had a good cry. The dread, the fear, all crowded, and crowded on my little mind. No one had seen him. I need not say how overjoyed I was to find him. How happy he was, whistling his way home, holding my little hand. The rent was paid; mother's eyes got well; poverty was forgotten. Working from hand to mouth, we constantly took chances. Well, chances are taken by degrees as well as poverty is endured that way. We were a happy little group. There was father, mother, five girls, my brother Jim, Rowley the little one, and myself. Then there were the Kafir boys—Shilling, Kleinboy, Springbok, Soldat, Martinus and Engelsman. We took life seriously. It commenced at 5.30, and the day's work ended at dark. We lived under canvas, and dressed in white moleskins and flannel shirts; we had no use for coats. The mine ground was sorted, and we got so accustomed to finding nothing that the poor old guv'ner, who was the banker, kept looking at the fast emptying treasury, and sighed deeper and deeper. As the boys didn't know its condition, they worked confidently, and as my brother and myself hadn't troubled to inquire, we simply worked on, and rose every day with a sure conviction that that day we would find a stone and everything would be all right. How many of us, in those days, were doing the same thing. We got thin on hope, dreadfully thin. The groceries, meat and vegetables were finished, and there was no credit. There were some bags of mealie meal, and we got down to pap, pap, pap. It's only those who have got down to it seriously who know and appreciate what I am writing. There were five girls. We had to keep up our heads. The Kafirs had got to believe we were merry and bright. There was a window, a little window in the canvas side of the frame house. It looked at a dead bush fence. It was a fence without character, or if it ever had a character it had been lost in its deadness. It was a thing without life, an obstruction, and beyond it was the west.

My mother's mother was the wife of a sea captain, as daring a seadog as ever took the sea. He had left her at times with the sails full of wind and darted into the ocean on voyages that lasted months, and then, like Ariadne, she had stood before the lattice searching the sea, and there, at that little window, with the setting sun beyond that rotten dead fence, her daughter stood for hours in silent thought. My mother had a thoughtful face and dark brown eyes. She would wear her silk fichu and cairngorm brooch, and with her basket of work mend for nine. Tired, she would drop her work and look at that dead fence, with the

glinting sun sending her messages through its gables and twisted shapes. Ever and anon her eyes would brighten as some thought flashed by. I have wondered at those thoughts. They were not for me; I never knew them, they never carried a sigh, and yet there were but two bags of mealie meal, six or eight Kafirs, and the family—and she did not sigh.

Down at the mine was a pinched face, sorting in the sand and dust. It was coated with soft, yellow lime, and two dark eyes looked out of their hollows. The boys moved silently at their work. There was no singing. I have often thought that those Kafirs must have thought us awful fools, working for nothing for months. I suppose without religion and belief in a God, no sane being would have gone on as we did; but father prayed, mother prayed, and all the tribe prayed, and everyone of the tribe and their parents felt as certain as we do of the income tax to-day that we would find a diamond and everything would be right ever after. Many a time in those old days did I get into a corner, and always got out of it the same way. God always answered our prayers. I remember on one occasion I found a debris heap. It had every appearance of being good, and I hadn't a cent. There was no one I could go to, and I walked round that debris heap and prayed. At last I went to William Rogers, and he lent me £10, and in a week I found £100 worth of diamonds, but there was the family eating mealie meal, father sighing his heart out, and his wonderful mate as confident as life that he would bring home a stone.

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And he did. On this occasion it was my brother Jim who found it. The strain at that time was most intense, and our flag was in danger of being pulled down any minute, when the native sifted out a great white diamond, which my brother pounced on and placed in my father's hand. It is near on fifty years ago, but its recollection remains undimmed. It was a happy moment in his young life, and though it is ever so far away, he would not have missed it for untold wealth. "Oh Lord, we thank Thee for Thy bounteous mercies," was the Taylors' prayer. It happened not once, but at other times, and so, working on narrow margins, the pioneers struggled on; it was their very shortness that kept them perpetually busy. That stone fetched £600. It was sold to Messrs. Merriman and Becher, and I believe Mr. R. E. Wallace, father of Stuart Wallace, of this town, was the broker.

Early Financial Experiences.

When I was but 12 my ambitions were about on a par with Cecil Rhodes. I had amassed £100 in buying diamonds, and my safe was a black, tarred, canvas chest that had been one of two on a gun-carriage. They had an iron rail on each side and a strong hasp and staple, for when in action they had carried the black powder for the gun. How they found their way to Kimberley I do not know, but I converted one into my safe, and they both remained the repository of all my worldly possessions for many years. My father was nervous of this constant accumulation of money, and took me to Mr. Sheriff, the then manager of the Cap of Good Hope Bank. I was introduced as a prospective customer, which amused the manager immensely. It was against the rules, as I was too young; but on my father assuming responsibility I was allowed to open an account. I think it was because we had been neighbours at Green Point, near the Cape, and that I was so well known to him, that I was privileged; but all the same, I felt very proud with a cheque book, and it proved a convenience not handling bundles of notes. I banked with them for a great many years. After Mr. Sheriff came Mr. Feltham, and finally, Tommy Ball. Fred St. Leger and Sidney Cowen are the only two that I still see of the old staff. This bank was Cecil Rhodes' mainstay in his dull, dim days, when gloominess nearly overcame his luminous hopes. Let it not be thought that Rhodes' little barque sailed through nothing but smooth water, with full sails and a fair wind. There was a time when Henry Feltham had to come to the rescue—perhaps not only once. There was many a buzzing in his bank parlour. Rhodes always got cash, and with his cash was always a day ahead. I remember when the first De Beers Company was floated there was a big transaction in which Rhodes, Beit, Graham, Stow, Runchman and Dunsmore were guarantors, or rather purchasers, of reserve shares, and when the money became due, De Beers shares had fallen so low that it was impossible to finance. Rhodes, Beit, Graham and Stow financed through. Dunsmore got stuck, and a dear old friend of mine, Joe Deneyx, lent him twelve thousand pounds and pulled him through. (I am sorry to say that when the bank broke and pulled poor old Joe down, Dunsmore did not return the compliment.) Poor Runchman was ruined, and it was indirectly through this

very transaction that Wildegerood committed suicide. So you see, the little barque had to be steered through very troublous waters at times. Ah well, Henry Feltham always retained Rhodes' undying thanks. He became a director of the De Beers and was pensioned for life. A fine handsome man with dark eyes, aquiline nose, and a great soft beard, dark and long, which rested on a white waistcoat. One of the pleasantest of bank managers, he never refused me anything I ever asked him, but I often felt he could refuse advances with the adroit modesty of a lovely young lady who knew how to finish a lover without money. They say, when Mr. Feltham went on pension, they thought it might cost the company five years' pay, and I am glad to say he lived a happy retired life of about thirty good pensions, and this is as it should be, for I honestly believe that he was the man who saved the ship.

Two Genial Lawyers.

Through all our early ups and downs there were two genial lawyers. One was Bob Graham, and the other Selby Coryndon. Now when I say genial, I mean it in its fullest sense, for there never were two more popular men in any town anywhere. Bob lived and died a great, big, loveable thing, and his early death filled many a heart with sorrow. Selby Coryndon was full of character and a sure winner. There were numbers of amusing stories about him. His son is to-day Governor of Uganda. As a native administrator his talent is immense, and his promotion will ever continue. Our Robert Hearle was at Stow's with Henry Russell. Poor old Russell. His father was the great English baritone singer, and he longed to see the world. "If De Beers go to £10," said Fred Stow, "I'll take you round the world." De Beers did go to £10, and Russell was taken, but it was anything but a joy ride. It was a sort of penurious Ford shake about, and the telephone cigar story came back with Russell. Stow smoked the telephone cigar and a down East Yank told him so. One day Mr. Otto swanked into the old Craven Club. He was dressed in immaculate white, with a white helmet and white cow's tail whisk in his hand and a red rose in his button-hole. A handsome man with dark curly hair, cheeks that just showed their redness through his soft, curly beard, and a bright smile for every lady and an ever thankful heart that loved God for his goodness. Just then E. F. Gray met him and said, "I can't think, Otto, how you can sleep at night, owing Litkie £20,000." "Me sleep," said Otto, "oh, I sleep all right; it's Litkie that can't sleep." And so it was.

Barium.

The Imperial Mineral Resources Bureau has issued a booklet on barium. The chief barium minerals are barytes and witherite. The former is the sulphate and the latter the carbonate of barium. Barytes is the more common mineral, and its chief uses are: (1) in a finely ground state as a filler in the manufacture of paint, rubber, linoleum and asbestos goods; (2) as a raw material for the manufacture of barium compounds. *Inter alia*, the work says: Barytes appears to be fairly widely distributed in South Africa, but little reliable information is as yet available regarding the individual occurrences of the mineral. The most important deposits occur in Southern Rhodesia. Since 1918 a large deposit, near Hunter's Road, has been the principal source of supply for the Sienna Paint Company at Durban and two large explosive works in the Union. Another deposit has recently been discovered near Bulawayo (E. 28° 58', S. 20° 2'). In the Union of South Africa, a deposit has been opened up near Riversdale (E. 20° 10', S. 34° 00'), Cape Province, where the barytes is of a pale bluish-white colour and averages 87 per cent. BaSO₄. In the Transvaal, massive barytes occurs in large quantities on the Magalacqueen River (E. 29° 30', S. 23° 15'), 80 miles north-west of Pietersburg, and in the Bushveld to the north-east of Pretoria. It is of a very pure white colour, and apparently well suited for the manufacture of white paints. The chief consumers of the mineral in South Africa are the manufacturers of explosives and paint. The total output for South Africa and Rhodesia up to the present time is only 48 tons.

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Early Natal Mining.

A REMINISCENCE.

By James Cumming.

Somewhere about 1886 a young man who, prospecting in Zululand, one day entered the "office" (a grass hut) of the Gold Commissioner (the late Mr. Andrew Muirhead) and asked for a licence for a new discovery he had made—a brass mine! And, right enough, he there and then produced samples of brass he had found.

What he had actually stumbled across was an old Zulu forge, containing scraps of brass—smelted by natives by an admixture of copper and tin ores, and used by them in their manufacture of armlets and leglets. But this young man, in his stupendous ignorance, really thought he had discovered a brass mine.

At about the same time he (the same smart young man) was working a small mine by means of an adit level, on behalf of the late Mr. H— E—, of Natal (and, by the way, the level was as crooked as a maze), and he had a large staff of both whites and natives. He constantly reported in the Natal Press that he was getting good gold values, while on the same line of reef, outside his claims, the quartz was well known to be practically barren. He regularly sent samples to Mr. E— for assay purposes, and the results as published bore out his reports in the newspapers. One ounce, two ounces, three ounces, and more per ton were announced in the *Natal Mercury*, and eventually he acquired a small battery and engaged a man named G— H— to run it.

This man brought his wife and family into Zululand, and received instructions from his "principal" to await his arrival before commencing milling operations. But the "principal" never again materialised on that field, and H— was left stranded and unpaid. But on going through the "stores" at the battery he found two dozen books of gold-leaf and a sugar packet of specimens of quartz, from the honeycomb holes of which it was quite easy to pick out plugs of gold-leaf, when suspicion was aroused.

These "samples," when crushed by pestle and mortar and run through a fine-meshed sieve, gave lovely "tails" of gold, as had those sent to Mr. E—, on panning. Suspicion was first caused by the fact that on one occasion H— panned a sample only roughly crushed and not sieved, with the result that the plug of gold-leaf partly unfolded itself.

The name of that prospector and "owner" of a brass mine and of that "principal" without principle was— well, having regard to the law of libel, knowing that the greater the truth the greater the libel, coupled with the fact that the worthy man still lives, let me content the curiosity of my readers by saying that, as the twig was bent in those long ago days, so does the tree stoop to-day.

Magadi Soda.

The report of the Magadi Soda Company for 1920, issued in mail week, shows a debit balance for the year of £159,327, including £49,342 as provision for depreciation. This makes with the £197,731 brought forward a total debit balance of £357,058. The operations in Kenya have, the report states, continued throughout the present year without material interruption. The directors feel satisfied from the results already obtained from the initial working of the various sections of the plant that the latter is capable of producing soda ash of the finest quality. Shipments of the commodity are being made in increasing quantities, and the reception accorded to them by consumers has been a favourable one. The plant will soon be fully equipped, and the company will then be in the position of producing and marketing largely augmented quantities of soda ash. The directors state that the War Office has definitely refused to recognise the company's claim for compensation for military use of the Magadi Railway and water supply during the War. Dr. W. T. Pauling, owing to absence from England and to pressure of other work, has resigned, and Sir David Yule has joined the board and now offers himself for re-election.



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EDITORIAL.

THE REAL VALUE OF GOLD!

Since we wrote a few weeks ago on the gold question, our correspondence columns have testified to the increasing public interest in the matter, and we have printed all sorts of views on the subject from divers sources. It seems to us that as currency and exchange problems have now become the business of world congresses and international conferences, we in South Africa should, in our own interests, best confine ourselves to the study of these questions as they affect us as producers of half the world's annual gold output. If we keep that consideration constantly before us, we can perhaps best judge the value of the multifarious proposals and schemes brought forward by economists, bankers and doctrinaires from time to time. As gold producers, it is plainly our duty to ourselves to make gold an indispensable basis of currency and to support every reasonable proposal that enhances its value and importance in the scheme of things.

Moreover, in the light of the same consideration, it behoves us to oppose every proposal or scheme that aims to make currency independent of gold, or that lessens the importance of the part played by the metal. When, therefore, Prof. Cassel, at the meeting of the International Chambers of Commerce in London recently, declared for a scheme that meant getting currencies back to gold on new ratios of gold to paper, and he was supported by Mr. Samuel Evans, we cordially welcomed the proposal as a simple solution of the currency problem that had the added advantage of fixing a permanent premium on gold to the obvious benefit of our gold mining industry. Since then we have watched for opinions on the point, and, it is most gratifying to note that authoritative and influential opinion in England is coming round to support the proposal. For instance the *Statist* received by this mail, in a long article under the heading "The World's Currency Problem—a Suggested Solution," comes out strongly in support, and nails its colours to the mast on behalf of this solution of the problem. We have quoted freely from the *Statist's* article elsewhere in this issue because it elaborates and explains very clearly the scheme merely sketched by us. Briefly, it will be seen the *Statist* proposes making "the paper currencies of all countries formerly gold using convertible into gold not at the pre-war gold rates, but at the values as measured by the actual exchange rate with the U.S. dollar at the time chosen for taking this step or the average exchange rate over a selected period." That, in other words, is what Mr. Samuel Evans said at the last Crown Mines annual meeting, and what Prof. Cassel said in London and has since repeated in a report made to the League of Nations at Geneva. The latest recruit to the movement is no less than the Chairman of the Federation of British Industries, Sir Peter Rylands. The resolution which the Credits and Currency Committee of the Federation of British Industries, under the presidency of Sir Peter Rylands, sent to the Prime Minister recently, recommending a reconsideration of the report of the Cunliffe Committee—which advised a policy of gradual deflation—is described as re-opening the whole currency question. Sir Peter Rylands, in a covering letter, explains that no criticism of the Cunliffe Committee's report is intended, but declares that conditions have so altered since 1918, when that report was issued, that a reconsideration of the whole matter is imperative. He gives four instances of these changes: (1) The de-control of foreign exchanges; (2) the unwillingness of any other country to incur the loss of a policy of deflation; (3) the continued rise of prices through 1918-19; (4) the already enormous burden of taxation on industry, which would become intolerable if it had to pay back war debts with a pre-war standard of currency.

Sir Peter Rylands suggests that now the Government have had to stop reducing the paper currency note issue, because of trade depression, *the best thing they can do is to fix a new standard of currency by minting sovereigns with a lower standard of gold purity than before the War*, so as to bring them into nearer relation with the currency note, and so stabilise the currency. It is expected that there will be fierce opposition to this idea, and all the old hubbub about risk of provoking spurious coining if we alter the standard; but this is because the standards of anything purely relative and instrumental are always more precious to the departmental mind than the more important standards of national solvency and progress. It is—as one paper puts it—with the economic position as it is with Ireland: people have had so much anxiety, and are having it still, that they are prepared for bold measures and a little risk, rather than for a groovy timidity which condemns the Government to be evasive and the population to despair. No less an authority than the *Spectator* supports Sir Peter Rylands's apparently revolutionary proposal in the following eloquent passage:

"From a theoretic point of view the arguments against deflation seem unanswerable. After all, it does not really matter whether we give few or many tickets for a thing. What does matter is that they should always be of equal exchange value for the same commodity and should be for a

perfectly stable and trustworthy standard against which we can measure the fluctuating values of commodities. The only real harm is done when the value of the currency—the tickets—itsself suddenly changes, and we seem to get all sorts of new values for commodities which have really changed only in price and not in value. We get the sort of result that would be obtained if one tried to measure off cloth with a tape measure which was continually expanding and contracting in length. Hence the essential need in the currency problem is the need for stabilisation, and any measure which necessitates a change in the value of money, even if it is in the direction of deflation, is an unmitigated evil, sure to have the most detrimental effects on trade and industry. Lord Melbourne was wont to declare that it did not matter what the Cabinet said so long as they said the same things. So, with the exchange value of money it does not much matter what it is as long as it is always the same."

Enough has been quoted to show that enlightened public opinion in England is rapidly coming round to the view we expressed as far back as our issue of September 3 last. With some of the great bankers, industrialists and leaders of the Press in favour of the proposal, it is, at any rate, certain to be fully ventilated. For our part, we are satisfied that the suggested solution of the world's currency problem contains in it the solution of the problem of the future of the Rand for the reason that the latter is vitally affected by the scheme to stabilise the price of gold at a substantial premium.

THE WAGES QUESTION AGAIN.

It came as a surprise—almost, indeed, a shock—to the Rand last week-end to learn that the miners' union was seriously considering going back on the wage agreement with the Chamber of Mines of July last, and demanding a reversion to the pre-July wage. The reasons given for this extraordinary decision are not plain, but there seems to be a confused feeling that neither the cost of living nor the gold premium is going down, and that the members of the mine officials' unions have not had their salaries correspondingly reduced. Nothing is said of the deliberate intention to break an agreement solemnly made within a few months of its ratification; and indeed the whole proceeding is so outrageous as to encourage the belief that it is the merest "try on" and not to be taken seriously. If an agreement of this sort only made after months of discussion and debate, is to be treated as "a scrap of paper" at the whim of either party, then the whole system of collective bargaining on the Rand is turned into ridicule. The facts are, of course, that both the cost of living and the gold premium are on the down grade and the pay of all classes of mine employees on the Rand is bound to suffer accordingly. Indeed, ever since the unions expressed their intention of taking another ballot on the matter the gold premium has been falling rapidly, and at 105s. per oz.—the latest quotation available—is perilously near the danger limit for a number of the low-grade mines. From the now historic list prepared last year by the Chamber of Mines, showing the cost of producing an ounce of fine gold, we may quote the following:—

Mine.	Ounces produced	Cost.
	Jan.-Aug., 1920. Ozs.	per ounce Produced. s. d.
Luipaardsvlei	36,466	111 11
New Goch	26,891	109 0
Roodepoort U.M.R.	39,804	109 3
Durban Deep	59,081	106 11
Randtontein Central	290,773	105 11
Aurora West	23,792	105 7
New Primrose	31,118	100 6
Simmer and Jack	101,784	100 3
E.R.P.M.	274,567	99 8

Apropos of these figures, it may be recalled that the Chamber of Mines' representatives pointed out to the

Unemployment Commission that with gold at 105s. per oz., six mines would be unpayable on the July basis of costs. These mines employ 2,457 Europeans and spend £2,250,000 per annum on wages and £1,440,000 in stores. With gold at 95s. the number of unpayable mines would be increased to fourteen, employing 7,295 Europeans and spending £6,053,000 per annum in wages and £3,644,000 in stores, and at the normal price of 85s. no fewer than twenty-eight mines, employing 12,688 Europeans and spending £10,146,000 per annum in wages and £6,471,000 in stores, would be unpayable unless costs were reduced or only ore of a higher grade extracted, which is frequently impracticable if not impossible. It is, of course, true that the causes which would bring about an improvement in the American exchange would also tend to reduce working costs, but any reduction, particularly in rates of wages would take place at a much slower rate than the fall in the price of gold. Since this list was prepared the Knights Deep has closed down, its end being hastened by the burning of the mill; and the Roodepoort United Main Reef is now on the eve of following suit, its directors endeavouring to ensure its gradual closing down in order to save its employees from sudden unemployment. The E.R.P.M., for a reason other than wages, was on the verge of a strike during the week, the men being apparently oblivious of the fact that once closed that property would probably not re-open. Despite all these patent facts, the farce of taking a ballot in regard to reverting to the July wage basis goes gaily on, and it is said that November 5—appropriately enough—is fixed for the return of the voting papers. Exactly what is at the back of this unprecedented manoeuvre we do not profess to know, but the men should know that public opinion is against their action, and in circles outside mining altogether the opinion is strongly held that the mine directors would be justified in declaring a "lock-out" in the face of such conduct. For our part, we can only reiterate that the whole business is too stupid and aimless to be taken seriously, and we hope those responsible for it will recognise the folly of their attitude.

THE GRAIN ELEVATOR CONTRACT.

There has been much discussion lately on the question of the grain elevator contract which has been placed by the Government with an American firm, and although the official statement hints that there is a possibility of the American contractor installing British machines, past experiences have not shown that American firms are exactly keen on putting in British machines. The American tender is said to be between 30 and 40 per cent. lower than the next lowest tender, but there appears to be a marked reluctance on the part of the Railway Administration to publish the actual figures, and we can see no valid reason for this. We understand that a local firm put in quotations for the 34 country elevators, and one would naturally assume that a practical knowledge of local conditions would give them a distinct advantage when tendering, particularly with regard to the constructional work, as admittedly conditions in South Africa, especially in the country territories where these inland elevators are to be erected, are dissimilar from those met with in Australia or America. In addition to this, our information is that the local firm had secured quotations for the machinery section of the contract showing a reduction of 33½ per cent. on the prices quoted by the only other two English firms quoting, and as we understand that the American firm has not received a quotation from this firm, the natural inference, in view of the information given by the Government that English machinery is being installed, is that the successful tenderer is quoting on the higher priced machinery. Therefore, his price, allowing for the constructional work, must be about 60 per cent. lower than that of a firm of experience in this class of work and thoroughly conversant with local conditions. This does not appear to be feasible, and although the Railway authorities may consider themselves amply safeguarded in all respects, we have recollections of similar instances occurring where the body con-

cerned were badly let in. As a case in point, the Cape Town Pier may be mentioned. We can admit the possibility of a strong American firm equipped with a large and efficient plant and using the most modern concentration methods, being able to beat the average contractor by a considerable margin on a large unit such as the Cape Town or Durban terminal elevator, but not in a case where 34 small units are spread over an area of 90,000 square miles, where an expert knowledge of local conditions is imperative. Apart from these points, we doubt if the economic position has been taken sufficiently into account. Money spent in America shows no benefit to South Africa, whereas a contract placed in South Africa with a South African firm ensures the maximum possible of money being retained locally. Surely a firm with its headquarters in South Africa, paying taxes, and employing local labour throughout, should have some preference over a foreign competitor. Further, all customs dues are withdrawn in this particular instance, and the country suffers accordingly. The whole of the material in connection with the reinforced concrete work can be, and is being, produced locally, but if the price submitted by the successful tenderer shows such a considerable difference, then obviously local producers cannot supply at a price to compete. The same remarks apply to the bulk of the structural steel. On more than one occasion recently Mr. Malan, the Minister of Mines and Industries, has lectured the local industrialist on his shortcomings, and the latter naturally feels aggrieved that the Government spokesmen should confine themselves to giving advice that is in the nature of a "counsel of perfection" and ignore their interests when a contract of substantial proportions comes to be given out. Finally, there is the British manufacturers' attitude on the matter. According to the cables, that attitude has been fully ventilated in the London papers during the week. There certainly seems to be cause for complaint when within a few weeks of the Union Government raising five millions in London, a contract for a round million goes to America. More is likely to be heard of this aspect of the matter. In the meanwhile, we would urge upon the Railway Administration the desirability of publishing the actual figures of the contract, and also any other facts that may be pleaded in extenuation of its action.

Notes & News.

Settlement of E.R.P.M. Dispute.

A dispute which nearly culminated in a strike arose last week at the E.R.P.M., due to an engine driver named Lang refusing to become a member of the labour union. The employees on the mine had intimated to the authorities, through their union, that they refused to work with a non-union man, and that work on the property would cease at 4.40 p.m. on Tuesday. Efforts were made between the Chamber of Mines Executive and the S.A.I. Federation to adjust the matter, but no way out of the difficulty was found. The mine management was officially informed by the strike committee that the strike would take practical effect. At the last moment a new development occurred. Lang conveyed verbally his resignation from the E.R.P.M. to the engineer and promised to put it in writing. His resignation was placed in the hands of the strike committee, and this new phase of the situation discussed. After some deliberation the strike was declared off, and work continued as usual.

Commerce in Conference.

The annual congress of Chambers of Commerce, held at Pretoria during the week, produced notable addresses from the Minister of Mines, Mr. Malan, and from the President, Mr. G. A. Fichardt. Mr. Malan gave some sound advice to the assembled business men and reviewed the whole field of commerce and industry, incidentally entering a plea for this newly-constituted Board of Trade and Industries. Mr. Fichardt also covered a multiplicity of subjects in his address, and emphasised the inter-connection of mining, farming and commerce. He ended on an extremely hopeful, not to say optimistic note. There was a general feeling, he remarked, that the bottom had been touched, and he

went on to indicate measures which he deemed necessary for the advancement of the country. He also noted that good roads and plenty of them are required, that railway rates must be so fixed as not to hamper the growth of the various industries, and that a wise taxation policy should be laid down. He also repeated one or two home truths. "If only," he said, "we had less politics and agitation and more solid work in building up commerce, farming, mining and other industries, the country would be better off, and it behoves all to do their utmost to achieve this end. Let us be ready when the time arrives, so that we may take full advantage of the situation and that South Africa may hold the place it should in the world's trade."

The Flotation of Gold Ores.

The success of a metallurgical process of extraction is defined by profits per unit of material treated. Profits depend chiefly on the following factors: Grade of ore treated, grade of tailing or waste, and working costs. Assuming the grade of ore to be constant, then the profits will be determined by the sum of the two remaining factors. If this sum is reduced, then the metallurgist is improving his process of extraction. In present Rand metallurgical practice we find a very low-grade tailing produced with an accompanying cost of treatment. Flotation processes applied to Rand ore have as yet failed to produce such low residues. For the flotation process to be able to compete against standard cyanide practice, it must make up for loss in tailing by reducing working costs to a correspondingly greater extent. The success of the flotation process on Rand free milling ore thus depends entirely on a reduction of working costs. However, when we pass from our free milling Rand ore to the refractory varieties known as antimonial, cupriferos, arsenical, telluride gold ores, etc., then we approach the field of the flotation process. On ores of this description, straightforward amalgamation and cyaniding have in many cases proved to be unsuccessful, and a solution of the difficulties has been found in the flotation process. An example of this nature is found in the Falcon Mine of Rhodesia, where the gold is associated with copper. A metallurgical process which results in an increase in profits, even if only slight, will receive due attention in an industry treating thousands of tons of ore a day. Such a slight increase amounts to a not inconsiderable sum when applied to the total tonnage. Experiments on Rand ores have been conducted by the representatives of Minerals Separation, Limited, at their Flotation Research Laboratory, and the results will be read with great interest by those following the development of flotation. An account of the results appears elsewhere in this issue.

S.A. Mining Year Book.

The 1921-22 edition of the *S.A. Mining Yearbook* has now been issued. The work is in its ninth year of publication and its many valuable features are too well-known to require detailed review. A gratifying increase in circulation has attended each successive issue of this Year Book, and its merits are yearly becoming more widely known and recognised by shareholders in South African companies, resident in this country and overseas. The present edition marks a big advance on former issues in more than one direction. The editor (Mr. S. R. Potter) has again been able to enlist in the work of compilation the fullest cooperation of the Gold Mining Companies, the big Diamond producers, the Colliery Companies and the Banks. The work, therefore, can truly claim to be fully representative of every branch of mining and financial activity in the country, and to enjoy the support of all those responsible for the great industries with which it deals. No annual work of reference produced in South Africa or overseas, concerned with our industries, enjoys these privileges; and the result is that readers and users of the Year Book are assured of the fullest possible measure of accuracy and authority for its contents. The Year Book, which runs to over 250 pages, is bound in cloth with gold lettering. It is beautifully printed and produced by the Argus Co., and may be obtained from the office of this paper, from the Argus London offices, or from any branch of the Central News Agency.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

The Fracture of Wire in Steel Ropes.—*The Colliery Guardian*, Sep. 23, p. 870.

Die Casting.—*The Engineer*, Sep. 23, p. 309.

The British Association.—*The Engineer*, Sep. 23, p. 311.

The Shipping and Engineering Exhibition.—*The Engineer*, Sep. 23, p. 316.

The Gas Turbine.—*The Engineer*, Sep. 23, p. 321.

Boiler Efficiency and Output as Affected by Drought.—*The Engineer*, Sep. 23, p. 322.

Million Volt Transmission.—*The Electrical Review*, Sep. 23, p. 394.

The Utilisation of Tidal Power with Special Reference to the Severn Estuary.—*The Electrical Review*, Sep. 23, p. 418.

Developments in Power Station Design.—*The Engineer*, Sep. 23, p. 324.

Mining and Metallurgy.

Institution of Mining Engineers.—*The Colliery Guardian*, Sep. 23, p. 864.

Valuation of Placer Deposits.—*Mining and Scientific Press*, Sep. 10, p. 365.

Electricity in Mines.—*The Electrical Review*, Sep. 23, p. 395.

Steel—Hot and Cold.—*The Engineer*, Sep. 23, p. 322.

Coal and Fuel.

Low Temperature Carbonisation.—*The Colliery Guardian*, Sep. 23, p. 875.

Powdered Coal Under Steam Boilers.—*Coal Trade Journal*, Sep. 14, p. 1028.

Oil in North-West Canada.—*Production and Export*, Oct., p. 358.

Economics.

Cost of Living.—*The Colliery Guardian*, Sep. 23, p. 867.

The World's Currency Problem.—*The Statist*, Sep. 24, p. 466.

Unemployment Insurance.—*The Colliery Guardian*, Sep. 23, p. 873.

Metal Market Report.

On the Metal Market during the week some disappointment was felt at the fact that the bank rate was not reduced. However, the new loans were remarkably well subscribed, and this money must shortly find its way into industrial channels. Foreign exchanges exerted an unsettling influence.

The copper position is largely dominated by America. In view of the better outlook there it is unlikely that there will be a further serious set-back in the price.

Any attempt to lower the price of tin was restricted. Trade prospects are better, and it is confidently asserted that the price is low enough.

Lead improved on a general demand, the scarcity of the metal for prompt delivery and the indifference of producers.

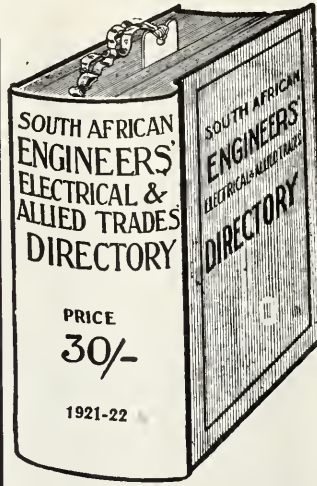
A further advance is anticipated. The spelted market was firm. The demand after slackening improved. Producers abstained from offering here.

The tinplates output is now 60 per cent. of normal. A larger shipment is being made in the East, while home buying is assuming importance.

Silver advanced at 42½d., the chief factor being a demand by China.

Technical Education for Trades.

Last Wednesday night's meeting of the S.A. Institution of Engineers was the occasion for some interesting discussion of Mr. W. J. Horne's paper entitled "Technical Education for Trades." Mr. V. Powers, of the Draughtsmen's Association, discussion was the more notable, and he pointed out the requirements of such an education from the draughtsman's point of view. He went on to discuss the need for the technical training of engineering students, which he thought could also be met by a development of the trades school system. While the sure grounding in technical studies afforded by a "shop" apprenticeship was still essential for the engineering student, it became increasingly difficult to secure this in the ordinary trade workshop, for on the one hand the specialisation of the works or factory no longer admitted of that all-round training which was desirable. Mr. Powers also commented on the lack of interest displayed by craftsmen in their work. Work was no longer done for the satisfaction that accompanied a conscientious expenditure of the best energies of both hand and brain. He thought that the courses described by Mr. Horne had a particular significance as possibly tending to restore this real living joy in work once felt by the craftsmen.



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The Week in the Sharemarket.

FALLING GOLD PREMIUM AND LABOUR TROUBLES DEPRESS MARKET—A SLIGHT RECOVERY.

The week opened with the whole market under a cloud owing to the falling gold premium and several distinct labour troubles. Gold dropped sharply to as low as 104s., but seems to have recovered about a shilling since, according to the latest cables. What is going to happen to the premium in the immediate future no one can say, but it is believed that as the prospects of the Disarmament Conference at Washington improve, the effect on the price of gold will be to depress it further. In regard to labour, at the beginning of the week three separate and distinct causes all added their quota to the general unsettlement: the claim of the stationary drivers and firemen to have their wages stabilised until the end of the year, the demand of the Joint Executives that the mining industry should revert to the conditions of July, and that the recent settlement should therefore be swept aside, and, lastly, the more imminent threat of a strike on the East Rand Proprietary Mines because a workman with a conscientious scruple had resigned his membership of a trade union. Fortunately for everybody, the last trouble was settled at the eleventh hour, and there now only remain the two former bones of contention. It is inconceivable that, in the present circumstances, either could lead to a rupture, but the market is in pessimistic mood these days, and all gold shares were marked down in view of the possibility of trouble. The fall in gold premium has rudely shattered the hopes that the price of gold might be stabilised, but it is noteworthy that the overseas press is paying increasing attention to the subject, and the public is being educated up to the need for some such step. Fortunately, as the week wore on, the outlook improved a little. Gold improved a trifle and rather better advices from London caused a slight recovery. This was reflected in the prices on High Change on Thursday morning. Springs were 9d. higher at 38s. 3d. sales, Randfonteins 7½d. at 14s. 6d. sales, Modder Deeps 3d. at 42s. 3d. sales, Modder B 3d. at 25s. 9d. sales, and Anglo-Americans 6d. at 19s. 6d. bid, while Gedulds, State Mines, New Modders, and Van Ryn Deeps all had higher buying bids without business. Bantjes were higher at 6s. sales, Modder Easts had a higher buying quotation, as also had West Springs, etc. Frank Smith Diamonds were steady, Consolidated Diamonds and others, inactive. Nothing was done in tin or industrials, but Witbank Coals were again bought at 37s. The week's quotations are reflected below:—

	Fri. 11th.	Sat. 15th.	Mon. 17th.	Tues. 18th.	Wed. 19th.	Thur. 20th.
Anglo-Amer. Corp.	19 9	20 0	19 9	19 0	19 1*	19 6a
Apex Mines	7 3*	7 0*	7 6*	—	6 9*	7 6†
Bantjes Cons.	5 6*	5 6*	5 6*	5 9*	5 6*	6 0
Brakpan Mines	53 0†	—	—	—	—	—
Bushveld Tins	0 6*	—	0 6*	—	0 5*	0 6*
Cinderella Cons.	—	2 3*	2 3*	2 3*	2 3*	2 3*
City and Suburbans.	—	2 3*	—	2 3*	2 3*	2 3*
City Deeps	47 6*	—	50 0†	15 6*	—	46 0*
Clydesdale Colls.	25 0*	25 0*	—	—	—	26 0†
Con. Diamonds	11 3*	15 0	15 3	14 6	14 3	14 3†
Con. Investments	—	—	—	22 6*	—	—
Con. Langlaagtes	12 6*	—	12 6*	13 0	12 6	13 0†
Con. Main Reefs	10 4½	10 3*	10 0*	10 0*	10 0*	10 0*
Coronation Colls.	—	—	—	—	39 6†	37 6*
Do. Freeholds	—	0 11*	—	0 6*	—	0 9*
Do. Syndicates	6 3*	6 0*	6 0*	5 9	5 6*	5 7*
Crown Diamonds	3 6*	3 9*	3 7*	3 9	3 8	3 6*
Daggafont. Mines	2 6*	2 6	2 6*	2 8*	2 9*	2 9†
Durban Road Deeps	—	—	0 6*	—	—	—
East Rand Coals	2 1†	2 1†	—	2 1†	—	1 9*
East Rand Deeps	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
East Rand Props.	5 3	5 0*	—	5 0*	4 9*	5 0*
East Rand Debs.	£85½*	—	—	£88†	£86*	£85*
Eastern Golds	—	0 9†	—	0 9†	0 9†	0 9†
Frank Smith Dias.	3 6*	3 3	3 7*	3 9	3 7*	3 8
Geduld Props.	44 9*	44 6*	44 9	43 9*	43 6	44 0*
Glym's Lydenburgs	—	9 0	9 0†	9 6†	7 6*	7 6*
Government Areas	80 6	80 3	80 3	80 0*	80 0*	80 3*

	Fri. 11th.	Sat. 15th.	Mon. 17th.	Tues. 18th.	Wed. 19th.	Thur. 20th.
Knight Centrals	4 3*	—	4 2	4 3*	4 2	4 5*
Lace Props.	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
Leeuwpoot Tins	7 0	7 0	6 9*	6 6*	6 6*	5 6*
Lydenburg Farms	5 0	5 3†	—	—	4 9*	4 9*
Middelevlei Est.	—	1 3*	—	—	—	1 0*
Modder B's	26 3	26 0*	26 6a	25 3*	25 6	25 9
Modder Deep	42 6	42 9*	42 3	42 0	42 0	42 3
Modder Easts	9 6*	9 7½	9 6	9 0	9 1	9 3*
Hume Pipes	18 0†	15 0*	15 0*	15 0*	—	15 3*
Natal Nav. Colls.	—	—	—	29 0†	—	—
National Banks	—	—	£11a	—	—	—
New Eland Dias.	—	26 0*	25 0*	27 6†	—	—
New Era Cons.	7 3*	7 6	7 6	7 3*	7 3	7 9*
New Geduld Deeps	—	1 4*	1 4*	1 4*	1 1*	1 4*
New Kleinfonteins	5 10*	—	—	—	—	5 7*
New Modderfontu.	71 9*	72 3	71 9*	71 6	71 0	71 6†
Nourse Mines	9 6*	9 0	8 6*	8 0*	8 3*	8 3*
Pretoria Cements	13 6a	13 6*	13 6*	14 0a	14 6*	14 0*
Princess Estates	1 0*	0 11*	0 11*	—	—	—
Rand Nucleus	1 1*	—	1 0*	1 1*	1 1*	1 1
Randfontu. Centrals.	—	10 0	—	8 6*	10 0†	—
Randfontu. Est.	15 0	14 9*	14 9*	14 0	13 10½	14 6
Roberts Victors	—	9 0†	8 6†	8 0	7 6*	7 0*
Rooibergs	2 9*	2 6*	3 0*	2 0*	2 6	2 3*
S.A. Breweries	—	—	—	—	28 0†	—
S.A. Lands	4 0*	4 0*	4 0*	4 0*	1 0*	4 0*
Springs Mines	38 6	38 3*	38 6	37 6*	37 6*	38 3
Sub Nigels	10 6*	10 9*	10 9*	10 6*	10 6	10 9†
Swaziland Tins	9 0†	—	9 0†	—	9 0†	—
Transvaal Lands	—	—	—	16 6†	—	—
Trans G.M. Est.	8 0*	—	8 0*	8 0*	8 0	8 0*
Van Ryn Deeps	71 3*	71 0*	71 0	70 3*	69 3	69 9*
Village Deeps	9 0†	—	—	—	8 3*	—
West Rand Ests.	3 6†	3 6†	3 6†	3 0*	2 9*	3 0*
Witbank Colls.	38 0*	—	38 0†	38 0†	37 0	37 0
Witwatersrand Deep	9 3†	9 3†	8 6*	8 9*	8 6*	8 9
Woluhuts	4 1	—	4 6†	4 0*	4 1*	4 1*
Zaaiplaats Tins	3 0*	3 0*	3 0*	2 6*	2 6*	2 6*
Union 5 per cent.	£101½	£101½	£101½	£101½*	£101½*	£101*
New State Areas	23 9	23 3*	23 3*	23 0	23 0*	23 0*
S. Van Ryn	1 6*	1 6*	1 6*	1 6*	1 6*	1 7*
S.A. Townships	10 6†	9 6*	—	9 9*	9 9*	9 9*
S.A. Alkali	15 0†	15 0*	15 0	15 0*	15 0*	15 0*
Transvaal Silver	16 6	16 0*	16 3	15 6	15 0*	15 4
West Springs	10 6*	10 6*	10 3*	9 9*	10 0*	10 3

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

Mr. Archie Simpson, of the English Electric Co., Ltd., is on a visit to the Rand.

Mr. A. C. Holtby, of the Consolidated Goldfields engineering staff, returned from England this week.

Mr. H. S. Harger, the well-known diamond mining expert, has returned to the Rand after a professional visit to Brazil.

Mr. R. T. Mathison, Chairman of the Union Petroleum Company, Ltd., has resigned from the Board of the company.

Mr. A. F. Mullins, of the Corner House, and Mr. G. H. Beatty, of Randfontein, have returned to the Rand after a six months' visit to England.

Mr. W. Wolstenholme, of Hume Pipes, Ltd., sailed from Capetown for England this week by the intermediate steamer "Gloucester Castle" on a six months' visit.

Dr. Rodgers, Director of the Geological Survey, left Pretoria for the Free State on Monday. Mr. A. L. Hall, the Assistant Director, leaves this week for Brandfort, where an oil indication is reported.



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WE have proved this machine to be the fastest drilling, and the lowest on cost of maintenance, of any machine of a similar size, type and price on the Reef. Let us give you a demonstration so that it may show you what we know it can do.

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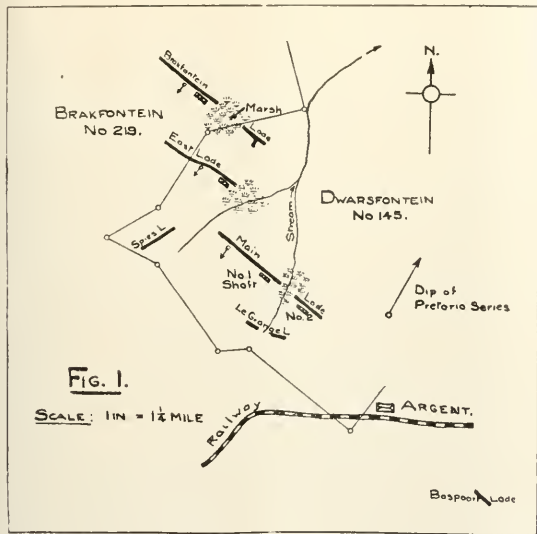
P.O. Box 4256.

Telegrams: "Thumbscrew."

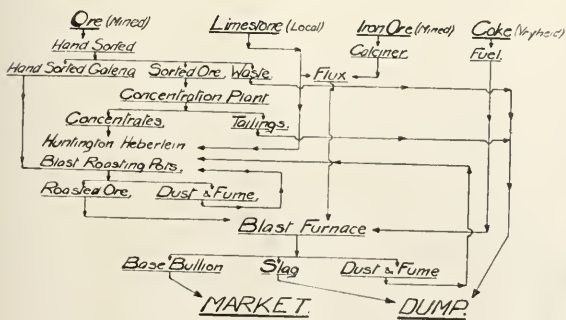
Telephone 2794

Transvaal Silver and Base Metals Ltd.

Official reports have been cabled to London concerning the commencement of operations on the roasting and first units of the smelting plants of the Transvaal Silvers. The diagrams reproduced hereunder represent: A general plan of the property showing the several lodes, and their relation to the railway at Argent; and a flow sheet of the metallurgical process adopted on the property.



FLOW SHEET No. 1.



The concentration plant has not been completely installed, and operations are being conducted on hand-sorted ore. This passes to the roasting plant, where the excess of sulphur is removed prior to its proceeding to the blast furnace. Addition of the fluxes is also made at this stage, and the ore is smelted in a water-jacketed blast furnace using coke of South African manufacture as fuel. The products of the furnace are: base lead, base bullion, dust and fume, which are retreated, and slag which is dumped.

METALS, MINERALS, DIAMOND PIPES AND FISSURES.

I have invented an instrument to divine any reef lodes of metals, coal, oil or water. I can guarantee to locate any of the above mentioned with my instrument.

For particulars apply to: "INVENTOR," Box 837, PRETORIA.

NEW PATENTS.

- 862a. George Walter Sharp, P.O. Box 3346, Johannesburg.—Improvements appertaining to the runners of guiding means for skips, cages and other vehicles employed in vertical shafts.
- 862b. Reginald de Robillard, Tongaat Sugar Co., Tongaat, Natal.—Improvements relating to electrolysis.
- 863. William Arthur Caldecott, P.O. Box 668, Johannesburg.—Improvements in tube mills and the like.
- 883. Adam McCracken, Royal Colonial Institute, Northumberland Avenue, London, England.—Improvements in connection with rock drills.
- 890. George Gadda, P.O. Box 41, Potgietersrust, Transvaal.—Reinforced concrete slabs for irrigation furrows.
- 898. Ernest Fraser Jones, Oceana Buildings, Simmonds Street, Johannesburg.—Improvements in fluid control for rock drills.
- 902. 1, David Charles Bowen; 2, John Fairfax Walker, both of P.O. Box 3146, Johannesburg.—Improvements in apparatus for washing ore preparatory to sorting.
- 907. John Herbert Veasey, c/o P.O. Box 7312, Johannesburg.—Improvements in the construction of rock drilling machines.
- 908. Durelec Ltd., Thanet House, Strand, London, W.C.2, England.—Improvements in or relating to reduction of oxides of tungsten and molybdenum.
- 909. James Stephenson, 13 Cranbrook Avenue, Beeston Hill, Leeds, County of York, England.—An improved method of manufacturing railway and like vehicle axles.
- 911. Edwin William Balderson, c/o P.O. Box 3146, Johannesburg.—Improvements in water supplying attachment for hammer drills and the like.
- 917. Samuel Hardman Berryl, V.M.C.A., Market Street, Pretoria.—Water power wheel.
- 919. 1, Joseph Edward Francis Winter; 2, Herman Max Biegel, both of 34a Milligan Street, Perth, Western Australia.—Improved vapouriser for motor engine.
- 920. 1, Andries Johannes van Tonder; 2, Felix Johan Tromp, both of Transvaal University College, Pretoria.—Fuel for internal combustion engines.
- 921. Morris Ellis, Stellenbosch, Cape Province.—Improvements in devices for removing dust and purifying air before inhalation during mining operations, and the like.
- 924. Gerold Francis Dampney, Lynista, Turramurra, near Sydney, New South Wales.—Improvements in concrete slab building constructions.
- 925. 1, Matthew Richard May, William Street, Gawler South; 2, John Albert Blackall Wesley, 37, Alexander Avenue, Rose Park; 3, Henry George Mole, Margaret Street, Walkervilla, All of South Australia.—An improved spring washer nut lock.
- 926. Thomas Greig Ironside, c/o P.O. Box 3146, Johannesburg.—Improvements in the process of distilling oil shales, coal and other carbonaceous materials and in apparatus therefor.
- 927. Harold Wade, 112, Hatton Garden, London, E.C. 1, England.—Improvements in or relating to the treatment of oxidised ores.
- 929. John Wilfred Wickes, Tongaat Sugar Co., Ltd., Tongaat, Natal.—A cane loading or off loading grab.
- 931. Mannes Mannrohren Werke, L-6, Bergenufer, Durseldorf, Germany.—Improvements in tubular masts or poles.
- 932. Robin Seymour Urry, 2073 Brakpan, Transvaal.—Improvements in hand tools.
- 933. William Thomas Hust, 107, Smedley Road, Cheetham, Manchester, County of Lancaster, England.—Improvements in steam separators.
- 939. Otto Tobler, c/o P.O. Box 668, Johannesburg.—Improved process for welding metal.
- 941. John McKay Dixon, c/o P.O. Box 668, Johannesburg.—Improvements in or relating to stamp mills and the like.
- 942. John Herbert Veasey, P.O. Box 7312, Johannesburg.—Improvements in wet rock drilling machines.
- 943. Ernest Fraser Jones, Oceana Buildings, Simmonds Street, Johannesburg.—Improvements in fluid control for rock drills.
- 944. 1, Albert Thomas Harris; 2, Charles Alexander Grant, both c/o P.O. Box 3146, Johannesburg.—Improvements in hose pipe connections and the like.
- 947. 1, Francis John Archibald Courtis; 2, Jules Denis Henri Constantin; 3, Joseph Miller; 4, Albert Rieckhoff, all of P.O. Box 3146, Johannesburg.—An improved device or appliance for use with pans or other similar cooking utensils.
- 949. 1, Walter Penker, 45, Sixth Street; 2, William Henry Hamer, 45, Sixth Street; 3, James Robert Alexander Mills, 51a, Sixth Street, All of Boksburg North.—Haulage dip.
- 960. 1, Neville Charles Thomson Harper, 571, Essenwood Road, Durban; 2, Frederick Lamplough, 25, Victoria Street, Westminster, London, England.—Improvements in or relating to centrifugal filters.
- 955. Thomas Daynes, 31, Categate Street, Norwich, England.—Improvements in or relating to boots or shoes.

Gospel of Safety.

Mr. S. Beaton, manager of the mine, presided at the lecture on "Safety First" delivered by Mr. A. M. Anderson, Ambulance Organiser to the Prevention of Accidents Committee of the Rand Mutual Assurance Co., Ltd., on Tuesday, the 18th inst., in the Recreation Hall at the Nourse Mines. There was a large and appreciative audience which, in view of the inclemency of the weather, was distinctly gratifying. The interest and enthusiasm displayed in "Safety First" on this mine is a fine example as to what can be achieved by the co-operation of all concerned. The lecturer congratulated those present on the fatal accident rate of the mine for the year 1920, which was 1.67 per thousand, and compared favourably with the rate of the Witwatersrand gold mines, which, for the corresponding period, was 2.45 per thousand. This figure, although gratifying, still left room for further improvement, and the lecturer urged his audience to continue to co-operate with the Prevention of Accidents Committee and the management of the mine by conveying the message of "Safety First" to their fellow-workers, in addition to acting upon it themselves. The lecturer then briefly outlined the various causes of accidents, and illustrating each with a series of interesting lantern slides, and referred to striking cases of negligence which had come to his notice, and which had unfortunately cost their victims loss of life or limbs. He also instanced cases where prompt and efficient first-aid had been the means of saving limbs which otherwise would most probably have been lost. He made a special appeal to shift bosses and shop foremen to assist in the movement, as their co-operation was particularly essential. Ladies, he stated, could also help in this campaign, and Mr. Anderson urged those present to take up first-aid and home nursing, as a knowledge of both would be found most useful in the prevention of injuries and illness. Mr. Beaton thanked Mr. Anderson for his interesting lecture, and expressed the hope that what had been said would bear fruit in the further reduction of the mine's accident rate. The lecture was preceded by the "Dust that Kills" cinema film illustrating the various causes of miners' phthisis and the measures employed to counteract them and to ameliorate the condition of sufferers from the disease. This film was recently produced by the African Films, Ltd., at the instance of the Transvaal Chamber of Mines. It is admittedly one of the best mining films ever taken underground and should be of particular benefit to underground workers.

Asbestos.

A rich discovery of fine white silky asbestos associated with pure zeolite has been made on the farm Edendale, a couple of miles from Rayton Station, district Pretoria, by Messrs. J. H. Spohr, E. H. Solomon, and another, of Johannesburg.

ASBESTOS

HOBDELL WAY & CO., LTD.

MINORIES, LONDON.

Cables: "HOBNAILS."

the stabilisation of the wages of certificated winding engine drivers had been agreed to in February last, the Chamber decided to give those drivers the benefit of that doubt. The representatives of the Chamber who attended the February conference are, however, quite clear that, if any exception was then made in favour of engine drivers, that exception could have applied only to certificated winding engine drivers; and the Chamber cannot agree that there are any sufficient reasons for extending the exception to the other members of the Association and thereby favouring those employees above all the other classes who are now sustaining reductions in pay." The Association communicated to the Press the following resolution, passed at its mass meeting on Sunday: "That the S.A. Industrial Federation be requested to notify the Chamber of Mines that their decision re the stabilisation of wages for stationary drivers and firemen is not acceptable to the members of this Association, and that unless the terms of the agreement verbally made in February last to organised labour under the auspices of the S.A.I.F. are complied with, means will be adopted by the Association to enforce compliance." This resolution will be dealt with by the Executive of the Association as soon as possible. Members are specially asked to observe that nothing has been agreed to between the Chamber of Mines and the Association in connection with the payments made to certificated winding drivers, notwithstanding anything that has appeared in the Press."

SEPTEMBER COMPANY REGISTRATIONS.

The list of companies registered in September is as follows:—

- 6861. Wholesale Distributors, Limited, Winchester House, 87, Main Street, Johannesburg; £5,000.
 - 6862. The Berkeley Rooms, Limited, 148, Jeppe Street, Johannesburg; £2,000.
 - 6863. Universal Stores, Limited, Shop No. 4, Hatfield House, corner Eloff and President Street, Johannesburg; £6,000.
 - 6864. Commercial Industries, Limited, 2-6, Estate Buildings, Fox Street, Johannesburg; £50.
 - 6866. Germiston Dairies, Limited, Provident Buildings, President Street, Johannesburg; £1,000.
 - 6867. Golden Tobacco, Limited, 48a Commissioner Street, Johannesburg; £750.
 - 6868. The Mayfair Land and Investment Company, Limited, 8, Meischke's Buildings, corner Harrison and Market Streets, Johannesburg; £100.
 - 6869. Crouse and Levy, Limited, 61, De Korte Street, Braamfontein, Johannesburg; £6,000.
 - 6870. X.Y.Z., Limited, 213, Permanent Buildings, Harrison Street, Johannesburg; £50.
 - 6873. Matthews & Son and Elswick Garage, Limited, 64, Sivewright Avenue, Doornfontein, Johannesburg; £2,500.
 - 6874. The Silowe Finance Company, Limited, 97a, Commissioner Street, Johannesburg; £25,000.
 - 6875. I. J. Yodaiken & Company, Limited, 29, Sacke's Buildings, 109, Commissioner Street, Johannesburg; £500.
 - 6876. Windram & Fain, Limited, 3-4, Norwich Union Buildings, Fox Street, Johannesburg; £710.
 - 6877. The Globe Furnishing Company, Limited, 85, Delarey Street, Vrededorp, Johannesburg; £6,000.
 - 6878. H. L. Hall & Sons, Limited, Tomango, near Nelspruit, District Barberton; £21,000.
 - 6879. G. H. Winters, Limited, 4, Commercial Exchange Buildings, Main Street, Johannesburg; £3,000.
 - 6880. George Cacaburas, Limited, 35, Bureau Street, Pretoria; £1,500.
 - 6881. Dungor Warehouse, Limited, 65, Delarey Street, Vrededorp, Johannesburg; £5,000.
 - 6882. London House, Limited, 65, Delarey Street, Vrededorp, Johannesburg; £2,000.
 - 6883. The Newlands Brick and Tile Company, Limited, 14, Henwood's Arcade, President Street, Johannesburg; £1,250.
 - 6884. Gilcliff Investment Company, Limited, 57-58, National Mutual Buildings, Rissik Street, Johannesburg; £60,100.
- FOREIGN COMPANIES.
- 6865. Underwriters, Limited, c/o William Thomas Lee, 1-4, B. & T. Buildings, Commissioner Street, Johannesburg.
 - 6871. Ackerman's, Limited, c/o Barnard Joseph Lyons, corner Marshall and Maddison Streets, Jeppe, Johannesburg.
 - 6872. Leenwult Diamond Syndicate, Limited, c/o T. E. Duckles, 119/20, Stock Exchange, Johannesburg.

Letters to the Editor.

THE REAL VALUE OF GOLD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Mr. Lewis Watkins assumes that if the price of "fine" gold were fixed at six guineas per ounce, the Mints would still continue to put more than twenty shillings worth of gold into a sovereign. I think it improbable. That, sir, is my reply to Mr. Lewis Watkins' letter. Now, sir, with your kind permission I would add a few remarks to my letter published in your issue of the 8th instant. We were told by the authorities on finance and political economy that deflation was an infallible remedy for all our commercial ills. Well, sir, the British Treasury has tried it, and look at the position of commerce to-day! We are now told that an infallible remedy lies in the reduction of wages, salaries and the cost of living. Since the days of King Canute, if not before, there have been attempts to put back "the clock of time." This is one of them. Formerly, "the world was governed by monarchs and statesmen," to-day the world is governed by the voters. In the days gone by the saying, "Vox Populi Vox Dei," was very much qualified; to-day it is literally true. The reduction of wages, salaries, and the standard of living is impracticable; then for gracious sake let us try something that is practicable, and make a real attempt to restore normal conditions. The fact that the British currency is ranked among the depreciated currencies is galling to our national pride. The discount on the British paper pound is not a passing phase. Only the revival of industry and commerce can remove the ills from which we are at present suffering. To continue to speak of the increased price of gold as a "premium on gold," and to attempt to reduce wages, salaries, and the standard of living, is travelling on the wrong road. No one at present living will ever see the price of gold back to 84s. 7½d. Does anyone think of asking a manufacturer of lead piping to sell him a ton of his product at £20 per ton when he knows it costs about £30 per ton to produce? Then why expect the gold miner to sell his product below the cost of production? This talk of deflation, reduction of wages and salaries and the cost of living, etc., etc., would be amusing if the consequences of the persistence in such a policy would not be so tragic. The price of gold will remain at a so-called premium. The said premium may vary a few shillings from week to week or month to month, but it has come to stay. Then why not "stabilise" things by definitely fixing an increased "standard" price? I have the honour to be, sir,

Your obedient servant,

G. H. BLENKINSOP.

[This suggestion has all along been supported in our editorial columns.—Editor.]

TRANSVAAL SILVERS.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—We shall be obliged if you will insert in the next issue of your paper a notification to the effect that the following cablegram has been despatched to the London office to-day on behalf of the Transvaal Silver and Base Metals, Ltd.:—"Desulphurising plant working satisfactorily; first unit smelting plant started 13th October."—Yours faithfully,

GENERAL MINING & FINANCE CORPORATION, LTD.,
C. E. FARQUHARSON, Sub-Manager.

WOOD PRESERVERS' SERVICE BUREAU.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir, The Service Bureau of the American Wood Preservers' Association has just been established with headquarters at 1146 Otis Building, Chicago. We are pleased to enclose our announcement, which contains a brief statement of our activities and a list of members. It is our aim

to make the Service Bureau a direct benefit to all users of wood, lumbermen, engineers, architects, farmers, the wood preservation industry, and to everyone interested in the conservation of our forest resources. The cooperation of the *South African Mining and Engineering Journal* is earnestly solicited, and we will appreciate any assistance you can give in bringing our organisation to the attention of the readers of your magazine. If, in return, we can render you any service we shall consider it a pleasure to do so.—Very truly yours,

SERVICE BUREAU,

P. R. HICKS, Secretary-Manager

The objects of the new organisation are explained in the following:—The Service Bureau has been established to promote the use of wood properly treated to resist decay, marine borers, and insect attack, thereby aiding in the conservation of the forest resources of the nation by making one stick of timber do the work of several. Headquarters are maintained which act as a repository for reliable information on the practice of and the results obtained from the art of wood preservation. The value of wood for construction purposes is fairly well understood, but for permanent structures treatment with a standard preservative, such as creosote or zinc chloride, is absolutely necessary. The policy of the Service Bureau is to give the public reliable information on the treatment of timber according to the standards of the American Wood Preservers' Association and the use of treated wood. Publicity will be given to facts relative to treated wood from the standpoint of economy and conservation through the public press, trade and farm papers, and technical journals.

THE REAL VALUE OF GOLD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Referring to Mr. Blenkinsop's delightfully breezy letter in your issue of the 8th inst. on "The Real Value of Gold" (it was so breezy in places that it came perilously near blowing), it is conceivable that voters of like mentality to Mr. Blenkinsop might fix the price of gold at £10 the ounce and prohibit the use of notes, but I doubt whether the country which compelled its mint to give 10 sovereigns containing nearly 2½ ounces of gold for each ounce of bullion, would find in this a very satisfactory solution of the currency problem. 'Tis said that "a little knowledge is a dangerous thing," but absolute ignorance, though it may not be very edifying, would appear to be both innocuous and amusing.—Yours faithfully,

ARTHUR N. LAWS.

Gatooma, 16th October.

PROSPECTING AND THE MESSINA MINE.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—As an old Johannesburger, allow me to thank you for your various articles and letters from correspondents, of late, appearing in your esteemed journal, dealing specially with the decline of genuine prospecting throughout the Transvaal, and also the departure of so many of our pioneer prospectors. These, as pointed out, are not being replaced by the coming generation, and it certainly seems to me, Mr. Editor, that our big mining houses are now entirely resting on their oars in the shape of being quite satisfied with their present production of gold, ignoring to a large extent the importance of new districts, which can only be opened up through the assistance of the genuine prospector. Unfortunately from our Government we cannot expect much help in this direction, their sympathies leaning more towards agriculture, forgetting seemingly that successful mining is the forerunner of agricultural success in South Africa, as well as many other countries. Now, sir, I have just returned from the Northern Transvaal, Messina, having spent over a month wandering around between the Sand and Limpopo Rivers and was much interested in one of your correspondent's letters of last week, from Mr. J. Huitt, speaking of

the possibilities of that district, etc., waiting for development up there. What struck me very forcibly, Mr. Editor, was this: a fine railway built to the Messina copper mine, a rich proposition reputed to have over 3 million tons of copper ore developed, going average 8 per cent. copper, with Vogelsang and Artonville adjoining, which have opened out fine copper lodes, a reasonable Government who has given the Messina Company relief in the way of rebate, on the loss incurred in running the railway. Now, sir, I found the mines practically closed down, soup being dealt out to children in the district, and the few remaining miners keeping themselves going by shooting an occasional buck. I found several small mining syndicates holding ground on the Messina copper belt, who have put in a lot of useful work, with certainly good results, but all complained (rightly, too, I think), whilst the Messina Mines remain closed, our propositions are being killed after (they say with some truth) we have given the copper company an enormous rebate from loss on railway running. Now, sir, my contention is, seeing the Government has helped the company, we, the public, should surely have the right to say either work or allow us (the Government) to work the mine, in these hard times of unemployment, and thus push along a district which I can assure you, Mr. Editor, only wants confidence and capital to open up and give us markets for our labour, commerce and enterprise. Mayhap this will take the eye of some of your correspondents, who, I hope, will take this subject up to our mutual advantage. Thanking you for your courtesy, Mr. Editor, allow me to remain, yours truly,

" LIMPOPO. "

THE GRAIN ELEVATOR CONTRACT.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—An announcement appeared in the *Rand Daily Mail* of the 15th October to the effect that the contract for the S.A. Grain Elevators had been let to a Mr. Menkins, a gentleman of considerable experience and Canadian interests.

Inquiries disclose that Mr. W. A. Menkins is a contractor of purely American interests, whose head office is 321, Broadway, New York. He appears to be backed by another American firm, namely, the American Trading Co., also of Broadway, New York.

In view of the large sum of public money involved, over one and a half million sterling, it would seem that the public, a very large section of which is interested, are entitled to know the following:—

- (1) The amount of Mr. Menkin's tender.
- (2) By what amount was Mr. Menkin's tender lower than the lowest British or South African tender.
- (3) What guarantees the Government have that British machinery will be used and local industries supported.
- (4) Is the money for the scheme to come out of the loan recently raised in London (all good English money) by General Smuts.

Inquiries among local engineering firms elicit the fact that there is an element of mystery surrounding the whole affair. Why should this be?—Yours, etc.,

" ENGINEER. "

[The matter is dealt with in our leading columns.—Ed.]

Transvaal and Rhodesian Estates.

The profit of Transvaal and Rhodesian Estates for 1920 was £22,403. Total outstanding to credit of profit and loss is £86,520, which it is proposed to carry forward. Further reductions have been made in administrative expenses both in London and Rhodesia. Tons milled at Fred Mine totalled 18,950. Yield per ton, 14.75 dwt. Cost per ton, including development redemption, 52s. Cost per ounce produced, 64.55s. Total working profit (before providing for depreciation), £29,324. Ore reserves, 48,350 tons; assay value,

16.2 dwt. Total ounces in reserves, 39,163. Recoverable gold in reserves (90 per cent. extraction and gold at 85s.), £149,795. All figures indicating values are calculated at standard price of gold. The board is advised that there is every likelihood that ore reserve position will be maintained in ensuing year as at end of 1919. The company's interest in chrome and asbestos is represented by shares and debentures in Rhodesia Base Metals. Progress on Nigerian interests has been interrupted and slow. Total of 40 tons of tin were won from Zari properties, but in view of price of tin it was decided temporarily to close down operations. On silver lead properties, in which the company owns 30 per cent. interest, work has proceeded during the year. Large bodies of heavily mineralised ore have been disclosed and partly opened up. Since close of year the company acquired an interest in the farm Maraisdrift, situate in the Heidelberg district. Part of purchase consideration has been satisfied by allotment of 100,000 shares of 3s. each.

* * *

The Power Controversy.

The power question has been the subject of much discussion at recent election meetings. Various candidates have put forward schemes of action and suggestions, but on the whole there appears to be a lack of knowledge concerning the true facts of the case. The position is as follows: The municipal power station is unable to meet the demand for power placed upon it, and the question has arisen of the advisability or otherwise of obtaining extra power from the Victoria Falls Power Company. On what terms such extra power could be purchased from the V.F.P. is unknown to the public, as the Council has refused to make any inquiries into the matter, but a recent letter, by Mr. Bernard Price, of the V.F.P., appearing in the press stated that power could be obtained from that source at less expenditure of time and money than was possible by any other alternative. The cost of connecting up with the V.F.P. has been given by Mr. W. M. Taylor as £5,000, citing Mr. Sankey as his authority. In opposition, Mr. J. A. Clark, however, states that if extra power were available, its distribution would not be possible with the present state of overload under which the present distributing system is labouring. This is so, but by making suitable arrangements with the Power Company it is possible to relieve the overloaded feeders at the necessary points. It is a technical difficulty which is not beyond the scope of electrical engineers to settle. Fortunately, those portions of the town which consume the greater portion of the power lie in the vicinity of the V.F.P. distribution system, a fact which further facilitates the obtaining of extra power from that source. It has been stated that if consumers were dependent on private companies for their power, they would be totally at the mercy of such companies. This is not the case, as such companies will be bound by contract with the Municipality to supply power according to definite decrees. Further, the interests of the public are safeguarded by the terms of the licence granted that company under an Act of Parliament. The fact that the price at which the Power Company has been providing power has not changed for the last ten years of change in all other commodities clearly shows that the interests of the public will in no way be endangered by fluctuations in price.

Gold Premium in Rhodesia.

The Acting Secretary for Mines and Works, Salisbury, has received, the Rhodesia Chamber of Mines notifies, the following cablegram dated the 12th inst. from the B.S.A. Company's London office:—" Rothschild and Sons to-day distributed £1 7s. 3½d. per fine ounce profit on gold realised quarter ended 30th September." For the period from July 25 to December 31, 1919, the profit was 17s. per fine ounce. The gold premium paid for the quarters succeeding December 31, 1919, are as follows:—January 1 to March 31, 1920, £1 9s. 8½; April 1 to June 30, 1920, £1 0s. 9d.; July 1 to September 30, £1 7s. 1d.; October 1 to December 31, £1 13s. 5½d. (the highest figure); January 1 to March 31, 1921, £1 2s. 5d.; April 1 to June 30, £1 0s. 11d.; July 1 to September 30, £1 7s. 3½d.

ENGINEERING SECTION.

The Howick Falls Hydro-Electric Power Plant.—II

By H. W. Miller.*

From this anchored band the horizontal branch pipe passes alongside of and parallel to the power house, there being two branches, each 10 inches diameter, for the two units installed, and the end of the pipe is blanked, but a third connection is provided for a further unit. A 4-inch diameter blow down outlet is provided at the bottom of the branch pipe for emptying the main if necessary at any time. Two other main anchorages are provided for the other two pipe sections, each adjacent to the expansion pieces, and the pipe is carried at regular intervals by massive concrete saddle supports, well anchored by steps into the steep hill side, to prevent any creep of the pipe line down the hill. It was decided to maintain this pipe in a straight line, although it would doubtless have reduced the amount of work entailed if it had been permitted to follow the sinuous course of the ground. A considerable amount of excavation was therefore necessary, as for a comparatively short distance only is the pipe line above the ground. In order to reduce this excavation as much as possible, it was decided to rivet the pipes by means of pneumatic riveters, and this course was adopted, although, provided that good access can be obtained to the pipes below them, hand riveting is the least troublesome method for work of this class and the least expensive. I must pay a tribute, however, to the excellent work performed by the pneumatic riveting tools, that turned out a very fine job.

The upper section of the pipe line, which was 34 inches diameter, was made of $\frac{3}{4}$ inch thick mild steel plates in sections 14 $\frac{1}{2}$ feet long, each section being formed of three plates, the joints being crossed out to form inserted joints where the ends came together. The second section was made of plates 5-16 inch thick and of similar construction, and the lower section was made of plates 7-16 inch thick, each length being made of one plate, double riveted in the longitudinal seams and being made alternatively telescopic male and female joints. The pipes were all single rivetted at the circumferential joints. They were all coated with Dr. Angus Smith's solution. Considerable difficulty was experienced in assembling these pipes, owing to the careless way in which they had been manufactured, for they had certainly not been "tried out" in the works in the careful manner that should have been adopted. The way this difficulty was overcome, I have embodied in a small contribution to the items of practical experience, which I think will prove of some interest to the members. In spite, however, of the difficulties mentioned, the men made a magnificent job of this pipe line, which stands as a monument to efficient workmanship.

The power house is a substantial stone building in random rubble masonry, measuring 60 feet long by 27 feet wide and about 15 feet high to the eaves. The roof trusses are of massive steel construction, specially designed to take the

weights of the largest pieces of the plant to be installed in the house. The light steel angle purlins support the corrugated asbestos roof covering, which helps to keep the power house cool in the hot weather, which is very much in evidence in that part of the world. Ventilators are also provided in the gable walls, as well as in the ridge of the roof.

The power house is made large enough to accommodate three units, of which two have been installed and are now at work. Each unit consists of an impulse turbine, more familiarly known as Pelton wheels, directly connected to an electric generator. Each wheel develops 175 horse power at a speed of 500 revs. per minute, the generating dynamo having an output of 120 kilowatts. The generators are three-phase alternating current machines, made by the Westinghouse Company, wound for 500 volts at 50 cycles, and have their exciting machines directly connected on the same spindles. The generating dynamos are connected to the turbines by means of flexible couplings of the Zoidel-Voith type. To ensure an even torque under irregular loads, there is a cast steel fly-wheel, 5 ft. 3 in. diameter, fitted to each turbine, the wheel spindles being carried in three bearings, there being one bearing support on each side of the fly wheel. The revolving parts are carefully balanced. The turbines are mounted over an arched tunnel, into which the tail water is discharged, and through which it runs away to the river after it has passed through the wheels. The turbines, out-board bearings and generating dynamos are anchored to massive concrete foundations of the most substantial character, and in the event of a run-away speed of even double the number of normal revolutions, there would be no risk of any movement of the plant of a dangerous nature.

Each machine is connected to the main switchboard, which is fixed at the end of the power station and takes the width of the building to accommodate it. There are four panels, two being the receiving panels from the machines and two being the outgoing panels. Each machine has its own independent three-core cable to the switchboard room at the factory, where the current is distributed to the different buildings containing the motors that derive their driving force from it. Space is left on the frame work of the switchboard for the additional panels for the third unit when it is installed. The whole board is of handsome design and pleasing appearance and, with its instruments, is an ornament to the power station.

The running of the wheels is controlled by oil pressure governors made by James Gordon, who is also the designer and builder of the impulse turbines. The governors are of exceedingly sensitive action and control the plant within a very small percentage of speed variation, which is an essential feature in a plant so liable to speed fluctuations as rubber machinery. These governors are sufficiently sensitive that with an alteration in load of 45 to 50 per cent, there is no appreciable variation in the speed. They are capable of being synchronised with alternators operated in parallel, being fitted with a special device for this purpose.

* From a Paper read before the S.A.I. of E.

(To be continued.)

Table Bay Harbour Improvements.

The committee appointed by the Minister of Railways to inquire into and report upon the immediate requirements of Table Bay Harbour and general scheme of dock extension and developments for the future, has issued its report recommending an estimated outlay of three and three-quarter millions on immediate requirements. The report states that in the unanimous opinion of the witnesses and the committee itself, immediate improvements are required, such as the widening of the South Arm to permit of new cargo sheds and the minimum of four cranes. The committee is unanimously of opinion that in the event of a heavy crane being ordered it should be a 50-ton non-propelling floating crane, costing £100,000, in preference to a short travelling crane, but Captain Mathie is unable to agree with the other members that a heavy lift crane is necessary. The committee, with the exception of Captain Mathie, hold that such a crane would obviate the necessity of three 15-ton cranes which otherwise would have to be ordered. Dealing with coaling facilities, the report states that the capacity is 360,000 tons per annum, of which 83 per cent. is dealt with from the shore and 17 per cent. from the water side. After outlining means for expediting the handling of coal, such as adequate craning facilities at all deep water berths, the report says that greater use should be made of the water side, as it would help to relieve the congestion on the railway in the dock area. The committee is in favour of pooling and grading of coal, fixing, as the minimum quantity of coal which should be available, 50,000 tons. In considering the provision of coaling facilities, regard should also be had to the question of increasing the use of oil-fuel, and the report mentions the necessity of low coal prices, as coal will have to compete with oil-fuel.

Bunker Coal.

Dealing with ocean routes and their direct bearing on the route followed, which the cost of bunkers at Capetown, has, the report says "on the relative importance of the English coal prices; it is not necessary to make any further remark than that outward-bound vessels to Australia are at present bunkering in the United Kingdom for the voyage through to Australia without replenishing at Capetown. After full consideration, both from the material and engineering standpoints, the committee states that the breakwater should be extended in its present alignment. As regards the important question of cold storage accommodation, the committee says the necessity for providing additional cold storage accommodation to deal with the

anticipated increased citrus export trade will require careful consideration after the Citrus Exchange (formed as a result of the recent Conference at Johannesburg), has become established. In the meantime the committee has no hesitation in recommending that the Government extend the present accommodation to its fullest capacity of 2,000 tons. Another point touched on was the new graving dock, the committee recommending that provision should be made in any future dock expansion for a large dry dock. Under the heading of the amenities of Table Bay, the report states that it should be recognised that the amenities of the town should be subordinate to any scheme of development. The time has undoubtedly arrived when Capetown should regard itself as a business and trade centre as well as a pleasure resort for visitors. In conclusion, the report outlines four future schemes referred to as Northern, Eastern, Southern, and modified Southern. The Northern scheme providing for 6,000 feet breakwater from Mouille Point and extension in the deep-water area, is not approved of, mainly owing to the expense. The modified Southern scheme provides for extension on the Bay side of the Docks and includes widening the South Arm extension of the breakwater to 1,500 feet and the construction of a mole, possibly from the end of the promenade pier, at a total estimated cost of £3,479,500. The breakwater would take 10 years to construct and the other works six years, so that for the first six years Parliament would require to vote £536,000 per annum, and the remaining four years £65,000 per annum.

Subject to reservations to Captain Mathie, who inclines towards the Eastern scheme, the committee is of opinion that the modified Southern scheme and the Southern scheme would be most suitable. The combined cost would be £6,205,500. In conclusion, the report says the modified Southern scheme will meet the needs of Capetown for any years to come and its adoption will harmonise with any development in an easterly or southerly direction.

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High Speed Steel.

By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Steel Makers, Sheffield.

High-speed steel, or tungsten steels as they are sometimes called, are manufactured in the crucible or the electric furnace. The evolution of this steel is very ably described in the official handbook of the Sheffield and Rotherham Chambers of Commerce from information given by Professor J. O. Arnold, D.Met., F.R.S., who was for many years Professor in Metallurgy at the Sheffield University: "In 1740 the standard turning tool in iron and carbon steel contained, as to-day, about 1.25 per cent. carbon. When hardened its efficiency, say in turning was limited by the fact that its cutting strength was thermally unstable and the nose of the tool became soft and broke down with the heat caused by friction of cutting. In 1868, however, Robert F. Mushet, whose inventive genius was always at work, found that tungsten so fortified the hardness of plain carbon steel that the breaking-down temperature was considerably raised, and later he still further fortified the thermal stability of the carbon hardness with relatively small quantities of chromium. At the time spoken of that achievement was the last word in hard steel, but at the Paris Exhibition in 1900 there was displayed a new type excelling it in strength and hardness. It came from America. Realising at once the potentialities of the exhibit, and that if it were allowed a chance its popularity would affect the sales of their own steel, Sheffield and Rotherham manufacturers concentrated on improvements and began that series of experiments which eventually gave to the world modern high-speed steel, a material which has undoubtedly revolutionised engineering output. The main features of this development from Mushet's original steel are: much lower carbon, much higher tungsten and chromium, and the virtual abolition of silicon and manganese. Even with this remarkable progress experimenting did not cease, research work carried on in the manufacturing laboratories of Sheffield University proving the advantage of vanadium as a fortifying element. The net result of these collective Sheffield experiments between, say, 1900 and 1910 was to produce a turning alloy with a thermal stability up to 650 degrees Centigrade—a distinct red, or, in other words, an advance of 400 degrees Centigrade over the plain carbon steel of 1740. In every kind of turning operation the superiority of the latest steel is obvious. It is not too much to say that by the use of high-speed steel in tools engineering output has been doubled. As previously stated, its introduction entirely revolutionised the trend of engineering possibilities, for the new steel was so hard that many of the machines in which the previous steel was used could not stand the strain—the tail, as it were, was too strong for the dog—and had to be replaced by machines of heavier design. With high-speed cutters the old machines used to tremble and vibrate."

The chemical composition, as will be seen from the above, of high-speed steel, in addition to the standard ingredients of carbon tool steel, such as carbon, silicon, sulphur, phosphorus and manganese, we have tungsten, chromium and vanadium, and in some cases cobalt or molybdenum. The following analysis table gives details of the high-speed steels in general use:—Carbon, 0.50 to 0.65 per cent.; manganese, 0.30 per cent.; phosphorus, under 0.02 per cent.; sulphur, under 0.02 per cent.; silicon, 0.15 to 0.30 per cent.; tungsten, 14 to 22 per cent.; chromium, 2 to 4.5 per cent.; vanadium, 0.25 to 0.75 per cent.; and cobalt, 2 per cent.

The low sulphur and phosphorus contents are not possible in steels made in the crucible, but in the electric furnace this can be guaranteed. Tungsten steels with a fairly high carbon content are very retentive of magnetism, and an alloy with 5 per cent. tungsten, 0.65 per cent. carbon and 0.55 per cent. manganese is very suitable for the manufacture of magnets in electric meters. Low carbon tungsten steels do not possess this magnetic retentiveness.

Heat Treatment of High-speed Steel.

Forging.—Do not heat above 1,000 degrees Centigrade, and do not continue forging below 880 degrees Centigrade. If forging is continued below this temperature strains will be set up. After forging, cool slowly and grind the tool to the desired shape.

Hardening.—In turning, slotting and planing tools, etc., the point only should be uniformly heated to a red heat, and then quickly to a dazzling white (1,300 degrees Centigrade). Cool in either oil or air. Milling cutters, dies and drills should not be heated above a yellow colour, and should then be cooled in oil.

Tempering.—For drills for use on mild steel temper to a straw colour, and leave untempered for work on cast-iron.

Grinding.—Wet with a good supply of water to keep the tool from getting hot. Only use water when grinding with a sandstone. When using a carborundum or emery wheel no water must be used. When the steel is in the hardened state always grind without undue pressure, so as not to produce heat which, would draw the temper.

A very interesting experiment can be made in the workshop, and at the same time a very useful test learned. Take a piece of high-speed steel, a piece of high carbon steel, such as an old file, and a piece of mild steel, and by holding them against a dry emery wheel the sparks given off each sample will be entirely different. By this method steel can easily be tested, and, in the event of a mix-up in the works, easily detected and separated.

Owing to a printer's error in our last issue we repeat the following corrected paragraph from Mr. Bethell's article:

Case Hardening.—For plain carbon steels the actual process is as follows: Pack the articles to be case-hardened in an iron box into which a case-hardening compound has been placed, and close carefully with fireclay to make airtight. Heat up uniformly to 900 to 950 degrees Centigrade, and keep at that temperature for a pre-determined period, this period to depend upon the depth of case required. The object of this treatment is to add carbon to the steel. Cool the articles either in air or quench out in oil or water. If the articles were quenched out and fractured to see the grain of the steel they would appear very crystalline and give obvious proof that the steel had been overheated. Therefore to refine the steel heat up to 870 degrees Centigrade, and quench in oil or water. This process refines and toughens the core. Reheat to 750 degrees Centigrade, and quench in water. The object of this last treatment is to refine and harden the case.

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British Engineering Standards Association.

SOUTH AFRICAN BRANCH.

The hon. secretary writes:—Enclosed is a copy of the British standard electrical pressures for new systems and installations, which has been published by the British Engineering Standards Association. These standards, after full discussion by the electrical section of the South African branch of the association, have been recommended for adoption in South Africa. In addition to the standardising of electrical pressures, the frequency of 50 cycles per second for all alternating current systems has been recommended. A list of members of the Sectional Electrical Committee of the South African branch is attached, together with a list of the members of the main committee. The association is desirous that recommendation of the above standards should be made known as widely as possible:—Definitions: (1) The term "consumer's pressure" denotes the pressure at the consumer's "terminals" declared by the supplier. (Note.—This definition corresponds with that of the term "declared pressure" in the Electric Lighting Acts.) (2) The term "station pressure" denotes the normal pressure applied to the terminals of the transmission line at the generating station or sub-station. (3) The term "delivered pressure" denotes the normal pressure at the terminals of the transmission line at the delivery end. Specification: (a) Direct current systems and installations: (4) The standard pressures for new systems and installations shall be as follows: Consumer's pressure (declared) 220 volts, station pressure 242 volts; consumer's pressure (declared) 440 volts, station pressure 484 volts. (b) Alternating current (three-phase) systems and installations: The standard pressures

for new systems and installations shall be as follows: Consumer's pressure (declared) between neutral wire and each of the principal conductors 240 volts, station pressure 264 volts; consumer's pressure (declared) between phases 416 volts, station pressure 457 volts. (5) The standard extra high pressures for new systems and installations shall be as follows: Delivered pressure (declared) 3,000 volts, station pressure 3,300 volts; delivered pressure (declared) 6,000 volts, station pressure 6,600 volts; delivered pressure (declared) 10,000 volts, station pressure 11,000 volts; delivered pressure (declared) 30,000 volts, station pressure 33,000 volts; delivered pressure (declared) 60,000 volts, station pressure 66,000 volts; delivered pressure (declared) 100,000 volts, station pressure 110,000 volts; delivered pressure (declared) 120,000 volts, station pressure 132,000 volts. The consumer's or declared pressure in the above clauses shall be the pressure denoted as standards, the station pressure being derived by the addition thereto of the pressure lost in the line when carrying its full load; unless otherwise specified this loss shall be assumed to be such as to give the station pressures shown above. If a higher station pressure than one of the values given above be required, the purchaser shall state such pressure with any inquiry or order for electrical machinery or material.

Compressed-Air Miner's Pick.

A recent number of a German mining periodical shows an air-operated handpick for miners. The tool is shaped like the ordinary handpick, except it has one tine only, and this a very pointed and straight one, the intention apparently being that the point will work its way by percussive action into coal or rock. The device should be very useful in confined spaces where swinging of the pick is difficult or ineffective. The air enters from the end of the wooden handle and passes upwards through the handle to the head of the pick. The instrument has the formidable name of "Pressluftspitzhacke."

An Important Invention.

Mr. E. J. Way, consulting engineer to the New Kleinfontein Company, has invented a machine obviating the rewinding of bioscope films, and thus minimising wear. It is claimed that one film has been projected 3,800 times and remains in perfect condition. The usual vertical reel is replaced by a horizontal table, the projector being fed from the centre of the disc. The film is pushed out with a rotary motion, eliminating tension and avoiding manual rewinding. The film is ready again for projection within a minute, thus reducing the necessity for extra copies. The Cinematographers' Union has testified to the simplicity of operation of the new device. A company has been formed, styled Bioscope Improvements, Ltd., with a nominal capital of £180,000, the working capital of £30,000 having been subscribed privately.

Wire Rope Research.

The engineering experiment station of the Ohio State University desires to collect data—reports of tests and the like—on the strength of wire-rope fastenings, with the object of eventually publishing a bulletin and preparatory to recommending paragraphs on this subject for the safety code of the State of Ohio. Professor W. T. Magruder is in charge of the investigation, and is desirous of making some check tests. He purposes using $\frac{1}{2}$ in. 6 by 19 plough steel wire rope as being a much-used size of typical rope. Some of the questions that have arisen are these: What are the relative strengths of wire rope loops, or eyes, made up with clips and clamps, and of wire rope with sockets of various kinds and constructions, as compared with the rope itself, either when spliced or tested over sheaves? Sockets are usually considered to be a permanent fastening, but when should clips be used rather than clamps? How many fastenings should be used on each loop, or eye? How should they be applied? How tightly should they be drawn up? What effect has the size of the thimble on the strength of the rope?

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The Electrification of Railways.

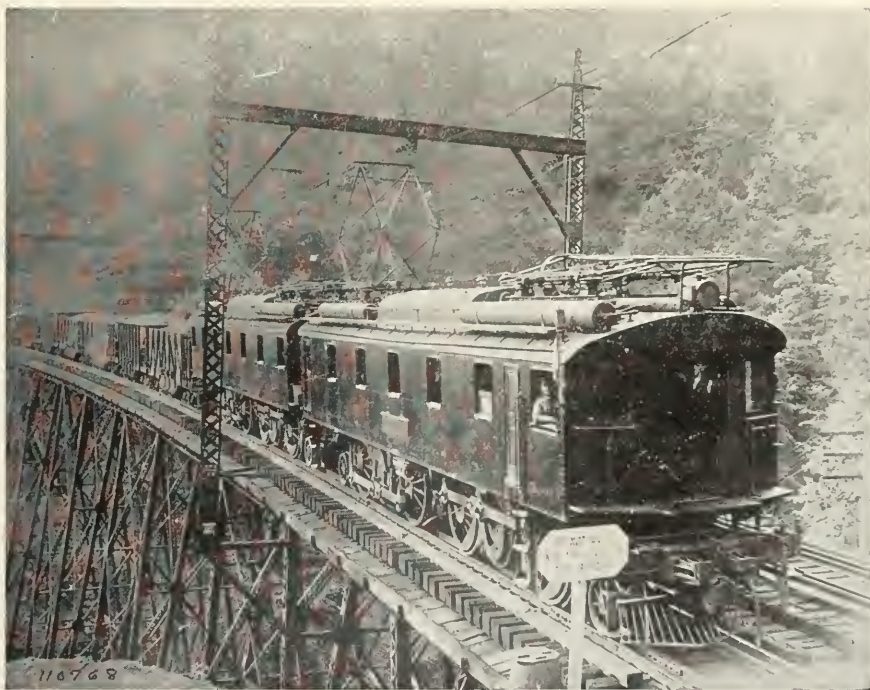
It will be recalled that in the Interim Report of the Electrification of Railways Advisory Committee, issued in 1920, there are two points which have given rise to much comment, namely, the advocacy of a standard system, which shall be direct current at 1,500 volts, and the recommendation that the energy should be generated in the form of three-phase alternating current at the frequency which is in general use in the district. In connection with this general question *The Engineer* has approached Mr. Geo. Gibbs, the great American authority on this subject, and has invited him to express his views. Mr. Gibbs is acquainted with the general conditions surrounding the operation of British railways, having resided in England some years ago for about a year's time, as chief engineer of the British and Continental Westinghouse Companies; he has also spent a portion of his time for the last twenty-five years in England each year, with the exception of those covered by the War; he

Per contra, I am in favour of certain exclusions and the fixing of certain general requirements of any permitted traction system; thus:—

(1) I recommend standardising the location and clearances of third rail and overhead working conductors.

Standards for these have been established for American railways by the American Railway Association. The figures will, of course, differ for British railways. Standardisation of this kind will permit the continued development of both the alternating current and direct-current system of traction and will ensure interchangeability of running requirements between roads using the same character of traction system.

(2) Standardising suitable and safe limits for voltages in each of the two types of working conductors. These should be as follows:—



An Example of Successful Railway Electrification from America.

was, in part, responsible for the plans adopted in the electrification of the Metropolitan District Railway in London and of the Mersey Railway between Liverpool and Birkenhead; and finally, as chief engineer in charge of design and construction, he has been responsible for all the electrification carried out by the Pennsylvania Railroad and its subsidiary companies.

Mr. Gibbs' Statement: Standardisation.

I.—System.—I am not of opinion that at the present time one system of traction at a suitable pressure should be applied as a standard to meet all requirements of railway traffic in Great Britain. Admitting the advantages of standardisation in general, yet I believe the establishment of any one system of electrification as standard for British railways would be a mistake at the present time, because:—

(1) It is too early in the state of the art to determine and fix the features of any system to the extent required for the purposes of complete standardisation, and yet not restrict the future and desirable development of the system selected.

(2) There do not exist sufficient and comparable operating data from which to conclude as to the relative advantages and disadvantages for the future of the two radically different systems most prominently before the railways today, *i.e.*, the "direct current" and the "alternating current." Both systems are workable and in use; each has its advocate in important manufacturing interests, and able professional men differ as to which system should prevail. This competition of diverse minds in the development of these different systems is an important factor in ensuring the future determination of the best system; it should not be discouraged by the premature exclusion of either system from trial in the present development period.

(3) Neither system, as now developed and applied to a typical general case, differs greatly in first, operating, and upkeep costs; therefore railways will not be greatly penalised, except by hampering interchange, by being allowed to work out for the time being the full possibilities of the different systems.

(a) *Third Rail.*—600 volts (nominal) direct current is recommended. A higher voltage than the above is, in my opinion, inadvisable for general railway usage, because employees or others who have access to the right of way cannot be effectively safeguarded from accidental contact with it. Contact with voltages of 1200 to 1500 is generally fatal to human life.

(b) *Overhead Conductors.*—The recommended voltage is 11,000 for the alternating-current system and 3000 for the direct current.

In the case of the alternating-current system the maximum is determined by the practical limit in maintaining insulation; 11,000 volts (nominal) is below this point, but experience indicates it is high enough for the heaviest kind of traction and is suitable for any class. A collector system carrying it can be installed and maintained properly and economically within close permanent way and rolling equipment clearances. It should be noted, however, that in an overhead wire system such as the three-phase, which requires two contact wires, insulated from each other and from earth, and two current collectors of different polarity, the practical voltage limit is considerably lower than 11,000.

In case of a direct-current system maximum voltage is limited by other considerations than that of insulation of the working conductor. The demands of economy in distribution and the problem of successful collection of current for heavy trains suggest the highest possible voltage; on the other hand, the limitations in respect of its utilisation in the train control and motors point to the desirability of low working voltage. For the general case I am of the opinion that 3000 volts is the minimum requirement from the standpoint of economy and successful current collection, and is the present maximum allowable for the other considerations.

II.—Frequency.—(a) Current frequency should be standardised for traction systems in accordance with the requirements of such purpose and not by a compromise with the conflicting requirements of another service.

(b) A frequency of 25 cycles per second is the best for both systems of traction recommended for trial, and should, therefore, be made the standard for traction generating plants.

III.—Generation.—High-pressure three-phase generation is suitable for both alternating-current and direct-current traction systems, and may be made standard.

The voltage at the generating plant may properly depend upon the local situation; it is quite immaterial for standardisation purposes what this actually is, as the voltage is transformed for secondary distribution, and various primary voltages may be utilised in the traction installation of one railway.

A consideration of "frequency" is highly important and no standard should be proposed which will exclude, materially complicate, or hamper the development of either of the two systems suggested.

One of the features making for simplification in the single-phase alternating-current system is that current from the generating plant is used in the working conductors without change, except, if desirable, by altering the voltage in a transformer. It is essential, however, that the "frequency" employed in the working conductors shall not exceed 25 cycles per second. If a higher generating frequency than the above is standardised it would complicate the alternating-current system; thus to utilise 50 cycles it would be necessary either to employ "frequency changers" or to install in the central station separate 25-cycle generators for railway purposes. The latter plan is employed to some extent in America, and it is found practicable for electric supply companies to install in the same station high-frequency generators for commercial purposes and 25-cycle generators for railway work and provide one or two large motor units for interchange of power between the two parts of the station.

With the direct-current system which employs alternating-current generation and transformation and conversion

in sub-stations any desired frequency from 25 to 50 (or more) cycles may be used. Twenty-five cycles is, however, not only a suitable standard for the direct current, but is from some considerations better than a higher frequency. Therefore:—

(1) Three-phase, 25-cycle, generation at any desired voltage or voltages should be specified as a requirement to allow the flexible development of electric traction systems.

(2) Commercial power plants, which employ other frequencies, may be utilised for railway power purposes either directly in case of direct-current traction or by the installation of separate generators and motor generator tie-in sets, or frequency changers in the case of the alternating current traction.

Costs.

The investigation of the Chicago Association of Commerce is probably the best source of information which has appeared to date regarding the details of first and operating costs of electric systems. This report was completed in 1915. It covers a minute investigation of a great railway problem within a compact area of 428 square miles in and around a very large city. Within this area thirty-nine different railway companies operate dense passenger, goods and shunting services over a network of tracks comprising an aggregate mileage of 4,500. The net first cost of the equipment required to operate this entire system electrically was estimated and analysed with great care for three different systems and gave the following results:—Direct current, 600 volts, third rail, 188,132,314 dols.; direct current, 2,400 volts, overhead, 181,891,122 dols.; single-phase alternating current, 11,000 volts, overhead, 178,127,230 dols. In other words, the first cost was substantially the same for all three systems. This conclusion is, of course, for short-haul conditions; for long-distance haulage the showing for the high-tension system, as compared with the third rail, would be better. For average conditions estimates I have made on important projects indicate a first cost difference of 15 to 20 per cent. in favour of the high-tension overhead alternating-current or direct-current trolley systems as compared with the direct-current third rail, and of the two high-tension systems the alternating current appears in every case to cost less than direct current.

As to operating costs, the Chicago report showed, for items affected, a substantial saving per train mile as compared with steam. The saving was least in the case of the 600-volt third-rail system and greatest for the 11,000-volt alternating-current system, but there was not a very great difference between the latter and the 2,400-volt "overhead" system. The conditions, however, in the Chicago district are somewhat peculiar; for the average railway condition, estimates indicate differences of 10 to 16 per cent. in favour of the high-tension trolley systems as compared with the 600-volt direct-current third rail and the high-tension alternating current appears in every case to be more economical than the high-tension direct current.

Selection of System.

The important considerations governing the selection of a system are:—

- (1) Adaptability to all physical conditions of the railways.
- (2) Economy in first and operating costs.
- (3) Flexibility as regards conducting varying kinds and volumes of traffic.
- (4) Suitability for extension.
- (5) Possibilities as regards future advance in the art and improvements in detail.

I would work, as far as consistent with the above, towards the elimination of systems which are applicable to special cases only. This, as before indicated, would narrow the selection to the adoption of one of the high-tension overhead conductor systems.

The 600-volt third-rail direct-current system would only be considered for extensions to existing installations or for very special cases.

The 1,500-volt direct-current system could only be adopted with an overhead conductor and for light traffic requirements; 1,500-volt third rail cannot be used generally because of its danger to life. The 1,500-volt system is an interim development only. Higher voltage direct-current systems, such as the 3,000-volt system, have promise for the future, and their development should be allowed to continue unhampered.

The 11,000-volt alternating-current system likewise has a broad field of usefulness and promises well for future development.

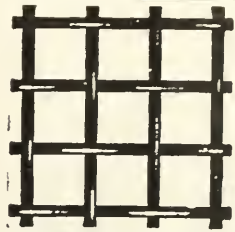
The selection, therefore, of a proper system for general use appears to lie between the 3,000-volt direct current and the 11,000-volt alternating current. I have referred to the existing difference of opinion as to these two systems, and since I am not recommending the elimination of either from adoption at present, it is unnecessary for me to indicate my preference. I should approach any concrete problem upon its merits along the lines laid down, having regard to the latest experience and facts as to the state of the art when decision is to be made.

French and British Reports.

I have looked through the voluminous report of the French Commission on Electric Traction, and, frankly, its conclusions do not seem to be well founded on the data presented. Perhaps the Commission has arrived at a correct conclusion, having regard to the particular conditions in France, but the reasons given for condemning the single-phase system seem inadequate and largely the results of a "scare" as regards the inductive interference question. The Commission seems to have been dominated by telephone and telegraph experts. It also seems to have been greatly influenced by reports of the high cost of maintenance of the alternating current, which, they state, is at least double that of direct current, a conclusion which is absurd. No effort seems to have been made to equate operating condi-

tions in comparing systems, and I doubt if the Commission really had any accurate figures of cost of maintenance of the alternating current. It does not seem to have attached much importance to the future trend of development and possibilities in connection with both alternating-current and direct-current traction.

I was interested, and disappointed, in reading the Interim Report of the Advisory Committee on Electrification of Railways. It would be valuable to know what reasons led the Committee to the adoption of the 1500-volt direct current as standard. I think a mistake has been made, even if it should prove to be the eventual system, because the adoption of any standard now is going to put the development of electric traction in a straight jacket. The development of both the alternating-current and the direct-current systems should continue in order to get the best results finally from electric traction.

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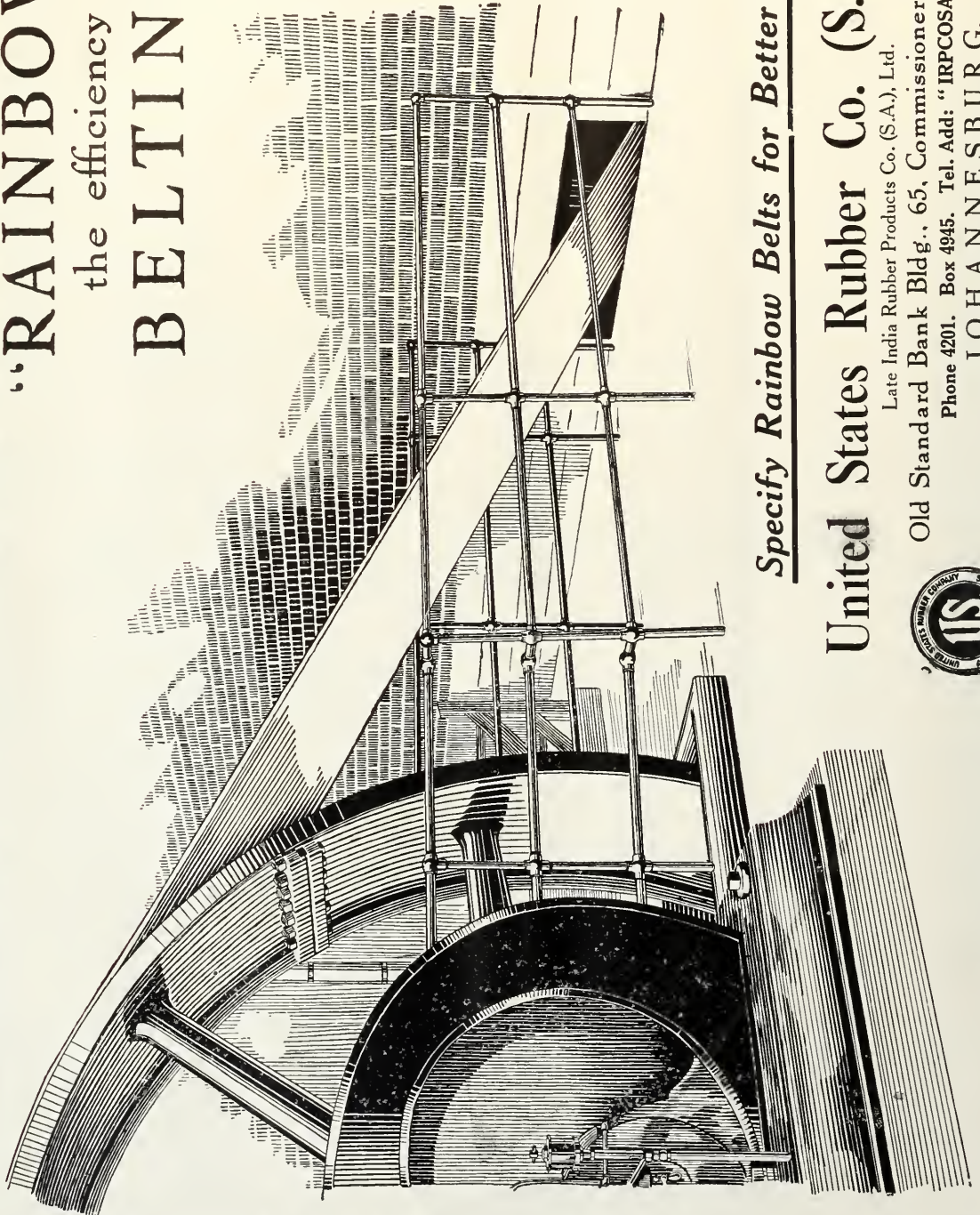
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS AND TONE SLIGHTLY BETTER—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—
AGRICULTURAL IMPLEMENTS—ELECTRICAL GOODS—OIL PROSPECTS—UNION'S GRAIN ELEVATORS—
CONTRACT—UNION'S TRADE RETURNS, JANUARY-AUGUST, 1920-21—FINANCIAL—METAL MARKET.

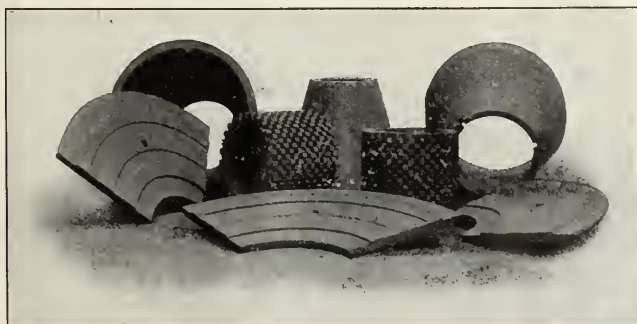
General Review.

The position on the whole is regarded in mining circles with more equanimity. The situation at Home, though of course far from satisfactory, is still showing signs of gradual, if slow, improvement. In regard to the key industry, the coal miners are becoming more and more convinced that their only salvation lies in their acceptance of lower wages and of more energy being thrown into their work, thus enabling manufacturers, through lower coal costs, to meet foreign competition. The price of coal and coke in Britain is still falling, with the result that more iron and steel works are resuming operations. The commercial community was relieved by the removal at the eleventh hour of the trouble threatening at the E.R.P.M. mine. Prices generally for timber and iron and steel remain fairly stationary, and are now gradually getting into line with imported goods. Recently merchants have, of course, been selling at a great sacrifice, but the tendency now is towards a slightly higher level more in consonance with prices of goods laid down from Home to-day. Regarding the recent announcement that the Government were using their influence with the banks to extend financial facilities to the farmers, it is generally felt here that such "tiding over," if it came about, would be an undue advantage to one section of the community and at the expense of merchants and others. Despite all troubles, actual and potential, through which we are now passing, there can be no doubt that merchants on the whole are of opinion that we are gradually emerging from the lethargy which has characterised business of late, and that things generally are now shaping towards improving conditions. Every month which now goes by brings us more into line with the stocks which we should be using, and in that way—apart from the serious position of the importer at the present moment and during past months regarding profits, or more correctly, losses, the general position is improving with the passing of time. The slump of the German mark to 750 to the £, as compared with the pre-War exchange of, roughly, 20.40, gives us furiously to think about German reparation settlements; but sufficient unto the day.

Iron and Steel.

There has been a fair amount of business transacted during the past week; inquiries have been more numerous and the tone generally more consistent than for some time past. On the Commercial Exchange there has lately not been so much selling at or below cost. An influential merchant is of the opinion that in a few months' time a lot of people now cutting will be out of stocks, with a consequent rise in prices, when present holders will at last reap their reward. Things were, he thought, settling down more and more to normal again, and he should not be surprised if by the beginning of the New Year an improvement in conditions—slight though it might be—manifested itself. In any case, he said, there were bound to be shortages in certain lines within a very few months. The only special feature of the week calling for remark has been the advance of fencing wire by about 15 per cent., caused, it is understood, by Germany's inability to supply at the present time.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 35s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 35s.; steel, 38s.; $\frac{7}{8}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges;



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Iron Ore Industry.

Speaking at the 24th annual congress of the Associated Chambers of Commerce of South Africa in Pretoria on Monday last, the Right Hon. Mr. F. S. Malan, Minister of Mines and Industries, said, *inter alia*, that it was not creditable to us as a people that we have not been able to do more with our iron ores. Experts had convinced the Government that both in regard to the available ore and the suitability of our coal and lime deposits all the raw materials required for the development of this industry are present. The Government's and Parliament's sympathy had repeatedly been shown in regard to the development of this key industry, but little progress unfortunately had hitherto been made. Of the four local undertakings, two working scrap iron and two attempting to work up raw ore, the two latter are hampered by want of capital. He said something more should be done to make proper use of opportunities lying to our hands and make this key industry subservient, as it would do more than any other industry, the industrial and economical development of the country. As an illustration of the improvement recently experienced at Home in the iron and steel industry, a number of vessels are leaving Wales with cargoes of metal manufactures for the Far East. Large orders for galvanised sheets have been placed in Britain during the past few weeks.

Under the sliding scale bonus 27,000 Welsh tinplate workers will have their wages reduced a further 37 $\frac{1}{2}$ per cent. owing to the fall in steel bars.

A leading iron and steel importer stated that his English correspondents by the last mail had reported that general conditions there were still uncertain; prices were coming down, except on the Continent, where there has been a sharp advance. Germany has been inundated with orders and been putting up her prices and postponing dates of delivery for all steel products. The French works are getting into the same way. Belgium works have labour troubles and many factories are closed. Prices generally have declined from 15s. to 40s. per ton, the lower price applying to bars and the higher price to sheets and wire, with other products in between. In England labour is gradually recognising the economic factor and is now accepting lower wages all round. America is still out of it, as although prices are lower they are really not competitive, and of course the item of exchange is a factor against America, just as it is in favour of Germany, France and Belgium. This exchange factor is probably the main cause of the present trade uncertainty and lack of confidence, all leading to bad trade conditions. The world's demands are great, but the lack of money must prevent many countries operating to a large extent. America is finding out, however, that it is not an unmixed blessing to have too much money, and with most of the world's gold in their possession trade conditions are worse there than in Britain and unemployment most serious. Until such times as exchanges become anything like normal we can hardly look for that trade boom which our papers are so fond of writing about.

There is a slight revival of trade in the Far East, and there is also improvement in purchases in the Australian trade.

Further Reduction in British Steel.

A fresh reduction in the price of steel has been announced, ranging from £2 to £4 per ton, with effect from 17th inst.

New South Wales Boiler Contract.

The New South Wales Government has placed an order with a Lancashire firm for boilers to equip the electric service for Newcastle, New South Wales, at a cost of £50,000.

Iron and Steel Production Hampered by Cost of Production.

The latest advices from Britain are to the effect that the iron and steel position has not materially improved owing to the cost of production. The price of coke has now been reduced to 32s. 6d. per ton, but ironmasters state that this is still too high, and pending a further reduction they cannot produce at a price to meet Continental competition. British 60 lb. steel rails are now £12 10s. per ton.

Leeuwpoort Tins.

It is rumoured that the price of tin, together with other factors, will prove detrimental to the working of this property, the unstable conditions caused by fluctuations in the price of the metal in the world's money market, causing, we hear, restriction of the mine.

En dit that a hoar frost has been noticed around Krugersdorp district in the way of an attempted flotation. It has been stated by a well known metallurgist that a possible coating of the yellow metal may eventuate in years to come, but at present, the gentleman states, minus the

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gold and minus the reef is not too encouraging for investors. We would advise our reading public to be careful of its tickets in these strenuous times.

Fires which Cost £3,000 to Light.

An expert just returned from a visit to the Midlands states in connection with fire lighting of blast furnaces that at the time of writing 37 out of about 300 up-to-date blast furnaces in Great Britain are alight or in the process of lighting. This is the first reply of the ironmasters to the reduction of 15s. per ton in the price of furnace coke. If the further small reduction which is anticipated comes about probably 200 blast furnaces will be in the process of being fired next week. Generally speaking, all the steel-makers, shipbuilders, and allied trades are pausing with a hand on the starting lever waiting on the ironmasters. *Without the blast furnaces in operation no appreciable revival of trade can take place.* It is astonishing to learn that the cost of lighting a big blast furnace is in the neighbourhood of £3,000 and sometimes more. To grasp it one has to realise that the blast furnace is from 80 to 90 feet high with a diameter of about 20 feet. It is built of steel plates and lined inside with a skin of special fire bricks several feet thick, and this skin plays a large part in the process.

Engineering Shops.

Business in these generally is still improving, orders coming in fairly steadily. Those industrial concerns dependent upon the Power Station to any great extent are perturbed at the present state of things, which will cause a lot of hardship to many if the position is as serious as it is alleged.

At the Unemployment Commission last week Mr. A. S. Elston, general secretary (S.A.) of the Amalgamated Engineering Union, in dealing with the general question of the merits of technical education for apprentices, said that while the principle was quite sound, hundreds more lads are being trained at the present time than have any prospect of being absorbed by the skilled trades of the Union when they reach the proper age. Especially was this the case with engineering, where many lads are being trained in certain branches of engineering without any possibility of their being afforded even the opportunity of starting on a practical course of apprenticeship. Efforts should, he thought, be made to point out that other sections of industry and commerce are equally attractive, and methods should be used in order to spread the youth of the country over the various industries.

Timber and Building Materials.

Business has if anything slightly improved during the past few days, but not to any great extent. Prices remain practically unaltered, with, however, a tendency rather to

harden than decline. Latest advices from the Baltic may to the effect that bottom has been reached and that prices may probably advance somewhat in some lines. Stocks locally are good. 3 x 9 deals, 1s. to 1s. 1d.; scantlings—1s.; beaver board, 4½d. to 5d.; floorings, 6½d. to 7d.; ceilings, 5¼d. to 5½d.; Oregon, 7s.; pitch pine, 8s. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cub. ft. at the mills; Honduras mahogany, 30s. per cub. ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks, in the absence of much activity in the building trade, are unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 37s. 6d., 47s. 6d., 55s. 3d. for 1 to 3-ply.

Second-hand Iron and Timber.

Business, probably on account of the Jewish holidays, has been rather quieter this week. The price of second-hand iron is still ruling at from 6d. to 7d., timber at from 10d. to 1s. The tightness of money is the chief abstacle to improving conditions, while the continued inactivity in the building trade is a very important factor. Second-hand yards are now well stocked with materials.

Agricultural Implements.

Owing to the present tightness of money and the low price now being obtained by the farmers for their maize, etc., the demand for agricultural implements is now not

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very large. It is, however, hoped that the advent of rains, of which we have already had a foretaste, may lead to better conditions.

Electrical Goods.

Business remains much about the same as last reported; there are no alterations in prices to record, although there is a probability that some reductions may occur shortly. Electrical goods are now coming in somewhat sparsely, but merchants are stocked up to the hilt in all lines. Dealers at the moment are, as a matter of fact, marking time, awaiting the development of building operations. A few country orders in the meantime are keeping them fairly busy.

Oil Prospects.

Melbourne cables that consequent on the discovery of distinct traces of mineral oil in the Kimberley district (Western Australia), there has been a rush of applicants for prospecting licences, and leases covering 100,000 square miles in the western portion of the northern territory adjoining Kimberley have also been applied for.

Petrol has declined another 1s. per case, meaning a reduction of about 6s., or about 15 per cent., since the beginning of the year.

It is reported that oil has been discovered on a farm six miles from the Basutoland border and 33 miles from Bethlehem, at 25 feet from the surface, the analysis giving a lubricant and kerosene value of 75 per cent. It is also stated that the Government has become interested in the proposition, who will, it is understood, lend a 6 in. or 8 in. drill to continue the boring operations, which were commenced with a 2 in. drill. It is confidently anticipated that within three months either a "gusher" or an artesian oil well will be struck. It is stated that oil has been traced for six miles, and farms in that area have been acquired.

Rooedeport United Closes Down.

The profit-sharing scheme, which was placed before the mine workers by the management of this company early in September, not having been accepted, it has been decided to close down the mine. It is much to be regretted that this scheme for prolonging the life of the mine has come to naught, but in view of the continued losses month by month (September showed a loss of £1,700) the management had no option but to cease work.

The Union's Grain Elevators.

It is officially announced that the Railway Administration has placed the contracts for these with Mr. A. W. Meukins, whose tender was substantially lower than that of any other firm. The work of constructing the elevators is divided into four separate contracts: Durban terminal elevator, 42,000 tons storage capacity; Capetown terminal elevator, 30,000 tons storage capacity; 17 country elevators

(group 1); 17 country elevators (group 2), of varying storage capacities. The successful tenderer has recently concluded work on the large terminal elevator at Glebe Island, Sydney, and is a man of the highest qualification in regard to elevator construction. The total amount of the contract is said to be about £1,000,000.

Union's Trade Returns for 8 Months ended August 31.

These show a continued heavy fall in imports and a recovery in exports, especially noticeable in August:

	1921.	1920.
Imports	£40,091,767	£67,773,506
Exports	38,645,131	61,014,736

The most encouraging advance has been in the export of corn and grain. During the eight months it has increased from £490,523 in 1920 to £2,086,915 for this year. Shipments of maize in August this year amounted in value to £213,215, compared with only £3,062 last year for the same month; for the eight months the Union exported maize valued at £1,561,590 as compared with £57,636. The principal falls in imports were £5,800,000 in articles of food and drink (principally as regards food on wheat and wheaten flour); cotton manufactures, which fell from £7,429,830 to £5,267,620; woollen goods, which declined by nearly a million; hardware and cutlery from £2,586,487 to £1,592,172; iron and steel manufacturers by over one million in value. There was, however, a gain on machinery from £2,331,900 in 1920 to £3,428,088, mining machinery accounting for an increase of £400,000. Vehicles dropped from £2,713,789 to £1,018,378, and motor cars from £1,142,025 to £434,865. Wood and timber fell from £1,700,705 to £978,297 (flooring and ceiling, other than planed and grooved and house frames accounting for much of the decrease).

Coal Crisis in South Wales Settled.

This dispute, which arose through the Government and the coal owners disagreeing as to the interpretation of certain terms of the strike settlement, has now been settled in favour of the owners by the arbitrator, Sir William Plender. The award has resulted in the restarting of numerous collieries and the easing of the unemployment situation. The matter in dispute was that the Mines Department contended that the liability of the owners for the September wages was 97.57 on the 1915 standard of the wages, while the owners, on the other hand, claimed that their liability should be 76.6.

Financial.

Mr. Charles Maggs has joined the board of the National Bank of S.A., Ltd.

A 6 per cent. Nigerian loan of £3,000,000, issued at 97 and redeemable in 1936-46, is now being underwritten.

Australian Loan of £5,000,000.

A cable from Melbourne states that the House of Representatives has authorised the raising of a loan of £5,000,000.

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), 15 Metal Certificates were granted in South Africa, and of this number our students secured 10 certificates. Previous examination we secured 7 certificates from 8 entries, and in two other recent examinations 15 passes from 19 entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured 3 certificates from 6 entries.

OVERSEAS EXAM.: 21 certificates secured 1920, and 14 certificates to date, 1921.

SURVEY EXAM.: We have secured practically all the certificates granted by the Mines Department during recent years and have obtained 60 certificates to date.

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The Reserve Bank.

According to the weekly statement of the S.A. Reserve Bank, dated October 15, the ratio of liability to the public was 72.7.

Currency and Banking Act.

An important conference was opened on Monday last at Pretoria, presided over by Mr. Burton, the Minister of Finance, at which were present many of our financial authorities. The object of the conference is to discuss the terms of the Currency and Banking Act of 1920 and the inconvertibility of gold certificates—whether according to the Act this should terminate in June, 1923, or the period be extended, and what steps should be taken, if any, in order to avoid undue disturbance of exchange and business.

Wireless Progress.

A cable from Brussels says a contract has been signed for the erection of a gigantic wireless station at Ruyssekede, in West Flanders, which will be in direct communication with the Congo. This station, which will be the most powerful in the world, will, it is expected, be completed within 18 months.

In this connection it is interesting to note that very successful results have been obtained in Cape Town in long distance wireless experiment; all the principal American and European stations are now easily heard. The Windhuk station, when the necessary alterations have been made, and the proposed new station at Nairobi, will form two important links in the Imperial wireless chain.

Brighton Diamond-cutting Works.

The Oppenheimer diamond cutting factories for soldiers are now being re-organised, and it is now hoped that with the present staff of 300 the works will be conducted on a paying basis. Roszelaar and Zouen, Amsterdam, one of the oldest diamond-cutting firms in existence, are to act as technical administrators of the Brighton works, and although the firm will still carry on business at Amsterdam and New York, all the cutting will be done at Brighton.

Goldfields Rhodesian Development Co.

The accounts for the year ended May 31, states a cable from London, show that the available balance is £161,907. A final dividend of 6d. has been declared, making 1s. in the year, and the sum of £99,052 has been carried forward.

The Dunlop Rubber Co. (London) announce that, in view of the serious depreciation of the stocks of rubber and cotton held by them at the end of the financial year, dividends on the preference shares will not be paid.

Metal Market.

Latest London quotations: Standard copper £67 11s. 3d. cash, £68 13s. 9d. forward; electrolytic copper £74 10s. cash, £76 10s. forward; Straits tin £153 7s. 6d. cash, £157 15s. forward; English lead £23 17s. 6d. cash, £23 10s. forward; bar silver 45½d.; fine gold 101s.; quick silver £10 per bottle.

A notice in the current Union *Gazette* invites the attention of the travelling public to the account that the Belgian Government has issued a decree regarding the measures to be taken to combat human tuberculosis in the Belgian Congo. Passengers passing through Africa on their way to this Colony are advised to make themselves acquainted with the regulations of this decree, in order to avoid any inconvenience on reaching their destination. The following is an extract from the decree:—"In order to combat human tuberculosis the Governor-General may impose restrictions to the admission to the territory, require medical certificates, order medical examinations and special disinfection, fix the conditions which dwelling houses and meeting places must satisfy, order treatment in the Government hospitals, require the compulsory notification of the disease, and cause the non-Congolese subjects suffering from open tuberculosis to be repatriated. Defaulters are liable to imprisonment for a period not exceeding three months and to a fine not exceeding 1,000 francs, or to one of these penalties.

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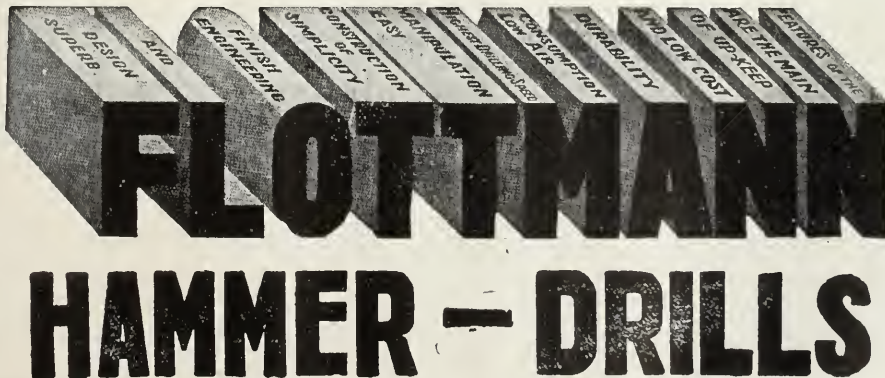
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Coal-Cleaning.

TWO RECENT DEVELOPMENTS.

Attention was called by Mr. Robert Nelsen at the Civil Engineers' Engineering Conference to the deterioration noticeable since the war in the coal supplied to consumers in respect of the amount of incombustibles contained in it, and he described two processes of recent development which he suggested would in proper combination offer an adequate solution of the problem of cleaning coal.

He stated that 40 separate records from works where a comparison of the ash in pre-war and post-war coal (purporting to be the same class of coal from the same sources) can be directly made indicate that the average increase in the quantity of ash is nearly 63 per cent.; that is, coal that formerly contained 8 per cent. of ash now contains on the average 13 per cent., and coal that formerly contained 12 or 13 now contains more than 20. It has been computed that about 35 million tons of uncleaned slack coal are transported annually in Great Britain, for an average distance of perhaps 50 miles, to be used for steam and manufacturing purposes; and it follows that at least $1\frac{3}{4}$ million tons of material which is worse than useless are annually transported up and down the country, absorbing labour to load it, to unload it, to fill it into furnaces and to take it out again as clinker. If the whole of this recently added 5 per cent. could be got rid of at the pit head, about 2,000 trucks and 40 locomotives, together with all the man-power released, would be permanently available for some useful purpose.

Froth Flotation.

The chief difficulty in washing coal by the older methods is to deal efficiently and effectively with fine coal. Hitherto, coal-washing has been effected by specific gravity between the coal and the dirt. If the dirt is of the same or nearly the same specific gravity as the coal, these methods fail when applied to material below a certain size. The new flotation process for washing fines coal is, however, independent of gravity. The coal to be treated, if not already fine enough, is crushed until the particles pass through a screen about one-tenth linear inch aperture. It is then mixed with three to four times its weight of water, together with a small quantity of reagent. The reagent may be an oil or coal-tar product, and 1 lb. is, generally speaking, required for each ton of coal treated. The mixture is agitated by a power-driven mechanical mixer, and a multitude of minute air-bubbles is produced. To these the coal particles attach themselves, and by them are floated to the surface of the water in the form of a thick coal laden froth. The coal in the froth is removed by a suitable scraper and dried for use, while the ash-forming dirt sinks to the bottom and is drawn off. Once the proper reagent has been found, the working of the process is simple, and given a steady flow of feed and a regular supply of reagent, a flotation machine, it is claimed, will produce clean coal on the one hand, and on the other a residue which is very nearly coal-free.

Apart from valves and piping and the mechanically-driven mixers and scrapers, the ordinary flotation machine is made entirely of wood. It consists usually of from five to ten "mixing" boxes, each with a froth box connected to it. The material under treatment passes from No. 1 mixing box via No. 1 froth box to No. 2 mixing box and so on through the plant, the final reject coming from the last froth box. A machine to deal with 1,000 tons of coal in a 24-hour day measures approximately 37 ft. by $15\frac{1}{2}$ ft. by $15\frac{1}{2}$ ft.

Rheolaveur Process.

A process, called the Rheolaveur, for cleaning coal other than fines (from $2\frac{1}{2}$ in. downwards) comes from Belgium. Its first requirement is a strong and steady flow of water. The water is turned into a trough into which the coal to be treated is also led. The flow of water carries the coal along with it, and the separation of coal and dirt is effected by stratification, the rate of the flow of water being so regu-

lated, and the trough made of such a length, as to allow time for the coal and dirt to stratify. Arrangements are made at intervals to draw off the dirt from the bottom of the trough, and the coal is borne along until, at the end of the trough, there is no more dirt to be drawn off, and clean coal is delivered to the clean coal hoppers. At each drawing-off point a cast-iron box is inserted, from the bottom of which a current of water, controlled by a hand-valve, is made to flow upwards into the trough to prevent coal from being drawn off with the dirt, serving a similar purpose to the upward flow of water in the wash-box of the Draper washer. The water is stored in a tank fixed about 20 ft. above the trough and arranged to give a continuous steady flow.

In washing nuts the strength of the upward current in the first box is kept high so as to allow shale only to be drawn off. This shale forms the reject and at once finds its way to the shale dump. In the second box the strength of the upward current is rather less so as to allow the balance of the shale, and it may be a little coal, to pass through the box. This reject is not sent to the shale dump, but is returned by an elevator to the original trough to be re-washed. In washing nuts two boxes only are necessary, and the coal passing the second box, being dirt-free, is delivered via a moving drainage plate to the nut-coal bunker. In washing small coal four boxes and two lengths of trough, one above the other, are needed.

The advantages claimed for the process are low initial cost, low maintenance and running costs, easy control of working, absence of complicated mechanical parts, and economy of space.—*The Times*.

Carboniferous Glaciation of South Africa.

The above was the subject matter of an exceedingly interesting paper read by Dr. A. L. du Toit before the Geological Society of South Africa at their meeting on Monday evening. Present climatic conditions would lead one to doubt the existence of conditions of extreme cold in our sub-continent in the past, yet abundant geological evidence exists proving that South Africa once formed portion of a huge ice-covered land mass in the distant carboniferous age. Before the deposition of our coal measures this country was subject to conditions of extreme cold such as are seen to-day in the polar regions. Everyone is conversant with the movement of glaciers, and the deposits of debris and morrains formed at their termini. These ice masses, during their slow movements, exert enormous pressure on their beds, and when passing over rocky formations leave the bedrock in a roughly polished state and covered with striations which lie in the direction of movement of the glaciers. These striations are produced by fragments of rocks included in the ice which continually abrade the bed of the glacier. The nature of these rock fragments or boulders enables one to determine from which locality they were derived. When glaciers carrying large quantities of rock fragments and boulders are subject to warmer conditions they melt and deposit their load in the form of a boulder bed. This boulder bed in the course of time becomes covered with other sediments, and finally consolidates, forming a rock known as a till. In South Africa abundant evidence of such a rock is to be found below the coal measures, and the name of Dwyka conglomerate or tillite has been ascribed it. The Dwyka conglomerate is to be found at the base of the rocks of Karoo age, even as far north as the Zoutpansberg district. It presents conclusive evidence of the existence of huge glaciers in carboniferous times. Striations due to the glaciers are to be seen in several parts of South Africa, and a study of their directions as well as the rock material making up the conglomerate shows that three distinct centres of glaciation existed at that period. The most important of these had its origin in the central Transvaal or Bushveld area. The Dwyka conglomerate from this centre of activity contains boulders and fragments of all the prominent rocks existing in central Transvaal at present. Red granites, Magaliesberg quartzites, dolomites, and Pilandsberg volcanic rocks are all represented.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

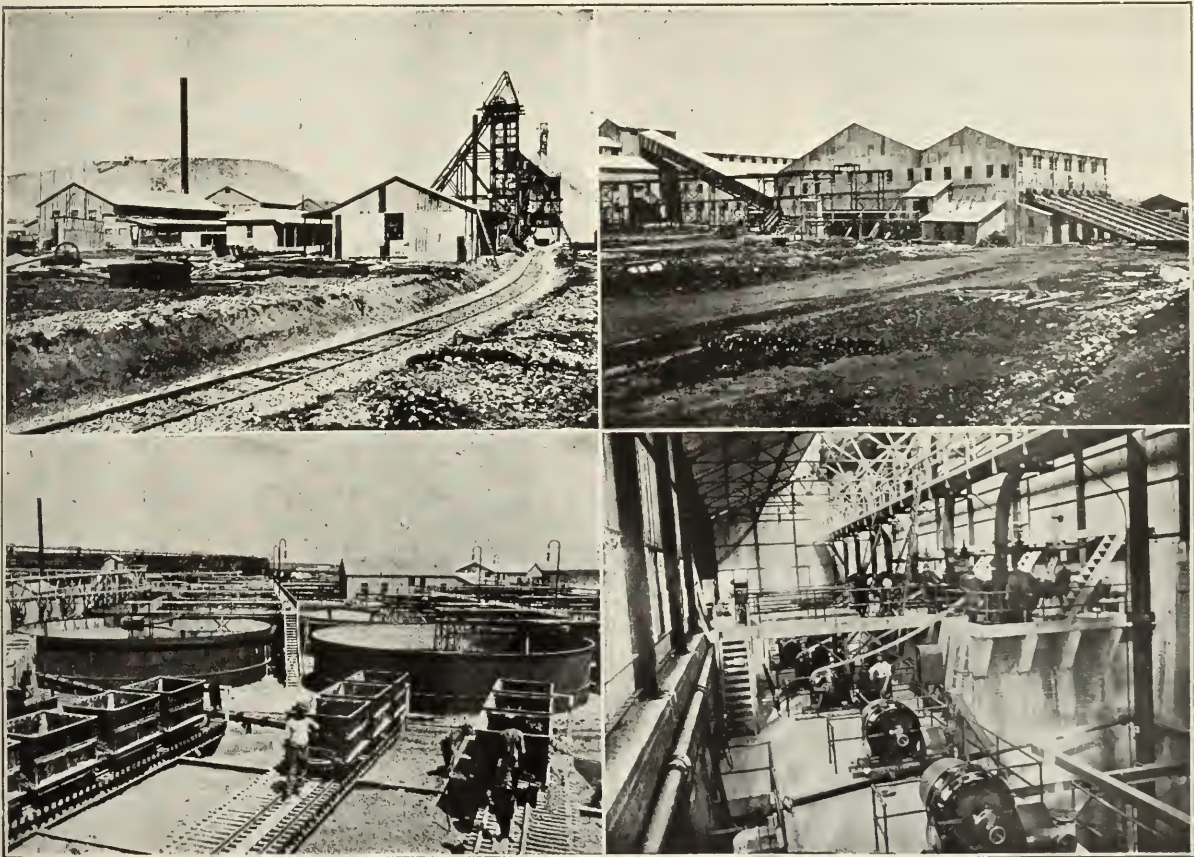
Established 1891.

Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, OCTOBER 29, 1921.

No. 1570.

Four New Views of Randfontein.



Views of the Randfontein Central Mill and Reduction Works and (top left hand picture) New Buildings and Equipment of the Randfontein South Vertical Shaft. A very satisfactory report for the September quarter was issued this week, showing that the quantity of ore crushed during the quarter was 19,500 tons more than during the preceding three months. The revenue was 1s. 9d. per ton higher, and the working costs 1s. 3d. per ton lower, with the result that the working profit for the quarter amounted to £112,699, an increase of £61,818 over the quarter ended 30th June. The development footage sampled totalled 7,560 feet, and gave the following results: Payable, 5,840 feet, having an average value of 24.5 dwts. over 15 inches of reef. Unpayable, 1,720 feet, having an average value of 11.2 dwts. over 14 inches.

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Gold and Currency Problem.

MORE PROS AND CONS—WELL-KNOWN MINING AUTHORITY'S VIEWS—"MERELY DEBASING THE COINAGE."

It is gratifying to find that the gold question, as dealt with in our last issue, has provided the topic of the week in mining and business circles, and we have been favoured with many expressions of opinion—some of them favourable, most of them unfavourable—to the views expressed and quoted by us. For the benefit of those who may have missed our last issue, it may be recalled that in our issue of September 3, under the heading "A Real Solution of the Currency Problem at Last," we wrote strongly in favour of the suggestions that the true solution of the gold and currency problem in countries with depreciated currencies, lay in abandoning paper money for gold, no doubt with units containing far less gold than their pre-war money. Since then no less an authority than "Barclay's Bank Monthly Review" came out with support for the proposal, and the Chairman of the Federation of British Industries, Sir Peter Rylands, has also put it forward as the only and the better alternative to deflation. *The Statist*, by last mail, had a long and closely reasoned article in favour of the idea; and we quoted passages therefrom giving the arguments in detail for making "the paper currencies of all countries which were formerly gold using, convertible into gold, not at the pre-war ratios, but at the values as measured by the actual exchange rate with the United States dollar at the time chosen for taking this step, or the average exchange rate over a detailed period." Needless to add, the net effect of the adoption of this proposal, thus backed in such influential quarters, would be to stabilise the "premium" on gold, to the direct and obvious benefit of the Rand gold industry.

An Adverse View.

In the course of conversation during the week with one of the leaders of the industry we learned that these views did not commend themselves, that the cardinal fact that Great Britain still owed the U.S.A. 1,000 millions and that any scheme to increase the value of gold would be merely augmenting the value of that country's great gold reserve were the governing factors in the situation. This authority, for whose opinion we have the greatest respect, went on to say: "To debase our coinage does not alter real values. It is only a pretence and makeshift." He then proceeded to analyse some passages in our last issue. "Take," he said, "your sentence: 'It is necessary to comment on the main principle involved—namely, that Governments which, through the exigencies of War and post-War finance, have allowed the value of their currencies, expressed in terms of gold or commodities (and, of course, the value of their Public Debts), to depreciate by the process of inflation, are to be allowed to fulfil their obligations by repaying them at the depreciated value.'" "This simply means reducing their claim!" Again, take the following passage in your article: "If it were possible to pay off the bulk of our Debt last year, when prices were at the peak, and when, consequently, the commodity value of the Debt was greatly depreciated, it is hardly conceivable that the repayment would occasion a general outcry among the holders, though in reality the Government would be paying back much less than it received." The reply to this is: "That the commodity value of debt rises and falls with commodities is a fact. But if repayment is to be made on the basis of value of the commodities that were supplied and caused the debt, then the only just amount repayable would be the amount that would return with interest the commodities (or money) advanced. That would be a sort of judgment of Solomon and would involve knowing exactly what the debt was due to. But this form might not be acceptable because many of the commodities for war purposes were supplied at abnormal prices, and the same commodities might in times of peace and at leisure be supplied vastly cheaper. Hence the money value of the debt can be the only standard

applied unless the creditor—appreciating that the War was his War too, and that he should bear a share of the abnormal prices—agreed to reduce *arbitrarily* the amount of his claim." Then take the sentence: "We do not suggest, of course, what is obviously impossible—that the Debt should be redeemed in the near future—but if our proposals are carried into effect the real value of the Debt will be more or less permanently fixed, so that the payment of a given nominal amount of the annual interest charge or of the principal would over a number of years represent approximately the same effort on the part of the Government." But once having debased coinage, what is to prevent further debaseure? "Again you say: 'Under existing conditions it is impossible to foretell with certainty the course of prices during the next few years. If the present inflationary finance of the Government should, in conjunction with a trade recovery, bring about a rise in the price level, the commodity value of the Debt would decline, to the disadvantage of the holder. If, on the other hand, prices should fall, the real burden of the Debt would be correspondingly increased. The same applies to private as well as to public debts.' True, but the only cure is the stability of exchange due to gradual parity in the imports and exports." "Finally," said our informant, "debasement is exactly equivalent to issuing paper—to the extent indulged in—and the appetite is apt to grow!" We hope we have printed the views of this authority in as nearly as possible his own words. They certainly supply a useful corrective and we shall take an early opportunity of dealing more fully with them.

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AT 11 A.M.

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- C.—FARM "TARENTAALPAN," No. 1858. District Pietersburg, in extent 647 morgen, 412 square rods.
- D.—FARM "LEKERSVLAACH," No. 1665. District Pietersburg, in extent 937 morgen, 554 square rods.
- E.—FARM "MODDERPIT," No. 884. District Pietersburg, in extent 807 morgen, 22 square rods.
- 3.—Certain three Prospecting Contracts over three portions of FARM "PALMIETFONTEIN," No. 697. District Potchefstroom, in extent respectively 171 morgen, 564 square rods, 253 morgen, 448 square rods, and 123 morgen, 416 square rods. These are granted for a term of 99 years from 15th March, 1895.

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New Developments in Ore Treatment on the Rand.

THE ALL-SLIMING PROCESS AND WHAT IT MEANS—AN EXPLANATION BY ITS FIRST ADVOCATES.

By G. A. & H. S. Denny, in the "London Mining Journal."

Experiments on the Springs and Brakpans.

The condition of things in the gold mining industry of the world has been causing considerable discussion recently. The Rand, as the greatest gold producing centre, is naturally the field upon which the interest is focussed. It is incontestable that the continuance of operations there on the present scale is dependent primarily on the status of the gold premium, and that in its turn is governed by the dollar exchange. The highest authorities believe that the premium must continue for a long period, but there is no guarantee that such will be the case. It may change quickly, and therefore the situation is precarious. It is generally believed that, with the disappearance of the premium—which involves the adjustment of exchanges—an accompanying levelling process in the cost of labour and material will automatically arrive to offset the loss. But will it? Certainly something in that direction may be counted upon, but it is expecting too much to suggest that it will do everything. The industry must in any case help itself by improvements in method, and it is encouraging to note recent utterances by leaders of the industry regarding development in ore treatment methods; and in this connection the following extracts from official statements are informative:—

The chairman of the Springs Mines, Ltd., at the meeting held at Johannesburg on May 17, 1921, said: "... Certain tube milling experiments which were initiated at Brakpan Mines are now being conducted at Springs Mines, and if the promise of success which they show is realised, your directors and consulting engineer will take the fullest advantage of these results when considering the advisability of installing additional plant. The success of the experiments is of special importance to the company, because it would enable us to adopt a variation of the existing standard process at a considerably smaller capital outlay."

While the manager of the Brakpan Mines, Ltd., in his report for the year ended December 31, 1920, wrote: "... Tube Mills.—The experimental plant for investigating the problem of feeding tube mills with a product that has not passed through the stamp mill worked very successfully. The experiment was eventually transferred to Springs Mines, where improved facilities were provided."

The £ s. d. of the System.

A perusal of these two extracts naturally gives rise to the questions: "What is the real bearing of these alternative measures on the economic position of the mining industry?" "To what extent is it applicable to existing treatment plants?" "Is its application limited to new installations?" "Will it have any important effect on production cost generally, or is it something entirely for the future?" "How will it affect Brakpan or the Springs Mines returns?" "What benefit in £ s. d. will the shareholder get?" "Does it mean that lower-grade ores can be treated at a profit?" "Can it be applied to the old mines of the Central Rand, to give them a new lease of life?" "Is it, in fact, of material benefit to the shareholders in the Rand gold industry as a whole, or is it merely a point more of metallurgical and technical than of commercial interest?"

These are probable some of the questions that must agitate the mind of the average shareholder who reads the above extracts, and there is nothing in the reports to guide him to the answer.

The literal interpretation of the statement made by the chairman of the Springs Company—viz., "The success of the experiments is of special importance to the company, because it would enable us to adopt a variation of the existing standard process at a considerably smaller capital outlay"—does not suggest that the innovation will give any

reduction of operating costs, nor does it imply that it may have any influence on existing equipments, so that, without further explanation, the statements are vague and indeterminate.

The *African World* of July 30 published an interview with Mr. J. S. Wetzlar, the managing director of the Consolidated Mines Selection Company, who had just returned from South Africa, and at this interview Mr. Wetzlar is said to have expressed the following views:—

"The All-Sliming Process.—The experiments which had been carried on at the Brakpan Mine originally, and now at Springs, for the purpose of seeing whether the stamp battery could not be eliminated, were no longer an experiment. A complete unit was now at work at Springs and was successfully treating the ore. Without going into technicalities, the idea is, roughly, to eliminate the stamp mill and the sands treatment, which would actually result in the all-sliming process, one of the subsidiary advantages of which would be to settle the question of gold thefts. A high percentage of extraction is possible by the process, which will effect a considerable saving in capital expenditure for plant, as well as important economy in working. The success attained meant a great deal for the future of the Rand generally, as well as for the companies with which he was associated, as the question of the provision of further plant for increasing the output would presently have to be settled."

It will be noticed that Mr. Wetzlar goes much further than the chairman of the Springs Company or the manager of the Brakpan Company. (See footnote.)

Treatment of Ore.

In order to understand the trend of these various statements, it is necessary to explain that in ordinary practice the broken ore raised from the mine is first passed over a rough sizing screen, called a grizzly, the function of which is to separate the "fines" from the coarse rock. It must be understood that in blasting the rock underground a certain percentage of "fine" material is made, and this varies in different mines, depending on the nature of the rock, the width of the slope, the particular type of explosive used, etc.

When charged on to the grizzly the "fines" pass through the bars into bins, from which they are conveyed direct to the stamp mill bins. The coarse material passes through one or more crushers, and then goes over sorting tables or belts, and the sorted rock goes to the mill bins to join the "fines." The contents of the mill bins are fed to the gravity stamps.

The experiment made at Springs consists of passing the "fines" direct to tube mills, instead of conveying them to the stamp mill bins, so that gravity stamps for the further reduction of the "fines" are eliminated.

"Fines" may include anything from the fine powder up to 2in. cubes, depending on the spacing of the bars in the grizzly, but in the case under notice probably nothing bigger than 1in. cubes would go direct to the tube mills.

The effect of the alteration is to take a certain amount of work from the stamp mill, thereby leaving that mill with a bigger capacity for coarse rock; and assuming the "fines" to represent, say, 50 per cent. of the total ore from the mine, the stamp mill would be relieved to that extent. The tube mill capacity, however, would have to be increased proportionately, and as the capacity of a tube mill is directly relative to the size of the material in the feed as against the size of the product required from the discharge end, the number of additional tube mills required, and the horsepower absorbed by them, would be dependent on these two points.

By adding tube mills, therefore, to an existing plant the mill capacity would be increased proportionately to the amount of "fines" diverted in the manner suggested. In a new equipment of combined stamps and tube mills the number of gravity stamps for a given output per day would obviously be proportionately less.

It is implied in the official extracts above given that there is a considerable margin in favour of by-passing the "fines" to go direct to the tube mill.

Elimination of Stamp Battery.

By eliminating the stamp mill altogether, as contemplated by Mr. Wetzlar, the process of reducing the ore to a fine powder resolves itself into (1) stage crushing with coarse and fine crushers, followed by rolls or ball mills or edge runners, with final grinding by tube mills or grinding pans; or (2) stage crushing with coarse and fine crushers, followed by tube mills only.

In the first case, the combination of rolls or ball mills with an edge runner of the Chilean mill type would be designed to reduce the ore to approximately 30-mesh, and this would be further reduced in the fine grinding plant to 150 to 200-mesh. In the second case, a coarse product of about 1in. cubes maximum would be fed direct to the tube mills.

The tube mill is essentially a fine-grinding machine, and does its best work within fairly narrow limits—that is to say, its efficiency from a power standpoint will be greater in the second case cited above than the first. For practical purposes, however, the feasibility of satisfying the theoretical requirements must largely depend on the scale of operations. On a small plant the supervisory labour and all overhead charges must be kept down to the lowest limit, and it is usually necessary to sacrifice something in the direction of efficiency in order to save disproportionate charges in other directions. On the other hand, large-scale operations provide the right basis for reducing the comparative weight of overhead charges, whilst, contrariwise, losses in mechanical efficiency become increasingly important.

The development of the mining industry of the Witwatersrand in South Africa has very clearly proved that for the treatment of its low-grade ores there is no alternative to large-scale operations. The capital outlay essential to the establishment of safe development and ore reserve conditions calls for a big turnover to cope with the demands of capital amortisation, interest, and operating profit, and hence the installation of ore treatment plant may only be considered in that light.

The extracts from the official reports above cited do not hint even at modifications of present methods beyond the domain of crushing and grinding, but Mr. Wetzlar boldly suggests that the "all-sliming" principle is to be followed in the subsequent treatment of the ore.

Present Process of Gold Extraction.

In order to make the meaning of this suggestion clear, it must further be explained that present practice on the Rand includes the following operations:—

1. Coarse crushing.
2. Sorting.
3. Fine crushing.
4. Stamp milling.
5. Amalgamation process taking the entire pulp from stamp mill.
6. Classification and separation of coarse material to go to the tube mills.
7. Tube milling of coarse material and secondary amalgamation treatment of finely-ground products.
8. Separation of sand and slime.
9. Separate treatment of sand by percolation methods with cyanide solution.
10. Separate treatment of slime in cyanide solution by decantation method or filter pressing.
11. Extraction process for recovering the gold from cyanide solution.

The All-Sliming Process.

The all-sliming process eliminates:—

1. Stamp milling.
 5. Amalgamation process.
 7. Secondary amalgamation process.
 9. Separate treatment of sand.
 10. Separate treatment of slime.
- and substitutes for these:—

1. Finer crushing and increased fine grinding capacity.
- 5, 7, 9, 10:—

(a) Circulation of cyanide solution through the whole operation of fine grinding classification (so that, instead of erecting huge, cumbersome plants for water settlement of the classified products and subsequent treatment by cyanide, the process of gold solution begins in the fine grinding plant).

(b) Reduction of the whole of the ore to 150 to 200-mesh.

(c) Agitation of the pulp in suitable tanks.

(d) Separation of the gold-containing cyanide solution from the treated fine material by filter pressing.

The objects of the modifications are:—

1. Substantial reduction in capital outlay on plant.
2. Substantial reduction in labour and stores in operating costs.
3. Appreciable increase in recovery.
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These indicated improvements are the inevitable result of the alterations in practice above outlined, and their importance to the mining industry of South Africa is incalculable. But revolutions in cost of production are not to be expected from the mere elimination of the stamp mill, quite apart from the fact that many companies are unable to afford the change. That is the only one step in the programme. To achieve any really radical improvement, the whole economics of mining and metallurgy must be attacked.

In a series of short articles, the writers will deal with the salient feature of the mining and metallurgy of the Rand, in the hope that the issues above indicated may be helpfully elucidated. As far as possible, technicalities will be avoided, in order that the issues may be made plain to the non-technical reader.

[Since the above was written the Springs Mines, Ltd., has issued the following notice:—"Directors have decided in extending reduction plant to discard stamp battery and plate amalgamation and adopt all-sliming of ore and direct cyanide treatment. Decision come to as a result of metallurgical experiments, and will result in reduced capital expenditure, probable saving operating costs, increased extraction gold contents."]

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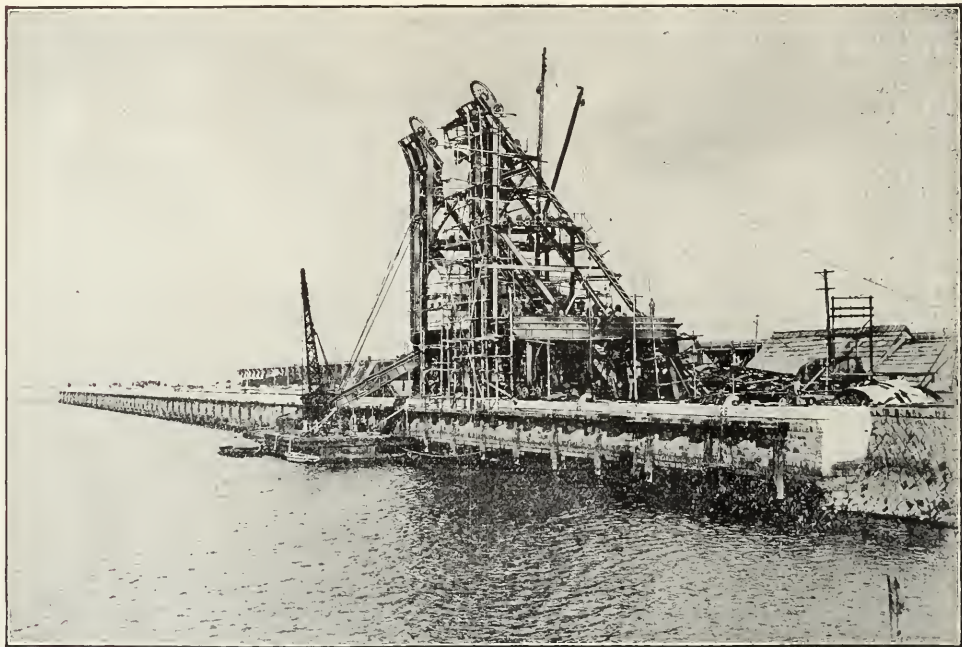
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Efficiency and Economy on the Mines of the Rand.

By L. P. Sheridan.

The majority of the Rand mines are to-day deep-level. Consequently, owing to pressure at depth, the actual breaking of the rock is an easier process now than in the early days of Rand mining. Hence mining is fast becoming a lost art on these fields. In the department of the actual drilling and blasting of the ore, little hope can be held out for a greater efficiency in the economic use of workers under the present system, *i.e.*, the gang system. Even if the colour bar were removed, the gang system would still survive, a semi-enlightened savage directing drill holes and firing same, instead of the white miner. In this respect it is very problematical if a lowering of working costs would accrue, when we review the psychology and mentality of the ordinary Bantu.

My experience of the latter is, that he merely attains an aptitude to act correctly through the repetition of the act, and not by reasoning the job out. To illustrate my point, I have had the same boss boy assist me for years in starting holes, and while he could approximately point out the correct place to start a hole as regards burden and maintaining a stopping width, he could never determine where the hole would end, *i.e.*, he would either go "heavy" or "light." The inability of the native to take an alignment and keep it is proverbial. I have tried them to take a sighting in a leading, but here they also failed. I have taken the direction of a socket by the orthodox fashion of washing out



Underground on a Rand Mine.

under a force of water, inserted the charging stick, started the hole 6 ins. away, but coming round again found the native deviating and likely to intercept the socket, although I left the charging stick inserted in the hole. I often marvel if the Mines Inspector came round, would he consider that the socket was properly plugged?

To my mind, efficiency can be improved and working costs lowered mainly through the more efficient and economic handling of the broken ore. Here the savage is in his element and primitive environment, the pick and shovel come natural to him. It is a department of mining that is to-day neglected. The men (to my recollection) who are retained as trammers and lashers hold their jobs through being good slave drivers.

The overseer in charge of a shovelling gang should be a good exponent of the navy's art, then he understands his job and can judge if efficiency is being "put in" by every individual of his shovelling gang. Mistakes one often sees are "boys" crowded in the working place without room to use themselves efficiently—old and broken shovels in use—these should be scrapped immediately they show impairment—the unskilled use of the pick—the raking motion not being imparted, picking out the oversize stuff before starting, this is a bluff of the native that "goes"; bad loading

platforms, and worse stope boxes. The modern system on the Rand is to stope out from level to level, leaving no drive pillars, so boxholing no longer prevails. Nevertheless, stope boxes and loading platforms must be installed—in very flat stopes the rails are laid upside the face. The construction of these platforms and boxes has always left much to be desired; instead of being a facility provided by the management for the removal of the ore, they are often a hindrance and obstruction.

The construction of a good stope box connotes that the excavation where the box is to be erected must be of ample dimensions. The stope boxes should be of a standard size and dimensions—the pieces should be interchangeable, and belted together, the members could be made on the surface excepting the bearers or legs, they can be easily assembled, and when required nearer the stope face can be pulled down and re-erected.

The size of a stope box is somewhat determined by the size of the kokopan. The ordinary mine car is 40 in. by 36 in., and stands 42 in. high on rail. Your box has got to discharge into this space and without spillage. To ensure this some designers taper the boxes, the height of sides 36 in., above which should be a strong brow-piece bolted through the stull pieces; this gives strength and rigidity to the structure. A double-box containing above features would be a potent factor in reducing working costs.



Another View Underground on a Rand Mine.

The principle of the Kimberley chute could be introduced in the stope box in this manner, that behind the stopping boards the deals should extend far enough to hold a load for the ordinary mine car, below the stopping boards the floor of the box should extend far enough to provide space for spillage to be lashed back into the box, and thus providing against fouling of the track. To avoid the boxes being damaged by blasting, a good plan is to leave sufficient stuff in and around the boxes to act as a shield against flying rocks. The angle of the floor of the box should be about 25 degrees; this provision prevents the entire weight of the column of ore pressing on the stopping boards; this will allow the boards being easily opened and closed. At will, either box could be used as a waste box, if it is desired to sort in the stope. The waste could be used for pigstyes and walling up the drives, as there are no pillars. Timbermen are often held up for waste for packs, many times having to drill and blast up footwall for their purposes. This sorting is also desirable from the recovery standpoint. The ordinary "underground" man sorts waste because to his mind it contains no gold. Few realise that this waste after cost of haulage and reduction goes to the dumps carrying a few shillings worth of gold to the ton. Many underground officials are out for a tonnage, and tram anything that will help to make up a ton.

If the process of gold recovery was more generally known and instilled into the Rand miner, I think that underground sorting could be introduced to advantage. The æsthetic side of man's nature revolts against the nullifying or destruction of a process that is grand and beautiful in itself, and thus I think miners could be induced to do sorting in their stopes. If 10 per cent. were sorted, a double enhancement of recovery accrues: (1st) the waste sorted out is not enriched by the gold-bearing cyanide solutions; (2nd) a longer period of treatment in the reduction works can be given to the mine-product.

In lashing in a flat place and development ends (drives) chutes and flat sheets should be more extensively used. In flat stopes on the Witwatersrand chutes are frequently installed, but the writer has not seen the use here of the flat sheet in drives. In Rhodesia I tried them to great advantage. When the end is lashed clean put down a flat sheet or deals, say four 9 by 3 fastened together by struts or stays (on bottom side, of course), far enough from the face to allow the bar being rigged—a foot clearance—to foot or hanging wall side can be allowed—lash the stuff from the "dressing down" on to the flat sheet; this will suffice to keep flat sheet being displaced by the cut and round going off. It is possible also to further provide against the above contingency by spragging the deals or flat sheet in position.

The advantages accruing from the above practice are many and self-evident. The shovel glides easily along the smooth surface, the piled up stuff runs to the centre to fill the void left after each shovelful, an end can be lashed clean in 100 per cent. less time and with 200 per cent. less fatigue to the shovellers, a larger shovel can be used; in fact, the ordinary coal shovel is suitable. The present shovelling from a rough floor is slow and laborious, the point of the shovel being obstructed by big pieces of stuff and the uneven surface of the floor. The above suggestion deserves introduction to these fields.

At the risk of being tiresome, I would reiterate that it is only through evolution that the native will become a skilled worker. The period of evolution may be centuries. Any immediate reduction of working costs under the present system must be achieved through using the native as an unskilled worker. The above specific suggestions, to my mind, would reduce working costs, in the number employed, the expense of material involved, lessen the laborious toil of the mines, and thus create a more agreeable atmosphere deep down in this old earth. I would suggest more continuity of supervision from the stope face to the residue

dumps. The different operations and phases in the winning of the precious metal are carried out in snatches as it were, little attention being given to co-ordination. The higher managerial staff doubtless possess, or should possess, the necessary qualifications for their respective departments; yet it appears to me desirable that an official should studiously watch the gold contents from the stope to the strong room, because leakages may occur at any point in the circuit.

Grain Elevators: the Official Explanation.

Tenders for the grain elevators have been carefully considered by the Railway Administration, and it has been decided, subject to the arrangements of certain formalities, to place the whole of the contracts, as detailed below, with Mr. A. W. Menkins, the tenders by that gentleman being substantially lower than those of any other firm or than the lowest tenders for each separate section grouped together. The work of construction of the grain elevators is divided into four separate contracts, as follows: Durban, terminal elevator, 42,000 tons storage capacity; Capetown terminal elevator, 30,000 tons storage capacity; 17 country elevators, group 1, of varying storage capacity; 17 country elevators, group 2, of varying storage capacity. It is stated that Mr. Menkins is a Canadian by birth, and has recently concluded work on a large terminal elevator at Globe Island, Sydney, where he was responsible for the execution of the whole construction work on behalf of the main contractor, the late Mr. Teesdale Smith, and that the successful contractor is a man of the highest qualifications in regard to elevator construction. There is reason to believe that almost the whole of the cost of the buildings, other than for structural steel, will be expended in South Africa, and by far the greater proportion of the machinery will be purchased in Great Britain.

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A Visit to the Kilo Goldfield.

RHODESIAN'S TRIP THROUGH CENTRAL AFRICA—MR. H. C. FLETCHER'S INTERESTING JOURNEY.

Mr. H. Clarkson Fletcher, who recently made an extensive tour in Central Africa, has written for the "Bulawayo Chronicle" the following article, which gives an account of the celebrated Kilo goldfields in the Belgian Congo, and an interesting description of a journey through the heart of Africa.

A glance at a good map will show that the Kilo goldfields are situated in the north-east corner of the Belgian Congo, just west of Lake Albert Nyanza. They can be reached via Elisabethville and the Congo River to Stanleyville, but by this route one has a 42-day safari through the 750 miles of equatorial forest which lies between Stanleyville and Kilo. The quickest and easiest route is by rail from Mombasa to Lake Victoria Nyanza. Having received an invitation from the Government authorities to visit this little-known goldfield, I at once decided to make what looked like being a most interesting trip, and left Bulawayo for Beira in June, sailing by a very comfortable boat, the S.S. "Karoa," for Mombasa—a six days' trip—calling at Mozambique, Dar-es-Salaam



On the way to the Kilo Goldfield.

and Zanzibar. I found these old East Coast ports most interesting, especially Zanzibar with its old Arab buildings and mixed population of Arabs and natives, making it a perfect microcosm of the East.

Tanganyika Territory, with its principal port Dar-es-Salaam, swarms with its new Civil Servants busily engaged trying to restore it to its pre-war condition. Here the Indian appears to be taking the place of the white man very rapidly. Already the principal buyers at the Government enemy property sales have been mostly Indian firms, who have also purchased a number of the principal buildings, including the Kaiserhof Hotel at Dar-es-Salaam. Indian penetration on the East Coast is a very real thing. Trade of all kinds on the coast is dead, and will no doubt remain so until the Home markets revive. The Germans apparently fully realise the position and do not appear to be in any hurry to return to their old haunts. In fact, I was told that in many cases German firms have granted their agencies for a short term of years to some of the big Indian firms.

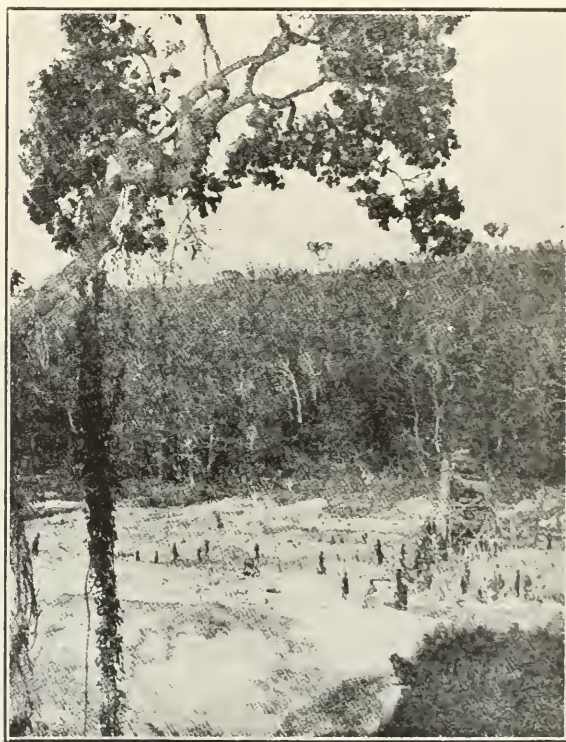
Kenya's £5,000,000 Loan.

I found Mombasa in quite a cheerful mood, Kenya Colony having just been granted a loan of five millions by the Imperial Government, and they are in hopes of getting a further four millions later.

Messrs. Paulings had secured a contract for a new wharf at Kilindini to cost £1,200,000, and I was told that another company was about to spend £500,000 on a wharf scheme at M'Barki.

At Mombasa I had the luck to engage a good Swahili Arab as my personal boy. This is absolutely necessary if one wants to travel with any degree of comfort and not to lose most of one's kit.

The journey by rail from Mombasa to Nairobi proved very interesting. The line, which for some reason was made metre gauge, is run entirely on the lines of the Indian railways. Fares and rates appear to me to be higher than in Rhodesia, and I should say 90 per cent. of the staff are Indians or Goans. Some of the locomotives burn oil fuel. Oil is also used by the Lake steamers. For meals the train stops and one feeds in well-run dak bungalows.



Prospecting in the Congo Free State.

Leaving Mombasa, the line reaches the mainland over the fine Macupa Bridge and gradually rises to the high veld. At Voi—104 miles—a branch line runs south to the foothills of Kilimanjaro, connecting with the Tanga Moshi line. At Magadi—283 miles—a branch line runs to the Magadi soda lake.

Big Game by the Line.

After leaving Simba—231 miles—a considerable amount of game was seen quite near the line. We disturbed giraffe, hundreds of zebra, wildebeeste, hartebeeste and gazelle of various kinds, the numbers increasing when we passed through the game reserve on the Athi Plains near Nairobi. The country from Voi to Nairobi reminded me of the veld round Mafeking—short grass with thorn trees dotted about, and open rolling veld.

Nairobi—330 miles and 5,600 feet—owes its position to being the original railhead, and it would appear that the Indian coolies who were imported to build the line have never left it, as in the Municipal area the Indians outnumber the whites by about nine to one, and a big Indian bazaar is situated in the centre of the town. The residential suburbs are well laid out on the rising ground around the town, and many charming houses and gardens are to be seen. Unfortunately I was there while a bad drought was on, and at a time of year when very little is seen of the sun owing to heavy clouds, but one always has to wear a helmet. I found the two hotels of the town very comfortable and far better than any we have in Bulawayo. Good building stone is obtained locally and there are a number of well-designed buildings in this stone, but the town itself does not compare favourably with Bulawayo or Salisbury.

The whole of the colony appeared to be suffering from a very severe depression, due to the state of the Home markets and the alteration of the currency from the one-and-fourpenny rupee to the 2s. florin.

Beyond Nairobi.

After spending a few days getting together kit and provisions likely to be required on Lake Albert and in the Congo, I left for Kisumu, on Lake Victoria. Leaving Nairobi, the line passes through some very fine scenery and reaches an altitude of 9,000 feet on Mau Summit. All kinds of game can be seen grazing close to the line. At Uplands—6,000 ft.—there is a very fine bacon factory, turning out most excellent bacon and hams. At Lumbwa there is a large creamery which supplies excellent butter to the whole of Kenya and Uganda. I understand that it is now decided to proceed with the construction of a branch line which, starting at Nakuru, will run north-west, tapping the Uasin Gishu Plateau; presumably it will terminate at Port Victoria on Lake Victoria Nyanza. Luckily I had to spend only one night at Kisumu, as the heat, even in the cool season, is very trying. Kisumu—3,700 feet—is the headquarters of the Victoria Nyanza Marine, the Government having a small dockyard there with dry dock and well-equipped workshops.

Next morning I sailed on the mail steamer Clement Hill (1,100 tons, twin screw), reaching Entebbe the next day. Entebbe is the headquarters of the Government, who evidently do not wish to encourage visitors, as the nearest hotel is 28 miles away at Kampala, the native capital. Leaving Entebbe that day, the steamer called at Port Bell, which is connected with Kampala by a railway 6½ miles long, and reached Jinja next day. Here, 20 minutes' walk from the jetty, brings one to the Ripon Falls, the source of the Victoria Nile. The falls are only about 20 ft. high, but a large volume of water falls through three openings in a rocky bar on the lake short and drops into a large pool swarming with big fish and crocs. From Jinja one takes the Busoga Railway, which bumps and rattles along 61 miles to Namagasali, on Lake Kioga. Here the Government have a slipway and shops for repairing the lake steamers and barges. Namagasali is a hot, unhealthy spot, and I was glad to sail the same day in the small stern wheeler S.S. "Speke," reaching Port Masindi—130 miles—next day. Lake Kioga is really a vast papyrus swamp with a few open waterways, which often get choked with dense sudd. What with the heat, mosquitoes and lake flies, I was very glad to get ashore again.

Calling on a King.

From Masindi Port the road runs to Masindi and on to Butiaba, a distance of 100 miles. Passengers and goods are carried in 2-ton Albion motor lorries driven by natives, and I found the trip full of exciting moments, especially when sliding down the 1,500 ft. escarpment to Butiaba on Lake Albert. Masindi, where one spends a night, is a pretty and well laid-out station boasting a District Commissioner and a native king—the King of Bunyoro—who lives in a well-built bungalow. I called, but the king was away, so I signed the visitors' book and left a card. Masindi has figured largely in the history of Uganda, Sir Samuel and Lady Baker making it their headquarters when they came down the Nile to the Albert Nyanza in 1864 and 1872.

Butiaba—2,000 ft. altitude—the headquarters of the Lake Albert Marine, will in a few years be quite an important place. At present it consists of a few bungalows for housing the white staff. From here the S.S. "Samuel Baker," a small flat-bottomed paddle steamer, drawing only 3 ft. of water, leaves twice a month for the Belgian ports on the west side of the lake, and also goes 150 miles up the Nile to Nimule, in the Soudan. I found the steamer ready to sail and, after a rough passage, we reached Kasenyi, on the Belgian side, next morning, having done only 65 miles. The boat was designed for the river and is quite unsuitable for the lake, which is subject to very violent storms. Even an ordinary breeze makes it necessary for her to run to shelter.

Kilo Goldfields.

Kasenyi I found to be a collection of wattle and daub huts placed close to the lake—an eight-mile plain covered with high grass and thick scrub extending to the foot of the escarpment, which runs the full length of the lake, rising to a height of from 5,000 to 6,000 feet. This place is very hot and extremely unhealthy, and one could not help feeling sorry for the few Belgian officials who are here running the post office, customs house, and the Kilo mines transport. I was glad to leave that afternoon by Ford lorry, and after an exciting climb we managed to reach Bagoro, at the top of the escarpment, where we spent the night. Continuing our journey the next day we reached the gold bearing district



Another View in the Congo Free State.

of Kilo and stayed at the Nizi Mine, where the quartz reefs are being crushed by two 4 ft. Chilean mills; and the Nizi River washed for alluvial. From the Nizi I safaried to Kilo—20 miles away—which is the headquarters of the district administration, the Governor having very kindly invited me to stay with him. After a few days spent in inspecting the various reefs and alluvial, I went on 20 miles to the Shari Mine and spent several days inspecting some promising looking quartz reefs and a small steam dredge working rich alluvial in the Shari river. The whole district is one mass of steep hills covered with a big depth of red (gold formation) soil, the hills running down to ravines filled with big trees and dense vegetation, through which flow small alluvial streams. It is a most difficult country to travel in, especially at the time of year I was there. In these latitudes there are two rainy seasons, and at the time of my visit the big rains were just over and the whole of the country was covered with 10 ft. elephant grass, so that no game could be seen except elephant, which could not be got at. There is no accommodation for travellers and no stores can be bought in the country. However, this did not cause me any inconvenience, as I was most hospitably entertained by the Governor and other officials at the various mines.

From Kilo the path to Stanleyville—750 miles—goes through the full length of the vast equatorial forest which stretches the entire distance. I discussed the idea of returning via Stanleyville and Elisabethville, but as it meant walking or being carried for 42 days through black forest, I thought better of it.

The gold-bearing formation appears to extend from Kilo through Mongbwalu, which is an important alluvial centre, to the alluvial diggings at Moto—180 miles. As no reefs have been developed there as yet, I decided not to make this trip and, after spending 14 days in the Kilo district, I returned to Kasenyi. I felt considerably relieved to see the lake again after tramping through so much hilly country and elephant grass under a vertical sun; luckily I kept very fit. From the top of the escarpment the lake, shimmering in the heat, presented a wonderful sight, and it was interesting to realise that one was on the spot where Stanley found Emin Pasha in 1888. Now an up-to-date wireless station transmits messages to Stanleyville.

Prince William of Sweden.

On reaching Kasenyi I found that I had to wait two days for the steamer, not a pleasant prospect, as I had no tent and the heat and mosquitoes were very trying. Luckily, the agent of the Kilo Mines very kindly let me camp in his office. The next day Prince William of Sweden and his party arrived on their way up the Nile to Cairo. He had been out since January with a safari of 400 porters shooting and collecting round Lake Kivu and Rewenzori for the Stockholm Museum. His party consisted of Count Gyldenstolpe, together with a taxidermist and cinema operator. Unfortunately, the Prince had been laid up for two months with spirillum fever at Irumu in the Congo, and was still hardly able to walk. They were anxious to get back to civilisation and were all very pleased when the "Samuel Baker" steamed in next day, and we sailed at once. Instead of returning direct to Butiaba we steamed round the south end of the lake, where we got a good view of Rewenzori, reaching Butiaba the next evening. From there we steamed up the White Nile 150 miles to Nimule, a Sudanese post on the border of the Soudan. Here the Prince was met by the Governor of Mongala and left at once on a six days' safarai to Rejaf, where he would catch the steamer for Khartoum, 10 days' steaming.

Down the Nile.

I found the trip up and down the Nile the most interesting part of my journey. Both Lake Albert and the Nile gave me the impression that one was in an earlier geological age. Here was the source of the mysterious river that had baffled explorers for centuries until Sir Samuel and Lady Baker, after terrible hardships, discovered Lake Albert in 1864.

The river swarms with large crocodiles and hippo, and elephant and various game are to be seen on the banks. It is said that the finest fresh water fishing in the world can be had in Lake Albert, which swarms with fish, the giant perch reaching 200 lbs. weight.

Commander Dugdale, who is in charge, very kindly made the trip more or less of a picnic, and we landed and shot when any game or duck were to be seen. The Prince had a special permit to shoot white rhino, but we only had time to spend one afternoon ashore in the Lado Enclave, or West Nile district, as it is now called. I ran into two, but was unable to get a shot owing to the long elephant grass. The only months for shooting in Uganda and the North-Eastern Congo are December, January and February, when the grass is burnt.

Returning to Butiaba, I left at once for Mombasa, travelling the same route by which I had come. On boarding the S.S. "Clement Hill" at Jinja, I met Monsieur Mazoratti, the new Governor of Ruanda and Urundi, who was going on leave. He had just handed over Kigoia to the British in exchange for these two provinces. We travelled together to Mombasa, and he proved a most interesting companion.

Kenya's Indian Problem.

Nairobi, where I had to spend five days, I found in a state of considerable excitement over the Indian question. Several large meetings had been held and feeling ran high. I was told that the Indians as a whole were quite satisfied with the present conditions and that the agitation was the work of a few extremists of the Gandhi type. It certainly made one think when I saw the members of the Nairobi Club playing an Indian team at cricket on the Sunday I was there.

Owing to climatic conditions, Indians and Goans are necessary for the development of both Kenya and Uganda, but under white supervision. If the Colonial Office gives way to the pressure that is evidently being brought upon it, and the Indians in Kenya are given equal rights with the whites, a great injustice will be done to the present settlers, and the effect will, in my opinion, be felt throughout East and South Africa.

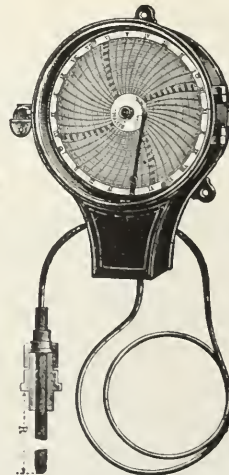
My trip took me exactly three months, and I returned to Bulawayo feeling that, while we have lots of troubles of our own in Rhodesia, I was very thankful that my lot was not cast in a tropical climate under the Colonial or India Office.

Durban Roodepoort Deep.

Total profit for the quarter, £18,807. The improvement in the working profit of £10,418 as compared with June quarter was due to an increase in yield of 352 dwt., and to the price realised for gold being about 5s. 9d. per ounce higher. Development operations were further increased with satisfactory reef disclosures. The Board has decided not to resume shaft-sinking in the new Circular Shaft at present, but the matter will be reviewed again early in next year.

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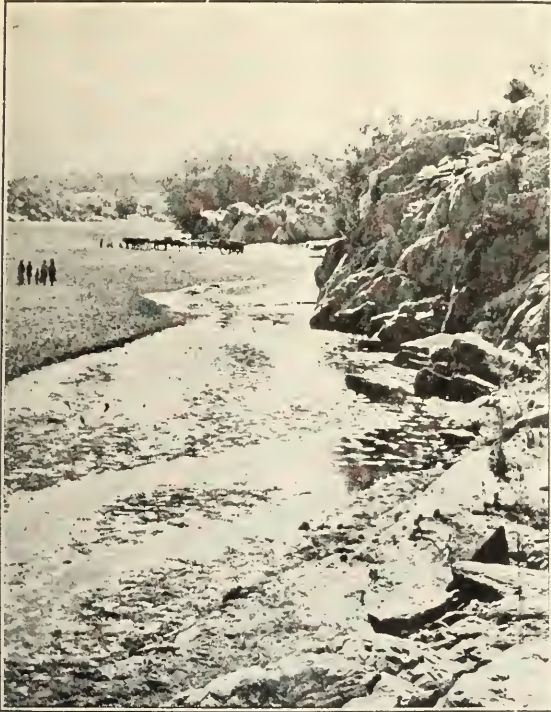
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Prospecting Activities in South-West Africa.

A report from Port Nolloth states that important mineral discoveries have been made by a prospector in that neighbourhood. He reports having found gold nuggets in the



A Typical Scene in the S.W. Protectorate.



Natives with Rotary Pan—S.W. Protectorate.

Richtersveld, evidently proving the presence of an alluvial gold deposit of importance. A large deposit of low grade copper was also discovered. The copper-bearing reef extends for eight miles and is intersected by bands of native copper. In this connection it might be interesting to note that copper has been worked in the neighbourhood of



Prospecting Activity in the S.W. Protectorate.

O'okiep for several years. This fresh discovery of copper probably has some relation to the existing known deposits. The minerals tantalite and molybdenite have also been found.

The gold was found six miles north-east of the Nemees Copper Mines. The copper belt is about fifteen miles south-east of Ansenkehr Drift, and the molybdenite deposit lies south of Kaboos. Tantalite was found in large quantities in Bushmanland.

Dwelling upon the development of South-West Africa, Mr. Alby Wilmot, at the last meeting of the S.A. National Union, gave some impressions gathered during four weeks' tour in that country. He mentioned the inadequate loading facilities existing at Walvis Bay, and how an improvement in that direction would aid in the development of the copper and tin mines, as well as in the export of marble. These remarks would possibly apply to conditions existing in the southern portion of that province where the above-mentioned discoveries have been made.

New Modderfontein: Quarter's Results.

The payable reef disclosures at the New Modderfontein during the quarter ended September 30 were as follows:— Main Reef Leader: Feet, 2,750; reef width, inches, 19; assay value, dwts., 37.1. Total profit: £440,000. Compared with the previous quarter the working profit shows an improvement of £84,792, due to the higher price obtained for gold, an increase in tonnage output of 17,000 tons, and a reduction in working costs of 1s. 7d. per ton milled. Development operations were further extended and continued to disclose satisfactory values.

Railways and Mines.

HOW LABOUR STULTIFIES PROGRESS.

From a Special Correspondent.

When I first drew attention to the fact that it wasn't very unlikely that twenty gold mines would have to close down, if the vagaries of currency depreciated the premium on gold, the only reply I got was that it possibly would be a very good thing. I'm afraid I am too fond of old institutions to accept the retort, but curiously enough the position of shareholders in gold mines is analogous to that of the public in railways. Both have their directors, and both shareholders and the public have infinite trust in their administration, and lastly, both the shareholders and the public get little return, and live on hope. There is an old mining saying that a rich mine makes a manager's reputation, and a poor one often destroys it. It's the poor one I have to deal with. To my mind, enough has never been said of poor mines and too much has invariably been said of good ones. I think that if the directors of companies here had made the public understand what some of these mines had to undergo during the last 25 years, they would have had greater consideration; as it is, I find intense ignorance of the real condition of things. Directors are primarily the servants of their shareholders. In this autocratic centre it has been a good deal the reverse. To be a shareholders' servant one would think that the shareholders would come first and have their first consideration, and if there was to be a struggle the shareholders' interests would come first every time. It applies just the same to the Government direction of railways, for there you would think the public came first. Unfortunately it is not so. The first duty of a director here is to have no unpleasantness and to avoid a fight or strike. The first duty of the Government is to keep the poor indigent and avoid offending labour, and thereby hangs a tale. Let us take one mining company. There are many, but I don't suppose they care for too much limelight. Take the Luipaardsvlei Gold Mining Company. It was floated perhaps twenty-five years ago. A low-grade mine of the first order. Pathetically, it has always worked just under the Plimsoll line of dividends. As a noble supporter of the Government, and labour, it has done extremely well. I daresay in its twenty-five years it has produced some five million pounds' worth of gold. Magnificent! During the War it was called upon to produce all it could to help the country with its gold, and again magnificently it did it. But of what avail all this noble magnificence and patriotism to its shareholders? Its shares are held in England, its board of directors are there; but for twenty-five years it has been nothing else but a great charitable institution for Government, labour, and its servants, for in all those twenty-five years its shareholders have received but thirty-seven thousand five hundred pounds, or seven and a half per cent. I wonder how the Labour Party would like to invest on those terms?

Recently the local chairman made a fight for fairer treatment; but, barring that, the majority of low-grade mines followed their bell wether and sacrificed their shareholders to the labour butcher without even a bleat of resistance. It's just the same with the railways. I have been told that it would pay the Government to give the railways to companies that would take them over for nothing. Personally, I don't think this necessary. Of course, if the public interests are to be continually sacrificed to labour and political sentiment, it is not unlikely that the losses may go on multiplying until we easily lose twenty millions sterling a year. If they do, then it might certainly be a wise thing to give them away, but, on the other hand, say they were investigated and showed a possible 25 or 30 per cent. margin on different working, might there not be plenty of inducement for capital to interest itself? Now I have grave reason to know what railway mismanagement can do, for I sold recently Grand Trunk bonds that cost 110 for 37—and this was due to its unagement and direction; and knowing this, and feeling the smart of the lash, I have no greater regard for the railway management of the Union than I have for that of the Grand Trunk, and if

the one can smash up I'm not certain that the other can't! If there is a margin on the change of management and the new concern could have a capital of, say, £150,000,000—to buy out the Government—fifty millions could be paid in cash and one hundred millions could bear 4 per cent. interest. The new concern would have to find working capital and capital to build new lines. Given that this could be done, look at the strong financial position of the Union. It could proceed with untold profitable propositions. Why, growing timber alone, it could give employment to its indigents and thereby improve the health and wealth of everyone of them. It could spread the waters of its great rivers over endless stretches. It could settle its waste lands, and for a generation or more have no financial fears. I don't say it can be done to-day. I haven't got the offer in my pocket, but I feel it is a sound commercial scheme. I have seen many railways in Asia, Egypt, and other places, financed by some of the cleverest men living, and I know of none they would sooner have handled than the railways of this Union. Of course, if the matter could not be handled with British capital, it would have to remain as it is; because, with their control would go the manufacture of all the material, and if they went into American hands, it would practically become a trade suzerainty over this Union. I am not sure that American capital would not bid for the project, but I doubt whether those that voted for the maintenance of the British flag at the recent elections would, for pecuniary and other reasons, vote to transfer the country's soul to America. Yet, if what we are going through to-day accentuates, measures will have to be found to remedy these evils. The mainstay of this country, I have to repeat, is gold. We cannot complacently view a large number of mines closing down, and we cannot view complacently the fabulous wages and moneys paid to unskilled labour, whilst the farmer with it all finds himself scabbing for a moratorium. As I have said, it is low-grade mines that have suffered and practically for a generation. They have not only been drained dry by Government and labour, but they have been starved for labour. The richer mines have always been able to arrange their labour so that immense unnecessary development has blazed their riches in the advertisement of untold millions; had some of the lower-grade mines had some of that labour, their unfortunate shareholders might have received dividends; but, being corralled to combine for the gain of the rich and the ruination of the poor, they have, as I have remarked before, followed their bell wether to their slaughter. I am afraid that unless a general amalgamation of the mines can be carried out and such measures as removing the colour bar, or a general lowering of wages for them, there is no salvation, and if there is no salvation, then the shrinkage before us will entail further heavy losses on railways, further heavy borrowings, further moratoriums, and, when too late, a revival of the idea of turning over the non-paying railways to companies. With reduction of rates must come reduced costs; labour must come down, all of it, from top to bottom. Deficiencies cannot be met with fresh taxation on the country's supporters; they cannot be met by continuous borrowing. Political cant must be swept aside, even if votes are to be lost. Let there be an honest attempt to meet difficulties. It may take a strong man to master the position. It is only a strong man that can, but it's no use hanging on the bell-rope when you can't ring up the price of gold. The time may be inopportune to deal with railway finance, it may be inopportune to deal with mining organisation, but it is not too late to deal with the economies, which must be tackled at once; and whatever the unpleasantness, facts and figures alone can give the solution. The public are dead tired of politics and the impossible demands of labour.

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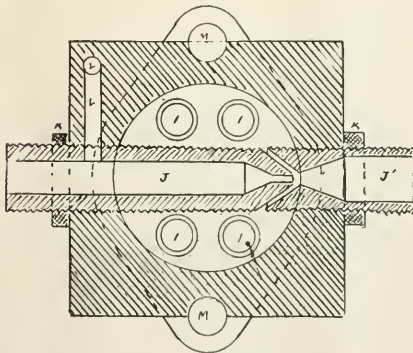
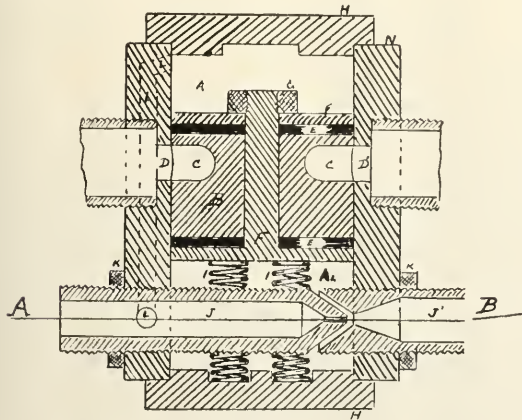
For particulars apply to: "INVENTOR," Box 837, PRETORIA.

Improvements in Fluid Control for Rock Drills.

DESCRIPTION OF PROVISIONAL UNION PATENT No. 849-21.

The invention as shown in accompanying drawing consists of casing "N" bored out to form a cylinder in which there is a piston or plunger "B." The air for the rock drill enters through port "D," and when the piston is at the position shown in Figure 1, the annular space "C" communicates with the port "D1" on the side leading to the machine or rock drill. The water which is used through the axial tube of the machine or otherwise enters pipe "J," which has a constriction or Venturi contraction at its end, which is so arranged that it is opposite a throat at "J1." A port "L" communicates the water pipe pressure with the chamber "A." When the water is flowing it creates a slight vacuum in the chamber "A1." The pressure in the chamber "A" exerted by the water compresses the springs "I" and puts the piston in the position shown in Figure 1.

When there is no water flowing, the springs "I" have no compression against them from chamber "A," therefore will move the piston upwards, thereby shutting off the air supplying to the machine; also, if there is no free egress of the water through the rock drilling machine or other appli-



Section A-B

ances, the water will fill the chamber "A1" and will be at the same pressure as the water in "A," and the pressure exerted on the base of the piston "B" plus the compression of the springs "I" will again move the piston "B" upwards, shutting off the air. Should there be insufficient pressure in the pipe line to that laid down by the various Government regulations, it can be so arranged that the springs "I" will not be sufficiently compressed by the pressure in chamber "A," so that the annular space "C" does not coincide with the ports "D" and "D1," that there will not be an egress of air.

The claims of this invention are as follows:—

- (1) An apparatus so constructed by means of a Venturi tube or constricted area in pipe line, which causes a differential pressure when the water is flowing so as to shut off the air or motive power to a machine similar to a rock drill, when the water ceases to flow.
- (2) It will also perform the same function when insufficient water is flowing, or
- (3) Water at an insufficient pressure.
- (4) It can also be arranged by the size of constriction or jet at the end of tube "J" to pass any desired volume of water.

- "A"—Chamber on one side of piston "B."
- "A1"—Chamber on other side of piston "B."
- "B"—Piston.
- "C"—Annular ring in piston "B."
- "D"—Inlet air port.
- "D1"—Outlet air port.
- "E"—Packing material.
- "F"—Discs or plates to hold packing material.
- "G"—Nut drawing discs "F" together.
- "H"—End or cover plates.
- "I"—Spiral springs in compression.
- "J"—Inlet water pipe.
- "J1"—Outlet water pipe.
- "K"—Locknuts.
- "L"—Port communicating pressure in "J" with "A."
- "M"—Bolt holes for cover plates.
- "N"—Casing.

A letter from Mr. E. Fraser Jones, relative to the above, appears in our correspondence columns.

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EDITORIAL.

THE GOLD QUESTION.

There is reason to believe that the articles in our last issue on "The Solution of the Gold and Currency Problem" and "The Real Value of Gold" have excited much interest and comment, and that they have had the effect of maintaining confidence in the future of the gold mining industry despite the daily weakening in the "premium." Without attempting to repeat or extend the arguments used last week, there are one or two points which may at this juncture be made clear. Thus it should be stated, for the benefit of several correspondents, that the proposal of the London *Statist*, quoted by us, was to make the £1 (paper) convertible into gold at a rate determined by the average level of the New York exchange over a selected period. The effect of this would be to establish a gold parity between sterling and dollars. At present there is none, as British currency is for all practical purposes not a gold but a paper currency. The gold content of the sovereign has obviously at present no influence whatever on the exchange. Here Professor Edwin Canan's latest view may be quoted. He writes: "A good

many of the present currencies, including our own, can easily be got back to their old gold values, and the inconveniences of getting back are, in my opinion, far outweighed by the advantages. Some currencies are too far gone for that, but may be fixed at a rate lower than the old one. Others are perfectly hopeless, and the sooner the world makes up its mind that they are destined for the waste-paper basket, the better both for the countries which own them and the outside world. They will then soon be replaced by sound currency. Historical experience is conclusive on this from the earliest times down to the recent case of Mexico." Professor Canan's view, which we have italicised above, is, it will be seen, practically the same as that which Mr. Samuel Evans expressed at the Crown Mines meeting, and in fairness to Mr. Evans, it should be made clear that he has not committed himself any further than has Prof. Canan. Again, a pointer to the fact that gold is coming into its own is contained in the following extract from Messrs. Samuel Montagu & Co.'s weekly letter dated 22nd September, 1921:—"The Chilean Minister of Finance has decreed that importation duties, warehouse rent, lighthouses and buoys and consular fines will have to be paid in the future in the following way: In July 65 per cent. in gold and 35 per cent. in currency, with the corresponding recharge, and an extra 5 per cent. in gold each month till January, 1922, when 95 per cent. will be payable in gold and 5 per cent. in currency. In February and onwards the total will have to be paid in gold coin." Italy and, we believe, Spain have issued similar decrees in the past month, at least as far as customs dues are concerned, and the net effect cannot but be for good. Every move towards bringing gold back into currency merits our unqualified support; and with the object of obtaining authoritative opinions we have discussed the issues raised last week with several heads of the industry. "Debasing the coinage," it will be noted, is the orthodox criticism of the well-known mining authority whose views are quoted elsewhere in our pages. We leave those views, which we admit are eminently reasonable, to speak for themselves this week, and shall endeavour to deal with them more fully in an early issue.

THE TREATMENT OF RAND ORE.

Metallurgists will be interested in two interesting letters in this issue from no less important authorities in their field than Mr. Alfred James, of London, and Mr. H. S. Denny. Mr. H. S. Denny's letter—to which we gladly give prominence—was evoked by some recent remarks of ours on the introduction of tube-mills; and Mr. James, dealing with some points raised recently in our columns by Mr. Andrew F. Crosse, recalls that we printed in our 21st Anniversary Number in 1912 a valuable account from his pen of the beginnings of the cyanide process on the Rand. We hope in an early issue to reprint some extracts from the paper by Mr. James. In the meanwhile it is noteworthy that the success of the "all-sliming" process at Springs—as already fully dealt with in these columns—has aroused great interest in London and even in America. Messrs. G. A. and H. S. Denny are contributing articles on the subject to more than one of the London papers, in which they voice their well-known views on cyanidation versus amalgamation. In his interesting contribution to our columns recently, Mr. Andrew F. Crosse made some pertinent remarks on the subject. Speaking of the importance of amalgamation, Mr. Crosse compared the neglect to utilise this process, wherever practicable, to the attitude of a shopkeeper who would refuse to deal with any but credit customers. Gold obtained by amalgamation, as Mr. Crosse remarks, is ready cash. In reviewing the recent history of the metallurgy of gold, we note that the *Mining and Scientific Press* says: "It is interesting to note how the mining industry has been swayed locally by fashion; and fashion insists, first of all, on the discarding of what is not strictly up-to-date. All-sliming was and is necessary in Mexico and elsewhere for silver ores, as at Kalgoolie for telluride gold ores, but it was and is unnecessary for the majority of gold ores. Amalgamation was applied during the secondary crushing of Kalgoolie ores because it was practicable and because grinding-pans were

used. Elsewhere tube mills were adopted, in which amalgamation treatment was not always feasible. In Mexico, on silver ore, amalgamation was only partly successful. Silver has a low specific gravity as compared with gold; it occurs mostly as the sulphide; amalgamation was not a logical procedure and was soon displaced by cyanidation. But no similar argument could be advanced in the case of the majority of gold ores; nevertheless, it is apparent that amalgamation has been abolished in many gold-recovery plants because of a desire to be up-to-date. There should be no question of antagonism between amalgamation and cyanidation in the treatment of gold ores. The experienced cyanide engineer will recognise that they are complementary processes, and that the ultimate metallurgical success of cyanidation, as judged by the amount of gold lost in the residue, will depend to a large extent on how great a proportion of the gold has been recovered by amalgamation before cyanidation is commenced. Our Californian contemporary puts the matter so well that we have no hesitation in quoting its conclusions. "There are instances where amalgamation is technically impracticable; in some cases its adoption is economically inadvisable because of the danger of theft. The two processes must go hand in hand, for they are complementary, the success of the entire operation being dependent on the efficiency of cyanidation, and that, in turn, being dependent on the efficiency of amalgamation. In these days of intensive search for something new, one is inclined to undervalue the well-tried aids to success. The scientific application of amalgamation is just as pertinent a study to-day as it should have been before the invention of the cyanide process. In conjunction with cyanidation it is the hope of a waning gold industry; the combination of the two processes will permit the exploitation of low-grade deposits as well as the expansion of the reserves in high-grade mines."

Notes & News.

Rooiberg Ceases Crushing!

In the latest quarterly report of this company it is stated that in view of continued losses due to the low market price of tin, the Directors decided to cease crushing operations at the end of September. As it is essential to keep the Mine dewatered, which necessitates running a portion of the plant, the treatment of alluvial sands and slimes continues, the revenue from which will assist in meeting the necessary monthly expenditure. Underground development will continue in the meantime.

* * *

America's Gold and Prosperity.

Accretions of gold in the United States continue, the extent of this phenomenon being strikingly emphasised in a New York cable received by the London office of the Guaranty Trust Company of New York, which points out that the ratio of reserves to deposits and note liabilities of the New York Reserve Bank has reached 84.1 per cent. More remarkable is the increase in the ratio of gold reserves to notes in circulation, which advanced from 116.7 per cent. to 134.2 per cent. The cable reads: "The Federal reserve system continues to show remarkable improvement, particularly in the New York district. A more remarkable increase occurred in the ratio of gold reserves to notes in circulation (after setting aside the 35 per cent. against deposits required by law), which increased from 116.7 per cent. to 134.2 per cent.—a new high record. There was a substantial improvement throughout the whole system in this ratio, though not so pronounced as in New York. Call money is available at 4 per cent.; four, five and six months' paper at 5½ per cent. to 5¾ per cent. Time money shows a strong undercurrent. Generally money conditions continue to show ease. The New York and Boston Reserve Banks have reduced the rediscounting rate for all class of paper from 5½ per cent. to 5 per cent. Another favourable feature is the strength of the Bond market, particularly in Liberty bonds, and the absorption of Railway Equipment obligations at 5.75 per cent. to 5.80 per cent. basis."

The Professional Chemist.

During the course of his presidential address read before the South African Chemical Institute (formerly the South African Association of Analytical Chemists), Mr. Joseph Lewis, M.A., D.Sc., dwelt briefly upon certain aspects of the chemical profession in the light of modern economic and social ideas:—The nineteenth century, with the birth of the factory system, witnessed the birth and growth of industrial organisations. The present century sees the birth and growth of organisation in every sphere of economic activity: teachers, Government employees, clerks, are all in process of organisation, and it behoves every chemist who desires to obtain fair recognition of his labours to co-operate in the organisation of his own particular profession. The attitude that association is undignified or unworthy of a scientific profession is still held by a few ultra-conservative, but with the passing of the present generation it will be as dead as the dodo. It is being realised that the day of the more or less hand-to-mouth chemist is passing, and that a sound scientific education is an essential foundation for workers in this branch of science. It is gratifying to note that in South Africa the Government has taken a step forward towards the improvement of the status and conditions of employment of its chemists. The subjoined list shows the basic scale recently adopted and at present in vogue in the Union of South Africa:—

	Per annum.
Junior Chemist	£400
Assistant Chemist	550
Associate Chemist	750
Chemist	900
Senior, on fixed scale	1,100
* * *	

Wages on Coal Mines.

An interesting reply has been made by the S. A. Industrial Federation to the Chamber of Mines in regard to the adjustment of the wages of collieries' employees. In the opinion of the S.A. Industrial Federation, Department of Mining, the Chamber has not proved its case for a reduction of wages. With regard to the cost of living, the Department of Mining is unanimously of opinion that as the workers on collieries have never had a rise of wages commensurate with the cost of living allowance, it is unreasonable to ask for a cut in wages. With reference to leave pay, the Department is of opinion that the only equitable way of dealing with the matter is to give holiday-pay not according to the rate of pay in force at the time the holiday is taken, but based on the average rate of pay in force during the period in which the holiday is earned. If the Chamber proves in future that the economic condition of the coal mining industry is such as to justify a reduction of wages, the Department of mining is strongly of opinion that such reduction should begin at the top and not at the bottom. The statement suggests that if combined action were taken to bring pressure to bear on the Government to make it possible for the products of the country to be carried to the best markets, either coastal or inland, and so allow the coal industry to expand, much better results would accrue than by nibbling at the wages of the employees, which can only effect to an almost negligible degree the economic position mentioned in the Chamber's letter.

* * *

Transvaal and Rhodesian Estates.

The meeting of this company was held the other day in London. M. H. G. Latilla presided, and delivered a far-sighted address on the company's affairs in the course of which he did not fail to deal with the general financial position at the present time. He made a remark that ought to be stereotyped for reference, that "every investment tends nowadays to become a lock-up." He declared the policy of the board to be that of conserving the company's resources, which can be done without "either anxiety or misgiving." The principle producer at the present time is the Fred mine, as to which the chairman said the position is encouraging with regard to the immediate future, but

not without an element of doubt if one takes a longer view. The exploratory work has given negligible results, but there is a possibility that between the ore shoots a new ore body will be opened up in what has hitherto been regarded as unpayable ground. The Fred mine made a profit last year of £25,569, as against £27,892 in 1919 and £20,479 in 1918. The recoverable gold in the ore reserves is estimated at £150,000, and, taking gold at about its present price, the value would be nearer £200,000. The reserves are expected to show no decrease during the present year, but the known ore shoots appear to be diminishing in size and depth. The directors have in view the acquisition of a similar property. The chairman attached much importance to the company's chrome and asbestos interests at Umvankwe. He described the chrome deposits as the "biggest and richest yet opened up anywhere in the world." He is certain that sooner or later the demand for chrome will assert itself, and then the company will come by its own. Recent developments justify what he said. Asbestos is being regularly shipped, and the demand for it is world-wide. Special attention was drawn to Maraisdrift—on the Far East Rand. The chairman did not hesitate to say that it contains "the most profitable gold reef in the world to-day." Land sales have been diminished by the world-wide depression; but still, there was a good demand in the early part of the year, and sales were made to the value of £24,000. The company has large interests in Salisbury, the capital of Rhodesia, and, therefore, the future government of that territory deeply concerns it. The board are favourable to union with South Africa, and General Smuts has said that Rhodesia would be treated in a broad and generous spirit. Mr. Latilla mentioned the curious fact that there are as many shareholders in the company as there are voters in Rhodesia. The constituency is widely scattered, and the whole white population only consists of 10,000 people.

* * *

A New Type of Concentrator.

Many attempts have been made by inventors to devise a machine for separating the waste matter in old mine dumps and forming a concentrate sufficiently rich in gold content to repay extraction. Among recent inventions is a machine of the rotary type which aims at effecting the elimination of all material which from its fineness may be regarded as having only unpayable gold contents. The principle of the arrangement is that of a trommel, and the machine when set up is not unlike the tumbler or tippler used for dumping rock or blueground in the mines. A framework made of ½ in. steel angle iron rivetted together forms the support for the trommel. This trommel is circular in shape, about four feet in length, and rotates on an axle through its centre. The axle in turn rests on two trunnions, one at either extremity. A small gear is so arranged on the principle of a rack and pinion so as to enable the trommel to be turned by direct or secondary action from the source of power, steam or electricity. The rate of rotation depends on the quantity of stuff to be treated per hour. With a three feet diameter trommel and a 400 mesh screen it is estimated that 4,000 tons of residues per day of 10 hours can be treated. The machine is operated in the following manner: The plant is erected at a point below the dump to be treated, water pressure through nozzle is applied to the dump, and the resulting pulp sand and water with slimes is conducted by launders to the top of the trommel. A valve regulates the flow of the pulp from the launder over the trommel, which is revolving at a certain speed. A separation of all grains of a size greater than the mesh used to cover the trommel is made in this way. The fines are allowed to run to waste. The sands or concentrates are now dealt with by means of grinding pans or tube mills, and the resultant slimes run into cyanide tanks for treatment in the usual way. It will be seen that its action is very similar to that of a spitzkasten, with this difference that it effects the separation of the particles by sizing, and not by specific gravity. The inventor claims that the machine has proved efficient in practice when in use on a local dump. Should this claim be substantiated commercially, it would result in the recovery of a considerable amount of the gold now lying in the residues, as a one dwt. assay value in the dump will give a very handsome return on the operating costs of the plant.

The Drop in Prices of Mine Supplies.

To support its contention that prices of mine supplies are falling, the Mining and Scientific Press of San Francisco publishes the following comparative list of prices in August of this and last year. Nearly all these figures, it is stated, were obtained from the purchasing agent for an important group of mines that has its main office in San Francisco; they represent actual purchases made during August, 1920, and August, 1921, and are accurate:—

	August 1920.	August 1921.	Decrease Percent.
Rock-drills, a standard sinker...	\$170.00	\$170.00	0.0
Carbide, per ton	155.00	155.00	0.0
Blacksmith coal, per ton... ..	34.00	31.00	8.8
Drill-steel, hollow round, per lb. ...	0.19	0.16½	13.2
Fuel-oil, in tank cars, per bbl. ...	2.20	1.60	27.3
Packing, a standard kind, per lb. ...	1.05	0.92	12.4
Mine cars, a standard car... ..	189.00	134.50	28.8
Rail, in ton lots, per 100 lb.	5.00	3.25	35.0
Pipe, black, standard 2½ in.	41.15	28.20	31.5
Powder, 40% gelatine, ton lots ...	21.25	19.00	10.6
Fuse, standard brand, per M ft. ...	18.78	16.66	11.3
Caps, No. 6 per M	10.20	8.50	16.6
Mine timbers, Douglas fir	36.00	23.00	36.1
Copper wire, weather-proof, per lb. ...	0.42½	0.20½	51.8
Wire rope, plow-steel, 6-19, per ft. ...	0.29	0.25	13.7
Rubber belting, a standard brand, per ft.	0.95	0.71	25.2
Average decrease, %... ..			20.14

With respect to rock-drills it is said that the peak was reached in 1919, when prices averaged about 70 per cent. higher than in 1913. As compared with most equipment of similar character, the increase was moderate; this fact is advanced by manufacturers as justifying the retention of prices to-day that are identical with those of 1919 and 1920; nevertheless it is said that the diminished cost of the alloyed steels and other semi-finished materials and of skilled labour required in the manufacture of rock-drills will result in a lower schedule of prices early in the coming year. Carbide is the only other item that has remained stationary.

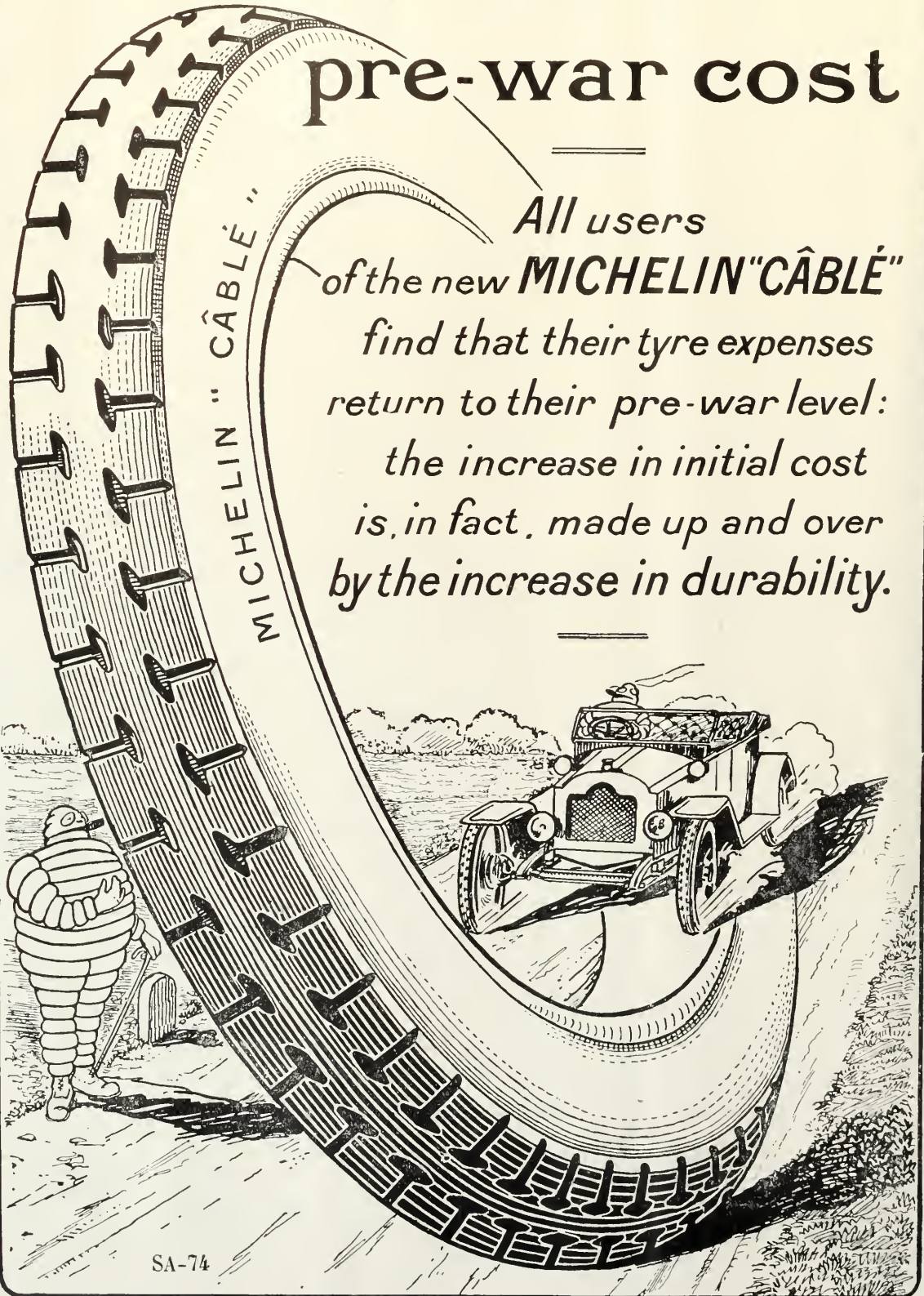
* * *

Occurrence and Utilisation of Minerals.

The Mineral Resources Committee of the Imperial Institute has arranged for the issue of this series of monographs on mineral resources in amplification and extension of those which have appeared in the bulletin of the Imperial Institute. The monographs are prepared either by members of the Scientific and Technical Staff of the Imperial Institute or by external contributors, to whom have been available the statistical and other special information relating to mineral resources collected and arranged at the Imperial Institute. "Silver Ores," by H. B. Cronshaw, B.A., Ph.D., A.R.S.M. Price, 6s. net. Publishers: John Murray, Albemarle Street, London, W. Chapter 1 of the book deals with silver ores, their occurrence, character and uses. The statistics arranged in the form of numerous tables and graphs form an interesting study of the production and value of silver from the year 1860 to 1919. The properties and uses of silver, its various ores, and metallurgical treatment of the latter, are briefly described, and form a fitting introduction to the more detailed descriptions which follow. Chapters 2 and 3 deal with the sources of supply of silver ores in the British Empire and foreign countries respectively. As a producer of silver, South Africa does not rank high, due chiefly to the fact that only lately have attempts in that direction been made. "Petroleum," prepared jointly with H.M. Petroleum Department with the co-operation of H. B. Cronshaw, B.A., Ph.D., A.R.S.M. Price, 5s. net. Publishers: John Murray, Albemarle Street, London, W. Owing to conditions brought about by the war, and maintained after its termination, the uses of petroleum and its products are more and more being felt. This led to the publication of this summary of the petroleum resources of the Empire. The publication deals with the characteristics, occurrences, mining, refining and uses of petroleum. Diagrams of production are also shown. Chapters dealing with sources of supply in British and foreign countries are given. South African activities in oil production resulted chiefly in negative results; hence very little space is devoted to this country therein.

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THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Economics.

The Third Party.—*The Electrical Review*, Sept. 30, p. 425.

The Contractors' Future.—*The Electrical Review*, Sept. 30, p. 431.

The Society of Technical Engineers.—*The Engineer*, Sept. 30, p. 353.

Remedies for Unemployment.—*Iron and Coal Trades Review*, Sept. 30, p. 479.

Centralized Buying.—*The Mining and Scientific Press*, Sept. 17, p. 403.

Mining

Electricity in Mines.—*The Electrical Review*, Sept. 30, p. 428.

Cost of Mine Supplies.—*Mining and Scientific Press*, Sept. 17, p. 385.

Coal and Fuel.

Oil Burning at Sea.—*The Engineer*, Sept. 30, p. 356.

Hydraulic Stowing.—*Iron and Coal Trades Review*, Sept. 30, p. 463.

Gas Coke.—*Iron and Coal Trades Review*, Sept. 30, p. 471.

The Froth Flotation of Coal.—*Iron and Coal Trades Review*, Sept. 30, p. 472.

Gaseous Fuels in the Shipbuilding World.—*Iron and Coal Trades Review*, Sept. 30, p. 476.

The Recovery of Volatile Solvents by the Bregcat Process.—*The Colliery Guardian*, Sept. 30, p. 931.

The Path of Travel of the Gases in the Coke Oven.—*The Colliery Guardian*, Sept. 30, p. 932.

Engineering.

The British Association—IV.—*The Electrical Review*, Sept. 30, p. 449.

The Electrification of the Swiss Federal Railways.—*The Engineer*, Sept. 30, p. 335.

Developments in Power Station Design.—*The Engineer*, Sept. 30, p. 336.

Turbine Blading Failures.—*The Engineer*, Sept. 30, p. 355.

Metallurgy.

The Institute of Metals.—*The Engineer*, Sept. 30, p. 338.

New American 600-Ton Blast Furnace Plant.—*Iron and Coal Trades Review*, Sept. 30, p. 467.

Nerada Consolidated Copper Co.—V.—*The Smelter.*—*Mining and Scientific Press*, Sept. 17, p. 393.

The Profession of Ore Hunting.—*Economic Geology*, Vol. XVI., Nos. 4 and 5, p. 243.

Electric Furnace Steel Castings in Canada.—*Iron and Steel in Canada*, Sept. 1921, p. 218.

Analysis of Some Drill Steel Tests.—*Iron and Steel in Canada*, Sept., 1921, p. 231.

Apex Mines Quarterly Report.

The tonnage of coal sold for the three months ended 30th September, 1921, was 49,014 tons. The working profit for the same period was £5,797. The capital expenditure was £138.

The Lonely in September.

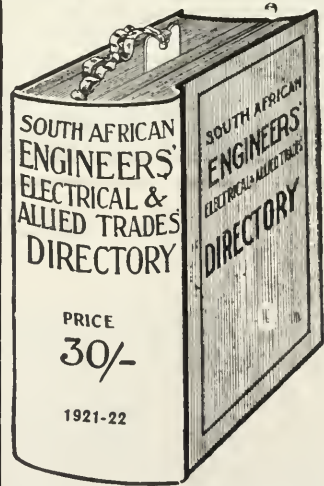
The following are details of the Lonely Mine output for the month of September, 1921:—Mill ran 678 hours; crushed, 4,950 tons; fine gold recovered, 1,525.123 oz.; value, £6,412 16s. 6d.; slimes treated, 4,950 tons; fine gold recovered, 2,893.424 oz.; value, £12,168 11s. 8d.; total fine gold, 4,418.547 oz.; total value at 84s., £18,581 8s. 2d.; profit, £6,047 5s. 1d.

Surveying and other Scientific Instruments.

A presentation copy of the latest edition of the catalogue of Surveying and other Scientific Instruments by T. Cooke and Sons Ltd., has just come to hand. It includes all such apparatus as is in ordinary use among engineers and surveyors. Through their catalogue they take this opportunity of reintroducing themselves to the older Members of the Profession, so many of whom are numbered among their clients, and at the same time desire to offer their best services to the younger generation.

For the information of the latter they state that their record of service now covers 80 years, and they claim that their reputation as Opticians and Scientific Instrument Makers is second to none.

The current edition of this price list is now about to go to press, and will undoubtedly be obtainable from their South African agents.



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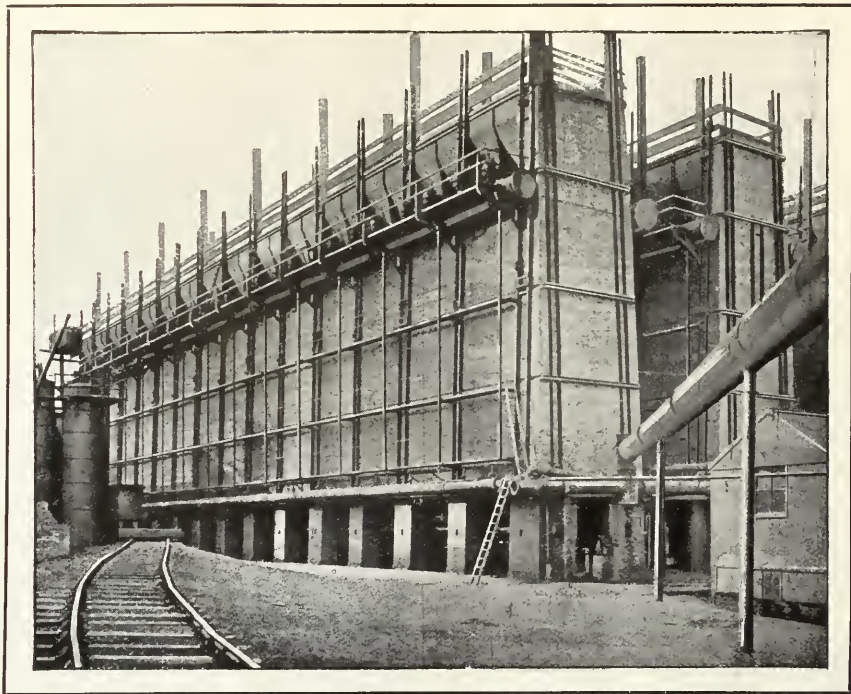
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Letters to the Editor.

THE REAL VALUE OF GOLD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Permit me to further trespass upon your courtesy to finally reply to Mr. Blenkinsop, who, in answer to my criticism of his (and Mr. S. J. Speak's) proposal to permanently raise the price of gold to six guineas per fine ounce, evaded the issue. From his last letter it would appear that what is meant is that gold is to be converted into a greater number of coins per ounce fine than at present; in other words, as I have already pointed out, 42,416 present-day sovereigns shall be converted into 63,000 coins, and your readers are asked to believe that each of the 63,000 coins (not guineas by the way) will purchase as much commodities as each of the more valuable 42,416 coins (sovereigns; verily, a "new way to pay old debts.") Last week I put the question: Why fix the new price at £6 6s. 2 and I have not been answered. Perhaps you, sir, will enlighten me. *The Statist*, from which you so liberally quote, proposes to so debase the sovereign that the ounce fine will have a face value of £5 13s, this being arrived at on the basis of New York exchange for September, which was an average of 3.656 dollars to the £; but, should this system come into operation, how will it affect our indebtedness to America? Shall we be able to get New York to accept a coin of 84.892 grains fine in exchange for 3.656 dollars in place of the 113 grains fine of the present sovereign? Evidently *The Statist* does not think so, as it admits that the question of debts owing abroad must be postponed. Finally, as a complete answer to the proposal to debase our gold currency, allow me to refer you to your own quotation from the *Spectator*, which reads, *inter alia*, "After all, it does not really matter whether we give few or many tickets for a thing. What does matter is that they should always be of equal exchange value for the same commodity and should be for a perfectly stable and trustworthy standard against which we can measure the fluctuating values of commodities."

Yours obediently,

LEWIS WATKINS.

[This matter is dealt with in our leading columns.—Ed.]

THE BEGINNING OF THE CYANIDE PROCESS ON THE RAND.

To the Editor, *S.A. Mining and Engineering Journal*.

Dear Sir,—There would seem to be some discrepancy between your original accounts of the introduction of the cyanide process and that published by you in your issue of June 18, 1921.

Mr. Andrew F. Crosse evidently cannot intend his article to be taken seriously: he does himself the injustice of stating that in 1891, when gravity percolation tailing plants were successfully at work at the Robinson and other mines, and were making fame for themselves by their successful work, he still "had honestly to confess that" he "knew nothing about the solubility of gold in alkaline cyanide."

Two interesting papers presented in recent years to scientific institutions have been prejudiced by the inclusion of inaccurate hearsay accounts of the beginning of the cyanide process on the Rand. It was with the idea of presenting to the future historian an authoritative statement of the subject that, availing myself of your invitation, I contributed to your twenty-first anniversary number in September, 1912, an article based on the official records.—Yours faithfully,

ALFRED JAMES.

[We hope in an early issue to reprint portions of the article in our anniversary number by Mr. Alfred James.—Ed.]

ROCK DRILL CONTROL.

To the Editor, *S.A. Mining and Engineering Journal*

Sir,—With reference to your current issue of the SOUTH AFRICAN MINING JOURNAL, I notice you publish a description of a system of rock drill control actuated by water flow. I herewith enclose a description and a tracing showing an apparatus, which I have recently patented, to accomplish the same object. (The description is printed elsewhere in this issue—Ed.) The principle of operation depends upon what is known as a "Venturi contraction" in a pipe line, which causes a differential pressure when water is flowing at different points of the same pipe line. It may interest your readers to know that this seemingly paradoxical hydraulic law was known even to the ancient Romans, but first established as a scientific fact in 1796 by the Italian philosopher, Venturi, then professor of physics at the University of Bologna. This law is explained at length in the ninth edition of the *Encyclopædia Britannica* under hydro-mechanics, paragraphs 7 and 28; but, briefly, it is that water flowing through a pipe of diminishing area loses the pressure which it exerts laterally as it gains in velocity, so that at the throat of the Venturi tube, which unites two truncated cones, it is only a question—within certain limits of pressure—of obtaining a sufficiently high speed in order to entirely lose all pressure and exert instead a vacuum. Conversely, water flowing through an expanding cone loses speed and gains head; consequently, the Venturi tube produces a great depression in the hydraulic gradient at the throat, but restores it to practically its original level at its outlet. This apparatus needs no alteration whatsoever in the rock drill, as it can be placed at the pipe line end of the air hose, and the air and water hoses for the machine connected on to it. This apparatus will cut off the air supply to the machine when:—

- (1) There is a choke in the tube, which prevents the water from flowing;
- (2) When insufficient water is flowing;
- (3) Water at an insufficient pressure;

and it can also be arranged, by the size of the constriction or jet, to pass any desired volume of water. I trust you will have an opportunity of allotting space to have this inserted in your next issue.—Yours faithfully,

E. FRASER JONES

THE INTRODUCTION OF TUBE MILLS ON THE RAND.

Mr. H. S. Denny Sets Out the Facts.

To the Editor, *S.A. Mining and Engineering Journal*.

Dear Sir,—In your issue of September 3, page 1759, you state that I advocated the introduction of tube mills "to reduce to a slime the concentrate produced by vanners. It was not till May, 1904, that the first tube mill working in circuit was started on the Glen Deep Mine, followed by one for crushing vanner concentrates on the New Goch a few days later."

I hasten to correct the impression that is given by this statement.

The machine used for the reduction of vanner concentrates was a Krupp ball mill (facing page 154, "Proceedings of the Chemical and Metallurgical Society," South Africa, 1903 and 1904), and this recommendation had nothing to do with the tube mill advocacy.

On page 221 I stated:—"Firstly, I do not believe in vanners, and we only use them at the New Goch Mines because they were already installed when we took it over, and we have had to make the best of a bad job. The cost of concentration alone with this method was, in June of last year, £560, and, as shown in my paper, the total cost of concentration and treatment of concentrates, taken over a period of five months, amounted to £6.12 per ton. Truly a monstrous cost! The very fine rich concentrates caught

by vanners offer no great difficulty to the ordinary cyanide process, and therefore it would seem possible that, as spitzlutte will separate the bulk of the heavy product, we only require hydraulic classification, with subsequent sliming and rapid cyaniding of the product."

We only used the vanners because they had been installed in the Goch plant before we took it over, and we threw them out as soon as we conveniently could.

The tube mill for the Goch Mine was installed for the purpose of regrinding a hydraulically separated coarse product from the mill pulp in order that the capacity of the mill might be increased, and the extraction improved as shown in the following extract (page 171):—

"One feature of milling which has occupied our attention in connection with the group of mines with which I am connected is that of coarse grinding to, say, 200 mesh, and returning everything over 300 mesh to be recrushed in the mill, the balance going forward to the cyanide treatment direct. This would undoubtedly largely increase the capacity of the mills, but amalgamation would not be so good as with fine crushing. With subsequent sliming in a tube mill and *secondary amalgamation* it may, however, prove to be practicable."

*This was the first suggestion it was a secondary amalgamation process.

The Goch tube mill was ordered long before the Glen Deep, and it arrived on the fields long before the Glen Deep Mill. At the time that I advocated the tube mill, John R. Williams, who I understand was subsequently responsible for the Glen Deep Mill, said (page 215):—

"May not finer crushing be one of the necessary variations?" to which I replied: "I think not. *Fine grinding* is what I pin my faith to."

Replying further to Mr. Williams, I said:—"He states that there is every special differentiation of feature in the Witwatersrand ores, from the Robinson to the Heriot, necessary to warrant extraordinary variation in the mesh of mill screening, and he cites as an instance the Ferreira Deep, where, after many experiments, 1,000 mesh has been finally adopted as the most suitable. I feel quite certain that in the case under notice, *with the assistance of a simple classifier*, after the mill pulp has passed over the plates, *and fine grinding and cyaniding of the heavier product*, the necessity for reducing to 1,000 mesh in the mill could be avoided, whilst *simultaneously the mill capacity would be largely increased*, and the *total extraction quite as high, if not higher.*"

The Glen Deep Mill got to work a few days before our mill at the Goch, but it was put in precisely for the purpose advocated and set out as per extract taken from page 171. The fact that the Glen Deep Mill got to work a few days before ours was a disappointment to us that was largely compensated for in the knowledge that our proposals were being adopted, and it had no bearing on the original advocacy of the use of the tube mill.

Figures were given proving finally that there was no difficulty in recovering a high extraction from slimes and finely ground concentrates in a very short time. We had not at that time proved that finely ground sands would give the same results, but we had no doubt on the point and we were then conducting experiments to prove it. On page 170 I said:—

"Assuming that the experiments on sands are successful, the outcome is to show that *in one operation, our sands slimes and concentrates can be treated together* in a very much simplified form to that obtaining to-day. Personally, I believe that on most of our ores here the efficiency of a stamp mill reaches its limit at between 200 and 300 holes to the square inch, and that from that point the further reduction of the ore is more economically and successfully accomplished by *means of attrition, such as that obtaining in a tube mill.* This is to say that the cost of reducing from a 300 mesh to a 40 000 is done at considerably less cost by attrition than percussion."

On page 158 I stated:—"I confidently look forward to the time when the huge plants, necessitated by the prolonged percolation methods in vogue to-day, will give way to something very much more simple and effective, both

in design and operation, and although, as elsewhere shown, our experiments on the short treatment of sands have not thus far resulted in a success that would justify too much optimism, I cannot but feel that on an ore offering to the metallurgist so few difficulties as that of the Witwatersrand, *the time is not far distant when the present difficulties will be overcome.*"

*Within three years a great deal had been done at the Meyer and Charlton.

On page 226 I stated:—"In West Australia, in using flint mills, it is stated that the larger percentage of the product will pass through a mesh of 220 holes to the linear inch. No screens are used on the machine and, once it is set, that product must be constant. In practice the slimes are passed through a classifier after leaving the flint mill, and anything coarser than about 200 holes to the linear inch is returned to the flint mill. *Our flint mill at the New Goch Mines is being set up to give results on these lines.*"

This extract shows very clearly the purpose for which the Goch Flint Mill was being installed.

On page 224 I stated:—"The tendency appears to be to slime everything, and treat the pulp after amalgamation by a simple agitation method in one operation."

On page 219 I stated:—"Despite Mr. Williams' statement, I venture to predict that he will before very long find that *sliming of his heavy products in flint mills*, with subsequent treatment by agitation—as suggested in my paper—is the correct treatment."

On pages 216 and 217 I stated:—"In the detailed results of many interesting experiments on "Witwatersrand concentrates, sands and slimes, carried out carefully and over a long period on a scale considerably larger than any laboratory work, *I do claim* to have given the first complete set of figures bearing on the *successful application of this principle to our ores*, and although the flint mill for *regrinding is glibly spoken of as a matter of common knowledge*, I know of no metallurgist on these fields who publicly advocated its use or submitted details of it prior to the figures given by me in July. The fact that the principle of fine grinding was recognised and referred to some years ago is substantially nothing. The important point is to prove its advantages to ourselves, and in this respect I believe I have been in some measure successful. We are more interested in what is being done in the way of actual work in the present than in references made in 1897, which were not turned to any practical advantage. *To-day there is more than one flint mill actually erected on the Rand for the specific purpose of regrinding classified products from the mill, and this is tangible evidence that the whole question of sliming by this means is to be put to practical proof at once, and I predict* that in the next few years the *flint or tube mill* will be as well known as the stamp mill, but for the cause of this innovation we have surely to look nearer home than to references made in 1897. In all due modesty, I think *I may fairly claim* to have given some impetus to the movement."

*This was in reply to the discussion on my paper nearly a year after the original paper was read.

A glance through the above extracts will serve to very clearly show *the purpose for which I advocated* the tube mill and briefly stated it was *firstly to get increased stamp duty and higher recovery*, with the suggestion that *eventually we should do away with the separate treatment of sands and slimes and adopt the "all sliming" process.*

In a joint contribution by Mr. G. A. Denny and myself to the South African Association of Engineers, we were able to give actual results from the Meyer and Charlton and Goch plants showing the advantages of circulation of cyanide solution, fine grinding and tube mill, etc., and we then unhesitatingly confirmed, as the result of the work done on these two mines, the advocacy of the "all sliming" process.

I must apologise for taking up so much of your space, but I feel sure that in the circumstances you will be only too glad to correct the impression that might be gathered from the extract from the journal referred to in the opening paragraph of this letter.—Yours faithfully,

H. S. DENNY.

The Week in the Sharemarket.

ANOTHER QUIET WEEK—LONDON MARKET WAITING—BUSINESS STEADY, BUT VERY RESTRICTED.

Business continues to be very quiet and restricted. Nothing yet seems to be known in regard to the ex-enemy share question, and the London market is unsettled by the news from the Continent and the Irish crisis. The gold "premium" continues to sag despite the views held in some well-informed quarters that something may yet be done to secure a permanent increase in the price of gold. On Thursday, on High Change, business was a little better and prices were generally steadier under the lead of Gedulds, which were 1s. higher at 47s. 6d. bid. The Options were about 1s. 3d. higher at 8s. sales. Van Ryn Deeps were 6d. higher at 69s. 6d. buyers after business at 69s. 3d., and State Mines were harder at 79s. sales. New State Areas, though lower on balance, were above the lowest price of Wednesday at 21s. 3d. sales and buyers and were again largely dealt in ex London. Most of the other leading stocks were a shade harder without business. Coronation Syndicates were bought at 6s. 3d., Randfontein Estates at 14s. 3d. S.A. Alkali were 1s. lower at 14s. 9d. and 14s. 6d. sales. P.P. Cements and Transvaal Silvers inactive. Nothing was done in diamond or tin shares, and Union Loans were also passed without business. The only bright spots in the market are the facts that the September quarter profits, owing to the "premium," ensure good dividends at Christmas, and the excellent development in the No. 7 shaft horizon at the Geduld. This was so well received in London that the shares appreciably firmed up. The week's fluctuations are as follow:—

	Fri. 21st.	Sat. 22nd.	Mon. 24th.	Tues. 25th.	Wed. 26th.	Thur. 27th.
Anglo-Amer. Corp.	19 9*	19 6*	19 3*	19 6	19 6*	19 7*
Apex Mines	7 6†	7 6*	7 6†	7 6†	7 6†	—
Bantjes Cons.	5 9*	5 8*	5 9*	5 9*	5 9*	5 9*
Brakpan Mines	48 9*	47 6*	—	—	48 0*	—
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	0 7*
Cinderella Cons.	—	2 3*	2 3*	—	—	2 0*
City and Suburbans	2 3*	2 3*	—	2 3*	—	—
City Deeps	46 0*	46 0*	46 0*	45 6*	46 0*	45 6*
Clydesdale Colls.	26 0†	—	—	—	—	—
Con. Diamonds	14 7½	14 4*	14 6	14 4½	14 1½	14 1*
Con. Langhaagtes	12 6†	—	—	12 0*	—	12 9b
Con. Main Reefs	10 0*	10 3	10 0*	10 3*	10 0*	10 3*
Coronation Colls.	—	—	—	—	40 0†	40 0†
Do. Freeholds	0 9*	1 0†	0 9*	—	—	—
Do. Syndicates	5 6*	5 9	5 9*	6 3b	6 3	6 3*
Crown Diamonds	3 6	3 6*	3 6	3 6*	3 6†	—
Crown Mines	11 0†	—	—	—	—	36 0*
Daggafont. Mines.	2 9*	2 6*	2 9*	2 9*	2 0*	2 6*
East Rand Coals	1 10*	—	2 1†	—	—	—
East Rand Deeps	0 6*	0 6*	0 6*	0 6*	—	0 6*
East Rand Props.	5 0*	5 0*	5 0*	5 0*	—	—
East Rand Debs.	£85*	£85	£85*	£85*	£85*	£85*
Eastern Golds	0 6*	0 9†	0 9†	0 9†	—	0 9†
Frank Smith Dias.	3 9	3 8*	3 9*	3 8*	3 9*	3 9*
Geduld Props.	45 6	45 0*	45 3	45 6*	46 9	47 6*
Glynn's Lydenburgs.	7 6*	9 0b	8 9*	9 0*	9 0*	—
Government Areas	80 3*	79 9	79 3*	79 6b	78 9	79 0
Knight Centrals	4 3*	4 4*	4 4*	4 4*	4 4*	4 4*
Hume Pipes	15 6*	—	—	—	—	—
Lace Props.	7 0*	7 6	7 6	7 0*	7 9	—
Leeuwpoot Tins	7 0*	7 3*	7 3	7 6	7 3	7 3*
Lydenburg Farms	4 10*	—	—	4 9*	5 3†	4 9†
Middelley Est.	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Modder B's	25 9	26 0	25 6*	25 9*	26 0	26 3*
Modder Deep	42 6	42 6	42 6*	42 3*	42 6	42 6*
Modder Easts	9 3	9 0*	9 0	8 10*	9 0	9 0a
Natal Nav. Colls.	27 0*	—	28 0	30 0†	—	—
New Eland Dias.	—	—	28 0†	25 0*	25 0*	25 0*
New Era Cons.	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	—	1 4*
New Kleinfontein	—	—	—	5 7*	—	5 7*
New Modderfontein.	72 3	71 6*	71 3	70 9*	71 0*	71 0*
New Unifeds	—	4 0†	—	—	—	—
Nourse Mines	8 6*	8 6	8 6*	8 6*	8 6*	8 9*
New State Areas	23 3*	23 0*	23 0*	23 0	21 6*	21 3
Pretoria Cements	44 0*	43 9*	43 9*	43 9*	43 9*	41 0*
Princess Estates	0 11*	—	0 11*	0 11*	—	—
Rand Collieries	—	—	1 0†	—	—	—
Rand Nucleus	1 0*	1 0*	1 0*	1 0*	—	1 0*
Rand Select. Corp.	—	—	—	44 0*	—	44 0*
Randfont. Central	—	9 0*	—	9 6*	—	9 6*
Randfontein Est.	14 9b	14 9	14 6*	14 6	14 0*	11 3
Roberts Victors	7 0*	7 0*	—	7 0*	—	—

	Fri. 21st.	Sat. 22nd.	Mon. 24th.	Tues. 25th.	Wed. 26th.	Thur. 27th.
Rooibergs	2 9*	2 9*	2 6*	2 9*	—	3 0*
Ryan Nigels	—	—	—	—	—	3 6*
Rouxville D.	1 6*	1 6*	1 6*	1 6*	1 6*	1 6*
S. van Ryn	1 6*	1 7*	1 7*	1 7*	1 7*	1 6*
S.A. Townships	9 9*	—	9 6*	9 6*	9 6*	—
S.A. Alkali	15 0*	15 0*	15 6	15 3	15 6*	14 6
S.A. Breweries	28 0†	—	28 0†	28 0†	28 0†	28 0†
S.A. Lands	4 0*	4 0*	1 0*	1 0*	—	4 0a
Springs Mines	38 9a	37 6*	37 6*	37 9	38 0*	38 9
Sub Nigels	10 3	10 6*	10 3*	10 3	10 3*	10 1½
Swaziland Tins	9 0†	9 0†	9 0†	9 0†	9 0†	—
Trans. G. M. Est.	8 0*	8 0*	8 0*	8 0*	8 3*	—
Union 5 per cent.	£101*	£101½*	£101	£101½	£101½	£101½*
Transvaal Silver	15 6*	16 0*	17 0	16 6	15 6*	15 9*
Van Ryn Deeps	69 6	69 3*	69 3*	69 0*	69 0	69 3
Village Deeps	—	—	—	—	—	7 6*
W. Rand Estates	3 1*	3 0*	—	3 4*	3 3*	3 0*
Withank Colls.	36 6*	—	35 0*	35 0*	35 0*	35 3*
Withwaters. Deeps	9 0†	8 9†	8 6*	8 6*	9 0†	8 6*
Woluhuters	4 0*	4 0†	3 0*	3 9*	—	3 11*
West Springs	10 6	10 0*	10 0*	9 10*	10 0†	9 0*
Zaaiplaats Tins	3 0†	3 0†	3 0*	2 6*	2 9*	2 9*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Union Mineral Statistics.

The following abstract is taken from the statistics for the month of September, issued by the Department of Mines and Industries, for the Union of South Africa:—

	Output. (ozs.)	Value.
Gold	692,356	£2,940,942
Silver	72,332 (carats)	12,659
Diamonds	53,080 (tons)	201,048
Coal	990,315	£20,469
Copper ore and conc.	96	3,699
Tin conc. and metallic	151	12,059
Other base metals	—	£9,176
Total	—	£3,600,552

Gold value calculated at standard rate of £4.24773 per oz. fine.

Gold shows a decrease in output amounting to £98,471 in value under the output for August. Silver, diamonds and tin show an increased output amounting in value to £1,713, £25,440 and £4,712 respectively. Coal shows a big drop amounting to £27,579 in value, while the output of base metals has also fallen by £1,231. On the whole the value of the mineral production for September was £91,717 less than that for the previous month.

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Foreign Exchange and American Trade.

By P. J. Stevenson, American Trade Commissioner.

The upset commercial balance of the world is emphasised by the present foreign exchange situation, which is of importance to the merchant and trader. Nowhere in the world is it of more practical interest than in South Africa. For here the exchange has a two-fold bearing. In the first place, it has furnished 23.1 per cent. more income to the gold mining industry in the first six months of 1921 than the standard rate would have yielded. It needs no elaboration to explain what the gold "premium" means, for from that 23.1 per cent. comes a large share of the working profit of the industry, which means so much to the agricultural, commercial and industrial life of South Africa. And further, it keeps going many properties which otherwise would have to face immediately the question of closing down, with all of the attendant hardships. In the second place, the merchant or manufacturer who imports from overseas is vitally interested in foreign exchanges.

It is often said that the American business man or banker is making a great profit out of exchange. Such a statement hardly needs refutation. The exporter sells for dollars and he gets not a penny more when the local buyer has to pay 5s. 8d. for a dollar than when the price is 1s. 1½d. He gets one dollar in either case. Neither does the banker, American or local, get it. The banker is buying and selling exchange at the same time. If the price of dollars in terms of sterling has advanced and it is necessary to pay more sterling for a dollar, the banker must pay the higher price just the same as if exchange were wool or any other commodity. Perhaps the most convincing fact, however, is that the American manufacturer, exporter and banker has been seeking relief from a fluctuating exchange, just the same as the British and other nationalities have.

There are others that think speculation in exchange has been an important factor. It would be foolish to deny that there has been gambling in exchange on a large scale. Temporary changes, a few points up or a few points down, may have resulted, but speculation has not depreciated sterling, or any other money. There is always going on, even in normal times, a large volume of intelligent speculation that serves to balance the price of many world commodities such as wool, wheat, grains, and even exchange. But the volume in New York is probably not one-tenth of what it is in London.

Neither can the exchange problem be solved by any plan of international co-operation, for there is no "short-cut." The most clever financiers of England, the Continent and America have given their best thought to the problem, but to no avail. There is no way of making the franc or mark worth its normal value except by giving it that value intrinsically. Gold is still the fundamental money of the world. Exchange is still merely the gold value of one currency in terms of the gold value of another. It is quite true that unbalanced trade and disorganised credit have their effect, together with speculation and other factors, such as political developments, that result in temporary changes, but the fundamental factor is the gold value of a country's currency. And it should be emphasised that London, as the most financially-wise community in the world, has more to do with estimating the value of the franc, lira, mark, dollar and even of the pound itself than has Paris, Berlin or New York.

From a study of world price exchanges, it is a fair conclusion that the world is still buying and selling goods and commodities upon a gold-price basis. Trade balances are not being settled in gold, nor are many countries as yet attempting to put their currencies on a gold basis, but it is evident that prices the world over have a close general relationship to what local currencies are worth in exchange for gold.

In fact, it is just this relationship that makes American prices competitive in spite of the high quotation of the dollar compared with other moneys. In many instances buyers in other countries can buy more cheaply in the United States than elsewhere, notwithstanding the exchange situation. It has been found that American goods on landed costs have actually been cheaper, grade for grade, and quality for quality. It is admittedly not true in every case. The Continent has bought American cotton more cheaply in England than in America, while Germany has been underbidding the world, without regard to exchange conditions, in conducting her campaign for export trade. America has this advantage, that as other currencies tend to improve, it is going to be desirable to buy in dollars because they will otherwise be faced with the necessity of buying other moneys on a rising market. In fact, it is even now just as cheap to buy in dollars low gold-priced goods in America as it is to buy deflated currencies cheap and pay out correspondingly more to get the same gold-priced commodities. It is easy to look at the high-priced dollar and to forget that behind it are really low-priced goods. The idea that America's trade with South Africa or any other part of the world is to be killed by exchange has no foundation in fact.

There is too much talk about "rectifying" the foreign exchanges. Take the mark as an example. Germany is said to have had recently 80 billions of paper marks. There was 1½ cents' (¾d.) worth of gold to the dollar back of it before the Reparations demand. On April 21 Germany's money had an international value of 1,120,000,000 dollars. To "rectify" the mark means putting 17,944,000,000 dollars of value in that paper money and further valorising a mass of credits and book assets, besides which the 18 billions is probably small by comparison at 15 times its present valuation! If it were possible of achievement, it would produce an economic catastrophe.

It should be plain that a nation cannot do a paying business by selling its products on the cheapness of impaired money. There would be no wisdom in having a sound currency if trade could thrive on cheap paper money. Germany must either raise prices to meet the loss or she is going to find a hole in her balance-sheet. Germany may be using the Governmental control of prices, exchange, and commerce to sell at the cost of production or below. Then the loss is absorbed by the whole nation. Some offerings have been made merely to disorganise foreign markets. Goods have been sold in sterling or other currencies in expectation of a rise in marks. There has been some selling of goods as a result of forced liquidation. There may be a combination of these possibilities in combination with genuinely low-cost production and a small margin of profit. It is to low production costs that English and American producers must look, rather than to an artificial exchange price.

Summarising the question, foreign exchange is the result of definite causes. It is not a separate, detached field of finance. Fundamentally, it reflects gold values, but also trade balances and the other factors taught by the economists. Certainly there is no cause for alarm over German competition, for if depreciation were a genuine aid to building up trade, Poland and Austria and Russia would far outstrip the rest of the world.

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Our Pioneers.

By James Cumming.

When I scanned the faces of those pioneers who foregathered at the Grand National Hotel, Johannesburg, at their annual dinner on Wednesday night I cast my mind back, through the long vista of years, to the very early days of the Witwatersrand Goldfields—to the days when Johannesburg was non-existent—to the days when a tent and a blanket were all that the pioneer possessed beyond his indomitable pluck and perseverance—I raise my hat to the memory of those splendid men, who were founders of an industry the influence of which is to-day a great power throughout the world.

Long prior to the inception of the Rand Pioneers (Incorporated), in those very early days, in 1886—thirty-five years ago, when I first saw the Rand—that hardy band of men, most of whom, alas, have gone over to the "other side," were the real pioneers of the greatest goldfield the world has ever known, and I was glad to see some few among the number present at the annual dinner.

On every goldfield, the real pioneers—the Voortrekkers—have been very seldom the men who have reaped the ultimate reward of the great adventure. It was the same here. Out of the thousands of men who trekked here, in the days of Ferreira's Camp, the Natal Camp, how very few have reaped a reward for their efforts and hardships. But they tried. They made the supreme effort, and even if they failed, they could hold up their heads and say "We did our level best." In many cases the man who succeeded in making money took it out of the country. It was the "battler," the man with the real pioneering instincts, the man with the stamina, who remained to explore further afield and to still enlarge this great goldfield.

From the days of the Californian and Australian "rushes" of the early 50's, from the days of the Pilgrim's Rest in the 70's, from the days of De Kaap in the 80's, and from the early days of the Witwatersrand it has not been the pioneer, who has borne the heat and turmoil of the day, who has reaped the profits.

The hand of true friendship should be held out to the real pioneer by the younger generations. As educational assets the pioneers of the early days will be of the highest value. They can tell us and our sons the story of the past, and in telling it they can give us many a lesson for the future—for the future greater South Africa, which will arise when all our wonderful resources come to be explored and exploited to their fullest extent.

The scope of the Rand pioneers is not confined to the days of the past—or even the days of the goldfields. In days to come, a great South Africa is looming on the horizon—a South Africa which will eclipse the South Africa of the past half-century, as that 50 years has eclipsed the days of Van Riebeeck.

When we think of such names as Bantjes, Struben, Knight, Phillips, Farrar, Dalrymple, Leonard, Webb, Jeppe, Lys, Meyer, Charlton, Hosken, Niven, Bloch, Alexander, Wolhuter, Simpson and dozens of others who helped to build the Rand and South Africa thirty and more years ago, it must surely stimulate everybody on these fields, old and young alike, to put forward the most strenuous efforts for the future.

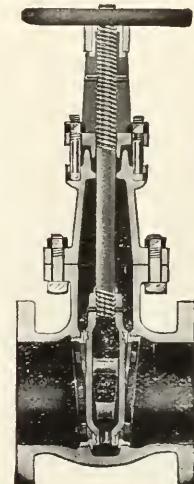
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ENGINEERING SECTION.

The Howick Falls Hydro-Electric Power Plant.—III.

By H. W. Miller.*

The old type of mechanical governor proved totally inadequate for the needs of efficient speed control in connection with hydraulically driven electric generators. The hydraulic type of governors was first evolved, but later oil pressure was used instead of water, as sticking due to gritty water often resulted and the water also caused corrosion of the mechanical parts. The automatic oil pressure type of governor has been steadily improved and has now reached a high state of perfection, possessing all the qualities required by modern practice for effective and reliable speed control.

The governor consists of the following principal parts:—

- A. Oil pressure pump driven by pulley.
- B. Oil pressure receiver.
- C. Servo-motor or hydraulic cylinder.
- D. Distributing valve.
- E. Centrifugal pendulum driven by pulley.
- F. Relay motion of anti-racing mechanism.

The principle of operation of the governor is as follows:

Assume for the moment that the turbine is running at normal speed, when consequently the pendulum sleeve L would be in its central position as indicated on the diagram; if now the load on the turbine is decreased the pendulum sleeve L would rise, in turn lifting the piston of the distributing valve D, through the lever O with point Z as a fulcrum, causing the oil pressure from the pressure receiver B to be admitted on the left side of the servo-motor C, thus closing the guide vanes. When the governor shaft R turns, however, the relay motion gear will come into operation, lowering the connecting rod J and move the piston of the distributing valve D back to its central position with the governor sleeve L as a temporary fulcrum. If the load had been increased, the operation would have been exactly the reverse.

The function of the relay motion gear is one of the most important in the operation of the governor, as by its action it prevents the governor closing or opening the guide vanes more than is necessary to re-establish equilibrium between the load and the corresponding output of the turbine.

Owing to the inertia or momentum in the turbine parts, some little time must elapse before the speed of the turbine has readjusted itself to the new conditions of load, and but for the relay motion gear, the guide apparatus would during this time have continued to move until it reached a position far beyond the correct point, corresponding to the load, and consequently the governor would "hunt" until the correct position was attained.

By means of the small handwheel K on the relay motion gear, the compensating rod J can be either shortened or lengthened, thus enabling the speed of the turbine to be slightly increased or decreased during running independent of the load on the turbine. This function can be clearly seen from the diagram, as if for instance the handwheel K is

screwed upwards it will lift the piston in the distributing valve D through the lever O with L as a fulcrum admitting the oil pressure on the left side of the servo-motor C and closing the guides, thus reducing the speed, or if the handwheel K is screwed further up, it will cause the guides to be totally closed, thus forming a convenient method of shutting down the turbine. If it is desired to slightly increase the speed, the handwheel would have to be screwed down, the operation being the same but in opposite direction.

It will be observed that in the above type of governor each position of the turbine guides corresponds to a certain position of the pendulum sleeve, and consequently the turbine will run at a slightly different speed at various loads, the maximum speed occurring when the turbine is running at "no load," and the minimum speed at "full load," the speed variation depending on the difference in speed of the governor pendulum at the upper and lower limits of the governor sleeve L, which is termed the "degree of irregularity," usually about 3 to 5 per cent.

When the turbine is driving electric generators, it is often necessary to maintain a constant speed at all loads, and for this purpose the governor is provided with a constant speed or compensating device.

The principle of this device is that instead of the relay motion gear forming a rigid connection between the pendulum lever and the governor shaft, the connecting rod J is fitted with an oil dashpot with springs which, after each regulating movement, brings the pendulum sleeve back to its central position, thus maintaining a constant speed independent of the load of the turbine.

The dashpot M consists of a cylinder with a piston and intercommunicating pipe allowing the oil in the cylinder to flow from one side of the piston to the other, the rate of the flow being controlled by the adjustable screw N.

Assume again that the turbine is running at normal speed with the pendulum sleeve and distributing valve in their central position. If now a load change in either direction occurs, the pendulum sleeve will move the distributing valve and the turbine gates will either open or close.

At the same time, the relay motion gear will come into operation and as the oil in the dashpot M cannot pass quickly enough from one side of the piston to the other, the connection between the pendulum lever and governor shaft can be considered as rigid, and the dashpot cylinder will follow the movement of the piston and bring the distributing valve back to its central position.

The springs P attached to the dashpot cylinder, each of which is compressed or under tension, according to the direction of the movement of the piston, will, however, bring back the cylinder and thereby the point Z to its previous position, the piston remaining stationary. It will be observed that the speed at which this movement takes place can be controlled by the adjusting screw N on the dashpot. With the movement of the point Z, the distributing valve will again cause the guide vanes to either open or close, thus

* From a Paper read before the S.A.I. of E.

adjusting the speed until the pendulum sleeve takes up its central position corresponding to constant speed of the turbine.

For a Pelton wheel the governor is usually connected with the spear shaft, thus controlling the speed by reducing the water jet issuing from the nozzle. As Pelton wheels are generally supplied through pipe lines, often of considerable length, it is necessary to provide a by-pass valve, operated direct by the governor in order to avoid undue pressure rises in the pipe line. The by-pass or relief valve has, however, several disadvantages which have been eliminated in the construction and design of the

Combined Spear and Deflector Regulator.

The characteristics of the system are:—

1. Quick acting—consequently close speed regulation.
2. Slow alteration of the velocity of the water in the pipe line—consequently avoidance of water hammer or undue pressure rise.
3. Economy of water.

The general arrangement and design of the system consists of the following principal parts:

A represents a standard circular type of inlet nozzle with internal spear regulator, the shaft B of which is directly connected to the piston moving in the dashpot C. D is the deflector which deflects the water jet from the Pelton wheel, and is supported on a spindle and bearing carried off the lower parts of the nozzle casting. The governor shaft of the automatic oil pressure governor is connected direct to the lever E, which is keyed on the shaft M, the deflector being operated positively from this shaft by means of lever and connecting rod.

Shaft M also carries a double lever F, which is provided with spindle and square steel block working inside the box G in spear regulator shaft M, lever F having sufficient travel in the box G, independent of any movement of the spear, to allow the deflector to be moved far enough into the jet by the governor to practically deflect all the water below the Pelton wheel buckets.

The spear shaft is provided with a helical spring H which always has a tendency to close the nozzle, and this shaft is provided at its outer end with an oil dashpot C, the piston of which is provided with a flat valve J allowing rapid movement of the spear shaft in the opening direction when oil can freely pass from one side of the piston to the other through the holes under the valve plate.

For any movement in the closing direction of the spear shaft, the valve J is closed and oil must escape from one side of the cylinder to the other through the small adjustable valve K. Under normal working conditions, the spear regulator would be open a sufficient distance to pass the quantity of water required to maintain normal speed with the load carried by the Pelton wheel, and the deflector would be in such a position that its forward edge would be just clear of and above the jet of water.

In this position the square block on lever F would be at the rear end of box G, the oil pressure of the governor pressing against the spring H preventing the spear regulator from moving forward.

In the event of any load being taken off the plant, the governor would immediately move the deflector into the jet, the lever F taking up approximately the position indicated on the diagram, as the spear rod B would be prevented from quick forward movement by the dashpot.

Immediately this occurred, the spear would slowly travel forward, its rate being adjusted by the valve K, and as the spear reduced the quantity of water discharged by the nozzle the deflector would be gradually brought back by the governor.

(To be continued.)

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Alloy Steels.

By Jonas Bethell, of Messrs. Spear & Jackson, Ltd., Etna Works, Sheffield.

Alloy steels may be generally classified as those usually low in carbon, containing some metal or metals added for the specific purpose of giving the steel certain properties not found in plain carbon steels. These steels differ very considerably and small variations of a single alloying element frequently makes differences in the physical properties of the steel, appearingly out of all proportion to the said variations, over and above these changes the varying of the carbon content also produces a change. The method adopted in adding these alloys is by means of a ferro-compound with high content of the required alloy and is added to the steel either in the furnace or in the ladle. The former is decidedly preferable, but the loss owing to oxidation is generally high in the Siemens-Martin process, and in the electric process no loss occurs, owing to the fact that the slag is in a reducing and not oxidising condition. Alloy steels must be treated according to their composition and purposes for which they are intended, and therefore we find the heat treatment of steels differing very considerably, and this side of the steel industry (heat treatment) has perhaps made greater strides than any other during the last 15 or 20 years. As new steels are discovered, new heat treatment is perfected and recommended. It is to alloy steels that we look for future developments and improvements in the steel industry. Roughly speaking, we may divide alloy steels into three classes: 1, tool steels; 2, structural steels; 3, steels for electrical purposes.

No. 1. Under this heading we include high speed steels, with which I have already dealt in detail, and special tool steels containing varying amounts of tungsten, chromium, vanadium, manganese, etc. These are given various brands by the manufacturer, describing them as "self-hardening," "oil-hardening," "water-hardening" special tool steels and detailing the specific purposes for which they are recommended. If you are a user of special tool steels make sure of the correct heat treatment, otherwise you may not be obtaining the best possible results from them.

Stainless steel used for articles subject to erosion is an alloy steel containing approximately 14 per cent. chromium. This steel is difficult to work but it has advantages over the 25 per cent. nickel stainless steel, for it not only offers greater resistance to corrosion, but it is readily softened and easy to machine, subsequent hardening presenting no difficulties. On the other hand, the nickel steel is difficult to machine even after softening and presenting exceptional difficulties in hardening. Stainless steel is in its ideal condition, i.e., most resistant to the corrosive effect of acids when in the hardened and polished state. An alloy steel is highly recommended for pneumatic tools which have to stand excessive shocks and vibration.

No. 2. Structural steels are those used in the automobile and general machinery industries, the objects of using alloy steels for these purposes being numerous. They give increased strength with the same or an actual reduction of weight over ordinary steels, offer greater resistance to shock, are capable of resisting wear, at the same time capable of withstanding the vibrations and shocks experienced on the road in the case of motor-cars, or in the moving parts of other machinery. Steels recommended for motor-car parts comprise: Tungsten steel for valves, chrome-vanadium and nickel-chromium case hardening steels for cam shafts, chrome-vanadium and nickel-chromium steel for gear and propeller shafts, steering parts, front axle, etc., silico-manganese (high silicon), vanadium and chrome-vanadium steels for springs and so on, each steel requiring heat treatment suitable for the particular work it has to do. A high manganese steel is extensively used in this country in the rock breaking and crushing machinery. Tramway crossings and bends subject to heavy wear are also made from this material.

No. 3. Foremost among the steels for electrical purposes we have magnet steels containing tungsten or tungsten and chromium. Non-magnetic steel, containing 25 per cent. nickel, is used for dynamos, cover plates of lifting magnets, parts of compasses, etc. For the cores of static transformers a silicon alloy steel is recommended, steel of this type giving a greater electrical efficiency than that of any other known steels, that is to say, electrical losses are small when transforming from a high to a low voltage. The alloying elements used in the manufacture of steels, therefore, include tungsten, vanadium, chromium, nickel, molybdenum, silicon, titanium, cobalt, etc.

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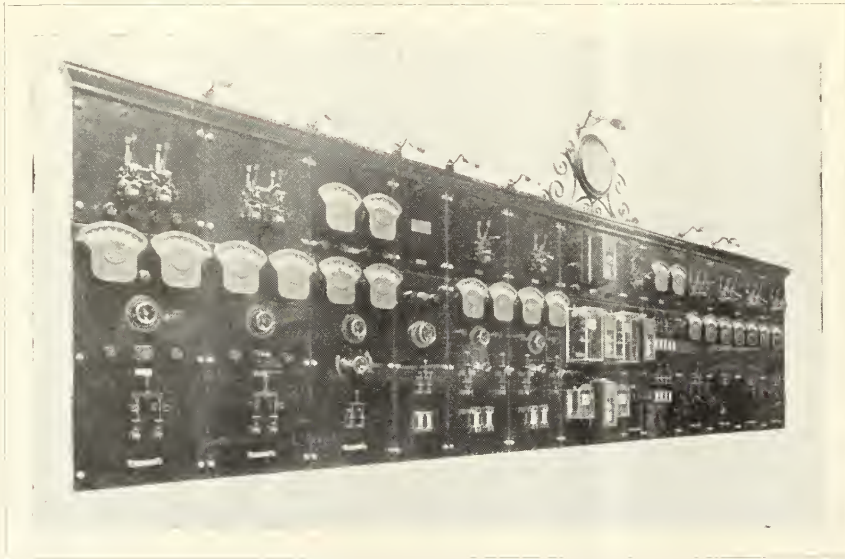
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS ENCOURAGING—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—OILS AND COLOURS—ELECTRICAL GOODS—BRITAIN'S UNEMPLOYED AND TRADE—EXPORT CREDITS SCHEME AND ENGINEERING TRADE—UNION'S INDUSTRIAL DEVELOPMENT—FINANCIAL—METAL MARKET.

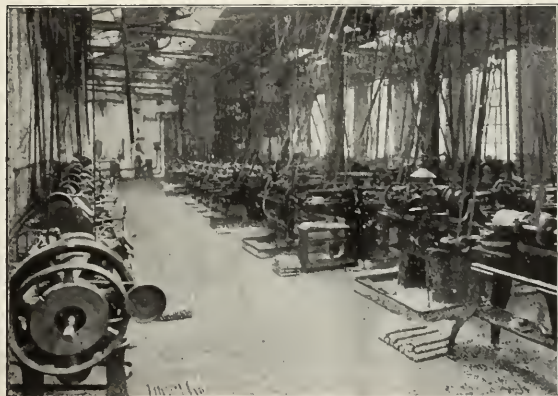
General Review.

The slight improvement in business conditions referred to in our previous notes has been maintained this week, during which, although nothing outstanding has occurred, the volume of transactions put through has been fairly good. Prices on the whole are not inclined to go lower, but, in view of the present unsettled European political outlook and the not altogether satisfactory position of our own labour troubles, merchants are disinclined just now to indent as freely as they would wish, and are perforce content to pursue their hand-to-mouth policy. There is no doubt, however, that as regards general business and prices, the present month has shown a distinct advance on the previous month's trading, and, given more stable conditions generally, there seems little in the way of a gradual return to more normal conditions. Meanwhile, British manufacturers are gradually coming into line with their Continental rivals in respect of steel goods, to which the recent big reductions in prices referred to under the rubric of Iron and Steel bear testimony. The fact of the matter is that German manufacturers are so overwhelmed now with orders that they find it absolutely impossible to execute a tithe of them, with the result that dates of delivery are becoming impossible of fixation within reasonable commercial limits. This congested state of affairs is bound ultimately to react in favour of British manufacturers, and with the Allies' control of raw materials, will contribute towards stabilising commercial conditions in the near future. Prices of materials remain, as stated, fairly stationary, except for heavy mining material, which still inclines to an easier tendency. Building materials have made no advance in the absence of the anticipated building spurt, but experts are of opinion that we shall see a distinct improvement in this direction within the next three or four months.

Iron and Steel.

Business this week has been quite good by comparison with recent weeks; prices, with a few exceptions, are inclined to harden, and inquiries have been more numerous than for quite a while. Steel plates are firming up, and although business is not very great at the moment, inquiries point to a more satisfactory position—given fairly satisfactory trade conditions—in the near future.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 35s.; steel, 39s.; $\frac{3}{8}$ in. round iron, 35s.; steel, 38s.; $\frac{7}{8}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; drill steel, 7d. and 8d.; hollow, 9d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black bal'ng wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb. °



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SHEFFIELD AND JOHANNESBURG.

Union Steel Corporation (S.A.), Ltd.

The managing director states that inquiries are increasing and that there is a likelihood of some very big orders being placed with the company very shortly. The directors are determined to meet foreign competition; they find that a lot of the imported Continental steel at low prices has been far from satisfactory. The Union Steel Corporation's shoe and die business is increasing, and they are now installing plant for forging shoes, which have hitherto, as a war measure, been cast and pressed.

Engineering Shops.

Inquiries among these elicit the fact that the improvement in conditions noticed lately is steadily increasing and that orders are now coming in fairly freely.

Second-hand Machinery.

The market in second-hand machinery, etc., is slightly better, but stocks are running short, so it behoves those who are holding back from purchasing to take advantage of the low prices now ruling for their many requirements, as shortly a rise is predicted and new goods will have to be purchased to replace stocks. Second-hand plates are now ruling: $\frac{1}{2}$ up to $\frac{1}{4}$ inch, £12 10s. to £15 a ton. When one considers the year 1917, when the same second-hand plates were fetching close on £55 and new plates up to £100 a ton, the present difference in prices will be appreciated. New plates to day are about £20 to £25 as against pre-war rates of £12 to £14. Generally there are inquiries for boilers and engines. These are mostly used for brick-making and industrial works. There is still a scarcity of loco-type boilers. Many outlying villages are installing plant for wood-cutting and other industrial work. Johannesburg is still the centre from which to obtain anything in the way of second-hand machinery; the Colonies are practically cleared out, and have to apply to Johannesburg for their requirements. 10 H.P. loco-type boilers (second-hand) rule at about £250, 25 H.P. at about £500. Business generally in the second-hand machinery market is getting better.

Reduction of Steel Prices in Britain.

Unless the price of steel is reduced to something like pre-war figures the steel works must be closed down, Lord Invernain recently declared. With a view to stimulate trade, steel manufacturers have issued revised price lists, which show substantial reductions. Since January last Scottish prices have been reduced 50 per cent., but only 25 per cent. of the workers are employed, and only 15 out of 112 furnaces are operating, as quotations are still higher than those from the Continent. British steel prices have now been reduced to: Ship, bridge and tank plates, joists and heavy rails, each £10 10s.; and boiler plates, £16 per ton.

Cessation of Tin Mining in Cornwall.

The last of the Cornish tin mines closed down some nine months ago. The tin district, containing Redruth, Camborne and a few townships and villages, and measuring about six miles by four, has now entirely ceased working, and every mine is shut down, which, in the absence of any other industrial activity, means total collapse to the district. About 12,000 men are thereby directly affected. Lack of capital and the great slump have prevented development work and the replacing of obsolete plant. All these mines, which are in the meantime deteriorating, are awaiting economic readjustment in the matter of receipts approximating costs, which, however, appears to be as far off as ever.

American Notes.

While the United States Steel Corporation continues to report decreases in unfilled orders, and most of the widely known producers of steel are waiting for something to turn up, there are some developments in this part of the field which may have considerable meaning. Steel ingot production is, however, increasing, and products for structural purposes are being turned out in larger quantities in response to demand. The American Radiator Company, which enjoys a high standing not only in America but in Europe, has raised its prices and is now swamped with orders.

The Kewanee Boiler Company, having a much larger function in the world than would be indicated by the small Illinois town where its works are located, has no considerable amount of its own products on hand, has abandoned plans based on the dullness heretofore prevailing, and will start at once on a new programme. Picklands and Brown, well known everywhere as producers of pig iron, have had a business during the past month twice as great as that of the corresponding period of last year, and their prices are up from 18 dollars at the low to 22 dollars. They have no furnaces in blast now, but their yards contain a large supply of pig iron. No one of these concerns is large by comparison with the United States Steel Corporation, but all are highly responsible and evidence as to the condition of business coming from them is of much value. When the grand movement forward starts, it will not be first answered by the biggest Corporations. It will be a result of revivals at any points, an accumulation of small orders, a movement on the part of individuals in response to the demands of their own business. For that reason it is not expected that there will be anything spectacular springing up all of a sudden some day, but a steady expansion. There is no revival yet in the iron and steel interest broadly considered, but there is here and there considerable gain, part of which is no doubt due to the natural lift in affairs during the last three months of the year, when money is realised from the products of the soil and when in the course of their labours the farmers find that they are short of everything. In normal times it might be expected that the great importation of gold into America would cause a revival in business, and eventually those importations will have an effect, but at the present time the tide of liquidation is so strong as to counteract influence coming from the precious metal. One hears of large hoards that are ready to be loaned or to be put into active business.

Timber and Building Materials.

Business has been fairly satisfactory this week. Stocks are plentiful, prices are gradually stabilising, there is a firmer tone in building materials owing to heavy buying in the United Kingdom. 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 1s.; beaver board, 4 $\frac{1}{2}$ d. to 5d.; floorings, 6 $\frac{1}{2}$ d. to 7d.; ceilings, 5d. to 5 $\frac{1}{2}$ d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9 $\frac{1}{2}$ d. to 10 $\frac{1}{2}$ d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at the mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks remain unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s. 6d., 46s. 6d., 55s. for 1 to 3-ply. Things are still quiet as far as building operations are concerned; there are no shortages, either of operatives or material. It is generally thought that from about February next a distinct advance will take place, with steadily improving conditions in the meantime, apart from the holiday and stock-taking months of December and January.

Second-hand Iron and Timber.

The second-hand iron and timber yards have been far from active this week, very little business having been done, as a matter of fact, for some weeks. Stocks are abundant and dealers are only too anxious to reduce them. Prices remain at from 6d. to 7d. for iron and 10d. to 1s. for timber. The present financial stringency and the continued pause in building operations are making themselves felt equally in new and second-hand concerns.

Oils and Colours.

White lead in oil, small sizes, 10 $\frac{1}{2}$ d. lb., 39s. 9d. per 50 lb kegs; English red lead, 10d. lb. in 6 $\frac{1}{2}$ lb., 12 $\frac{1}{2}$ lb. and 25 lb. kegs, 9d. lb. in 50 lb. kegs; dry white lead, 1s. 6d. per lb.; linseed oils, raw or boiled, small bottle, 1s. 9d. each, 7 lb. tins, 8s. 3d. each; 4 Imperial galls., 40s.; spirits of

turpentine, small bottle, 2s. each, 9s. 6d. per .83 Imperial gallon; oxide in oil, 25s. to 45s. per 50 lbs.; oxide, dry, 14s. 6d. per 100 lbs.; putty, finest linseed oil, in 100 lb. drum bulk, 5d. lb.; English putty, in bladders, 7½d. lb.; colours, ground, in oil, 42s. 6d. to 75s. per 50 lbs.; dry colours, 6d. to 11s. 6d.; colours, ground in water, 1s. to 2s.; in turpentine, 3s. to 10s. 6d.; motor colours, ground, in gold size, 3s. to 5s.; ready mixed paints, all colours, 1s. 6d. lb. in 1 lb., 2 lb., 3 lb., 7 lb. and 14 lb. tins.; 70 lb. drums, 1s. 4d. lb.; aluminium paint, 25s. per half imperial gallon., 45s. per imperial gallon; roof paints, 16s. 6d. per 14 lb. tin., 75s. per 70 lb. drum; leadless flat wall paint, 27s. 6d. per 5-6th imperial gallon, 33s. 6d. per imperial gallon; enamels, 16s. 6d. to 30s. per .416 imperial gallon; gold enamel, 2s. 6d. and 4s. 6d. per box; varnishes, 25s. to 47s. per imperial gallon; pumice stone, 1s. 3d. lb.; glass paper, 1s. 3d. per dozen, 50s. per ream of 480 sheets; bees' wax, 1s. 6d. lb.; carbolineum, 5s. per 5-6th imperial gallon tin, 23s. 9d. per 4 imperial gallon tin; bottles, 2s. 3d. each; alum, in powder, 9d. lb.; creosote, 4s. 6d. per 5-6th imperial gallon tin; gum arabic, 3s. 6d. lb.; methylated spirits, 5s. 6d. per tin., 5-6th imperial gallon bottles, 1s.; resin, 8d. lb.; caustic soda, 1s. 3d. lb.; seccotine, 1s. tube.; tallow, 1s. lb.; coal tar, 4s. 6d. per .83 imperial gallon, 17s. 6d. per 4 imperial gallons; Stockholm tar, 9s. 6d. per .83 imperial gallon, 47s. 6d. per 5 imperial gallons; common glue, 10d. lb., good quality, cake, 1s. 6d.; finest Russian, 1s. 9d.; English gold leaf, plain, 3s. 9d. per book, transferred 4s. 3d. per book; aluminium leaf, plain, 1s. 9d. per book; transferred, 2s. per book.

Electrical Goods.

Dealers were more hopeful this week as to business in the near future. They confirm the improvement which has taken place during the past two or three weeks, and state that trading is now quite good again both in town and country. A leading importer said he had this week had visits from residents of Ermelo, Vereeniging, and from Kimberley, all of whom purchased electrical materials, stating that in their opinion things were now about to move. He thought people were beginning to realise that better times were in store and were now more inclined to be enterprising than for some considerable time; those who have been keeping their pockets tight are now loosening them. He himself felt confident that things in the electrical world would now slowly but gradually improve. There are no alterations to report in prices, which remain very steady, with, if anything, a tendency to rise. Stocks in all lines are now full, and consignments continue to arrive in fair quantities from Britain, America and the Continent. Those from the latter destination continue still to be much below British quotations, but signs are not wanting that a gradual levelling up is taking place, and it will not surprise dealers if within a few months' time the present discrepancy between the prices of British and Continental electrical materials, with one or two exceptions, disappears to a considerable extent.

Mr. Lloyd-George's Proposals re Unemployment and Trade.

The Prime Minister's proposals for the extension of trade and assistance in raising capital for industrial undertakings have been well received in commercial circles, which consider them both sound and workable. The Government, it is understood, offered to leave the management of the credits system in the hands of the leading bankers, but the latter decided that the scheme should be managed by a committee within the Overseas Trade Department, while offering on their part to give every assistance to the carrying out of the scheme. Referring to the unemployment question, which was the worst experienced for a century, the Prime Minister affirmed that the Government had done everything in its power to alleviate the same by the export credit scheme, the distribution of relief to unemployed under an insurance scheme, and the provision of work by the Cabinet Unemployment Committee. He stated that £637,000 had been voted for the settlement of ex-service men in the Dominions, where already 60,000 had settled, and Government proposed to ask Parliament for another £300,000 for the purpose of meeting the rush of further applicants. He said we were more dependent than ever on the Dominions for trade, and the more men settled under the British flag the better for

trade and employment in Britain. There were signs of a revival in some industries in Britain, but it would be sanguine to predict an early return to normal. We had to convert the world's need for our goods into a demand, and a demand into payment. With regard to the export credit scheme, Mr. Lloyd George said the Government had decided to guarantee 100 per cent. of the cost, instead of 85 per cent., but the exporter would be liable on recourse to 57½ per cent. risk; therefore the Government's risk would remain at 42½ per cent. The Government was prepared to enter into enterprises such as railway extensions, electrification of waterways, etc., which would produce immediate relief. The Government's liability under this proposal would be limited to £25,000,000 sterling. The Government further proposed to allocate £10,000,000 sterling for relief works. The cost of production, however, must be reduced to employers and workers must come together in an endeavour to reduce wages.

In the House of Commons Mr. Chamberlain stated that unemployment will be considerably relieved by the construction of the enormous quantities of machinery, etc., required to build a new deep-water harbour at Takoradi, Gold Coast, which it is estimated will cost about £10,000,000. Inquiries for machinery are now being sent out, and the first working party of British engineers will leave in two months' time.

Export Credits Scheme and the Engineering Trade.

Mr. Lloyd George has announced that the Government was prepared, in the case of very considerable engineering and other orders from foreign Governments, to grant an extension of credit for repayment, where desirable, even for five, six or seven years, by which means, he thought, very considerable orders, especially for the engineering trade, which was suffering most from unemployment at present, could be secured. These proposals have been very favourably received in the House of Commons. Mr. Asquith urged the development of a more extensive trade with the Dominions, which supplied, he said, Britain with essential commodities. There was, in his opinion, no reason why inter-Imperial trade, assisted on sound lines by the State, should not exceed altogether European trade which Britain had lost through the war. Mr. Clynes (Labour), while emphasising that wages did not constitute the sole element, agreed that workers should endeavour to contribute to reducing the costs of production.

The Union's Industrial Enterprise.

In an able address to the members of the South African Mutual Life Assurance Society, the Chairman, Mr. Christian Silberbauer, said, *inter alia*, that he was optimistic as to the future of South Africa. We had so many resources within ourselves that any set-backs such as we were now experiencing should only be temporary. There were several reasons for a brighter outlook. One was the industrial expansion of the country with, as a natural result, a tremendous increase in our factories. Thirty years ago, when South Africa may be said to have awakened to industrial life, we had 550 factories, which had increased to-day to 6,000, employing 143,000 workers, white, coloured, and native, and paying out £14,500,000 annually in salaries and wages. This naturally meant a great distribution of capital and reacted beneficially on other sections of the community.

Industrial Development.

Mr. J. Waldie Pearson, K.C., presiding at the last monthly meeting of the South African National Union, said that there was generally a more optimistic outlook as to the future of the Union's industrial growth. He again emphasised the necessity for a better organisation of the agricultural industry and instilling new life into the societies and farmers' associations by the circulation of literature that made an appeal to the farmer, by lectures and demonstrations, etc. It must, he said, be brought home to every agriculturist that the Government was doing a great deal to help the industry, and that it was for the farmer to take full advantage of that assistance. With regard to manufactured articles, Mr. Pearson urged the necessity of showing the public what was being done in this direction by well-organised exhibitions at various centres, which would be bound to arouse interest in

the matter. Although the imports so far for 1921 were considerably below those for 1920, they still included many articles which could and should be produced in the Union, and the decrease already shown would soon be accentuated if the public were shown that we could supply a good article. But in order to do that, advertising on a large scale was necessary. He thought that the more forward policy initiated by the Railway Administration in the matter of excursions would, by the more intimate acquaintance with all parts of the country, mean a greater circulation of money, and consequently more development. Too much was, he thought, made generally of the present depression, which had been equalled if not exceeded in the previous history of the country. Greater development of the primary industries of the Union, in which the various classes of mining must be included, would, he was assured, soon bring about a condition better and more permanent than we had yet experienced.

Financial.

London advises that discount has declined to 2.68 per cent. on tendering of Treasury Bills.

Commonwealth's £5,000,000 Loan.

This loan, which is redeemable between 1931 and 1941, will, it is announced, consist of £1,000,000 of new money, while the balance will be made up by redeeming bills, amounting to £2,000,000 sterling, and other debts amounting to £2,000,000 sterling.

Australia's Shipping Line.

Sir Joseph Cook, Treasurer, announced in the House of Representatives that the Commonwealth Shipping Line had made a profit of £467,000 in 1920. This is a great contrast to the result of the activities of both Britain and America in the shipping line.

Metal Market.

The Metal Market was disturbed during the week by the collapse of the mark and the threatened strike in America, but recovered somewhat towards the close. There were heavy liquidations in copper. Tin was firmer, and still higher prices are anticipated. Lead was stronger. Spelter weakened on the heavy sales from the Continent, but recovered later. Tin plates were stiffer owing to shortage of supply. Latest quotations: Standard copper, £66 1s. 3d. cash, £67 3s. 9d. forward; electrolytic copper, £73 cash, £75 forward; Straits tin, £158 7s. 6d. cash, £160 10s. forward; English lead, £24 cash, £23 15s. forward; bar silver, 40½d. gold, 104s. 6d. per oz.

Mcderfontein B Quarterly Report.

The payable reef disclosures were as follows:—Main Reef Leader: Feet, 1,365; reef width, inches, 16; assay value, dwts., 45.1. Total profit: £301,308. The additional tube mill unit is running satisfactorily. A considerable increase in development footage has been accomplished. The total figure includes 1,020 feet of development from the south-eastern shaft, of which 315 feet disclosed reef of, on

the whole, unpayable character. At the south-western shaft 316 feet of ore passes and cross-cutting was done. During the current quarter the change over from sinking equipment to the permanent hoisting arrangements at the south-western shaft will be completed, and this, together with the haulage to the central shaft, will enable ore from the south-western section of the mine to be handled in a more economical manner. The operations of recent months have resulted in a yield considerably higher than the value of the ore reserves as recalculated at December 31, 1920. The reason for this higher yield is that actual stoping values have proved, during the period in question, to be in excess of block values. In stoping it is by no means uncommon to find the value of the ore proving higher or lower than the assay indicated. The ore reserves at December 31 last were calculated as usual upon a fairly conservative basis, but the unexpectedly high yield of recent months induces the Board to issue these few words of explanation.

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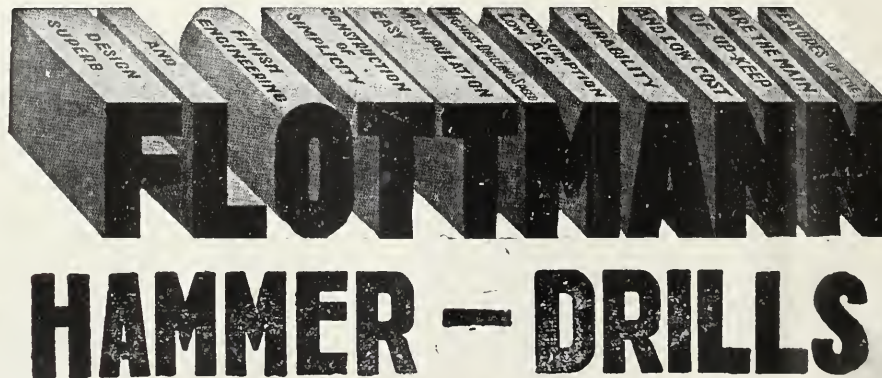
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Read "The New Johannesburg" in this Issue.

The South African Mining & Engineering Journal

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Established 1891.

Vol. XXXII., Part II.

JOHANNESBURG, TRANSVAAL, SATURDAY, NOVEMBER 5, 1921.

No. 1571.

Headquarters of the Transvaal Mining Industry.
A large Building just completed.



The New Chamber of Mines Building, adjoining the Stock Exchange. A photograph taken the other day, which exhibits the building with the scaffolding down and ready for occupation.

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THE NEW JOHANNESBURG.

OUR LATEST BUILDINGS AND THEIR SIGNIFICANCE—A BRIEF SURVEY OF THE POSITION AND OUTLOOK—"WILL JOHANNESBURG LAST?": AN OFT-DEBATED QUESTION—DEVELOPMENT WORK ALONG THE REEF—SOUTH AFRICA'S RESOURCES AND LEADERS—A DIVIDEND MARKET BEFORE CHRISTMAS?

The question "Will Johannesburg Last?" often has been asked in these columns, and invariably the replies to this momentous query have been of a most conflicting nature. In this issue we reproduce photographs which portray four new and costly Johannesburg buildings which testify to the sincerity of the optimism as to the future of the town which is held in some quarters. These edifices do not necessarily provide a sufficient answer to the question which has so often been debated in the "Mining Journal," but their roofs and spires at least point to some silver lining to the present drab clouds which envelope us. The significance of these buildings and the general position and outlook for Johannesburg and South Africa are briefly touched on in the accompanying article.

The new buildings just erected in Johannesburg and which are illustrated on the accompanying pages help one to sound a note of optimism in a town which is very drab and grey at the present.

Johannesburg, in common with every other place in the world, is suffering severely from the prevailing and universal depression. The share market, which always is the barometer of the situation in the Golden City, after its fleeting activity of a few weeks ago is again in the doldrums, and pessimistic brokers are recalling the bad times which succeeded the abnormal spurt after the Boer War, when the prospect of leasing the Stock Exchange to the Municipality for the purpose of selling vegetables was discussed by gloomy operators.

Scarcity of Cash.

On all sides one hears that money is exceedingly tight. Capital for the moment is most difficult to obtain, and there are attractive first mortgage debenture propositions which cannot raise the money they require at 9 per cent.



New Municipal Power Plant Sub-Station.

Yet in some quarters it is believed that there may be a more or less active dividend market before the close of the year and it is common talk that a settlement of the enemy shareholding difficulty is at last in sight.

Pessimism on the Rand.

For the time being the mining industry on the Rand seems to be sailing on an even keel, but the price of gold keeps at a considerably lower figure than it was expected would prevail, and is indeed at a lower figure than might reasonably be asked for the product of low-grade mines working at an abnormal rate of expenditure. It is scarcely conceivable that the miners can really be serious in their ridiculous demand as expressed by their leaders for a reversion to the rates of pay obtaining previously to the recent protracted settlement. Development work along the Reef continues

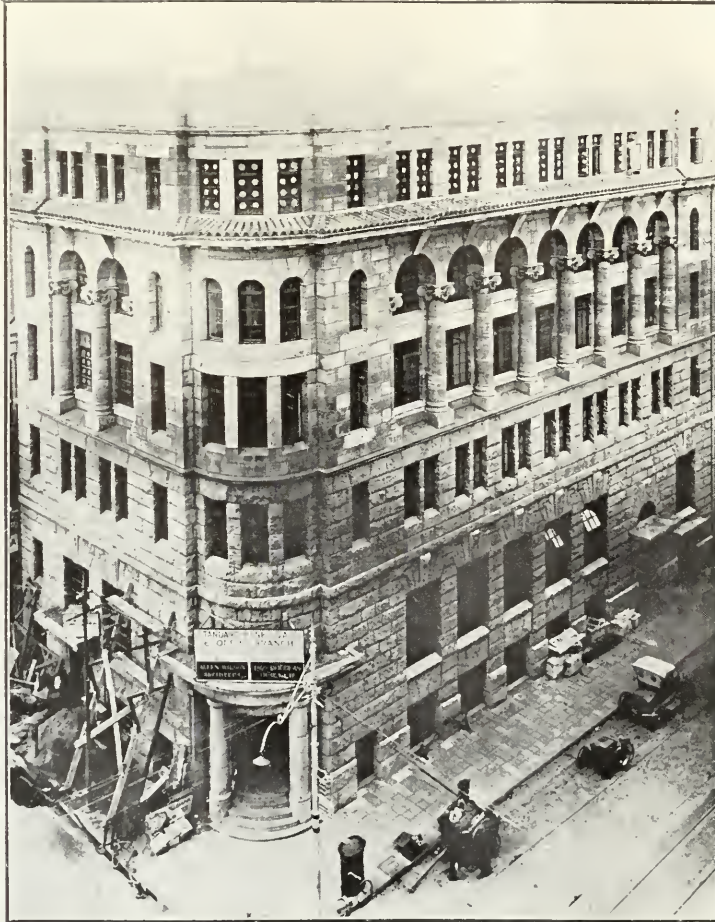
near future regain some of the prosperity which we enjoyed a year or so ago.

Our New Buildings: What Do They Signify?

There are, at any rate, those who believe in the future of the country and in the future of Johannesburg, this glorified mining camp, which is the hub of South Africa.

The new buildings of the Golden City which are portrayed in this issue are at least substantial testimonies in solid stone and brick and mortar to the view that the fall of Johannesburg is not yet.

We reproduce on our frontispiece this week a photograph of the new and completed home of the Transvaal Chamber of Mines, an impressive edifice which has been erected on a well and appropriately chosen site adjacent to the Stock Exchange.



New Branch of the Standard Bank, corner of Eloff and Market Streets.

much as ever, and although it is reported that the Ferguson section of the Randfontein Mines has been closed down on account of poor values, one learns as an offset to this report that disclosures are very satisfactory in some areas of the Far East Rand, and particularly so at Geduld.

It is hardly likely that there can be any substantial improvement in world trade conditions generally until the political situation and financial outlook in Europe becomes more satisfactory.

The Country and its Leaders.

But South Africa and Johannesburg may seek consolation in this fact, that the clouds, dark as they may be here, are more lugubrious in other countries, and with more enterprise and foresight on the part of our political and industrial leaders, there is no reason why the Union with its vast natural resources and many advantages should not in the

We give, too, photos of the new Eloff Street branch of the Standard Bank, a palatial warehouse recently completed in Market Street, and the new sub-station of the Municipal Power Plant.

Contracts for the erection of these were of course signed some time ago when the sun shone more brightly upon us than it does to-day. And they do not necessarily provide a complete and final answer to the question of whether Johannesburg will last, which has so often been debated in the columns of this journal.

A Comforting Reflection.

Yet these costly new piles at least provide solace for the ordinary Johannesburger in one respect. He can, at any rate, console himself with the reflection that if he is a fool to believe in the future of Johannesburg, there are much bigger fools who are chasing the same golden rainbow.

THE NEW JOHANNESBURG.



A Large and Palatial Warehouse just completed in Market Street.

Concerning Mines and Men.

Mr. Owen Letcher having returned from India has resumed editorial control of the *S.A. Mining and Engineering Journal*.

* * *

Mr. C. W. Francis Harrison, Special Commissioner of the Federation of British Industries, who has been on a visit to South Africa, is leaving shortly on his return to England.

* * *

Mr. S. Seruya, for many years the popular and respected Portuguese Vice-Consul for Portugal here, left the Rand this week for Lisbon. Mr. Seruya is being succeeded by Mr. J. P. Ferreira.

* * *

Mr. G. Bendien, joint manager in Johannesburg of the National Trading Company, is leaving shortly to take up the position of manager of the branch of the same London firm in Holland.

* * *

The certificates issued by the Mines Department for the period ending 31st October, 1921, were as follows:—Mine Managers (Metalliferous Mines): A. R. Bauristhene, P. O'B. Frost, J. J. Griffiths, J. E. Gudmundson, F. J. Hosking, K. J. MacWilliam, A. G. McAlister, A. P. Mellet, H. A. Mills, N. H. Menro, R. R. Vail. Collieries: A. F. Campbell, P. Gerrard, W. Tarran. Non-flery Collieries: P. A. Creewel, L. H. Maasderp, H. P. Townsend. Open-cast Diamond Mines: H. L. Olyer. Mine Overseers (Metalliferous Mines): J. H. C. Bell, C. E. Roy, K. B. Wood. Not available in Phthisis Mines: C. J. Richards.

A very pleasant bridge drive and social gathering took place in the Recreation Hall, O'okiep, Namaqualand, on the 21st October, 1921, the occasion being the celebration of their silver wedding by Dr. M. W. W. Cowan, M.B., Ch.M., Edin., and Mrs. Cowan, who are highly esteemed throughout the district where the doctor had practised for over 26 years. A presentation, consisting of a very handsome solid silver tea and coffee service and salver, the latter suitably inscribed, and a case of ladies' silver-backed hair brushes, silver-topped scent bottles, and silver manicule set, was made by W. F. Kitto, Esq., Superintendent of the Cape Copper Co., Ltd. Mr. Kitto, on behalf of the people of Namaqualand, in a very appropriate speech, voiced the goodwill and affection of the people present, and also those who were unable to attend. Representatives from outlying villages attended to convey the wishes of those centres, and the well-filled hall bore ample testimony to the esteem and regard in which the worthy genial doctor and Mrs. Cowan are held in these far-reaching parts of Namaqualand.

Oil in Mozambique.

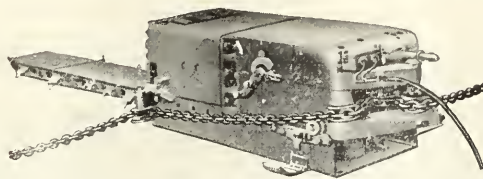
It is understood that a prominent Rhodesian geologist, who recently has been investigating the mineral prospects of an extensive tract of country in Mozambique, has pronounced his opinion that there are excellent indications of discovering oil near Inyaninga in that territory. This pronouncement has been arrived at after a most careful examination of the stratigraphical features and a correlation of strata with the oil-bearing rocks of Madagascar. It is proposed to commence boring operations in the near future, and for this purpose it is intended to employ machinery at present in use on the Beira-Zambesi Railway.

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SIR HENRY STRAKOSCH AND MR. RONKETTI LEAVING FOR SOUTH AFRICA.

EXCELLENT DEVELOPMENT VALUES CONTINUE AT GEDULD—No. 3 EAST RAISE DISCLOSES OVER 1,000 INCH-DWTS.—MODDER DEEP'S PROFIT IN SEPTEMBER QUARTER, £265,263.

We learn that Sir Henry Strakosch, of the Union Corporation, intends leaving England for South Africa on the 18th inst. Sir Henry is, of course, well known on account of his long and intimate connection with the Union Corporation, and more especially in connection with his association with the Union's currency problems and the formation of the South African Reserve Bank.

We understand, too, that Mr. V. J. Ronketti left England yesterday for South Africa, and that on arrival he will assume the important position hitherto occupied by the late Major Macormack, as chairman of the Union Corporation Companies.

* * *

Geduld Proprietary Mines.

The report of the Geduld Proprietary Mines for the quarter ended 30th September gives the following particulars in regard to development operations at that property:—Total



Sir Henry Strakosch.

development footage, 4,846 ft.; total footage sampled, 3,260 ft. The payable reef disclosures were as follows: 1,145 feet having an average assay value of 17.5 dwts. over 41 inches. Up to the 30th September the total footage of reef exposed and sampled at No. 7 Shaft on the 7th level and in the raises and winzes therefrom was 5,770 feet, of which 62 per cent. is payable, having an average value of 16 dwts. over an estimated stopping width of 66 inches. The three faces being advanced in this area since the end of September continue to show very satisfactory results, particularly No. 3 East Raise, which is now 814 feet above the 7th level. The values disclosed average over a thousand inch-pennyweights. Productive results for the quarter were:—Tons milled, 134,800; total yield ozs., 47,462; working revenue, £261,334; total profit, £111,531; working costs per ton, 23s. 5d.

* * *

The Modderfontein Deep Levels.

At the Modderfontein Deep Levels the outstanding features of the quarter's operations were as follows:—Total

development footage, 2,196 ft.; total footage sampled, 1,045 ft. Payable reef disclosures were as follows: 885 feet, having an average assay value of 15.8 dwts. over 41 inches. Results for quarter: Tons milled, 129,900; total yield ozs., 72,150. Working revenue, £397,254; total profit, £265,263; working



The Modder Deep.

costs per ton, 21s. 9d. The working revenue was arrived at by taking the gold produced during the quarter at the following estimated prices: July, £5 12s. 6d. per fine oz.; August, £5 11s. 6d. per fine oz.; September, £5 10s. per fine oz.

Bantjes Development Operations.

The work accomplished in the 11th level west drive by the Consolidated Main Reef Mines and Estate, Limited, during the quarter ended 30th September, 1921, was as follows:—Main Reef Leader: Footage sampled, 130 ft.; reef width, 4 inches; reef value, 2.5 dwts. Main Reef: Footage sampled, 85 ft.; reef width, 19 inches; reef value, 1.9 dwts. The waste parting between the Main Reef Leader and the Main Reef is 60 inches. The drive was advanced 161 feet during the quarter.

North-West Cape Oil Prospecting.

Nothing daunted by Dr. Wagner's report, the North-West (Cape Colony) Prospecting Syndicate held an enthusiastic annual meeting the other day at Kimberley, at which Mr. J. Lawrence, in charge of the work at Dubblede Vlei, reported that the borehole had now reached a total depth of 1,728 feet. He further wrote that Mr. Hutcheson said there was more oil on the water every foot they went down. Mr. Liddlell read extracts from a letter he had received from Mr. S. G. Hutcheson, the assistant drillman at Dubblede Vlei, as follows: "With regard to the work that is going ahead, the indications are improving with every foot drilled. The core now shows evidence of a distinct change, which augurs well for the future. The flow of gas has been particularly strong of late, and will return two or three times during drilling operations. The flow of oil is also improving, rising as it does now in one continuous film, with occasionally large patches. A flow of gas always precedes a freer flow of oil, which indicates alternate layers of rock and sands. . . . I think all things now point to a definite and final refutation of the geologist's report. I am most optimistic about this place, and feel sure that your courage in continuing will be amply repaid."

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The Last Word on Rand Metallurgy.

By F. Wartenweiler, A.I.M.M.

Mr. F. Wartenweiler, the well-known Corner House metallurgist, is the new President of the C.M. & M. Society. His inaugural address, dealing with the subject of which he is an acknowledged master, is therefore of unusual interest and value. We give some extracts below.

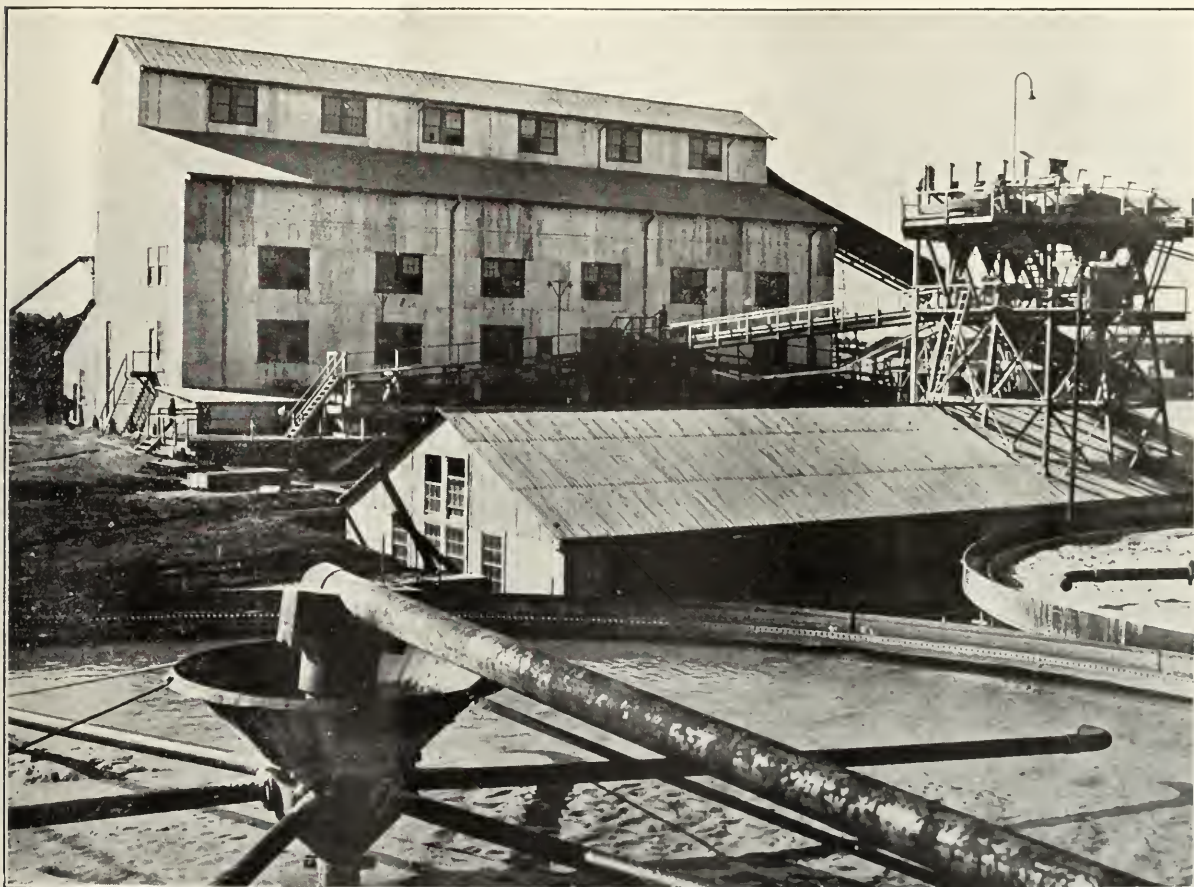
Underground Features.

In dealing with the metallurgy of the Witwatersrand, it is often taken for granted that the initial steps begin after the ore has been hoisted to the surface and delivered to the reduction department. On some mines this can be accepted as the starting point for the beneficiation of the

dilution, cannot be ignored without the payment of the penalty, scale in pipes, or the purchase of an expensive precipitant.

The precise chemical control appeals to the economist and mineowner as a means of saving tons of steel and other corrosive material used underground, not to mention that of cyanide at the surface plant. As an example the experience of one mine may be mentioned where, by careful control, cyanide consumption has been lowered from 0.28 lb. to 0.18 lb. per ton ore treated.

Acidity in mine water has been known to be sufficiently high in some old workings to blister the flesh of men coming in contact with it, as the episode of a mine manager who had such a practical though painful demonstration. We have also heard of miners who have suffered from the burn of strong alkalinity by coming in contact with an accumu-



Modern Rand Metallurgy— A View at Springs Mines.

ore. On others, however, natural chemical processes, which affect the subsequent treatment, begin in the stope, the ore pass and the pump sump, and it is due to the recognition of this fundamental fact that one large group has begun ore treatment underground and has extended the responsibility and usefulness of the chemist and metallurgist. I allude to the chemical control of neutralisation of acid mine water by means of lime, the settlement of sludge, its subsequent disposal, and the maintenance of a favourable composition of water for re-use in dust allaying, in which there are pitfalls unseen except by the trained chemist. The precipitation, from a super-saturated mine water, of the calcium sulphate formed in neutralising or its prevention by adequate

lation of milk of lime in some back water underground. The one points to the moral of the usefulness of information on the degree of acidity; the other, of wastefulness of lime when not applied under precise control or at the most effective place.

The practice of underground support by means of ore packs is well known and has been described at our meetings by several members in an interesting manner. In view of the chemical and physical alterations taking place in these packs, the question arises whether such a method of mining affects the subsequent extraction of gold, and to what extent. No satisfying answer has been forthcoming, perhaps due to lack of opportunity for a definite test.

Sand filling, which has returned hundreds of thousands of tons of residue sand to the place of origin, the stope, has found its way back to the reduction plants in small quantities, particularly on outcrop mines, where ground movements and consequent break away of sand barricades take place. The incidence of this acid material in the extraction of gold from the clean current ore is noted by reduction men to be adverse.

Crushing and Sorting.

Crushing and sorting operations so closely related locally as to be dealt with under one heading is such an important and comprehensive subject that it could easily form the sole basis of a paper. Interest seems to have lagged of late years. Is it because the existing plants are considered capable of fulfilling all requirements from the point of view of efficient crushing, sorting, and low cost of operation? Not until you make a close study of various types of stations now in operation are you impressed with the variety of objectives originally affecting the design of each.

The early designers, in the pre-conveyor belt days, built skywards and in conjunction with rotary sorting tables often employed crushers at the highest point of the structure for cracking large rock prior to sorting. Many of these old plants continue in operation, and excellent work can be obtained. Sorting to the extent of 16 per cent. has been carried out in a station of this type by picking out the valueless class of reef in addition to the usual quartzite and dyke waste.

We then come to the type of station employing conveyor belts and in which sorting and crushing in two stages is practised. Although the high sorting percentage possible with such a design has fulfilled the most sanguine expectations in this direction, lack of native labour and the economic factor has usually retired it in favour of the simple straight line design now found on our later plants. Such a station with trommel washing or with washing on a sharply inclined portion of the sorting belt lends itself, by reason of simplicity, to minimum capital and running expenditure.

One of the latest plants provides for the crushing of all the ore coming from the mine, including the grizzly by-pass, called unsortable fines, which comprise as high a proportion of the ore milled as 40 per cent. This is an innovation and the object is three-fold:—First, the avoidance of sending slushy fines to the stamp mill bins, the moisture from which leads to decay of timber and battery foundations, rusts steel and indirectly causes stem and cam shaft breakage through irregular feed; second, all material passing a ½ inch punched screen is sent to its most efficient grinding machine, the tube mill; thirdly, the chemical motive, which allows thorough neutralisation with lime water of that portion of the mine delivery which benefits by such treatment. It is of interest to note that as much as 15 per cent. of the ore milled is by-passed by this method.

With the realisation of the expense of conveyor belt wear and tear, the re-adoption of preliminary cracking large rock is being considered in order to reduce incidental rough usage. Also washing trommels stationed at the primary bins are favoured for the elimination of the slushy fines, so that no belt need become a conveyor of a material which, having the property of mobility, is preferably transported by the impulse of a modern centrifugal pump. The sorting percentage becomes a function of the number of native sorters and the amount of waste present. This last depending so often on underground conditions and the reef formation. It is, perhaps, not always realised that many mines, owing to peculiarities in their payable ore channel, present individual problems in sorting which must be studied separately if this important part of ore dressing is to be conducted on an intelligent and scientific basis.

Regarding crushers, which are taken so much for granted, the two standard types, jaw and gyratory, continue to hold the field. That stamping efficiency is greatly advanced by careful maintenance of their wearing parts and by close setting has always been known, and has again reached the practical stage since manganese steel need no longer be devoted solely to armament purposes.

Stamping.

The Californian stamp and its first cousin, the Nissen, have survived. There are those in our society who hold the view that these will continue to crush Witwatersrand blanket ore at least during our generation. Others feel that improved modern ball or tube mill development will seal their doom as an economical stage crushed. The question is extensive in its bearings and is most important. Working experiments have recently been conducted on this very point at one of the Far East mines. To what extent the crusher and the tube mill can economically encroach on the domain of the stamps, squeezing it out of existence between their extended functions, is a point for careful trial on an extended

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working scale. Let us offer the columns of our journal, as in the past, for the discussion of developments on this subject.

It is on this mining field that the heavy gravity stamp has reached its highest state of perfection. The 1,850 pound Californian stamp at the Government Areas mill crushes 28.5 tons per 24 hours through a screen aperture 0.625 of an inch square, while at New Modderfontein the 1,900 pound Nissen stamps 31.5 tons through a somewhat finer screen.

If you are statistically inclined, the size and power of the stamp mills on the Witwatersrand may be illustrated in various ways. For example, if all the 10 stamp batteries were placed adjoining they would make one continuous line extending for a distance of two and a half miles. If all the stamps were combined into one, the blow of this mammoth stamp would be equivalent to a weight of 5,200 tons dropping eight inches 99 times per minute.

The roar of stamp mills since the early Californian days has followed the axe of the pioneer in many parts of the world, and whatever may be their ultimate fate, to those of us who have spent many working hours in a stamp mill, the surf-like roar of its many batteries will remain impressed in our minds as symbolical of the restless and untiring energy of the gold mining industry.

Tube Milling.

Tube milling practice nowadays appears to be rather one of detail. The tube mills are called upon to grind to a finer degree of comminution than ever, one plant delivering a final product of which 90 per cent. passes the 90 linear mesh screen. Good practice now demands a coarse feed, the newer installations feeding $\frac{1}{2}$ inch maximum size. The trials referred to previously experimented with feed as coarse as that fed to stamps.

Scoop discharges of varying effective lift with screen openings of ample size to permit free discharge of the spent pebble are generally adopted except on old plants where the use of small motors does not permit the resulting high power load. Shell liners of the Osborn and El Oro type find general favour. These are keyed and require no holding bolts. End liners are either cast or forged from discarded stamp mill shoe shanks or dies.

No recent data has been published of the merits of the short 6 ft. diameter by 16 ft. length tube in comparison with the orthodox size, 5 ft. 6 in. diameter by 22 ft. There are also a few 6 ft. diameter by 20 ft. mills in operation whose performances have yet to be compared.

Since the trials of the Giesecke ball mill, to my knowledge, no further attempts have been made with steel balls. How effective a modern large diameter ball mill would be on the basket ore leads to interesting speculation. It should be recognised though that this ore is one of the hardest and most abrasive known, and a steel ball which readily crushes porphyry ore may prove impotent on basket. There are undoubtedly degrees of hardness and toughness in the ore delivered to reduction plants scattered from Randfontein to Springs, and it may be no idle speculation to look forward to the discovery of an ore that will lend itself to a change in grinding medium.

Amalgamation.

Like taxes, the ancient amalgamation recovery method is still with us and is responsible for from 40 to 70 per cent. of the assay value of our mill feed. While, with our system of classification, preferential amalgamation really takes place in practice, the question arises whether this could not be intensified and mechanical contrivance and concentration called in. The day of the non-amalgamating plant and the extraction of all recoverable gold by cyaniding may arrive. In fact one mine has committed itself and elsewhere working trials having this in view have been projected and are only awaiting opportunity and adequate support. Undoubtedly the knowledge that visible coarse gold is found in certain portions of the richer mines has acted as a deterrent with responsible officials. Aside from any technical advantage, the introduction of a method which reduces or eliminates the risk of mercury poisoning would seem to have human merit.

Cyaniding and Chemical Treatment.

No fundamental changes have been effected in cyaniding in the last few years. Considerable experimentation, however, has been conducted quietly, resulting in gains here and there. The practicability of collecting sand and its treatment in the same tank is well established at one of the most recently erected plants. Careful classification is a corollary. The importance of close classification and the advantage of fine grinding of the pyritic portion of the ore is receiving constant attention by reduction officials.

Cyanide solution strengths have been on the down grade and with the adoption of de-aeration of solutions prior to precipitation they will continue on this course. The saving of cyanide and zinc resulting from this constant pressure of experimentation with lower and lower cyanide strengths and with improved precipitation technique has been considerable. On one group alone it has amounted to a quarter million sterling in five years.

Precipitation has received due attention and on some of the plants a feed rate per diem of 2.3 tons of slime solution per cubic foot of zinc shaving in extractor boxes is current practice. The Chamber of Mines financed extensive trials on the de-aeration of cyanide solution and, resulting from these, mechanical de-aeration has been decided on at five reduction works, of which three installations are in operation. The expectation of direct and indirect economy promises to be fulfilled. Interesting details, it is hoped, will be brought forward for discussion this year.

Precipitation research has not been lacking within recent years; the margin of possible improvement, however, is small, and any new process calling for a new installation with heavy capital expenditure is severely handicapped by economic considerations.

Oxidising re-agents, by reason of rapidity of reaction and expense, do not find favour these days. Their effect is evanescent and apt to be harmful. The economical and satisfactory supply of oxygen continues to be derived from free air. Experience with de-aeration has taught us how readily air dissolves in solution and how watchful one must be to prevent this at certain stages of the cyanide process.

Vacuum filters are now accepted by the majority as standard slime washing equipment for new plants. Their washing is controllable, depending so much less than the decantation process on ratio of dilution and on the weather. Many installations maintain a consistent daily capacity rate of 3.5 tons dry slime per leaf.

Smelting and Refining.

No innovations have been introduced in recent years into refining and smelting on the individual mines. The large refinery erected near Germiston by the Chamber of Mines for the purpose of refining the gold output of the Witwatersrand by the chlorine process is about to operate and will no doubt offer a most interesting study to our technical men. We hope to be favoured with a description of its technology in due course.

Acid treatment of the gold-zinc slime from precipitation remains general practice, although with the precipitation improvements referred to this will possibly be discontinued. Subsequent calcination and pot smelting or reverberatory lead smelting is the practice according to preference or works convenience. Small blast furnaces are found useful for smelting by-products on the larger mines. For others the Witwatersrand Co-operative Smelter, a most excellent institution, fills all requirements. The treatment by cyanide of the "black sand" or pyritic by-products from amalgamation has received attention by many of our members and is well established.

Periodically, schemes for utilising the zinc sulphate liquor, now wasted, are brought forward. Many of them are ingenious and have undoubted merit, and I confidently look forward to an economic utilisation of this liquor.

In concluding the foregoing traverse of local metallurgy, I venture to reiterate that sound development is visible, and in the words of the young assayer who found a large looking speck of gold unweighable, is at least equivalent to "two traces."

Oil Shale Distillation.

COMMERCIAL CONSIDERATIONS.

The commercial utilisation of oil shale involves three distinct steps, production of the raw material, manufacturing this into finished and saleable forms, and marketing the finished products. All these steps are inter-related. Each presents its own peculiar problems. All these problems must be solved before success can be obtained. Each requires the best technical ability in its particular field. Finally, the several diverse operations must be welded into one harmonious whole which will require executive ability of the highest order.

As there are no commercial shale operations in this country the exploitation of our oil shale means the development of the industry and the training of the operating personnel as the business develops. All the competent investigators who have studied the matter are agreed that, to be successful, the business must be prosecuted on a large scale, not less than 1,000 tons per day, and that it will require the very best engineering, technical, and business skill backed by large financial resources.

Although conditions in Scotland are somewhat different from those prevailing in this country, a study of the oil-shale industry there, where it has been commercially successful for many years, is of interest in connection with our shales as it presents the only index of what we can expect to accomplish. There is enough similarity to be of assistance in guiding the development of the South African oil-shale industry. For this reason a brief sketch of the Scotch practice is given below.

Scotch Practice.

The Scotch shales occur in a geological formation which has been extensively tilted and folded. It is mined underground by methods similar to those employed in working pitching coal veins. The roof is supported by pillars and usually about 25 per cent. of the shale is left in worked-out ground in this form. An average of about four long tons of shale a day is produced for each man working at the face. The shale from the mines is crushed by large, toothed rolls so that nothing larger than two inches in diameter goes to the retorts.

The retorts are vertical and tapered, being about two feet in diameter at the top and three feet at the bottom. The shale is fed by gravity through a hopper at the top which holds several tons. The upper part of the retort is a one-piece iron casting about 12 feet high. It is in this that the bulk of the oil distills. The vapours and gases are removed under slight suction through a pipe which forms part of the top of the casing. The lower part of the retort is built of fire brick and is about 18 feet high. In this part the shale is brought to its maximum temperature, about 1,750 deg. F., and most of the ammonia and water gas are formed through the action of steam on the carbon and nitrogenous material remaining in the shale. The spent shale is discharged through a sealed hopper at the bottom of the retort by a suitable mechanical arrangement. The whole operation is continuous. The throughput of such a retort is between four and four and one-half tons per day. The steam, which is admitted to the hopper containing the hot, spent shale at the rate of 750 to 1,000 pounds of steam to 2,240 pounds of shale, serves for the following purposes: to cool the spent shale, to carry the heat from the spent shale into the retort, to form water gas from the fixed carbon, to form ammonia by reacting with the nitrogen in the shale, to sweep the oil vapours out of the retort, and to effect a better transfer of heat from the walls of the retort to the centre of the charge.

Four retorts are usually set together in a common furnace, and sixteen of these units of four constitute a bench which is two retorts wide and thirty-two long. The retorts are heated by burning the permanent gases which result from the distillation of the shale. Scotch shale which yields 25 imperial gallons of oil per long ton, or more, will also yield enough fixed gases to heat the retorts. When the permanent gases are insufficient to heat the retorts, producer gas is manufactured and used for this purpose.

In Scotland no use has ever been found for the spent shale and its disposal is one of the items of expense connected with the industry. Attempts to make use of it for road material and brick making have been unsuccessful.

The oil vapours, gases, and steam from the retorts pass into a common header and thence through air-cooled, vertical condensers. The oil and water vapours from the condensers run into separators where the oil is separated from the ammonia water. The non-condensable gases are passed through scrubbers in order to remove the light oils and ammonia and are then used as fuel for heating the retorts. This gas, with the gases from the oil stills, constitutes a large part of the fuel used at the plant.

After being separated from the ammonia water the crude shale oil is transferred to the crude stills where it is separated into various fractions by distillation. The scrubber oils are also distilled and the light oils thus obtained are added to the corresponding products from the distillation of the crude shale oil.

The refining of shale oil is much like that of petroleum, although the operations are more complex and more expensive. Shale oil differs from crude petroleum in containing certain organic compounds that have a particularly bad odour and must be removed before the product is marketable. Also, shale oil is more highly unsaturated than petroleum and hence requires more careful refining. The removal of unsaturated products and compounds having a bad odour necessitates several distillations and acid and alkali treatments which increase the refining costs and losses. The average refining loss for shale oil in Scotland is about 25 per cent. as compared to about 7 per cent. in completely refining petroleum.

The ammonia water obtained from the scrubbers and separators is distilled, and the ammonia so obtained is passed into sulphuric acid producing ammonium sulphate.

The shale now being retorted in Scotland yields an average of about 24.5 U. S. gallons of crude oil and about 37.5 pounds of ammonium sulphate per short ton. The gas yield is about 9,800 cubic feet per ton of shale retorted; its heating value is about 210 B. t. u. per cubic foot.

The products obtained by refining the crude shale oil are motor gasoline, illuminating oils, gas and fuel oils, lubricating oils, paraffin wax, and coke. The yield of these different products varies and depends to a certain degree both on the nature of the shale and on the conditions of retorting and refining. As a rule, three grades of lubricating oil are made, none of which is suitable for steam cylinders, internal combustion engines, or heavy duty bearings.

The industry was first started on a commercial scale in Scotland about 1860. In 1871 there were 51 companies engaged in the industry while at present there are only six. The successful companies have been those that, efficiently organised, have been able to employ the best technical skill, utilize labour-saving devices, and operate on a large scale. The industry has been favoured by several factors, such as relatively low cost of labour, large yields of ammonium sulphate, high price of competing petroleum products, and the situation in a densely populated industrial region where supplies and a market were close at hand.

From 1871 to 1916 the production of shale oil increased from 593,310 barrels to 1,965,000 barrels and the production of ammonium sulphate from 2,350 to 59,400 tons. This indicates that increasing effort has been directed toward the recovery of ammonium sulphate. Undoubtedly, the increased recovery of ammonium sulphate has had considerable to do with the success of the industry in Scotland.

On the London Metal Exchange on Tuesday standard copper closed at £66 6s. 3d. cash and £67 3s. 9d. forward; electrolytic copper at £73 cash and £75 forward; Straits tin at £155 10s. cash and £158 forward; English lead at £23 17s. 6d. cash and £23 forward; bar silver at 40½d.; and fine gold at 104s. 9d.

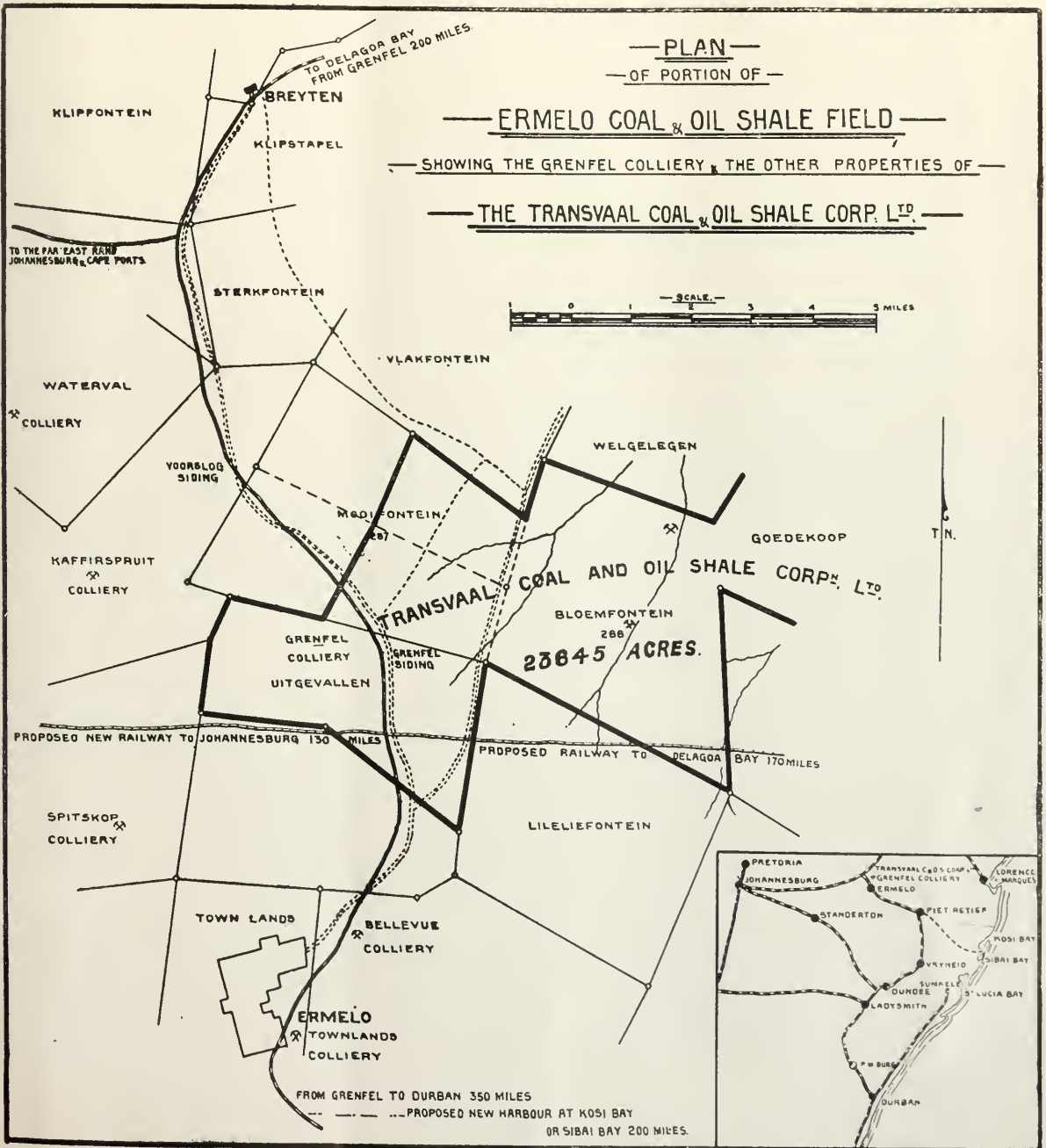
A New Coal and Oil Shale Flotation.

A BLELOCH ENTERPRISE WITH A WORKING CAPITAL OF £105,000—PROSPECTIVE PROFITS RUNNING INTO MILLIONS—NEW OIL DISTILLING PROCESS.

The latest Bleloch enterprise is the Transvaal Coal and Oil Shale Corporation, with a nominal capital of £275,000, and a working capital of £105,000. The assets to be acquired by the venture include a five-sixths interest in the Grenfel Colliery, in the Ermelo district, mineral rights over 2,132 acres on Mooifontein, freehold and mineral rights over 2,432 acres, and options over a further 9,697 acres of the farm Bloemfontein adjoining Mooifontein. The assets also include freehold of the Carlis portion of Mooifontein.

The whole of the cash capital of the Company has been guaranteed by the South African Nitrate and Potash Corporation, Ltd. The South African Nitrate and Potash Corporation, Ltd., now offers a limited number of shares to the

investing public in South Africa and the United Kingdom as follows:—100,000 10 per cent. Cumulative Preference Shares at 20s. per share, with option rights until 31st December, 1922, on 50,000 Ordinary Shares of 25s. per share—that is, an option on one Ordinary Share for every two Preference Shares taken up. The Ordinary Shares will be entitled to all the net profits over and above £15,000 per annum required to pay the 10 per cent. on the preference shares. The Grenfel Colliery has already been fully described in these columns, and in addition to it the rich oil shales and torbanite in the areas acquired will be exploited by the new company.



Samples of the torbanite have been forwarded to Mr. E. H. Cunningham Craig, B.A., F.P.S.E., M.Inst.P.T., Consulting Geologist, London. Mr. Craig is making a special technical report, which will be issued with the prospectus in England, and will be circulated to all shareholders in South Africa as soon as it arrives. The main railway line which connects with Natal and the Delagoa Bay harbours, the Transvaal, and thence on the Cape, passes through Mooifontein, and a siding on the Grenfel Colliery is in operation. The tonnage of torbanite on Mooifontein is estimated at 2,000,000 tons, from which it is estimated that a profit of £3 per ton may be obtained when worked by the new Ironside process. The tonnage of oil shale on the properties is placed at 20 millions, from which a profit of £1 per ton is expected, when treated by the same process. The estimated coal tonnage is 168,000,000 tons, on which an estimated profit of 2s. 6d. per ton is estimated. From the torbanite alone the Company anticipates a profit of £6,000,000.

The Ironside Process.

Added to the prospectus is an interesting description of the new Ironside process. According to the description, this process of distilling oils from shales and bituminous coals has been invented by Mr. T. G. Ironside, M.A., B.Sc. (Edin.). Mr. Ironside's invention constitutes a completely new method of extracting the oils and other valuable by-products from oil shales and bituminous coals. By his method the oils are extracted with extraordinary rapidity. Within half a minute after the shale or coal is placed in the distilling chamber the oil begins to run out through the condenser pipe. The capital cost for a distillation plant on this method will be only a small fraction—probably not more than one-eighth or one-tenth of the cost for a plant on the old retorting methods. An estimate for a plant built on the old method to treat 50 tons per day comes to £28,000. The cost for a distillation plant to treat 50 tons a day by the Ironside method will probably not be more than £3,000 to £3,500. Moreover, the extraction of the oils is more complete and satisfactory. A larger yield of the higher grade oils is assured, owing to the even and comparatively low temperature which can be easily maintained throughout the operation.

The prospectus states:—The process must necessarily revolutionise the oil position, not only in South Africa, but in the United Kingdom and elsewhere throughout the world wherever oil shales and bituminous coals are available. To the Transvaal Coal and Oil Shale Corporation the process means production of oils within the next few months at trifling cost for the retorting plant and with very great profits. The top seam of coal, which has very high volatile contents and which contains the rich layer of torbanite—the richest oil shale yet found in South Africa—is now of extraordinary value. Many millions of pounds sterling worth of oil which this valuable seam contains in the Company's properties will now be available for immediate production. The tonnage which this combined seam of highly bituminous coal, torbanite and oil shale carries in these properties is estimated to run into 100,000,000 tons. Even with a considerable reduction in the world prices for oil, every ton should show a minimum profit of 10s. Last year America put down 36,000 boreholes, which cost £150,000,000, all of which has to be included in the cost of production of oil from wells. In view of the great capital expenditure thus required constantly to establish and bring in new wells, and in view of the very short life of most of these wells when brought in, in view, too, of the comparatively rapid exhaustion of even rich and extensive oil fields in almost all oil well countries, the time may not be far distant when the principal source of the world's oil supplies will be from the distillation of oil shales and from coals rich in volatile matter. The Ironside process bids fair to make it possible to produce crude oil from such shale and bituminous coals at costs which will allow competition on level terms with oil from wells. In that invention, therefore, it may be said that South Africa has "struck oil." The Transvaal Coal and Oil Corporation holds in the Grenfel area, and the great areas adjoining on Mooifontein and Bloemfontein, practically

inexhaustible supplies, not only of highly bituminous coals and of ordinary oil shales carrying 20 to 30 gallons of oil per ton, but also an estimated tonnage of at least 2,000,000 tons of the rich torbanite mineral described in the prospectus, yielding up to 70 gallons of crude oil (specific gravity 0.880 at 20° Centigrade) per ton—unique almost in the world.

The Company is now about to erect the first Ironside Retort at Grenfel, and it is expected to be producing crude oil by about March next. It will therefore be the first producer of oil on a commercial scale in South Africa, and the pioneer in an industry which before long may rival the gold industry in magnitude and value. A complete refining plant would, it may be added, enable the production from the crude oil of lubricating oils and other products of still greater value. It is estimated that the cost of an Ironside plant, including condenser, to treat 50 tons per day will not exceed £3,500. This, with the £5,000 estimated for the primary refining plant as above and allowing £1,500 for contingencies, brings the estimate of the total capital cost for the first plant to £10,000.

Central Mining—Rand Mines Group.

The following are results from some of the subsidiaries for the quarter ended 30th September, 1921:—

	Tons Crushed.	Yield Fine Oz.	Estimated Value.	Total Profit.	Working costs Ton.
Dur. Rood. Deep . . .	79,350	28,558	£156,748	£18,807	34/4
Ferreira Deep . . .	99,000	31,646	173,909	49,271	25/4
Nourse Mines . . .	129,600	43,252	237,474	28,237	32/3
Village Deep . . .	148,100	47,917	263,294	48,987	29/0
Modder B . . .	178,000	95,236	523,557	301,308	25/6
New Modder . . .	297,000	140,592	770,797	440,800	22/5
City Deep . . .	263,000	108,971	598,885	210,994	29/7
Cons. Main Reef . . .	148,700	53,436	292,089	60,167	31/7
E.R.P.M. . . .	377,500	101,294	556,483	49,370	26/8
Crown Mines . . .	590,000	175,905	966,746	229,484	24/9
Geldenhuis Deep . . .	151,610	39,603	217,150	13,211	27/0
Knight Central . . .	85,400	20,463	112,188	13,939	23/2
Modder East . . .	78,650	32,279	176,491	28,558	34/3
Rose Deep . . .	180,100	49,409	222,055	43,800	21/8

Value of gold as follows:—July, £5 11s. 3d. per fine oz.; August, £5 10s. per fine oz.; September, £5 8s. 6d. per fine oz.

Development Results.

	Total Development Feet.	Footage Sampled.	Payable Reef.	Reef Feet.	Disclosures. Width in.	Assay Value dwts.
Dur. Rood. Deep . . .	3,464	2,710	M.R.	620	31	13.2
			S.R.	1,675	6	51.7
Ferreira Deep . . .	726	658	S.R.	129	23	19.0
Nourse Mines . . .	3,786	2,395	M.R.L.	190	43	6.2
			M.R.L.	1,370	31	14.7
			S.R.	315	27	14.2
Village Deep . . .	5,680	2,772	M.R.L.	2,428	34	9.0
Modder B . . .	6,806	3,555	M.R.L.	1,365	16	45.1
New Modder . . .	6,724	3,830	M.R.L.	2,750	19	37.4
City Deep . . .	6,885	2,730	M.R.L.	1,080	25.9	28.5
			S.R.	170	38	9.4
Cons. Main Reef . . .	6,090	3,535	M.R.L.	1,720	7	60.9
			S.R.	35	19	16.6
E.R.P.M. . . .	4,837	3,190	M.R.	410	33	12.2
			M.R.L.	1,175	25	21.4
Crown Mines . . .	13,276	8,470	M.R.L.	3,270	23	23.9
			S.R.	1,910	31	12.2
Geldenhuis Deep . . .	1,953	1,115	M.R.	195	39	17.3
			M.R.L.	40	14	28.7
			S.R.	135	26	26.1
Knight Central . . .	440	340	M.R.	80	77	10
			S.R.	120	43	16.2
Modder East . . .	5,808	4,390	—	2,300	29	11.2
Rose Deep . . .	1,626	1,571	M.R.	394	33	13.1
			M.R.L.	306	35	7.3
			S.R.	395	30	9.6

White vs. Native Labour.

By J. E. Parker.

The extraordinary times we are passing through, and the conditions prevailing at this period, bring very forcibly before us the extreme artificiality of the whole labour position in this country, with the natives who are so many times numerically stronger than the white man. The policy of employing the native to the exclusion of the white labourer is open to serious criticism, when compared to the money value of labour returned for wages, food, medical, housing, recruiting, compound management, police, sanitary, and other incidentals which are inseparable to labour of the native class; other countries with a similar climate and conditions as apply to South Africa, and employing white labour only, are more progressive, and this unit of cost in production is considerably lower and of higher quality than in this country with a so-called cheap native labour.

the future of this country, and its position as a competitor in the world's markets for manufactured goods of which we have an abundance of raw materials at hand, an ideal position for trade, with assets second to none.

Our progress during the last decade has not been due to any gradual influx of emigrants, bent on the betterment of their condition, which the cramped nature of the older countries cannot vouchsafe, neither has the Government fostered or catered for this class of worker, who has enriched other countries and colonies by giving a handsome return in labour. Owing to mistaken views held by the majority of the people's representatives, the advent of any new comer is looked upon as presaging the ultimate ruin of the South African. Whether this is a natural fear, or the first sign of degeneration, is difficult to say, probably a little of both.



A Group of Rand Mine Workers.

The Fundamental Mistake.

It has always been the prevailing opinion that our native is the cheapest unskilled labourer in the world, and in estimating costs, it is usually on this erroneous assumption that we generally have failed to make good; this opinion may have had its foundation in the very early days when labourers could be hired by the week or month for a yard of "linbo" or a few "beads," and when quantity was of more consequence than quality. These days are of the dim and distant past; we have progressed beyond this period, and require labourers of the semi-skilled type, men who can use their mental and physical powers in work of a productive nature, for it is in work of this class that we seem so hopelessly outclassed by the foreigner, who employs white labour and is able to undersell the locally produced article.

As labour represents the biggest item on the debit side of all manufactures, I would commend a close study of this question to both employers and employed, as bearing upon

Our progress has been entirely due to the mineral wealth and the influx of foreign capital for the development of the mines, which have induced workers from many climes to settle in this country. Their energy and hard-earned capital are being utilised to exploit the productiveness of the land, of which they have become the true pioneers.

The inherent pushfulness of the white race in opening up new works has created such a demand for unskilled labour—of which the native is the only form recognised—and the supply not being equal to the demand, it has not been necessary for him to qualify for his position, either by industriousness or efficiency, wages have risen enabling him to live in unaccustomed luxury, which in his natural state he could never have dreamed of, not to mention its appalling effect on his morality; but with the high wages paid, the quality of his labour remains practically at the old standard, and generally speaking he is the most inefficient, and therefore the most costly, labour in the world, proving not only

a hindrance to the skilled workers who have to deal with him, but a source of great and unnecessary expense to the employer.

Ocular Demonstration.

As evidence in the above contention it is only necessary to observe the native at work on the mines, roads, farms, or towns, and the number in attendance on the individual white worker, and compare their labour with what obtains in the white man's realm; one white labourer would be expected to do an amount of work equalling the joint labour of at least three natives, and in a more thorough and workmanlike manner, which is conclusive evidence of the costliness of native labour when all its extraneous costs of recruitment, feeding, compound, and other charges previously mentioned are debited.

The manner in which the native is allowed to squat on the land, and the large reserve areas granted to him by the Government are much to blame for his apparent indifference. If these lands were cultivated, they would yield all the necessaries required for his sustenance, instead of which his own innate laziness compels him at certain seasons of the year to seek work from the white man in order to provide for the next period of inertness. Bearing in mind the fact that the race for existence is always with the stronger peoples, and the natives being in such overwhelming numbers, there must come a time when the white man in this country must yield to the inevitable, and the problem to be faced sooner or later is, whether we shall be able to make of this a white man's country, or allow it to revert to the natives. Unfortunately what should be our unskilled white labourer, owing to his environment, is quite unfitted, without passing through a probationary period, to take the place of the native. Being already contaminated, he has neither the

energy or inclination, nor has he the experience in handling such tools as are necessary in manual work; not having been brought up to understand the dignity of labour—which, of course, is nauseating to him—and few are suitable to act as supervisors; hence the existence of so many indigent whites, who are an encumbrance to the country and a standing disgrace to the ineptitude of our administrators.

Higher Education.

The higher education in our schools and colleges will not do much towards improving the general status of the labourer in this country, aiming as it does at making embryo managers or supervisors, a class which is already overstocked and, except these few youths who have parents sufficiently well provided with the necessary capital to place their sons on farms or in business, the outlook for the great majority is not very promising.

To provide a remedy should be the first consideration of the Government; the necessary capital to provide for such schemes as the following need not occasion any difficulty in obtaining. This country is ideally situated in that respect, for we have a commodity in gold which can never suffer from over-production, and lands now lying idle which only require water conservation schemes established to make it equal to the best in productiveness in the whole world.

With the capital acquired, the gold reef areas held by the country should be opened up for the benefit of its people, and not given over to the speculators for the enrichment of the foreign shareholder. These mines could be worked by white labour, which would be under efficient and expert instructors, trained in actual practice as well as in theory, who would impart their knowledge to the workmen in the various branches, using the most up-to-date tools and machines, and all work to be done under contract on similar lines and conditions as prevail in other countries where white labour only is employed.

STANDARD BANK	
OF SOUTH AFRICA, LIMITED.	
<small>(With which is incorporated the African Banking Corporation, Ltd.)</small>	
	Established 1862.
Authorised Capital	- - - £10,000,000
Subscribed Capital	- - - £8,916,660
Paid-up Capital	- - - £2,229,165
Reserve Fund	- - - £2,893,335
<p>GENERAL BANKING BUSINESS transacted at all Branches and Agencies; DEPOSIT and CURRENT ACCOUNTS opened; PURCHASE and SALE of INVESTMENT SECURITIES effected, etc.</p> <p>SAVINGS BANK ACCOUNTS opened on terms, particulars of which may be obtained on application.</p> <p>The BANK is in close touch with TRADE and INDUSTRIAL CONDITIONS, both local and overseas, and special attention is given to COMMERCIAL ENQUIRIES from customers.</p> <p>EXECUTOR and TRUSTEE business undertaken.</p>	
Over 460 Branches and Agencies in Africa.	
Agents and Correspondents throughout the World.	

<p>USE</p> <p>“PORPOISE”</p> <p>BRAND</p> <p>ANTIFRICTION GREASE</p>
<p>Used for years by the majority of Mines all over South Africa.</p>
<p>Manufactured by</p> <p>South African Lubricants & Chemical Works, Ltd.,</p> <p>DURBAN & JOHANNESBURG.</p> <p>Phone 1618, Johannesburg Branch Office.</p>

Such mines would not only act as an education to the men and provide employment for many thousands, but would prove a highly remunerative proposition, circulating money within the country and therefore benefiting its citizens generally.

From each mine so started the nucleus of the running staff for those to follow would be obtained, and so on, opening up, developing, and finally producing and circulating its gold, which would be the basis of great commercial possibilities.

The working of the low-grade mines by the Government on these lines, even though they barely met expenditure, would pay the country better than doling out a bare existence to the unemployed for work of an unproductive nature. In the case of the low-grade mine there would always be a big percentage returned into circulation at a very small cost to the country.

To those who are more fitted for husbandry, suitable lands should be prepared and, under proper supervision of an expert manager, who will control and advise the worker and give him all the assistance necessary to start him under the most favourable conditions, payments to be made on results of working, and every inducement advanced to encourage the worker to take up land on his own account after a given period, during which he may have proved his fitness to occupy such land.

With regard to these farms which have native squatters equal on them, owners should be compelled to accept an equal number of white men, on the same terms and conditions, providing there is suitable land for cultivation.

Afforestation to be undertaken wherever possible, which in time to come will yield a very handsome profit.

Around these industries would spring up other allied trades requiring many more workers. The country should be thrown open to emigrants, and only these of the very best type admitted after the strictest examination, a guarantee of employment being the best inducement to such emigrants.

All profits accruing from these national undertakings would be utilised in furthering the extension of this policy, thereby creating a more equally distributed population, and contributing to a white South Africa a race of virile men, nurtured by a wonderful climate, and a fitting example to their successors.

It may be that certain readers will consider these schemes prejudiced in favour of the white labourer. It must be borne in mind that the majority of all peoples are the toilers, or manual workers—this country being no exception. The present condition of the poor white who has been brought to his condition by force of circumstances, unaccustomed as he is to any form of manual labour, is a very deplorable one indeed, and must become greatly intensified as time goes on. My object, therefore, in putting forward these schemes is to endeavour to break through the common prejudice against employing unskilled white labour and to find a means of providing men with a decent and respectable existence. The fact that numbers of these men in times of great depression

employed on Government relief works (usually pick and shovel) have proved expensive in amount of labour returned, is no criterion as to their fitness when trained in the proper use of these tools; besides, under proper organisation each branch would be composed of specially selected men. It would be like comparing the ordinary labourer with the skilled navvy, which is equally ridiculous. The avenues of employment outlined would really be quite apart from work now being done by the native, and for the time being would not interfere with him in any way. As the population of whites increased with the opening up of further industries, so would agriculture and the country generally, in which case there would be ample scope for the native in those lines for which he has especial aptitude. With the improvement of the white man's condition and the balance of numbers being in his favour, a great social improvement would be manifest throughout the country. The native, due to the spirit of emulation, would also improve; the kraal and the compound will disappear, and along with them their vile associations.

As I write I have before me several lists of unemployed, and apart from the unskilled labourer, every branch of the mineworker, from manager to trammer, is enumerated. These men are ready to take up any employment whatever. With the almost certainty of other mines closing down in the near future, what hope have these men of receiving the help required, what of their families? These are not the ordinary poor white, but are skilled tradesmen. Surely it would be possible for the Government to take over one of the best conditioned "derelict" mines for the benefit of these unemployed. These men are not afraid of work, and with the Government's assistance in technical advice and management, and with the strictest economy in working, it would have to be a very low-grade property indeed that could not be made to pay ordinary wages. With the exception of the general manager, who will be appointed by the Government (his sympathies must also be in favour of white labour), there need be few overseers. Most of the men being highly skilled, the ordinary overseer would be superfluous. It must also be clearly understood that every man is a worker. At the end of each month when the returns are in hand, and after payments for stores, etc., have been provided for, the balance of cash to be pooled and apportioned out to the men, using as a basis the percentage of difference between the various grades of workmen on other mines, a deduction of 10 per cent. monthly to be made for contingencies, this item to be carried forward in order to provide for any emergency. The control would be by board, composed of one man from each section, with the manager as chairman.

Of course, this would only be considered in the light of a temporary arrangement to tide over the depression, and not in any way to take the place of the proposal put forward, in which the Government are asked to open up other reef areas for the employment and training of white labour only.

[We print this article as an interesting contribution to the subject of labour economics, but are not in agreement with our correspondent on all the points which he brings forward. —Ed., S.A.M.J.]

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Ventilation and Miners' Phthisis.

II.

MORE POINTS FROM MINE INSPECTORS' REPORTS.

Negligence and Carelessness of Miners.—It would appear that some miners only use the dust-allaying appliances for fear of the consequences of being caught and reported, the benefit to their own health not being considered by them. This conviction is brought home to one by, in the first instance, the number of cases where one finds these regulations have been only partly complied with; secondly, by the number of cases of natives drilling dry reported to inspectors by mine officials; and thirdly, by the number of convictions obtained against the miners themselves for breaches of the Phthisis Regulations. If a shift boss in his daily visit of a working place can catch persons disregarding regulations, one must suppose that the offence often occurs. Many miners, apparently, do not fear phthisis, as they know that the examination by the Medical Bureau is so thorough that they will be warned of the first symptoms of the disease, and they also know that the first symptoms have very little effect upon their health if they leave the mine at once. Some of the miners make no secret of the fact that they look forward to receiving their compensation money, and this perhaps may be the reason for the carelessness of the miners towards the regulations framed for the prevention of phthisis.

Main Ventilation.—During the year there has been no radical change in the main ventilation scheme of any mine in this district. On the whole, the main ventilation on the mines in this area may be said to be very fair. The quantity of air downcasting is, with one exception, more than sufficient; it is the effective distribution of this air which still needs better attention. Systematic inspections have revealed that the laying-out of ventilating districts and the suitable splitting of air currents on some mines has been tackled in a very indifferent way.

Ventilation of Dead Ends.—Little development is now proceeding in the mines around Germiston, and such as has been done has not warranted any considerable expenditure on subsidiary ventilating appliances. On the Sub Nigel, however, where conditions are similar to those in the Boksburg district, and great distances have been driven, risen and sunk with the utmost possible speed, the consideration of the problem of ventilating their dead ends became imperative. A system of exhaust ventilation has been adopted. Galvanised iron ventilation pipes, 14-inch, 16-inch, 20-inch diameter, are carried within 100-300 feet of the face, according to the conditions. The vitiated air at the end of the tunnel is drawn into and through these pipes by means of small fans up to 25 inches diameter, either electrically or air driven. By adopting this method, it is claimed that the greater length of the tunnel has fresh air constantly, and that those travelling in it, especially after the blast, do so in fresh air, at any rate up to the end of the ventilation pipe, a short time after the blast, thus allowing work to proceed quicker than otherwise would be the case where air is blown in. Against the advantage claimed above, it must be born in mind that the length of tunnel beyond that end of the ventilation pipe which is effected by exhausting, is small, and with the necessity for keeping the end of the pipe at some distance from the face, there arises the necessity for considerable additional ventilation by means of compressed air at the face, especially after blasting, in order that the vitiated air may be expelled towards the ventilation pipe. Considerable time and energy have been expended by the manager and officials in performing these ventilation schemes, and a point has now been reached where a satisfactory method of effectively dealing with a difficult problem has been achieved at a minimum of cost.

Back Stopes.—Systematic inspections, coupled with the monthly returns giving the percentage of CO₂ and quantity

of dust present in the air, have shown that the ventilation of these workings in several instances is not as it should be. To attempt to apply any hard and fast rule as to a system of ventilation to be adopted is out of the question, as conditions vary so much. In cases where the monthly returns twice repeated indicate that ventilation is unsatisfactory, investigations have been made and action taken.

General.—Since the introduction of the komimeter, it has been made apparent that ventilation plays a most important part in the health conditions of phthisical mines. By proper use of water and appliances, the quantity of dust produced is enormously reduced; but as no reliance can be placed upon the continued and proper use of water, dust is frequently formed and escapes into the air. With ample ventilation, quantities of such dust which under feeble ventilation would be injurious, would in all probability be quite harmless. Not only will increased ventilation prove beneficial in dealing with the dust that gets into the air due to the non-use or misuse of water, but will also remove or dilute the air containing very minute dust particles upon which water has apparently no appreciable effect. During the year under review, there has been in general, as in past years, the same co-operation between mine managements and this department with regard to the prevention of phthisis. As evidence of this, it has not been necessary to proceed against any manager for breaches of the phthisis regulations, and in only one instance has it been necessary to issue a mandatory letter in this connection. The water supply in general is adequate, and on the whole good. Systematic inspections have shown that any unsatisfactory conditions are the result of negligence or ignorance on the part of the underground employees, either official or miners. There are, it would appear, still to be found both miners and natives who do not seem to appreciate the danger of dust. With the latter it is perhaps understandable, but with the former, unless we attribute it to callousness or the desire for compensation, it is difficult to understand.

Machine Drills.—During the past year, as a result of continued tests, the dry jack hammer type of machine has proved to be a dangerous dust producer. The use of this machine has been prohibited after the 1st of April, 1921. When it became apparent to managers that the dry jack hammer was to be prohibited, they were forced to find an efficient substitute. The axial water feed, or "wet" jack hammer, did not, apparently, find favour. With solid steel and water externally applied, it was found that there was a limit to the depth of hole which could be drilled below a certain angle, on account of the difficulty of sludging. In order to obtain a greater depth of hole, various schemes have been tried, amongst which the Simmer and Jack method has, it would appear, proved a success. The manager of the Simmer and Jack has converted all his dry jack hammer machines into solid steel throughout the mine. Ordinary 7-8 inch hammer steel is used, a slight flat is put on the steel for the last 12 inches, and a half turn put in about 8 inches from the cutting edge; this twist acts as an impeller, the sludge being driven away from the cutting edge or drawn away, according to the direction of rotation. Machines of either directions of rotation are in use, and work satisfactorily. The mine is, however, standardising on the machine rotating clockwise, and the twist giving an injection action is put in the steel; this ensures that the sludge is removed from the cutting edge. The dust results, according to the company's dust sampler, are good; the average number of "particles" for jack hammer stopes having dropped from 172 to 119 per c.c., and now results of 50 are regularly being obtained in these stopes. The management states that any high dust results now obtained in jack hammer stopes will be, in their opinion, due to other causes, such as lashing stuff not properly wetted, etc. The Geldenhuis Deep management is also using solid steel, but in this case either water or air can be supplied to the hole through a narrow pipe inserted in it. This method is perhaps not quite as satisfactory as the Simmer and Jack twisted steel from the point of view of dust prevention; the introduction of air into a hole during drilling lends itself to abuse should the water supply be insufficient, with the possibility that conditions almost similar to those obtaining with the "dry" jack hammers might occur.

Leyner Type of Machine Drill.—The Leyner type machine is not largely used on any mine in this district, with the exception of the Sub Nigel. Dust samples taken during the year where these machines were working gave for the most part unsatisfactory results. On the assumption that the dust produced by this type of machine could be satisfactorily low with good water pressure, if the tube and shank end of the drills were in good condition, considerable attention was paid to these parts. It was shown, however, that even with these things in order, unsatisfactory dust results could be obtained, and it was then found that, in sharpening the steel, the 3-8-inch hole was considerably restricted by the "dolly pin," and in many cases not more than a 1-8-inch hole was left at a short distance back from the bit, so that the amount of water flowing through the steel beyond this point was quite inadequate to effectively wet the rock at the cutting edge, and with the admission of air to the bottom of the hole, conditions similar to those obtaining in the dry jack hammer might be created, and account for the production of dust. The restricted hole also caused increased togging at the chuck, owing to the excess of water escaping. As a result, apparently, of this demonstration of a further possible cause of dust production, a circular was issued by the Chamber of Mines (rather late in the day) drawing attention to the necessity for maintaining the hole in the steel at full bore. Axial water feed drills passing water only, such as the Hydromax, Ingersol and Waugh, are in fairly general use for raising, back stoping, etc.; with these machines the dust results obtained are on the whole good. As the restriction of the hole in the steel is as likely with this type of machine as with the Leyner type, it would seem to point to the fact that the admission of air down the steel is the principal cause in the production of dust. The regulation recently framed prohibiting the use of machines "passing air only" down the steel, might with advantage be altered to "passing any air" down the steel. No new type of axial water fed machine has been put into commission in this district during the period under review, and no use has been made of either the Switt or Ferreira attachments for reciprocating machines.

Grizzleys.—Bad dust results are still often obtained at grizzleys. These grizzleys are generally in dead ends and badly ventilated; the use of sprays or atomizers does not seem to prevent dust. At places where large tonnages are handled, it would seem that more attention must be given to the ventilation of these points; better ventilation, in conjunction with atomizers, could not fail to give satisfactory results.

Records.—The records called for under Regulations 59 and 161 (10) have all been examined during the year. It can be said that these records are now becoming a valuable source of information both to managements and to this department. If all the mines would adopt the konimeter, a still greater knowledge of mine conditions will be available.

C. J. Gray, I.M., Johannesburg.

In the absence of a satisfactory statistical basis, all opinion as to the progress made in the fight against miners' phthisis must be rather uncertain; but I think that, on the whole, some slight advance was made during the year, while the prospect of future marked advance certainly became brighter. Established practice in use of water for dust prevention was well maintained. Improvements which were made in general ventilation should be distinct gains. Improvements in ventilation of sinking shafts, greater care to use drills producing comparatively little dust in these shafts, and closer attention to the conditions at commencement of shift in development drives, though conditions are not yet satisfactory in sinking shafts or drives, have also lessened risk of exposure to dangerous dust. Apart from care in selection, upkeep, and working of the drills, a really good special means of ventilation is necessary in a sinking shaft or development end, and that is not yet generally provided and used. Early in the year, use of drills (dry jack hammers) passing compressed air alone through the jumper steel seemed to be extending; but proof that such drills produced undesirable amounts of dust, followed by the decision to prohibit use of such drills from 31st March, 1921, which was come to at a conference called by the Government

Mining Engineer on 1st July, stopped further installation of such drills, and encouraged alteration of those installed. Most of these machines now use solid steel, but some have been altered so as to pass water as well as air through the steel (wet jack hammers). When solid steel is used, success or failure in preventing dust arising depends upon the care or negligence of the persons working the drill in applying water at the hole. In the machine with hollow steel, addition of water to the air-feed to the drill bit does not get over the difficulty completely, as experience shows that the risk of partial or complete failure of the water feed, owing to danger to the water tube or other cause, is such that the drills often make much dangerous dust, but the addition of water feed is certainly an improvement. The difficulties with the air and water feed to the bit in the wet jack hammer are those experienced with the water Leyner type of drill, the water feed arrangements being similar. Much attention was given to the dust results from the water Leyner during the year, and greater care and more general realization of the risk of derangement of the water feed probably reduced the amount of dust from those machines, but it was not reassuring to find late in the year, on an inspection of the steel, that at one mine in the district 100 per cent. of the shanks had holes too small to permit of entry of the water tube, and therefore that, apart from any accident or ill-treatment of the machine underground, the water feed could not be satisfactory.

NEW PATENTS.

962. The Climax Rock Drill and Engineering Works, Ltd., Stella Buildings, cor. New and Rissik Street Johannesburg.—Improvements in automatic rock drill control device.
963. Joseph Green, 35, Grosvenor Road, Kimberley, and presently 47, Bloemhof.—Improvements in diamond washing apparatus.
966. The Victoria Falls and Transvaal Power Co., Ltd., 2, Robertson Campbell McLean. Both of Consolidated Buildings, Johannesburg.—Improvements in or relating to the distribution of fuel over furnace grates.
969. Herbert George Dempster, Seaforth, Richmond, Natal. Improvements in means for fixing rails to railway sleepers.
973. Richard Harrison, Umtati, Southern Rhodesia.—Improvements in or relating to brazed joints of pipes.
974. John Harris, Henley-on-Klip, Transvaal.—An improved buffer for use on railways and the like.
975. British United Shoe Machinery (S.A.), Ltd., 86, Adderley Street, Port Elizabeth.—Improvements in or relating to machinery for grading sheet stock and dealing with the same in accordance with grading.
979. Alexander Spencer, 2, Central Buildings, Westminster, London, S.W.1, England.—Improvements in central buffing and draw gear for railway and like vehicles.
980. Andrew Barks, c/o Messrs. Niven and Mitchell, Ltd., 11, General Mining Buildings, and P.O. Box 922, Johannesburg.—An improvement in retorts for the recovery of by-products from coal and oil shale and other materials.
981. James August McGeorge, Rooms 37 and 38, African Buildings, Church Street, Pretoria.—Improvements in connections for pipes, bars and the like.
983. 1. William Henry Dyson, 2, Leslie Aitchison, Both of 2, Ringwood, Normandy, near Guildford, Surrey, England.—Improvements in and relating to the detection of high frequency currents.
983. 1. William Henry Dyson, 2, Leslie Aitchison, Both of 2, Ringwood, Normandy, near Guildford, Surrey, England.—Improvements in or relating to the treatment of ores and residues for the purification or concentration of the metallic values.
981. Marconi's Wireless Telegraphy Co., Ltd., Marconi House, Strand, London. Improvements in and relating to the detection of high frequency signalling currents.
987. 1. Robert Edwin Bateman, 2, Sidney Harold Hill's. Both of Simmer and Jack Gold Mining Co., Germiston.—Improvements to automatic valve controlling devices applicable to rock drilling machines and the like.

The following were Monday's cable rates of exchange:—London on Paris, 53 francs 37 centimes per £ (on October 27, 54.10); London on New York, 3 dollars 92 cents per £ on October 27, 3.93; New York on London, 3 dollars 93 cents per £ (on October 27, 3.93½); New York on Paris, 7 37 cents per franc (on October 27, 7.27); Berlin on London, 716 marks per £ (on October 27, 682); Berlin on Paris, 13 marks 12 pfennige per franc (on October 27, 12.65); Berlin on Amsterdam, 62 marks 30 pfennige per florin (on October 27, 59); Berlin on New York, 181 marks 50 pfennige per dollar (on October 27, 173.80)

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EDITORIAL.

THE MOZAMBIQUE CONVENTION.

During the past week or two public interest in the problems of the future status of the Mozambique Convention has been much increased by the remarks of the Prime Minister on the subject and by the despatch of a Union Government expedition to survey a new port on the Zululand coast. It need hardly be said that Lourenco Marques has read with deep interest the speech delivered by General Smuts at the congress of the Chambers of Commerce in Pretoria, and has noted the likelihood of a new Union port being established between Durban and Delagoa Bay with grave concern; for it is impossible to consider the revision of the Convention without reference to the significance of the Prime Minister's hint that the Transvaal mines may not be in such great need of Portuguese East African natives as

they were a dozen years ago, when the terms of the Convention were framed. And it is also not easy to believe that the projected opening up of Kosi Bay is an undertaking which has been engaged on by the South African Government without fully considering the effect upon Delagoa's trade which the introduction of a new harbour on the East Coast inevitably would have. That, at any rate, is the view held in Portuguese territory, and, whilst it may be a mere coincidence that the Zululand harbour project—which this paper was the first to draw attention to nearly a year ago—is at last receiving the Government's serious attention at a time when the future trade relations of the Union with Portuguese East Africa require earnest consideration, it will be appreciated that our friends in Delagoa are freely speculating as to the Union's future policy with regard to Portuguese territory.

Before proceeding to a further examination of these matters it may be as well if we recount in brief the essential clauses of the Mozambique Convention, the terms of which are not perhaps so thoroughly understood in this country as they might be. The Transvaal-Mozambique agreement is a convention entered into between the Transvaal Government and the Government of the Province of Mozambique in 1909, to remain in force for ten years from that date, and thereafter either party to the agreement may give one year's notice of intention to terminate it. The present convention replaced the *modus vivendi* which had been signed on the 12th December, 1901 (with addition signed on the 15th June, 1904). The existing agreement is, as was the *modus vivendi*, a commercial agreement between two adjoining Colonies having many identical interests. It deals with Customs matters, the circulation of commerce, native labour, and railway traffic between the two territories, and under these heads provides for the free entry into the Colonies of the products of the soil of either and for the recruitment of native labour in Mozambique for the Transvaal mines. Approximately 100,000 Portuguese natives are constantly employed in the mines of the Transvaal. It was also provided that by the periodical revision of railway rates it would be ensured that from 50 to 55 per cent. of the railway traffic to what are known as the "competitive areas" of the Transvaal should come through Lourenco Marques. Owing to the conditions brought about mainly by the War this percentage fell to much less than that provided for in Part II. of the convention, and in consequence the Portuguese authorities have denounced the treaty and asked for a new convention.

The whole subject bristles with difficulties, and wise and generous statesmanship is called for on both sides in the framing of the new agreement. Special interest, therefore, attaches to the Premier's recent remarks as to the native labour supply of the Mozambique territory to the Transvaal mines. It has always been held that the Union cannot dispense with labour from this source, despite the shadow of waning output which has fallen on the Rand. But the Prime Minister's remarks have given the impression that our mines are not so dependent on East Coast labour as they used to be. The interpretation put upon his speech by Delagoa Bay is that either it was made seriously, and must be dealt with in a serious spirit, or else it is "pure bluff," in which latter category it would seem to give colour to the view that it was somewhat natural that General Smuts should endeavour to minimise the advantages the Union obtained from the operation of the existing convention. Assuming that General Smuts spoke seriously, a possible decision on the part of the Union Government not to press for labour from the Mozambique Province would be not altogether unwelcome in the coastal territory, according to some students of the problem, who contend that farming and other industries in Southern Mozambique, which are to-day faced with the greatest difficulty in securing a sufficiency of boys, would benefit immediately, and, as a consequence, would be able to enlarge their field of operations.

There may be much more behind all this banter of words and interpretations than at first sight meets the eye. It may be that the eyes of our farseeing Prime Minister are

set upon the vast labour resources of Tanganyika territory. Then again, it is not improbable that East Coast labourers, no matter what the convention may decide on in regard to them, will always seek work in the markets which offer the largest rewards. At any rate, the Prime Minister's remarks have riveted attention and have set many minds wondering as to what exactly his words were intended to convey. Add to this the fact that the Union Government evidently is now desirous of establishing a new port on the East Coast at a point which lies almost in a direct line with the busiest industrial centre of South Africa, and it is scarcely surprising to find that Delagoa Bay is greatly wondering what its commercial relations with the Union may be in a few years' time. But whatever modification of the convention may be proposed or decided on, we feel sure that there is a very earnest desire on the part of the Union Government to perpetuate the amicable relations which always have existed between ourselves and our eastern neighbours. And this desire is, we are assured, heartily reciprocated by the inhabitants of the Province of Mozambique.

KEY INDUSTRIES AND OVERSEA COMPETITION.

Extraordinary interest has been aroused by the announcement that the contract for steel pipes for the Rand Water Board had gone to Germany. Following so closely on the giving of the big contract for grain elevators by the Railway Administration to an American firm, the whole question of public policy towards local industries on the one hand and British manufacturers on the other is raised, and demands serious consideration. A fortnight ago we dealt at considerable length with the grain elevator contracts, and we gave expression to what we consider the perfectly legitimate grievance of the unsuccessful local tenderers on the subject. Our article has evoked many expressions of appreciation from the tenderers, but it is disappointing to find that its main object—which was to extract from the Railways a statement of the amount of the successful tender—has not been achieved. It may be remembered that we asked the Administration, in justice to the local firms who had gone to considerable expense and trouble in submitting tenders, to publish the figures at which Messrs. Menkin had contracted to do the work. That figure, however, has not yet been vouchsafed to us, and so seriously is the matter regarded by prominent local industrialists that we shall be surprised if the whole matter is not brought up as one of urgency at the next session of the Union Parliament. The Water Board contract is not exactly a parallel case, but it furnishes certain features which may usefully be discussed here. Of course the reason why the German firm was successful is the exchange position, which enables the German manufacturer to underbid all rivals by a wide margin. What has happened in this case has happened in many others which do not come to light. We recently cited the experience of a new cement manufacturing company which placed its order for plant and machinery in Germany simply because no British manufacturer could come any way near the figure of the German tenderer. The advantageous position of German trade owing to the exchange factor is seen in every sphere of business, and it has even made its effect felt in freight and shipping circles, the German passenger lines now offering fares at about a third of those of the British lines. Until the chaotic state of the exchanges is settled these anomalies, we suppose, must continue, and from the strictly business point of view doubtless people cannot be blamed for taking advantage of them. But a bigger question emerges when we come to consider the placing of these spectacular public contracts with foreign firms. This country is going through critical years of growth in several industries, such as iron and steel. These, as they term them in Great Britain, are "key industries," and as such they merit a special need of Government support and encouragement. Hitherto the latter has taken the form mainly of fine words and unctuous platitudes. When it comes to doing something practical the Government finds itself unable to

take the smallest step to translate its smooth phrases into tangible assistance. For instance, it is, we believe, an open secret that the Newcastle Iron and Steel people satisfied the Government that with a little direct financial assistance they could successfully compete for the making of cast-iron pipes for the Water Board. But the Government, though sympathetic, was powerless to help, and this unique opportunity of giving a young and promising "key industry" a magnificent "leg-up" has been lost in favour of Germany! Facts such as these emphasise the need for some more consistent public attitude towards our young industries. Of course we must be business-like, but the question is whether in the long run it may not be better business to make a sacrifice in favour of the development of local "key industries" which may at some future time—as Great Britain found in many directions during the War—be necessary to our economic and national existence.

Notes & News.

Failure of a Large Cape Enterprise?

Disquieting rumours for some time past have been afloat regarding a large land settlement enterprise in the Eastern Province of the Cape Colony. The company in question has been liberally backed by one of the leading mining and financial corporations of the Rand, and, according to information which has just reached us from an unimpeachable source, the affairs of the concern have now reached a crisis of a most serious nature. Though a discreet silence has been preserved in regard to this enterprise for a long time past, it generally has been known that the scheme was encountering big difficulties. Even the strong financial support lent it by a Big House has not apparently been enough to materialise the roseate hopes held out to those who have been induced to settle on the land in question. To these latter people, many of whom have staked their all in the proposition, and who are now, so we hear, unable to obtain transfer of title deeds, we offer our sincere condolences. This paper is not an agricultural journal, and for that reason we do not propose to discuss this ill-starred venture further. But the fact that several men whose names are well known in the local mining world are closely identified with the enterprise has induced us to mention the reported failure of the scheme. Incidents of this nature cannot but have an ill effect upon the country. They will contribute towards keeping agricultural immigrants from South Africa and will doubtless tend towards negating the work which is being carried on by the 1820 Settlers' Committee, which aims at populating certain areas of the Union with overseas settlers possessed of capital.

* * *

Miners' Phthisis and Collieries and Tin Mines.

In the course of his annual report, issued this week, Dr. Watkins-Pitchford, Chairman of the Miners' Phthisis Medical Bureau, writes:—In 33 of the 398 new cases of "pure" silicosis with which we are now dealing, the previous mining work had been carried on in collieries only. The average duration of work in scheduled mines which preceded the development of silicosis in these cases was 9 years and 7 months; for all the new cases it was 9 years and 8 months. Twenty of the 33 men had worked in collieries for less than 10 years; the average duration of their work on the Reef was 9 years and 1 month. Eight of the men had worked in collieries for from 10 to 20 years; the average of their work on the Reef was 10 years and 6 months. Five of the men had worked in coal for 20 years or longer, and the average of their underground work with us, prior to the appearance of silicosis, was 9 years and 8 months. These results, taken in conjunction with similar returns for last year, appear to indicate that previous colliery employment has no marked influence in retarding the development of silicosis. In my last annual report the somewhat surprising fact was recorded that those of the new silicotics whose previous employment had been in tin mines only showed a longer average "effec-

tive period" prior to the appearance of silicosis than that for all new cases. The same fact has again to be reported this year. Twenty-seven of the new cases had previously been tin-miners only—practically all of them in Cornwall—for an average of 6 years and 9 months; the mean of their times of employment on the Reef, before silicosis appeared, was 11 years and 5 months, as contrasted with an average of 9 years and 8 months for all new cases. This phenomenon is probably one of both survival and inheritance. The tin miners who work with us are not only survivors in their own generation, but they are also the offspring of a race of men who have occupied themselves in mining since prehistoric times, and it is not unreasonable to suppose that some measure of natural selection has resulted from the latter fact.

* * *

The Birth of the Rock Drill.

In one of his articles on "Everybody's Business," in the *Saturday Evening Post*, Floyd W. Parsons told the following story:—The birth of the air drill occurred under circumstances that can hardly be termed auspicious. Back in 1871 a mechanic named Ingersoll came to New York with models of some of the newest inventions. Among other things, he had a device built like a good-sized pistol, with which he could throw a line through a second-storey window in case of fire. One day he was riding in a horse-car and explaining this particular model to a man who sat beside him. On an opposite seat sat a prominent contractor, who had undertaken a big excavating job, and who was therefore interested in inventing a machine that could drill the rock encountered in the excavation work. After the mechanic had finished his story the contractor inquired: "Why don't you invent something worth while? For instance, why don't you develop a rock drill? Such a machine would be largely used because of its saving of hand labour." "I could do it all right if I only had the money," replied the mechanic. "How much money do you want?" Ingersoll replied that it might take as much as 50 dollars to make the model, and immediately the contractor handed that amount of money to the stranger, at the same time giving him his card and telling him to go ahead. Work on the drill was commenced, and during the course of its building the mechanic went back to the contractor for many times 50 dollars. At last the machine was finished and a test was staged. Many difficulties arose, and numerous changes were made in the general design of the drill. Finally, however, the device was perfected and put in practical use, and has continued from that day, with various modifications, up to the present time.

* * *

Wages of Colliery Employees.

Recently, after a proposal by the Chamber of Mines Collieries Committee to award the wages of colliery employees on a sliding scale varying with the cost of living, the S.A. Industrial Federation replied that the Transvaal Chamber of Mines had not proved its case for a reduction of wages in the case of colliery employees. The secretary of the S.A.I.F. has now received the Chamber's reply, which states, *inter alia*, that the colliery employees as a whole have at least been treated as favourably as, and latterly more favourably in regard to increases of wages than, any other employees engaged in the mining industry, and that in the interests of the South African coal trade generally a lower cost of production is imperative.

* * *

The Busy Man's Page.

On account of delay in the arrival of the overseas mail, we are unavoidably prevented from giving our usual weekly digest of technical literature.

New Eland Finances.

The New Eland Diamond Mining Company, like all the others, suffered a severe setback when the diamond market went to pieces. At the annual meeting, held a few days ago, it was shown that the company is husbanding its resources against the day of recovery. The company's profit for the year under review was £12,112 as against £19,394 for the previous year. This is explained by the higher working costs and the lesser value by 2s. 8d. per carat. The higher working costs are attributable to the increased cost of stores and to the difficulty of getting ground, a difficulty which had now been overcome. The chairman, Sir Thomas Cullinan, stated at the meeting that for the past two or three years the profits had gone into development and equipment. This sound policy he maintained was the only course which would ensure future profits, and he really thought they had now arrived at that stage of progress when shareholders might anticipate a fair return from profits so long held back and put back into the mine. The chairman also mentioned that for the past three years the yield had been much the same. There were 1,244,551 loads in reserve, which, based on the past year's working, gave development twelve years ahead of the plant, but taking 800 loads a day, which the manager stated could now be handled, there was a little over five years' work ahead of the gear. They would therefore see that expenditure on development work need not be so heavy for the future.

* * *

Gold Accumulations in the U.S.A.

The New York correspondent of the London *Daily Telegraph* recently stated that the avalanche of gold which is constantly pouring into the United States of America from Europe is causing considerable concern among the officials of the New York Assay Office, the vaults of which are now clogged with the accumulation of gold in bars, strips, and coin. This is because that country is now the great creditor country of the world, while the exchanges of many countries are depreciated, so that wherever possible gold is shipped to New York because of its value in the exchanges. According to *Bradstreet*, on the 1st April, 1921, the United States' gold holdings aggregated 3,001,487,915 dollars. Since that date approximately 40,500,000 dollars arrived at New York alone, and upwards of 3,300,000 dollars was in transit from Europe, while domestic production in previous few weeks added to the figures. The total indicated stocks, including the shipment en route, was then in the neighbourhood of 3,045,300,000 dollars, while exports during the month were negligible. The figure just given compares with the high record of gold holdings of 3,095,077,000 dollars in July, 1919. The steady accumulation of gold has been reflected in the statements of the Federal Reserve system, as the combined report showed gold reserves of 2,298,071,000 dollars, as against the high mark of previous years of 2,201,804,000 dollars, reached on 6th June, 1919. The actual gold imports from 1st January to 10th April of this year totalled 201,271,594 dollars, and exports in the same period were less than 5,000,000 dollars. It is stated that gold has been coming into the United States from all parts of the world. This can be understood when all the world wants to deliver gold to the country in order to liquidate debts. New York bankers are somewhat perturbed at such a large increase in the precious metal, because it may tend to inflation.

* * *

Gold Producers' Association.

The *Australasian* of the 20th August states that sales of standard gold through the Gold Producers' Association, Ltd., during July amounted to 89,888 oz. (a mint par value of £350,000). The estimated net price received was £5 1s. 9d. per oz., or equal to £5 11s. per fine oz., while the average gross price in London for the month was £5 12s. 9d. per fine oz. After making provision for contingencies, the association earned £444,636 net premium during the past half-year. This sum represented £1 per oz. of standard gold, or approximately £1 1s. 10d. per oz. of fine gold produced by members, as shown by the mint certificates lodged with the

association during the last accounting period. On 30th May, £144,523 was distributed as an interim payment, and the balance will be payable on 25th August. The paper quoted adds that the secretary of the association has stated that the Mount Morgan Gold Mining Company, Limited (Queensland), has lodged an appeal against its assessment by the Queensland Commissioner of Taxes for income tax on gold premium, and that the case will come before the Queensland court shortly. During the half-year ended 30th June the quantity of gold obtained by members of the Gold Producers' Association was 444,636½ standard oz. The whole of this gold was sold before 31st July, the accounts having been kept open for one month in order to dispose of all gold available for sale, and thus avoid any carryover. Sales of gold during the term returned a net premium of £462,254, equal to £1 0s. 9½d. a standard oz., or £1 2s. 8.18d. a fine oz.

* * *

Trade Conditions in America.

South African imports into the United States during September showed a gain over the August figures, according to cable advice from the Department of Commerce to the American Trade Commissioner, Mr. P. J. Stevenson. September imports were 400,000 dollars compared with 355,000 dollars in August, probably due to the increased demand for raw materials for manufacturing purposes. American exports to South Africa, however, declined to 900,000 dollars as against 1,600,000 dollars in the previous month and 1,400,000 in July. Business conditions in the United States may be described as showing distinct signs of improvement. Production is on the increase, with a resulting decrease in unemployment, although the number of unemployed is still large. The alarming figure of nearly 6,000,000 unemployed, which has been so widely quoted, has in reality little practical significance, as it is merely the difference between the peak of employment under war and post-war conditions, and the present number employed in the same industries. As a large percentage of this number has returned to former employment on farms or in homes, the figure of six millions hardly represents the present situation. This is also borne out by the large labour supply that has been available for harvesting the wheat crop in the Middle West. Another indication of improvement is in the financial situation. Money is easier and available in large volume at lower interest rates. This is largely due to the liquidation of "frozen credits" and the decrease in loans on Governmental bonds. Prices, however, have been unsteady, as compared with one or two months ago, when they were stiffening. This is probably due to wage reductions, as raw material prices have reached pre-war levels in many lines. Crop conditions are satisfactory on the whole. The wheat crop has been only slightly below 1920, while corn is 10 per cent. above the average. The potato and oats yields will be below normal. The marketing is proceeding without financial difficulties, and has been helpful in furnishing freight for the railroads.

* * *

Centrifugal Concentrators.

Very satisfactory news is to hand from Natal in regard to the results being obtained by the Mauss continuous centrifugal separator in its application to sugar production. It appears that the inventor's estimates of extraction are being exceeded in practice, and those interested are naturally jubilant. The inventor, Mr. W. Mauss, is now in England superintending the manufacture of his machines.

* * *

The Rooiberg Minerals Development Co., Ltd.

Report on the operations of the company for the year ended 30th June, 1921:—Development: During the year 6,442 feet of development was carried out at an average cost of 37s. 5d. per foot. Mining and concentrating: Tons milled, 27,745; average assay, 1.63 per cent. M.T.; concentrates recovered, 500 tons; value of concentrates, 67.57 per cent. M.T.; working revenue, £66,387; working costs, £65,762; working profit, £625.

Tranevaal Gold Mining Estates, Ltd.

Report of Directors for the quarter ended 30th September, 1921:—Development footage, 9,358 feet; tons milled, 47,055. Working profits for quarter: Central Mines, £7,531—4s. 1d. per ton; Elandsdrift Mine, £4,544—19s. 8d. per ton; Vaalhoek Mine, £921—3s. 3d. per ton; total, £12,996. General remarks: The work-profit is based on an average net realisation of £5 9s. 7d. per fine ounce of gold.

* * *

Rhodesian Mineral Output.

The following details represent the gold outputs for the month of September of the principal Rhodesian mines:—

	No. of Stamps.	Tons treated.	Yield ounces.	Value. £
Lonely Reef	20.3T.	4,950	1,521	6,473
Do. (slimes)	—	4,950	2,886	12,256
Falcon Mines	28.2T.	15,419	2,809	20,778
Do. (copper)	—	—	—	8,788
Do. (silver)	—	—	—	838
Gaika G.M.	—	4,098	847	3,593
Do. (sands)	—	4,223	484	2,055
Globe and Phoenix	40	6,013	3,896	16,367
Do. (sands)	—	9,682	1,763	7,408
Do. (slimes)	—	2,445	643	2,704
Arcturus-Slate	20	5,700	1,153	4,838
Do. (sands)	—	5,700	1,468	6,230
Shamva Mines	64.12T.	55,300	2,439	10,344
Do. (sands)	—	32,403	5,741	24,342
Do. (slimes)	—	23,897	—	—
Do. (slags)	—	—	—	55
Rezende Mines	50.	5,700	1,633	6,933
Do. (sands)	—	2,903	250	1,061
Do. (slimes)	—	2,203	262	1,116
Do. (conc.)	—	196	459	1,951
Cam and Motor	—	13,900	792	3,360
Do. (concentrates)	—	1,454	3,978	16,873
Do. (slags)	—	—	196	826

Asbestcs—September.

	Tons.	Value.
Nil Desperandum	180.8	£4,520
Shabanie	242.9	£6,072

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Phthisis on Outside Mines

In the course of his annual report, issued this week, the Chairman of the Miners' Phthisis Medical Bureau, Dr. Watkins-Pitchford, says:—In pursuance of the recommendations of the Miners' Phthisis Commission of 1918, an enquiry was instituted into the production of silicosis by certain mines and quarries outside the area of the Witwatersrand. This enquiry, in so far as it related to the health of the employees, was entrusted to the Bureau. Two members of the Bureau (Drs. L. G. Irvine and R. M. Truter) were accordingly delegated to associate themselves with nominees from the Department of Mines as a Joint Committee to visit and report upon the mines and quarries to which attention had been drawn. The report of this Joint Committee was presented to you in January, 1920. Although the investigations were conducted with assiduity and thoroughness, the positive evidence obtained was surprisingly meagre. The following industrial centres were visited: (1) the Worcester, Consort, and New Fortuna Mines (gold mines in the Barberton district); (2) the Rooiberg, Leeuwpoot, Zaaiplaats, and Groenfontein Mines (tin mines in the Waterberg district); (3) the Messina Mine (copper mine in the Zoutpansberg district); and (4) the Ben Accord, and McIlrath's Quarries (in the Pretoria district). The conclusions arrived at concerning employment at these various centres may be briefly summarised as follows:—With regard to (1)—All the gold mines of the Barberton district are capable of producing silicosis; but if, as hitherto, the mines are not worked intensively, the amount of silicosis will be slight. The gold-bearing bodies are, in almost every case, essentially quartzitic. (2) Underground work performed over long periods in any of the tin mines mentioned is capable of producing, and has produced, an appreciable but not serious amount of pulmonary fibrosis. No case of definite silicosis was encountered. The rocks concerned comprised granite and Waterberg quartzites. (3) A certain, although not a serious, amount of pulmonary fibrosis appears to be produced by long-continued employment, especially upon machine-drills, at Messina. The mine works "a vertical alteration in the red granite." (4) An appreciable but not serious degree of pulmonary fibrosis may be produced by prolonged work at the Ben Accord quarry. No case of definite silicosis has been brought to light, although the dust conditions, especially at the crusher station, could not be worse. The rock dealt with is nerite—a mixture of labradrite, pyroxene, and hypersthene, but without any free silica. In McIlrath's quarry the rock worked is quartzite; for this reason the risk of producing silicosis must be considerable, although the clinical evidence obtained was not, by itself, sufficient to substantiate this, or any, conclusion. As a sequel to the report upon these investigations, the Bureau was requested to assist in the drafting of a Bill which it was proposed to introduce with regard to the production of silicosis by mines which have not hitherto been included in the schedule. A series of suggested clauses was accordingly sent to the chairman of the Miners' Phthisis Board.

Miners' Phthisis Examinations.

In the course of his annual report, issued this week, Dr. Watkins-Pitchford, Chairman of the Miners' Phthisis Medical Bureau, writes, *inter alia*:—The statutory purpose of the initial examination (to ascertain whether the applicant is free from disease of the lungs and physically fit in other respects for underground work) has not been changed. Its scope with respect to men who have previously worked underground, and who have temporarily abandoned this occupation, has, however, been enlarged. Under the 1917 Act a miner who had not worked underground during the preceding four years was required to submit himself to the initial examination before again undertaking such work; the 1919 Act (section 12 (4) reduced this period of permissible absence to two years. This change has increased the number of applications for the initial examination from amongst the ranks of those who have worked previously in the mines, and has, at the same time, given rise to a certain amount of discontent in consequence of the rejection of a certain proportion of such applicants. This matter will be referred to again under the section dealing with the periodical examinations. A further departure introduced under the 1919 Act (Regulation 23 (1) (2) has been the separation of the rejected candidates into two classes: (1) those who may apply for further examination after the lapse of three months; and (2) those who may not apply again, because "the bodily condition of the applicant is such as to preclude all possibility of his ever being physically fit for underground work." Thus the rejected candidates are now divided into the two classes of temporarily, and permanently, unfit. 4,613 youths and men of European blood were examined as candidates for regular employment underground, and a summary of the results of their examination is given in Schedule V. It will be observed that 70.26 per cent. of the candidates were of South African birth, and 29.74 per cent. of oversea birth. Fifty-seven per cent. of all candidates were permanently rejected on account of respiratory defect or other physical unfitness, whilst 16 per cent. were temporarily rejected with the option of applying again. The percentage of rejections is the highest hitherto recorded, a fact which is mainly due to the recognition of an "Ante-primary" stage of Silicosis by the 1919 Act. As this new provision requires the Bureau to certify that the earliest detectable signs of silicotic damage to the lungs have come on during and in consequence of employment in our mines, it is obviously necessary for the Bureau to satisfy itself that the initial pulmonary condition of the candidate miner is above the suspicion of damage of any sort. The complaint has been heard somewhat frequently of late that the Bureau's standards of fitness for underground work are unnecessarily high, and that adherence to them needlessly deprives the industry of recruits and inflicts an unjustifiable hardship on many of those who seek for employment. The reply to such criticisms is that the standard of fitness is a high one only in so far as it relates to the condition of the lungs and the physical capacity for resisting the development of silicosis and tuberculosis. The adoption of a high standard in these respects is obviously in the interests of the candidate, for no employment, however lucrative, will compensate for the loss of health or life. Apart from the condition of the lungs and the indications of capacity to resist pulmonary disease, the standard has always been, and still is, very low; the main criterion in these other matters is the absence of defects which might cause danger to other workers. Thus the presence of any condition which might suddenly render a man helpless whilst engaged in dangerous work is practically the only ground for rejecting a candidate whose "respiratory physique" is satisfactory. That a lowering of the standards for the initial examination is not called for on economic grounds is indicated by the fact that only 51 per cent. of those who have hitherto passed the examination have secured employment underground.

GOVERNMENT EXAMINATIONS.

MINE MANAGERS' EXAMINATION

Total certificates (metal) granted to date 1921 — 36
 Secured by students of Messrs. Lucas & Wolfe — 21
 Balance for S.A. — 15

In addition to above we obtained 5 coal certificates last two examinations

OVERSEERS' EXAMINATION

During 1918 and 1919 we secured the majority of the certificates granted. 21 certificates in 1920, and 23 certificates to date 1921 (metal and coal)

SURVEY EXAMINATION

We have obtained practically all the certificates granted by the Mines Dept. during recent years and have secured 62 certificates to date

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The Quarter with the Barnato Group.

PROGRESS REPORTS FOR THE THREE MONTHS ENDED SEPTEMBER 30.

The Mining Companies' Directors' reports of the Johannesburg Consolidated Investment Co., Ltd., for the quarter ended 30th September, 1921, have the following:—

Consolidated Langlaagte Mines.

Crushed, 130,300 tons. Total working revenue, £216,213 or 33s. 2d. per ton crushed; total working costs, £154,062, or 23s. 8d. per ton crushed; sundry revenue, £940; total profit for quarter, £63,091, or 9s. 6d. per ton crushed. No allowance has been made in the above for Colonial taxation, nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £3,360, and Debenture interest to £344. The quantity of ore crushed during the quarter was 3,400 tons more than during the preceding three months. The revenue was 1s. 11d. per ton higher and the working costs 9d. per ton lower, with the result that the working profit was £18,630 higher than for the previous quarter. The development footage sampled totalled 2,185 feet, and gave the following results: Payable, 1,176 feet, having an average value of 39.41 dwts. over 16.17 inches of reef; unpayable, 1,009 feet, having an average value of 8.98 dwts. over 13.54 inches. The average number of natives at work underground during the quarter was 2,914, as compared with 2,918 for the previous quarter.

Government Gold Mining Areas.

Crushed, 425,000 tons. Total working revenue, £944,046 or 44s. 5d. per ton crushed; total working costs, £450,659, or 21s. 2d. per ton crushed; sundry revenue, £2,158; total profit for quarter, £495,545, or 25s. 3d. per ton crushed. No allowance has been made in the above for Government's share of profits nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £28,900. The quantity of ore crushed during the quarter was 26,000 tons more than during the previous three months. The revenue was 2s. 2d. per ton higher, and the working costs 10d. per ton lower, with the result that the profit at £493,387 for the quarter was £88,672 higher than for the preceding quarter. The development footage sampled totalled 4,470 feet, and gave the following results: Payable, 2,970 feet, having an average value of 15.2 dwts. over 52 inches of reef. Reef partly exposed, 80 feet, having an average value of 1.2 dwts. over 76 inches. Unpayable, 1,420 feet, having an average value of 3.4 dwts. over 44 inches. The average number of natives at work underground during the quarter was 6,597, as compared with 6,404 for the previous quarter.

The Langlaagte Estate and-Gold Mining Co., Ltd.

Crushed, 123,200 tons. Total working revenue, £209,223 or 34s. per ton crushed; total working costs, £159,422, or 25s. 11d. per ton crushed; sundry revenue, £921; total profit for quarter, £50,722, or 8s. 1d. per ton crushed. No allowance has been made in the above for Colonial taxation, nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £8,303. The quantity of ore crushed during the quarter was 6,100 tons more than during the previous three months. The working costs were 1s. per ton lower, and the revenue 1s. 4d. per ton higher than for the previous quarter, with the result that the working profit was £16,030 higher than for the quarter ended 30th June last. The development footage sampled totalled 2,549 feet, and gave the following results: Payable, 1,451 feet, having an average value of 26.2 dwts. over 17 inches of reef. Unpayable, 1,098 feet, having an average value of 8.3 dwts. over 15 inches. The average number of natives at work underground during the quarter was 2,749, as compared with 2,804 for the preceding quarter.

New Primrose.

Crushed, 65,500 tons. Total working revenue, £79,957, or 21s. 5d. per ton crushed; total working costs, £63,833, or 19s. 6d. per ton crushed; sundry revenue, £558; total

profit for quarter, £16,682, or 1s. 11d. per ton crushed. No allowance has been made in the above for Colonial taxation nor the Provincial Gold Profits Tax. The quantity of ore crushed was 1,500 tons more than during the preceding three months, the revenue was 2s. 3d. per ton higher, and the working costs 10d. per ton lower, with the result that the working profit for the quarter was £10,373 higher than for the previous quarter. The average number of natives at work underground during the quarter was 1,283, as compared with 1,299 for the previous quarter.

New Unified.

Crushed, 33,900 tons. Total working revenue, £41,387, or 24s. 5d. per ton crushed; total working costs, £33,929, or 20s. per ton crushed; sundry revenue, £160; total profit for quarter, £7,618, or 4s. 5d. per ton crushed. No allowance has been made in the above for Colonial taxation nor the Provincial Gold Profits Tax. The quantity of ore crushed was 400 tons more than during the previous quarter. There was a decrease in the working costs of 7d. per ton, and an increase in the revenue of 1d. per ton, with the result that the working profit was £1,109 higher than for the preceding quarter. The average number of natives at work underground was 611, as compared with 628 for the previous quarter.

Randfontein Central Gold.

Crushed, 392,500 tons. Total working revenue, £632,989 or 32s. 3d. per ton crushed; total working costs, £520,290, or 26s. 6d. per ton crushed; sundry revenue, £3,731; total

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profit for quarter, £116,130, or 5s. 9d. per ton crushed. No allowance has been made in the above for Colonial taxation nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £57,180, and Debenture interest to £32,895. The quantity of ore crushed during the quarter was 19,500 tons more than during the preceding three months. The revenue was 1s. 9d. per ton higher, and the working costs 1s. 3d. per ton lower, with the result that the working profit for the quarter amounted to £112,699, an increase of £61,818 over the quarter ended 30th June. The development footage sampled totalled 7,560 feet, and gave the following results: Payable, 5,810 feet, having an average value of 21.5 dwts. over 15 inches of reef. Unpayable, 1,720 feet, having an average value of 11.2 dwts. over 14 inches. The average number of natives at work underground was 10,494, as compared with 10,713 for the previous quarter.

Van Ryn Deep.

Crushed, 151,000 tons. Total working revenue, £458,975 or 60s. 9d. per ton crushed; total working costs, £207,260, or 27s. 5d. per ton crushed; sundry revenue, £3,299; total profit for quarter, £255,014. No allowance has been made in the above for Colonial taxation nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £30,247. The quantity of ore crushed during the quarter was 600 tons more than for the preceding three months. The revenue was 4s. 8d. per ton higher, and the working costs 3d. per ton lower, with the result that the profit for the quarter was £38,187 higher than for the previous quarter. The development footage sampled totalled 1,123 feet, and gave the following results: Payable, 763 feet, having an average value of 29.8 dwts. over 18 inches of reef. Unpayable, 360 feet, having an average value of 4.7 dwts. over 50 inches. The average number of natives at work underground during the quarter was 3,132, as compared with 2,961 for the preceding quarter. The mill was stopped from midnight on Sunday, 4th September, to 6 p.m. on Thursday, 8th September, owing to a strike of the reduction workers, and this accounts for decreased tonnage and increased working costs in that month.

Witwatersrand.

Crushed, 119,000 tons. Total working revenue, £168,399 or 28s. 4d. per ton crushed; total working costs, £134,744, or 27s. 8d. per ton crushed; sundry revenue, £5,438; total profit for quarter, £39,093, or 5s. 8d. per ton crushed. No allowance has been made in the above for Colonial taxation, nor the Provincial Gold Profits Tax. The expenditure on capital account amounted to £1,303. The quantity of ore crushed was 10,300 tons more than for the preceding three months. The working costs were 2s. per ton lower, and the revenue 4d. per ton higher, with the result that the working profit was £15,374 higher than the working profit for the quarter ended 30th June last. The development footage sampled totalled 1,220 feet, and gave the following result: Payable, 590 feet, having an average value of 13.3 dwts. over

32 inches of reef. Unpayable, 630 feet, having an average value of 1.6 dwts. over 36 inches. The average number of natives at work underground during the quarter amounted to 2,242, as compared with 2,178 for the preceding quarter.

New State Areas, Limited.

The expenditure on capital account for the quarter amounted to £95,661, of which £14,580 was spent on development, £5,869 on ventilation, and the balance on compressor plant, pumping plant, and other surface works. A total of 4,657 feet of development was accomplished, 1,624 feet being on reef. South Shaft—550 feet sampled and all found payable, the average being 13.9 dwts. over 24 inches. North Shaft—1,060 feet sampled, 329 feet being payable, having an average value of 12 dwts. over 30 inches; 740 feet were unpayable, having an average value of 1.6 dwts. over 17 inches. North Shaft development is improving. 1,115 feet were driven in the connecting drive.

General.

The declared profits have been arrived at by adding together the published monthly figures. The value of the gold was taken as follows:—July, £5 12s. 6d.; August, £5 11s. 6d.; and September, £5 10s. 6d., which averages 6s. 4d. per fine ounce more than the previous quarter.

The Chemical, Metallurgical and Mining Society.

A feature of the meeting of the above society held at the Scientific and Technical Club, recently, was the presidential address delivered by Mr. F. Wartinweiler. His paper formed a very interesting and thorough account of advances made in metallurgical practice on the Rand. Among many others the following points were discussed. The harmful effects of acid mine waters were fully dealt with, and the several benefits accruing to the neutralisation of the acidity dwelt upon. The deaeration of solutions was also discussed, and researches on that point mentioned. The saving in cyanide as well as zinc consumption resulting from the adoption of this process was well brought out. The president dwelt at some length upon the need for research in industrial problems, and also called attention to the importance of publishing the results of such investigations. The importance of a properly equipped research institution to modern mining and industrial practice was well emphasised. An example of the utilisation of by-products from the mining industry was cited in the works of the Witwatersrand Co-operative Smelting Works. A subject requiring investigation was brought to the notice of the audience in the utilisation of the zinc contained in solutions which came from the extract boxes after the precipitation of the gold. At present this zinc goes to waste, and if utilised might prove to be an asset to the industry.

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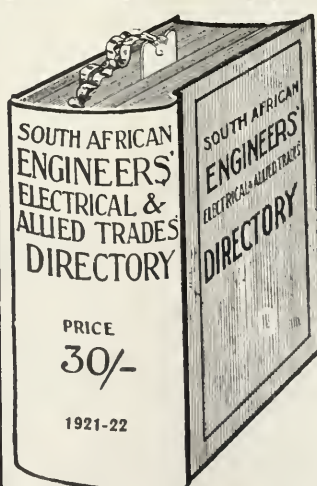
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Progress on Consolidated Mines Selection Group.

The following is a report on the operations of the company for the quarter ended 30th September, 1921:—

	Stamps working.	Tons milled.	Working Costs per ton milled.
Brakpan Mines	115	174,100	25 10
Springs Mines	80	117,750	29/ 5
Totals and averages...	195	291,850	27 7.5
	Value of Gold declared.	Yield per ton.	Working profit based on standard value of gold.
Brakpan Mines	£280,974	32 3.33	£55,436
Springs Mines	222,995	37 10.51	49,630
Totals & averages	£503,969	35 0.92	£105,066
	Working profit per ton.	Estimated premium on gold.	Total estimated profit.
Brakpan Mines	6/4.42	£83,419	£138,855
Springs Mines	8/5.16	67,183	116,814
Totals & averages	7 4.79	£150,602	£255,669

Development Work: Brakpan Mines.

The linear development amounted to 7,052 feet, of which 3,567 feet were on reef, averaging 8.81 dwts. over a reef width of 34.40 inches. Of the footage on reef, 1,415 feet, equivalent to 40 per cent, of the sections sampled, were payable, and averaged 13.18 dwts. over 43.83 inches. In addition to the above footage, a commencement was made with the cutting of the No. 3 shaft station, and development work was continued from No. 4 shaft. The details are given in this report under these headings.

Development Work: Springs Mines.

The linear development amounted to 5,939 feet, of which 3,803 feet were on reef, averaging 22.53 dwts. over a reef width of 14.75 inches. Of the footage on reef, 1,640 feet, equivalent to 43.1 per cent, of the sections sampled, were payable, and averaged 35.65 dwts. over 18.32 inches. The above footage includes development work from No. 3 shaft.

Transvaal Silver and Base Metals.

The report of the directors of the Transvaal Silver and Base Metals, Ltd., for the quarter ended September 30 states that the development footage sampled totalled 1,940 feet, and gave the following results: Payable, 670 feet,

having an average value of 12.1 per cent. lead and 11.0 ozs. standard silver over 29 inches (worth, at to-day's prices, 95s. 7d. per ton); unpayable, 1,270 feet, having an average value of 1.9 per cent. lead and 2.1 ozs. silver over 33 inches (worth 13s. per ton).

The Brakfontein shaft has been stripped to three compartments and timbered to a depth of 132½ feet. Sinking has been commenced. It is proposed to sink the shaft a further 100 feet to the second level, and to open up the mineral-bearing lodes, both at this plane and at the first level. In order to expedite development, it has been arranged to transfer the small Tangye compressor, which is now out of use, from No. 1 shaft to Brakfontein, and to erect two additional loco. boilers at this point.

The old first level of the mine, which extends for a total distance of 130 feet, has been re-sampled, and shows the following results over that portion of the lode which is exposed in the drive: Payable, 70 feet, having an average value of 12.0 per cent. lead and 12.6 ozs. silver over 35 inches (worth 100s. 10d. per ton); unpayable, 60 feet, having an average value of 0.8 per cent. lead and 0.9 ozs. silver over 42 inches (worth 7s. per ton).

Driving was commenced towards the end of the quarter on the 1st Level East, the results being as follows: Payable, 27 feet, having an average value of 7.0 per cent. lead and 3.6 ozs. silver over 55 inches (worth 45s. 7d. per ton); unpayable, nil.

The new power plant has been completed and is running smoothly. The sorting and crushing station is ready for use, except for certain minor details which are now in hand. In regard to the concentration plant, the bulk of the foundation work has been completed, the main steel floor for the jig house has been erected, the jigs have been built, and the main supply bin has been framed. The ball mill house framing will be closed in shortly, and the Hardinge ball mills are under erection. The desulphurising plant and first unit of the smelting plant have been completed recently, and are now in operation producing lead bullion on a limited scale from hand-picked ore.

Safety Electrical Appliances for Mines.

One of the drawbacks of using electrical apparatus in fiery mines is that explosions taking place inside switch boxes and other apparatus are liable to produce a flame outside, and ignite the gas in the mine. It is practically impossible to make the casing of the electrical apparatus strong enough to withstand the force of such explosion; and if a safety valve is fitted to prevent the cracking of the casing it is likely to permit the flame to escape with disastrous results. A solution of this difficulty has been devised by an electrical company in Great Britain. The cover of the casing is held down by bolts with a spring cover so arranged that when an explosion occurs the whole cover lifts by not more than one thirty-second of an inch. This lift is sufficient to relieve the internal pressure, but the gases, in escaping through the narrow passage between broad pieces of metal, are cooled sufficiently to prevent the passage of flames. Stringent tests of this ingenious device have proved it to be completely successful.

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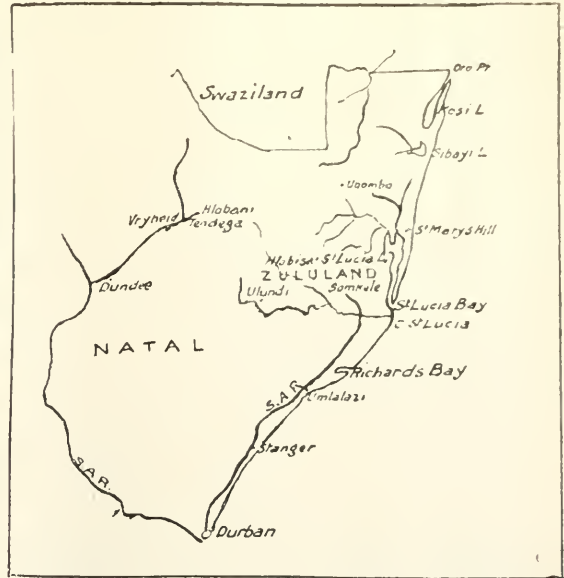
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The New Battle of the Ports.

GOVERNMENT'S SURVEY EXPEDITION TO KOSI BAY AND LAKE SIBAYI—DELAGOA AND DURBAN STIRRED.



Coaling at Durban.



Map showing the situation at Kosi Bay, Lake Sibayi, St. Lucia Bay and Richards Bay.

Coaling at Delagoa.



Interest in the possibility of opening up a new port on the Zululand coast has been quickened during the week by the despatch of a vessel by the Government to examine the coast and by the speech by the Prime Minister on the Union's relations with Delagoa Bay.

Lake Sibaya and Kosi Bay, which the Union Government are surveying with a view to new harbour developments, are not very well known, but those who know them speak highly of them. It is claimed that they serve the Eastern Transvaal as well as Delagoa, as regards the coal mines at Witbank, and are vastly superior as regards all the district lower down. A railway up the Pongola to Paulpietersberg has many advocates. The distance from Paulpietersberg, as the crow flies, is only 120 miles. The railway is up a natural valley, and it can be made to handle coal, and the railway graded to carry coal down in maximum loads with minimum expenditure. The distance by rail would be about 150 miles from the sea to Paulpietersberg, and from there to Breyten by the existing line is 135 miles. Breyten would thus be 288 miles from the new port. Witbank is 280 miles from Delagoa. The claims of Richards Bay are also being advanced in the Union Parliament.

The New Battle of the Ports.

By a Special Correspondent.

The announcement that the Government had ordered a vessel to survey the coast of Zululand with a view to determining the merits of its different natural harbours created great interest this week. In May last you printed an interesting article from your correspondent, Mr. A. Danks, on the subject, in which the merits of the several possible harbours were discussed, and you might profitably reprint the map then specially drawn showing the relative positions of Kosi Bay, Sibai Bay and St. Lucia Bay on the coast. It has been pointed out that Durban opposition to the project of another Natal port may be feared, but on closer examination it is seen that a Zululand port is essential for the development of a part of the Eastern Transvaal which is not now adequately served by any port. Coal cannot, of course, stand a haulage of 300 miles when it is possible to reduce the distance to 150 miles. It is believed in well-informed quarters that Sibai is bound to be the chosen harbour, as Kosi Bay is too near the Portuguese border, and its development would be seriously hampered by that fact. St. Lucia Bay is ruled out because of its shallowness, the bay, though extensive, being little more than a huge lagoon. It is suggested that a railway up the Pongola Valley would offer the most advantages though its construction might involve the erection of many bridges, as it would be necessary to cross and recross the river several times. From Piet Retief, the suggested jumping off point on the existing railway, to the sea is only 110 miles, and the distance that a good railway would demand need not exceed this by more than 25 per cent. The line would, of course, have to be a mineral one, built to carry coal economically. Were Piet Retief chosen as the point of departure of the new line, it would doubtless in time become the Germiston of the Eastern Transvaal. With the construction of a short connecting line from Piet Retief to Wakkerstroom, the whole railway system of the Eastern Transvaal would be linked up. The present line from Piet Retief to Ermelo runs through one of the best coal and shale fields in the country, and the building of a line to the coast would greatly facilitate the development of those areas. Moreover, a branch line from the projected Pongola line would directly open up Swaziland. In regard to the question of capital expenditure on a new port, it is pointed out that the example of the Canadian Pacific Railway might be followed, and the great expanse of Government ground rendered valuable by the new scheme might be sold to defray the capital expenditure. All these considerations will doubtless be taken into account when the proper time arrives. In the meanwhile, it is all to the good that the railway and harbour development of such a highly mineralised and hitherto neglected part of the country should have public attention called to it.

Gold Production for September.

The official returns issued by the Chamber of Mines for September show the following:—

	Tons milled.	Yield dwts. per ton.	Working revenue per ton.	Working costs per ton.	Total profit.
Witwatersrand	1,997,086	6.704	36/8	25/2	£1,151,127
Outside districts	29,320	8.183	45/7	35/6	14,813
Totals & averages	2,026,406	6.725	36/9	25/3	£1,165,940

Compared with the corresponding figures for August, there is a decrease in tonnage crushed equal to 53,562 tons. The working revenue has fallen by eightpence per ton, and although working costs are threepence per ton lower, the profits have diminished by £74,156. The grade of ore treated

is .001 dwts. per ton higher. The decreased profit is attributable to the decreased tonnage crushed as well as the falling of the value of gold.

New Uses of Asbestos.

Asbestos twine is used in laboratories to bind together parts of apparatus exposed to fire and strong acids. A number of household articles, and especially kitchen utensils, are made out of asbestos. Fibre felts made out of pure asbestos fibre are used in large quantities for insulating the heat radiating surfaces of automobiles, the insulation of electric service wires, and the manufacture of sadiron holders, etc. Asbestos can be used for all kinds of purposes—for purposes as widely different as cloth, twine and textiles, and solid building material.



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Indian Ocean Coal Trade.

WELSH COMPETITION—SOUTH AFRICA'S FIGHT— BETTER QUALITY DEMANDED.

Mr. Alexander Aiken, presiding at the annual meeting of the Coronation Collieries, held during the week, was not in a very optimistic mood. He declared that the immediate prospects of the South African coal trade are not too bright. The output capacity for which South African collieries are equipped cannot be disposed of to-day, and expansion is thus of no advantage to either the industry or the country unless the market for South African coal can be extended. For such extension the shipping trade has to be looked to, and it follows that the special requirements of this trade must be catered for if South African coal is to hold its own against outside competition. It has for several years been believed that South Africa could safely rely on holding the trade round the Indian Ocean as far east as Singapore, but recently Welsh coal has been on offer at prices considerably less than we in South Africa could compete against. The reason largely lay in the freights to be paid from Delagoa Bay



A Scene at the Coronation Collieries.

compared with Cardiff, and in railway charges to the former port. With regard to the latter item, the Railway Administration has met the coal producers in a substantial manner; but shipping freights are more difficult to manage. On the other hand, South African coal is much cheaper at pit-head than Welsh coal, and a big cut in prices has been made in order to hold the business. Efforts in holding the trade should not cease there; attention should also be paid to the quality of the coal exported. Although Transvaal coal averages higher in ash value than Welsh coal, attempts should be made to keep this value as low as possible in order to further stabilise the Indian Ocean coal trade. Recently the percentage of ash in coal taken on board an Indian Ocean steamer from Delagoa Bay was far in excess of the average ash content of Transvaal coal. The shipping trade requires the best quality of coal obtainable, and in order that we should hold the Eastern market it is essential that the quality of our export coal should be as high as possible.

Mr. H. S. Harger on Diamond Trade Prospects.

The return to Johannesburg of Mr. Harold Harger, F.G.S., the well-known South African geologist, after a year spent in investigating the diamond mines of Brazil is (writes the Johannesburg correspondent of the *Cape Times*) an event of considerable importance, not only from a geological point of view, but as affecting the prospects for the future with regard to our own South African diamonds. As a result of his tour, he is able emphatically to state that Brazil, which is the second largest producer of diamonds in the world, is not likely either now or in the near future to be a dangerous competitor of South Africa, and this opinion is formed by Mr. Harger after visiting all the leading diamond mines in Brazil. "There has been an impression in diamond mining circles for some time past," said Mr. Harger to a representative of the *Mail*, "that all Brazilian workings were on alluvial gravels. That is true as regards certain districts, but in the diamantina district in the State of Minas Geraes, diamonds are being won from actual mines, some of which have a very considerable area. These are not alluvial gravels, but consist of a very much weathered talcose product, and are being worked at a depth of 130 feet, while another is down to a depth of 100 feet. The diamonds from these mines are of a very fine quality, quite equal to the best stone that South Africa can produce, a much higher percentage being suitable for gems than is found in South African parcels. On the whole the stones are small, but I saw one of 85 carats, and the largest that has been found was nearly 200 carats. Both diamonds and semi-precious gem stones are being cut in Brazil, but in most cases the cutting is not good. In one or two cases cutters have been brought out from Europe, and are now turning out stuff on much more desirable lines than the natives of the country have done in the past. There are no automatic diamond-cutting machines such as they have in Europe, but they use the old-fashioned wheel, which is driven by power. The output of the mines at present is small, and as the stones are of exceptionally good quality, they find a ready market, despite the present stagnant state of the diamond market. Both cut and uncut stones find a ready market in Europe, where the bulk of the Brazilian output goes, and not to the United States, as might be supposed, in view of the fact that America is the largest purchaser of diamonds in the world. America certainly is a purchaser, but only to a limited extent." When Mr. Harger left Rio de Janeiro a month ago, there was a distinctly improved demand, both from America and Europe, for one-carat and two-carat stones suitable for setting in jewellery for the Christmas trade, and even cables were arriving trying to get parcels for this purpose. Mr. Harger said he was absolutely convinced that a recovery in the diamond trade generally would not be long delayed. Two years ago there were nine million pounds' worth of diamonds on the market, but these stocks were being absorbed, and when that process was completed a revival could be looked for. The financial position of the world, and particularly of America, and the present rate of exchange were, of course, at the root of the trouble.

The Diamond Outlook.

The prospects of the diamond market mean so much to South Africa that every utterance on the subject from competent observers is carefully noted. At the New Eland meeting a few days ago Sir Thomas Cullinan made an interesting statement. "Of course, as you all know," he said, "there is very little sale for diamonds just now, but I feel sure we need only to exercise a little more patience until normal conditions return. We may perhaps have a surprise in store, as the diamond market seems to go contrary to all rules and expectations, as, for instance, when the War started we shut down, as we were told our product, being a luxury, was not wanted. What happened? A big demand set in, whereupon we immediately resumed work. So it would appear that to prophesy is futile—as one is generally wrong, notwithstanding past experience. The role of the prophet I leave to others. Your directors are, however, very keenly watching the diamond market, and you may rest assured no time will be lost in resuming work immediately the opportunity comes."

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The Week in the Sharemarket.

STEADY WITH BETTER TONE—STATES AND GEDULDS MAINTAIN LEAD—BUSINESS STILL RESTRICTED.

The market opened on Monday steady but quiet. A lead is still being awaited from London, and the indications, at least, are more favourable in that quarter. State Mines, for instance, were bought at the beginning of the week for London, and Gedulds maintained the interest noted in this column last week, consequent on the good development in the No. 7 Shaft. Practically all the reports for the quarter ended September 30 have now been published, and all are favourably regarded with one or two exceptions. The price of gold, at any rate, was satisfactory during the period, and this will have its due effect on the December dividends. The latest quotation for gold is a little disappointing, and is said to be due to speculation in the price between London and New York. A flutter was caused in the market on Tuesday by a rumour that gold had touched 107s. 6d., but this proved to be based on a cable error. The latest price remains about 104s. 9d. The London market was closed on Tuesday, which did not make for activity on this side. It is hoped that we may soon have news of the ex-enemy share question, and on this, combined with Christmas dividends, the market now pins its hopes. Prices were a trifle higher all round on Thursday—State Mines being notably better—though business was very restricted, and in tin, diamonds and industrials there was practically nothing doing. The week's quotations are as follows:—

	Fri. 28th.	Sat. 29th.	Mon. 31st.	Tues. 1st.	Wed. 2nd.	Thur. 3rd.
Anglo-Amer. Corp.	20 0*	21 6	21 0*	21 3	21 3*	21 7½
Apex Mines	—	7 6†	—	—	7 0*	7 0*
Bantjes Consolidated	5 10*	6 0*	5 9*	5 10*	5 10*	6 0
Brakpan Mines	50 0	49 6*	50 0*	49 6*	50 0*	50 0*
Brayten Colls.	—	—	4 6†	—	—	—
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
Cindeella Cons.	2 0*	2 0*	—	2 1*	2 3*	—
City & Suburbans	—	2 0*	2 3*	2 6†	—	2 0*
City Deeps	—	—	—	45 6*	45 6*	47 0a
Con. Diamonds	14 6	16 0	15 9	15 6	15 3	15 3*
Con. Langlaagtes	12 6*	13 3*	13 9*	13 6*	13 6*	—
Con. Mian Reefs	10 3*	10 3*	10 3*	10 6	10 3*	10 6
Con. Mines Select.	13 6*	—	—	—	—	—
Coronation Colls.	—	38 0	38 6†	35 0*	35 0*	38 0†
Do. Freeholds	0 9*	0 10	0 10	—	1 0†	—
Do. Syndicates	6 3*	6 2	5 9*	6 0	6 0	5 9*
Crown Diamonds	—	3 6*	3 9	3 7*	—	3 9
Crown Mines	36 6*	37 6*	—	—	—	36 0*
Daggafontn. Mines	2 6*	2 6*	2 6*	2 6*	3 0†	—
East Rand Coals	—	—	—	2 1†	—	—
East Rand Deeps	0 6*	—	—	—	0 6*	—
East Rand Props.	4 6*	5 3†	5 0*	5 0*	5 3*	5 3*
East Rand Debs.	£85½*	£85*	£85*	£85*	£85*	£85*
Eastern Golds	0 9†	0 9†	0 9†	0 9†	0 9†	—
Ferreira Deeps	10 6†	—	—	—	—	—
Frank Smith Dias.	3 9*	3 10*	3 10*	3 10*	4 0*	2 0*
Geduld Props.	49 0	48 9*	48 3*	48 0*	48 3*	48 0*
Glencoe Collieries	—	—	—	—	—	10 0*
Glyn's Lydenburgs.	9 0*	9 6*	—	—	—	—
Government Areas	79 0b	79 0*	79 6*	79 6*	80 3*	81 0
Knights Centrals	4 3*	4 5*	4 5	4 7*	4 10*	4 11
Lace Props.	7 3	—	6 6*	6 6*	6 6*	6 6*
Leeuwpoot Tins	7 3*	7 3*	7 3	7 3*	7 3*	7 3*
Lydenburg Farms	4 9*	—	5 3†	—	—	4 9*
Middelylei Est.	1 0*	1 0*	1 0*	—	1 0*	1 0*
Modder B.'s.	26 0*	26 6	26 6*	26 9	27 9	27 9
Modder Deep	43 6	43 6	43 3	43 6*	44 0	43 9*
Modder Easts	8 10*	8 10*	8 10*	8 10	8 10*	8 9*
Hume Pipes	—	15 0†	—	15 9	—	16 0†
Natal Nav. Colls.	—	30 0†	—	28 9*	28 0*	27 0*
New Eland Dias.	25 0*	—	25 0*	30 0†	25 0*	26 0*
New Era Cons.	7 0*	7 0*	7 3*	7 3*	7 3*	7 0*
New Geduld Deeps	1 4*	1 4*	—	1 4*	1 4*	—

	Fri. 28th.	Sat. 29th.	Mon. 31st.	Tues. 1st.	Wed. 2nd.	Thur. 3rd.
New Kleinfonteins	5 8*	6 0*	—	6 0*	6 0*	6 1*
New Modderfontn.	71 6	72 0*	72 3	72 6	73 6	73 6
New Primrose	—	—	—	—	4 6*	4 6*
New Unifeds	—	—	—	—	4 0†	4 0†
Nourse Mines	9 0*	9 3	9 0*	9 0*	9 6	9 6*
Pretoria Cements	44 0a	44 6*	—	44 6	44 0*	45 0*
Princess Estates	0 11*	—	0 11*	—	—	0 11*
Rand Collieries	—	—	—	—	1 0†	—
Rand Nucleus	1 0*	1 0*	—	1 0	1 0*	1 0*
Rand Select. Corp.	44 0*	—	—	45 0*	—	—
Randfontn. Central	9 6*	10 0*	10 0*	10 3*	11 0†	11 0†
Randfontn. Est.	14 6*	15 3	14 9	15 0	15 0	15 0
Roberts Victors	—	7 0*	7 0*	6 6*	6 6*	7 3*
Rooibergs	3 0*	3 0*	4 0†	2 6*	3 0*	3 0*
Ryan Nigels	—	—	—	—	3 6*	3 6*
S.A. Breweries	28 0†	28 0†	28 0†	28 0†	—	28 0†
S.A. Lands	4 0*	4 2†	4 0*	—	4 0*	4 0*
Springs Mines	38 9	40 6	39 6*	39 9*	40 3*	40 6
Sub Nigels	10 0*	10 6	10 3*	10 6	10 3*	10 3*
Swaziland Tins	8 6†	8 6†	—	—	8 6†	—
Trans.G.M. Est.	—	8 3*	8 3*	8 6*	8 9*	8 3*
Van Ryn Deeps	70 0	70 3*	70 6*	71 6	71 0*	71 0*
Village Deeps	—	8 0*	—	8 3*	8 0*	8 0*
West Rand Cons.	—	—	1 9*	—	—	1 0*
W. Rand Ests.	3 3*	3 3*	—	3 0*	3 3*	4 0*
Witbank Colls.	35 6*	—	—	—	36 0*	36 0*
Witwaters. Deeps	9 0†	8 6*	8 6*	8 9	8 6*	8 6
Woluheters	3 6*	—	—	2 10*	2 10*	2 11*
Zaaiplaats Tins	3 0	2 9*	3 0	3 0†	3 0*	3 0*
Union 5 per cent.	£102	£101½	£101½	£99½	£99½†	£99½*
New State Areas	21 0*	21 6*	21 6	21 6*	21 6*	22 0a
Rouxville	1 1*	1 1*	1 6	1 9†	1 0*	1 0*
S. van Ryn	1 7*	1 7*	1 7	1 7*	1 8*	1 8*
S.A. Townships	9 6*	9 9*	9 9*	9 9	9 6*	10 0
S.A. Alkali	14 6*	14 9*	14 9*	14 6*	14 6*	14 9*
Transvaal Silver	16 6*	17 6	17 0*	16 6*	16 9*	16 6*
West Springs	10 3*	9 9*	9 9	9 9*	10 6	10 0*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

MINES DEPT. EXAMS.

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Rest of S.A.	3	2	5
Total for S.A.			17

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Letters to the Editor.

THE PROBLEM OF THE GOLD STANDARD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Some years ago a philosopher wrote a learned book called "The Riddle of the Universe." In this way he called the attention of thoughtful men to the fact that the Biblical account of God and things pertaining to the unknown and unknowable was not necessarily the only solution possible, and he brought forward many arguments, weighty and pertinent, which theologians did and do find it difficult, if not impossible, to answer. In our own day we also are brought face to face with a condition of things unparalleled in the known history of the human race. The collapse of the ancient Roman world state was doubtless in a large measure due to a similar concatenation of forces as those which have brought about our present day calamity. There is nothing in the ancient classics which gives us much light on the matter of finance and currency, and the science of economics was not brought into fruition until many ages after the Roman state became only a name. We may, however, gather this forceful reminder of the intimate relations existing between credit and production from our knowledge of the fact that Romans degenerated from a nation of frugal living, hard working, and hard fighting people to a condition of parasitism and effeminacy which ended in the enfeeblement of the central authority as well as of the people, and that the collapse of the tribute due to various causes meant at once the vanishing into thin air of the national credit and of the impoverishment of a people at once too proud to labour and too craven to fight.

Up to the year 1914 the basis of economic thought was centred in the conditions and principles enunciated in the monumental work of Dr. Adam Smith. "The wealth of nations" marked as great an epoch in the history of credit and currency as did that erudite work of a later day, Darwin's "Origin of Species," or as it is better known, "Evolution," in the realms of science and biological research. A brilliant succession of able writers in our own and in other countries developed the new science of economics and made its application to all questions of the production, distribution and enlargement of credit or wealth of universal acceptance without doubt or question existing as to its truth and infallibility. The functions of currency, the law of rent, the law of diminishing return, the law of supply and demand—to name only a few of the formulae found in any text book of economics—were all accepted as fundamentally exact and absolutely incontestable and inviolate. On this base of solid reasoning and demonstrable truth was laid the superstructure of the great financial edifices known as the banks, and of the still greater controlling agencies associated with, but completely masters of, the banks, the international financial inagnates, at whose nod nations were made strong or weak, and at whose word nations armed themselves and thereafter fell upon each other tooth and nail, so that a few men might fasten still more strongly their financial fetters about the necks of a helpless and ignorant people. During the 100 odd years of industrialism, gigantic forces have built themselves up and gripped the world with tentacles stronger than steel, so that for the possession of oil wells in the Gehenna of Basra, or exclusive privileges in Panama, or the right to exploit an ignorant and misgoverned country like Turkey, millions of earth's fairest manhood have been destroyed, many countries have been laid waste, the strength of the inhabitants has been undermined by malnutrition and the hideous ravages of war, and the unhealthy aftermath of riotous abandonment, moral and physical, of the peoples who have suffered, victors and vanquished both, until all incentive to labour has been quenched, and drunken with the evil precedent of, and association with, the feasibility of turning out wealth by means of the printing machine just as easily as printing a newspaper, European civilisation is in danger of becoming once again overwhelmed

and submerged under the enervating influence of a worthless currency, an inextinguishable debt, and an aversion to adequate production of the essential elements in the rehabilitation of the modern world.

In face of all this we are now called upon to return as quickly as possible to the pre-war gold standard. In other words, we are asked to add enormously to the weight of the millstone already around our necks in order to maintain our "national credit." As though the "national credit" depended upon our impoverishing ourselves and our children's children in order to pay money for value which the nation certainly did not receive. If we desire fairness and impartiality in the matter of duly discharging our national obligations, both internal and external, we must realise once and for all that our gold standard is purely arbitrary and has not in itself any peculiar virtue which it would be sacriligious to tamper with, the Act of Parliament, known as the Bank Charter, passed in 1844 at the instance of Sir Robert Peel, was a measure brought about through a mistaken notion that gold, once established as a standard of value by Act of Parliament, could be maintained at that value for ever irrespective of the fact that all other commodities were and are constantly changing in value, both relative to one another and to the common medium of comparison gold. The fact that 113 grains of gold at the time of the passing of the Act was the relative value of the standard compared with other commodities at that precise moment did not thereby make it everlasting in its ratio of value to all other commodities, nor indeed even to itself, since the actual purchasing power of gold changes according to its relative scarcity, irrespective of its value as against other standards of exchange.

As a standard of value, then, gold is useless, and when we are asked to consent to a return of a certain value of gold as ascertained to be the case on a given date, say 1914, it may be advisable to consider exactly what is the meaning of this request, especially in so far as it affects our own interests nationally and individually. On the present day purchasing value of the sovereign we can get in commodities about one-half the 1914 quantities. Our commitments during the years of that war were financed on an inflation basis, *i.e.*, the banks were asked by the Government to issue loans guaranteed by the nation on terms to be arranged by the banks themselves. It was all along assumed that the national credit was not at par value, and we have the paradox that the banks which alone and unaided externally would not have been able to get a penny of the public's money, were able to get many thousands of millions of pounds worth of credit which passed through their books, and in the process thereby lost a not inconsiderable part of the whole amount promised. What with underwriters' commissions, issuing the loans below par, payment of large rates of interest, collection expenses, distribution charges and many others, the banks did a handsomely lucrative business for themselves out of the national necessities, and yet the only power enabling them to do all this, and incidentally to enrich themselves in the process, was that of the very national credit which they arrogantly affected to despise, and voted at as low a price below par as they dared and demanded for their aid as large a rate of interest as they could wring from pliant servants of the State. Here, then, is the crux of the present evil condition of the nation. The national credit is pledged for a very large amount of money, only a part of which was really received by the State. So far as regards the internal portion of this debt, the Government would be abundantly justified in wiping it off the debit side of the ledger, and this will almost certainly be done sooner or later with due provision for such of the poorer citizens as would thereby be impoverished unduly by the process. The external debts are in a different category, and would have to be met in some way. Here, then, is a possible way out. By negotiation with our principal creditor, the United States of America, we ought to be able to pay our debts in terms of the relative purchasing power of the pound sterling at the time the debt was contracted. It might justly be pointed out to the U.S.A. that if they receive the actual value of their goods sold to us in terms of the pound value at that time, they should be satisfied with such payment, especially as they could not honestly desire

blood money. Our own country would then be able to do the same thing towards the debtor nations of Europe, and in this way a long step forward towards stabilisation would be taken, and such a measure would go far towards reviving the now practically dormant trade of the Continent.

However, so long as gold is considered to be in itself something valuable and not merely a convenient token of exchange, so long will it be impossible to avoid fluctuations and financial crisis. The fact is gradually emerging from the clouds of ignorance and fear on the part of the people that after all it may not matter so very much if we never restore the old gold standard. They read of the calculated stock of gold held on deposit in the vaults of the world's banks—about 10,000 millions sterling—and then that the total indebtedness of the nations is so immeasurably in excess of this amount as to make the gold held but as a drop in the bucket, and then again the enormous money values chiefly represented by bills of exchange and such like, by which the world's business is conducted and carried forward, and it is apparent that it is really a case of the tail wagging the dog instead of being otherwise. In short, the real factor of value in the world's affairs is that of the national credit, and the promise to pay according to agreement is the only safe basis for international trade. And now what exactly does this credit amount to. Surely it does not bind the nation to pay any exorbitant price which may be asked by creditors, rather is it the payment of that price which is the result of fair and honest dealing on the part of the principals on equitable, just and reasonable payment for value received. If we take this basis for the payment of our national obligations, we shall find our burdens considerably reduced in weight as to be quite supportable. The result of any such arrangement as this would in practice take the form of an amendment of the Bank Act, which, while retaining nearly all the clauses in the present law to rearrange the wording of that clause dealing with the fixation of the standard value of the pound sterling as to make it read thus: "That this value, 113 grains of pure gold to the pound sterling, shall be its value at the time of the passing of the Act, and that the value of the pound sterling in grains of pure gold shall at all times bear the same relation to the average price of commodities in general as the prices of such commodities bear to each other over a given period and in a given place. This would mean that the gold pound would fluctuate in value or in gold contents with the fluctuations of commodities over a given period. Such a ratio would, while constantly changing, be always equitable and just as a measure of value. Since its actual purchasing power would be constant, it would remain so under all conditions. It would at once tend to stabilise wages and prices and would do away with the gold market since no dealings in gold would be profitable under such conditions. Credit would function as it ought to, untrammelled and unhindered. Crises in trade and industry would be mitigated and would in time cease. The nation would repossess itself of its credit, and in so doing would be no longer subject to the manipulation of high finance, and a new era of peace and prosperity would result.—Yours, etc.,

T. H. JONES.

" THE LAND WITHOUT A LEADER."

The following somewhat belated letter from an occasional correspondent on the subject of the lengthy article appearing in our issue of July 2nd, 1921, has reached us:—

" JAPHET, OF JOHANNESBURG."

The above heading is taken from *South Africa*, dated 2nd September, 1921, and is in the form of a reply to "a Johannesburg contemporary," which has evidently demanded a "leader of men" for South Africa.

The leader under the above heading is good reading, but has the author lived in South Africa? Does he realise that the reason why South Africa is the best country in the world is similar to the reason why the Army of the British Empire is the best Army in the world: simply because Tommy sees his officers through?

But after the Great War the Tommy we knew of old has changed. In the old days he did not care about the reason why; to-day, however, he is beginning to ask and ponder for himself. And he wants a Man—the right Man with a very good reason—to push him back to his old state of "follow my leader." The thinking man of the rank and file will not follow a leader who to-day praises the country to its uttermost, and to-morrow damns it to the nethermost, because he has suddenly discovered that it is necessary to reduce its servants' remunerations. The people of a nation can surely expect from their leader the foresight of a few weeks, and if they get an optimistic and a pessimistic speech within a short period—without any particular reason, save shortsightedness—they cannot be blamed for looking for a Man.

Reference here is being made to the real workers, the middle classes who have forged the country ahead in spite of every obstacle (and many have been placed in their way), and not to the "labour" classes, who do not labour, but merely "oversee," who are led by the minority, and cannot work if they would for fear of that damning brand "scab," but who will one day arise in revolt against the tyranny of trades unionism and have their present leaders starve if they will not work. This is as it should be, and would have been long ago had it not been for the native, who is at once our salvation and our curse—our salvation inasmuch as he who striketh too much will find the colour bar removed and his services no longer required. Our curse, since, had it been otherwise, the "labour" class would have been a working class, and not "overseers," and South Africa would have been a self-supporting export country at least fifty years ago.

Yes, we want a Man who will not stifle enterprise with unnecessary taxation, who will distribute tribute fairly, and who will not burden one section for the benefit of another section, who will not leave obvious loopholes for the favoured section who grow fat and prosperous on a debit profit and loss account, who will run the railways for the progress of the country, and not merely to pay the debts of the country.

Had the critic of "Japhet" lived in South Africa he would understand that the real leader of men in South Africa must be an independent man, otherwise his life will be crushed out of him by the all-powerful thumbs of politics and gold—two tyrannous gods who have ruled South Africa to its detriment for a century.

The Man we want must be for South Africa, to steer our ship in the squadron of Empire, and he will find in the crew the finest material to work upon; but he must not interfere with the skippers of the ships fore and aft. The man we want will find enough to do to keep his own deck swabbed and the metal of his guns clear and bright. If he does this he will find many a good A.B. to fire at the right moment, if only he is Man enough to give them the right lead, and if for good reason—although mistakes may be made—he will find the same A.B.'s willing and ready to fire again at his command.

Give us the Man! Show us the Man! And if you can, the A.B. will be there at the salute. But—where is the leader of this splendid A.B. material? We have not noticed the mention of his name in the "Japhet" critic's very excellent article, save one long deceased.

The Sub-Nigel Meeting.

A full report of the speech made by Mr. D. Christopherson at the Sub-Nigel meeting will be found in another part of this issue. Shareholders will find the chairman's detailed explanation of the development position of particular interest, and it may be said that despite some discouraging features, the prospects are on the whole most satisfactory. The fact that the proceeds of the gold "premium" have been offset by the increase in working costs since 1916 is a significant reminder of the ever-present necessity for bringing down costs as the "premium" runs off. Costs at the Sub-Nigel have always been high because of its peculiar mining conditions, but none the less the mine must have relief from the abnormally high level reached during and since the war.

ENGINEERING SECTION.

The Howick Falls Hydro-Electric Power Plant.—IV

By H. W. Miller.*

It will be observed that under any load the position of the deflector is just clear of the required jet necessary to pass the correct amount of water corresponding to the load, thus eliminating any "dead" movement, and, in the case of the load being thrown off, it would cut the jet immediately.

This fact is most important, and is a special feature of this system, whereas in most existing designs the deflector has only one fixed position at all loads, and thus has to travel a considerable distance before coming into contact with the jet, which naturally is detrimental to the obtaining of close speed regulation.

In the event of any load being added to the plant, the governor would move the lever E in the opposite direction, taking the deflector away from the jet, and as the block on lever F would be in contact with the outer side of the box G, the spear regulator would have a positive movement in the opening direction in proportion to the movement of the governor, movement in this direction of the spear being free.

Hand Operation.

The nozzle can be regulated by hand by means of a hand-wheel on the governor, which would operate the deflector and spear in combination in the same manner as when operated by the governor itself.

In the event of a breakdown of the governor oil pumps, or failure of oil pressure from any other cause, the governor would then be unable to hold the spear shaft back against the pressure of spring H, and the Pelton wheel would then be automatically and slowly shut down by the combined action of the spring and dashpot.

In connection with the dashpot for obtaining constant speed, the governor is fitted with an equalising device in order to obtain a speed variation between "full" and "no load" from zero up to about plus or minus 5 per cent. for paralleling purposes. This arrangement consists of a lever connected to the dashpot support on one hand and to the governor shaft on the other hand, the latter connection being carried out by means of an eccentric, the radius of which can be adjusted to obtain the required permanent speed variation.

When the lever is in the centre of the regulating shaft, no movement is obtained and the turbine is running at constant speed at all loads, but if the lever is altered an eccentric movement is obtained which neutralises the effect of the movement of the dashpot and a permanent speed variation is obtained, the degree of which is adjusted by the length of the eccentric radius.

Each unit is connected to the main branch pipe by a 10-inch pipe, controlled by a 10-inch diameter sluice valve, so that each turbine is quite independent of the other. A tachometer is fitted to each machine, as well as a pressure

gauge to show the pressure of water at the nozzle, and these instruments are essential to the operator in starting up and controlling the machines in work. The governor controls the action of the jet, and the time of closing of the spear is adjustable by the cataract device on the needle valve spindle, but in this case, owing to the large area of the supply pipe, with two units at work and taking the quantity of water required for full power, the velocity of the water in the main pipe is so moderate as to preclude the risk of any great hydraulic surge, even if the needle valve closed unduly quickly, a contingency which might occur if the attendant was neglectful of the filling of the cataract cylinders, failure to regulate the bye-pass control valves on the cataract cylinders or from any mechanical defect that might arise from loosening of parts and the numerous reasons for imperfect working of machinery. Even when the additional third unit is installed, with the three machines on full load, a speed of closing of from five to six seconds will not cause undue surges on the pipe line, even if two governors acted simultaneously, a most unlikely contingency. The static head in this case being 320 feet, the pressure is not sufficient to give cause for apprehension from this cause, but in Burma, where I installed a plant working under 2,100 feet static head, the matter of the time of closing of the needle valve was one of the greatest importance, as when filling the pipe line there we did have one hydraulic surge which caused considerable damage and delay.

Owing to it being necessary to effect some alterations to the details of the plant as supplied by the makers, and consequently only one unit being operated singly when the plant was first started up for beneficial work, we were not able to carry out the tests we had hoped to be able to conduct on the completion of the work, but doubtless at a later date and a convenient opportunity some really good efficiency tests can be conducted, but when the machines were put to work one could not fail to be struck with the high mechanical efficiency of the turbines. A careful test was made of both machines running light, merely keeping the switch boards excited but no current being taken out of the boards, with a constant depth of water of two inches flowing over the notch of Lea recorder, the horse-power developed by the two plants so running was 41.21 as measured. As each turbine is fully capable of developing 175 h.p. under the conditions as installed, this gives an efficiency for the combined electrical and hydraulic plants of 88 per cent.

A Lea recording instrument has been installed at the end of the tail race before it empties into the river, and the charts give useful records of the work done. At the time the writer was present the work being performed in the factory was so irregular and intermittent that a study of the charts then being taken from the machine is not likely to prove of

* From a Paper read before the S.A.I. of E.

much interest, but they at least serve to show the water consumption by the wheels and the sensitive action of the governors, which responded to the slightest change of load.

The foregoing remarks constitute a somewhat sketchy description of a modern hydro-electric plant as installed in South Africa. I am of opinion that it would be wise to extend this system of power transmission, which although expensive to instal in most instances from a capital outlay point of view, has other advantages, many of which are not apparent at the first glance. One of these is the aid the use of water power affords towards the conservation of a country's fuel resources, a matter of some importance when the varied uses to which coal can be employed, other than for mere power production, are considered. A point that strikes me in connection with this system of power production is that it forms an insurance against any stoppage of the fuel supplies from a number of causes. Take for example the electrification of the railways; in the event of any dispute in the mining of coal the hydraulic plants would serve as a very important stand-by and at least prevent a total stoppage of the train services. I don't suppose this view of the case will appeal to the Socialistic gentlemen amongst the Labour Party, but nevertheless it is a point worthy of some consideration. There are quite a number of places in South Africa where there are sources of water power, but hitherto there has not been sufficient inducement to exploit them, and as long as coal can be produced cheaply so long will these sources remain undeveloped. One cannot help being struck with the hurried efforts now being made in England to improve the thermal efficiencies of the many heat plants now that coal can no longer be produced for the small price per ton that ruled before the war, but I suppose so long as an article can be procured cheaply so long will it continue to be wasted. The wise man, however, is he who looks well into the future, and I commend a study of the potentialities of South Africa in regard to hydraulic power to those in authority and to all who have the future welfare of this country truly at heart.

Improved Drop Hammers.

A battery of drop hammers recently supplied by a British firm to the engineering workshops of a Chinese railway possesses several interesting features. It includes three hammers, one of 30 cwt., one of 15 cwt., and a third of 7 cwt. All three hammers are lifted by wheels on a single overhead shaft, driven by an electric motor through a closed gear box which reduces the speed. The ropes supporting the hammer blocks are raised on grooved drums, to which they are held by special friction blocks; at any desired

moment the friction block is raised and the hammer falls. The mechanism of control is so simple that a child could operate the largest hammer with ease. Each hammer can be lifted to any height and allowed to fall, or it can be held stationary at any point. Before being installed the battery was subjected to the severest tests, all three hammers being held suspended while the motor continued to run, but not the slightest tendency to overheating showed itself in the lifters. No other drop hammer, it is confidently stated, was ever subjected to so arduous a test.

The Simplest of Steam Traps.

Among the innumerable forms of steam trap none could be neater or more effective than a new form recently brought out by a British firm of engineers. The working part of the trap is a small flat sealed chamber shaped like the vacuum box of an ordinary aneroid barometer. This chamber is filled with a volatile spirit and its vapour. When steam is passing the spirit is heated, the chamber expands and closes a valve attached to it, thus shutting off the steam. When any water collects the spirit is cooled, the chamber contracts, and the valve opens, allowing the water to escape. The flow of steam through the opening heats the chamber again and so closes the valve. Either side of the valve can be used as the inlet.

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New African Railways.

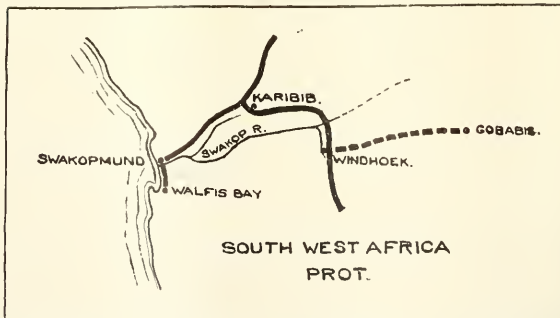
The Beira-Zambesi Railway.

The Beira-Zambesi Railway, which will form an important link in the chain of inter-continental communications, is now nearing completion. It is in fact expected to be put into commission about March next, and simultaneously new pier and wharfage facilities at Beira will be available in order to cope with the augmented trade of the port. Some considerable time will elapse before the Zambesi is spanned by the big bridge which will cross the river above Chindio, but with the exception of this comparatively small link, there will be direct communication between the Shire Highlands and the Union, and when the projected line from Luchenza to Fort Johnstone is completed, the south shores of Lake Nyasa will be linked up with Table Bay.

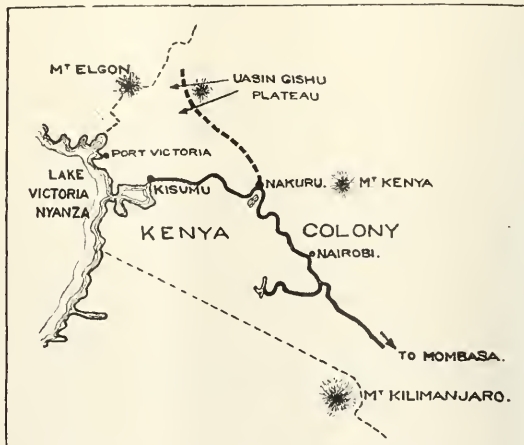
A contract has been signed with Messrs. Norton Griffiths & Co. for construction of a railway from Nakuru on Uganda Railway to Turbo on the fertile Uasin Gishu plateau to north-east of Victoria Nyanza. Work—to cost £2,000,000—will shortly commence. The new railway will, it is anticipated, be continued later into Uganda and form the connecting link between Mombasa and the Cape to Cairo route.

Another new railway proposed is to run from Windhuk, capital of the South-West Protectorate, easterly to Gobabis, for about 132 miles at a cost estimated at £726,000. Gobabis is one of the chief settlements in the eastern portion of the Protectorate, and, having numerous fresh water springs in its vicinity, is the centre of one of the few districts where agriculture is feasible. Maize is the principal crop.

The three maps given herewith exhibit the routes of these three new railway lines.



New Railway for the S.W. Protectorate. A projected line from Windhuk eastwards, which will open up a rich agricultural area.



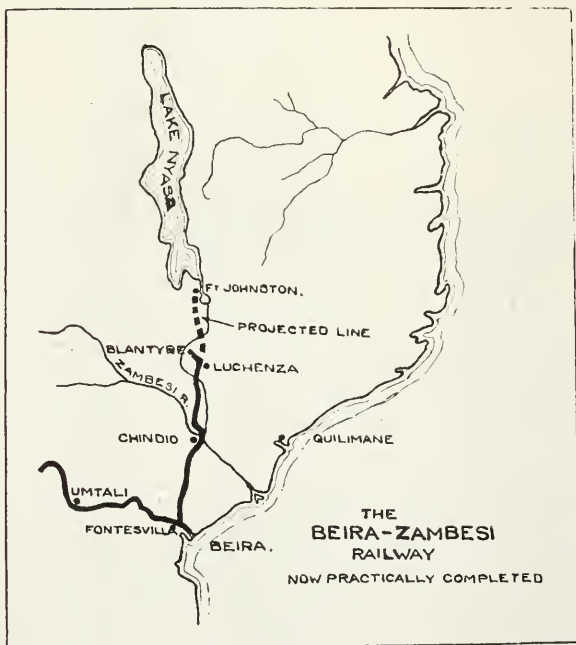
The New Plateau Railway in Kenya, "the highest line in the Empire."

The Geology and Mineral Resources of the Serb-Croat-Slovene State.

The official report of the geologist attached to the British Economic Mission to Serbia has just been published by His Majesty's Stationery Office in London. This report is the result of investigations carried out in Serbia during the summer of 1919, and a considerable amount of information has also been drawn from the mining literature of the district. The result is a most interesting and comprehensive report to which has been added a bibliography of the principal publications dealing with the mining industry and a useful glossary of the principal Serbian mining terms.

The main bulk of the report deals with the geological structure and mineral resources in detail, and an appendix gives the mining laws and regulations for the Kingdom of Serbia. Mr. D. A. Wray, the writer, has wisely not confined himself entirely to an account of the deposits within Serb-Croat-Slovene territory, but has treated the formation and deposits as a whole even when they cross a territorial frontier. Some excellent maps and diagrams have been included, together with photographs of the various workings in Yugoslavia.

The report may be seen at the office of His Majesty's Senior Trade Commissioner in South Africa, Goldfields Buildings, corner of Fox and Eloff Streets.



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Electrification of Railways.

LESSONS FOR SOUTH AFRICA FROM THE REPORT OF THE IMPERIAL ADVISORY COMMITTEE.

Last October an interim report was issued by the Electrification of Railways Advisory Committee appointed by the Minister of Transport.

The Committee has now issued its final report, dated June 30th, 1921, in which it confirms the recommendations of the interim report, and supplements them. With regard to contact rail collection of current, the Committee points out that the conductor rails must be so arranged that the same trains shall be able to run on railways employing a 1,500-volt supply and on those using 600 or 750 volts. The top-contact rail is generally used for the lower voltages, but the under-contact rail is also in use, and possesses advantage with regard to interference by the accumulation of ice and snow, and also with regard to the protection of men working on the track. Suitably designed shoes can be run interchangeably with either the top or under-contact type of rail. The Committee does not recommend the exclusive use of either type, leaving the door open to improvement in the design of either or both.

The Committee considers that a standard position outside the tracks should be defined within certain limits for the contact surface of the contact rails in relation to the position and level of the running rails, and recommends that in respect of new electrically-operated lines and extensions to existing lines the following regulations should be issued for securing interchangeability of running:—

- (1) The contact surface shall be in the horizontal plane.
- (2) The gauge measured between the centre of the horizontal contact surface of contact rails and the gauge line of the nearest rail of the corresponding track shall be 1 ft. 4 in.
- (3) The vertical height of the contact surfaces above the plane of the top table of the running rails shall be:—
 - (a) for top-contact rails 3 in.
 - (b) for under-contact rails 1½ in.
- (4) The vertical height of the contact rail (including, where required, the protection over the top of the rail) above the plane of the top table of the running rails shall be such as to provide the necessary clearance from the load gauges from time to time in use.
- (5) The under-contact rail, where employed, shall provide for the engagement of the contact shoe being made from the side nearest to the running rails.
- (6) Above the level of the under-contact surface (3) (b) no part of the contact rail construction shall be at a less distance than 1 ft. 1½ in. from the gauge line of the nearest track rail, and below the level of the under-contact surface (3) (b) at a less distance than 1 ft. 7½ in. from the gauge line of the nearest track rail.
- (7) The vertical distance between the under side of any contact shoe in the free position and the plane of the top table of the running rails shall not be less than 1½ in.

Existing equipments which do not conform to the above may be continued in use and may, subject to the approval of the Minister, be extended.

Similarly with regard to overhead collection, the following recommendations in respect of new lines and new electrical equipment of existing lines are made:—

- (1) The standard clearances, after allowance has been made for curvature and super-elevation, including any movements of the live wire or conductors and lateral movements of the collectors, under any circumstances likely to arise, shall be:—
 - (a) Between the underside of any overhead live wire or conductor and the maximum load gauge likely to be used on the line:—
 - (i) In the open, 3 ft.
 - (ii) Through tunnels and under bridges, 10 in.
 - (b) Between any part of the structures and the nearest point of any live overhead wire or conductor, 6 in.

- (c) Between rail level and overhead conductors:—
 - (i) At accommodation and public road level crossings, 18 ft.
 - (ii) At places where there is a likelihood of men in the conduct of their duties having to stand on the top of engines or vehicles, 20 ft.
- (d) Between any part of the collector gear and any structure, 3 in.

In the case of the electrical equipment of existing lines the dimensions stated in (a) (ii) and (b) may each be reduced to 4 in. as a minimum; cases of exceptional constructional difficulty may be considered by the Minister as special cases, and existing equipments which do not conform to the above may be continued in use.

(2) The horizontal distance of the contact wire from the plane through the centre line of the track and perpendicular to the surface of the track rails shall be within the following limits:—

- (a) At a height of 18 ft. above sea level, 1 ft. 3 in.
- (b) At a height of 4 in. above the maximum load gauge likely to be used on the line, 1 ft. 9 in.
- (3) The weight and construction of the contact wire and supports shall be suitable for the passage of collectors exerting an upward pressure of from 25 to 40 lb.
- (4) The width of the renewable contact surfaces of the collectors at right angles to the track shall not be less than 4 ft. and the extreme width over the horns of the collectors shall not exceed 7 ft. 6 in.

In the case of those railways that have already equipped any or all of their lines with overhead contact wires which do not conform to the above recommendations, the employment of these may be continued in use and may, subject to the approval of the Minister, be extended.

Having regard to the practicability of further standardisation of equipment by regulations, the Committee confirms the views expressed in the interim report to the effect "that such regulations should put no avoidable difficulties in the way of the adoption in future, with the approval of the Minister, of any improvements in methods or appliances which may from time to time become available with increasing knowledge and experience," and does not consider it desirable, in the interests of railway electrification, that further regulations (other than those recommended in this report) should be issued for the time being.

In October, 1920, the terms of reference were extended to cover the questions (1) whether any regulations should be made to limit the drop of potential in an uninsulated return conductor on electrically-operated railways; and (2) if any such limits are desirable, what limits these should impose, and under what conditions. On these points the Committee says:—

- (1) The evidence given by the railway companies operating electric railways indicates that the cases of harmful effects due to a drop in potential substantially in excess of that allowed by Tramways Acts in earthed railway conductors have been few and unimportant, and readily corrected by the railway companies themselves on their own initiative.
- (2) The clauses for the protection of observatories inserted in the Acts of railway companies applying for powers to operate their railways electrically have had, and continue to have, a retarding effect on railway electrification. The committee, having heard in evidence officers concerned with the observatory instruments likely to be affected by the operation of electric railways, is of the opinion that the interests of observatories would in any case be sufficiently protected if the scope of the clauses referred to were limited to the portions of electric railways within the vicinity of the observatories.
- (3) Some railways, by virtue of the wording of their Acts, are under no necessity to apply for new powers for electrifying their systems, and are therefore not placed under

the disadvantage with respect to limitation in the drop of potential by their Acts as in the case of the other companies.

Having regard to these considerations and to the views expressed in the interim report, as well as to the difficulties in imposing any definite limit to the voltage drop owing to the variety of conditions which present themselves along different portions of any railways, the Committee recommends that:—

(1) It is not desirable that regulations should be issued to limit the drop of potential in an uninsulated return conductor on electrically-operated railways.

(2) In cases where it is found impossible to dispense altogether with the present obligations which are imposed upon railway companies by the protective clauses inserted by the Board of Trade and other authorities into the Acts of the companies, these obligations should be specified definitely in each particular case.

The various recommendations are thus summarised:—

Standard System of Power Generation.—Three-phase alternating current.

Standard System of Power Distribution.—Direct current.

Standard Pressure.—1,500 volts at sub-station bus-bars; in special cases a multiple or sub-multiple of 1,500 volts, if approved by the Minister.

Standard Collection.—Contact rail and/or overhead contact wires.

Contact Rail Standards.—Top-contact or under-contact rail, with the contact surface in a horizontal plane installed at a gauge of 1 ft. 4 in. from the gauge line of the nearest track rail.

Overhead Contact Wire Standards.—Installed normally over the centre of the track at a height of 3 ft. above the maximum load gauge likely to be used on the line, and at a maximum height of 20 ft. above track rail level.

Limitation of drop in Earthed Return Conductors.—No regulations to be issued.

Diagrams showing the suggested positions of contact rails and wires are appended to the report.

Boring Methods and Machinery.

By G. Ireland, Boring Engineer, Union Irrigation Department.

Since the establishment of the Boring Branch of the Irrigation Department in 1904 close on 8,000 boreholes with a total footage of over 1,060,000 feet have been drilled throughout the Union of South Africa. The aggregate yield from these borings is approximately 135,000,000 gallons of water per 24 hours.

The provision of this large water supply has been a substantial factor in the development of the country and in view of the extent and importance of water boring in South Africa it may be of interest to briefly review the history of drilling in this and other countries.

The drilling of boreholes or vertical shafts of small diameter for the purpose of obtaining fresh water or brine, and in the search for minerals and oil is an ancient practice, so old that no dates can be fixed of the earliest methods.

The Chinese used crude machinery before the Christian era, and their early writings contain references to boring appliances. To the Chinese belongs the credit of reducing well drilling to a science.

A narrative published by the Jesuits in the 17th century describes the Chinese methods of boring "by an iron hand hung from the end of a cord."

During the 19th century the drilling of wells in France, England and Germany to depths of close on 2,000 feet aroused wide interest in the engineering world, and these operations were contemporaneous with a remarkable development in the art of boring in America due to the discovery of petroleum. In the Pennsylvania oil fields wells of 2,000 to 4,000 feet deep were drilled. The first deep well in the celebrated Oil Creek region, according to a published account of the early development of the field, was drilled by Jonathan Watson in 1866 to a depth of 2,130 feet.

Although boring for water has been practised in South Africa for some 35 or 40 years, the advantages of this method of providing pure water supplies do not appear to have been generally appreciated by the agricultural community until within the past 20 years. Mineral prospecting holes have been bored with diamond drills since the discovery of the Witwatersrand Gold Fields, and in the initial water boring operations in Cape Colony, Free State and Natal. This type of machine was almost exclusively employed both by the state departments and private boring contractors.

The continued use of the diamond drill was undoubtedly in a great measure responsible for the apathetic attitude of the farmers to boring, as the small diameter of holes drilled with this type of machine allowed of only a small proportion of the water developed being utilised except in the case of artesian or flowing supplies.

The increasing scarcity of diamonds suitable for drilling and the consequent high cost of the work led to the introduction of the American built percussion or "jumper" drill some 14 years ago and the employment of this type of machine gave a distinct fillip to the boring in South Africa.

Small steam driven drills with a boring capacity of 200 or 300 feet were first experimented with in Cape Colony, and although these were found more or less suitable for dealing with the comparative soft shales and sandstones, they proved to be too light for boring in the harder geological formations. More powerful drills were imported and the feasibility not only of penetrating the hard compact rocks at reasonable cost, but of finding large water supplies in and under these formations having been demonstrated, the popularity of boring was considerably enhanced.

There is, unfortunately, a remarkable paucity of literature on boring, and this particular class of work is seldom, if ever, dealt with in technical journals, although scattered accounts of drilling methods and machinery employed under specific conditions appear from time to time in articles dealing with matters involving boring.

In the absence of recognised text books on the subject, the driller is perforce, when in difficulties, thrown back on his resources and experience.—*S.A. Irrigation Quarterly.*

Welding Steel with Copper.

The persistently high cost of labour and material has forced manufacturers to give the keenest attention to every promising source of economy in production. For this, among other reasons, there has been a revival of interest in a unique welding system developed in Great Britain a few years ago, and since put into commercial operation. This system depends upon the fact that if a piece of copper on an iron plate is heated in an atmosphere of hydrogen to the smelting-point of copper, the copper will spread over the iron in a thin penetrating film like butter on hot toast. So, if the copper is melted between two pieces of iron it welds them together in an amazingly intimate fashion, the copper film actually working itself in between the crystals of the iron. By this process machine parts which can most conveniently be made in two pieces can be efficiently joined together without the complication of screws. In effect it enables the cheapness of separate manufacture to be combined with the strength and convenience of the solid combination. Steam turbine blades and the cage or body of a high speed centrifugal governor for small steam turbines are among the articles which have been successfully made by this simple and ingenious process.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS SLUGGISH—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—TRADE NOTES.

General Review.

Business during the past week has been somewhat restricted, and transactions on the Commercial Exchange have been fewer than for some considerable time. Merchants, in view of the European political situation and the not too stable local labour conditions, are refraining from indenting, and awaiting events generally. Prices of iron, steel and timber are much about the same, with, however, a tendency somewhat downwards in respect of heavies. Mining circles are undoubtedly concerned at the present price of gold and its downward trend, with its only too probable effect on our low-grade mines. A very prominent merchant this week said he had seen a farmer from Salisbury, who said that he was getting only 3s. 9d. per bag for mealies, which cost from 6s. to 7s. per bag to grow; this comparing with about 30s. per bag, the selling price of some twelve months ago. Generally it may be said that the mines are buying in the restricted way which they have pursued for many months past, and, in view of next month's stocktaking operations, no big forward move is looked for this side of 1921.

Iron and Steel.

Business has been fairly satisfactory this week without outstanding features. Merchants are still awaiting a lead from the other side.

Latest quotations:—Dunswart, 26s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 37s. 6d. to 45s.; larger sizes, 36s. 6d. to 47s. 6d.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 36s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 35s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 35s.; steel, 38s.; $\frac{7}{8}$ in. and upwards round iron and steel, 36s.; channels and joists, 42s. 6d.; shafting, $\frac{3}{8}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. a lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{2}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 2s. 2d. to 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{8}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; drill steel, 7d. and 8d.; hollow, 9d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black bal'ng wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per

square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Engineering Shops.

It is satisfactory to report that the improvement noted recently is being well maintained and that local manufacturers are fairly busy.

American Notes.

A more hopeful feeling exists in America as regards general business, and the outlook is more favourable. It is thought that the depression is passing and giving place to a more stable state of affairs. The steel industry is showing signs of improvement, the Pittsburgh district production advancing to about 40 per cent. The steel companies are more optimistic, as Government railways intend to place large rail orders in Canada.

German Competition.

Several German engineering papers are advertising for tenders for pipes, which they specially state are suitable for the South African market, in quantities as follow: 25,000 ft. of 8 inch, 10,000 ft. of 10 inch. German firms here are securing large orders for electrical machinery, one firm in particular has secured a large order from the Rand Water Board.

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It is reported that Mr. Struben will arrive here from London some time next month. We understand that his return visit is in connection with the companies in which he is interested, which have for some time been dormant. His visit should revive activities in the near West Rand so urgently looked for.

Indian Steel Works.

Large steel works, it is reported, are being established at Behar, with a potential output of three-quarters of a million tons of pig-iron and half a million tons of steel annually. It is noteworthy that the belief is prevalent that India is capable of producing the cheapest steel in the world.

A cable from New York announces that the Steel Corporation has reduced the price of steel rails by seven dollars per ton.

Timber and Building Materials.

The expected spurt in building operations has not eventuated, and things are not at the moment too brisk; there is, however, still a fair amount of business going in the way of repairs, and merchants generally look to improving conditions between this and 1922.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 1s.; beaver board, 4½d. to 5d.; floorings, 6½d. to 7d.; ceilings, 5d. to 5½d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at the mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks remain unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s. 6d., 46s. 6d., 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Dealers are still having a slack time, but appear to be fairly unanimous as to an approaching improvement, which, in their opinion, cannot well be delayed. They say, and with right, that the cost of materials is now as low as it is likely to be for some considerable time (timber prices have firmed up considerably on the other side), and labour shows a reluctant but welcome downward course.

Electrical Goods.

Business in electrical wares has, dealers report, been satisfactory during the past week, locally and outside, with very fair inquiries. Prices show no alteration, with the exception of tubing, which has declined again to 10s. 6d. as against 12s. 6d. recently, and about 15s. during previous months. As a matter of fact, everybody seems to be selling tubing at a big loss, owing to the general feeling that it will come down considerably at Home; but at the present time this would cost about 13s. 6d. landed here.

There are at present no indications of any reductions occurring either in British or Continental quotations; as a matter of fact, prices according to latest schedules are firming both at Home and on the Continent. America is slowly forging ahead, but on account of exchange difficulties is very much handicapped.

Reduced Freights.

The South African Conference Lines have decided to reduce their freights on wire, iron and steel to 35s. per ton, in addition to certain reductions on other specified articles. Owing to scarcity of freights, some Commonwealth steamers presently returning to Australia are being put out of commission for the time being.

Petrol and Paraffin Prices.

Last week's *Government Gazette* publishes the current price of petrol and paraffin. Petrol (all brands) is not to be sold at a price exceeding 28s. 3d. per case at the ports;

Shell brand, 34s. 3d.; Pegasus, 31s. 9d.; Zenith, 32s. 3d. At other places the cost of transport and railage is to be added. Retail prices at the ports: 28s. 3d. (all brands), plus 15 per cent.; Shell, 5s. 2d. per tin; Pegasus and Zenith, 3s. 11d. All other places (all brands), 28s. 3d. per case, plus 15 per cent., plus transport, etc., Shell, 5s. 8d.; Pegasus, 4s. 5d.; Zenith, 4s. 5d. per tin. Petroleum as a maximum is fixed at the ports to the retailers at 17s. 9d. per case. At other places the above price plus charges. Consumers' prices, at ports and all centres less than 400 miles therefrom, 20s. per case of two large tins, or 24s. 6d. per case of ten small tins, or 2s. 7d. per tin. At places 400 miles or more from the nearest port, 20s. 3d. or 24s. 9d. per case, plus charges. Bottle prices at the ports, 6d.; elsewhere, 7d.

British Coal Industry.

It is announced that sixteen collieries in Lanarkshire, in addition to the many pits permanently abandoned as an outcome of the coal strike, will be closed indefinitely owing to the lack of markets and the inability of the owners to avoid a loss on every ton produced. Some collieries are being temporarily closed in the Swansea district through the depression in trade.

British Coal Position.

The situation is far from assuring. What with the exhaustion of the Government subsidy of £10,000,000 and the large reductions in miners' wages now due, the position is unsatisfactory and likely to cause trouble. Owing to the present prices many pits, it is said, are likely to close down, but until the price of coal is very considerably reduced there is no prospect of any resumption of activity by blast furnaces. At the moment very little pig iron is being produced, and what little steel is being made is only by the use of imported pig iron. Notwithstanding recent reductions the price of coal is, roughly, about one half more than that produced in Germany, which means that if the United Kingdom is again to recover her coal position, the cost of coal production—in other words to-day the wages of the miner must be reduced. The Miners' Federation, in view of the present coal impasse, has submitted to the Government a scheme whereby the maximum price of industrial coal shall be fixed at 30s. per ton delivered, including cost of railway freightage, and that the Government should for a period make up the difference to the coal owners and railway companies. The scheme would involve a Government grant of about £10,000,000 sterling.

Dear Coal.

Ironworkers state that it is impossible to produce profitably with coal at its present price, against which coalmasters state that they are losing on every ton of coal produced and that they are faced with the alternatives of running at a loss, closing down, or making arrangements with the workers for an economic adjustment of wages.

Unic Trade for October.

The Customs imports, exports and revenue collections for October were:—

	Value of Imports.	Value of Exports.	Gross Revenue.
Capetown	£714,975	*£3,386,647	£99,038
Port Elizabeth	815,007	126,450	86,956
East London	251,762	261,796	29,802
Durban	1,614,255	893,696	132,137
Johannesburg	nil	nil	68,180
Lourenco Marques ...	399,469	nil	15,642
General Post Office ...	nil	nil	26,777
Other ports & stations	34,711	10,916	14,902
Total	£3,831,079	£1,979,505	£173,434

*Includes £2,983,299 gold exported at Capetown.

A ballot of Engineering and Shipbuilding Unions in Britain in respect of munitions bonus has resulted in a majority against the pending strike.

Railway Earnings.

These for the week ended October 22 were £395,000, £39,500 below the estimate. The total from April 1 to October 22 was £12,131,925, which is £62,790 below the estimate for that period.

London Railway Electrification Scheme.

The South-Eastern Railway is about to electrify the whole system. The British Government has now under consideration a scheme which if adopted will give employment to 20,000 men for two years. The object is to develop and extend the London tubes, and the scheme involves an expenditure of some £6,000,000.

British Trade Statistics, 1913 and 1920.

A Blue Book recently issued shows that the value of imports in 1913 was £769,000,000 and in 1920 £678,000,000. Exports in 1913 were of the value of £525,000,000, as compared with £1,334,000,000 in 1920.

Chain of Sample Rooms.

A scheme for the developing of British trade in markets oversea, under the auspices of the Federation of British Industries, has been launched. Belgium (Brussels) has already been infiltrated, and very shortly all the Dominions will be.

Strengthening of Pacific and Atlantic Naval Stations.

The British Admiralty, it is announced, intends to spend £2,000,000 in converting Singapore into a first-class station. An alternative base of lesser importance than Singapore will be created in Australia. The Bermudas, on the Atlantic side, will also be converted into a first-class naval base.

New docks are about to be constructed on the Clyde, which will give six large parallel basins with direct entrance from the river and will add about seven miles of quays to the accommodation of the port, at a cost of about £2,000,000. At the port of London a new cargo quay, 1,000 feet long, has just been inaugurated, and plans for a large passenger stage at Tilbury and for big extensions to dock accommodation are being prepared.

Harnessing French Tides.

A 100,000,000 dollar project for harnessing the tide in the Bay of Mont Saint Michel has been proposed by a group of American engineers to the Chamber of Commerce of the town of Granville, France, department of Manche. The plan involves the construction of 13 miles of barrier in the bay, consisting of coifers in which turbines and alternators would be installed. Through the rise and fall of the tide it is hoped to develop 6,000,000 kilowatt hours a year. The French Ministry of Public Works, in the meantime, is going ahead with arrangements for an experiment in developing the hydraulic force of the tide on the Finistere coast.

The French have also some ambitious plans for the development of the Rhone River. It is planned to make this waterway into a water transport line that will rival the

Rhone, and will serve for the irrigation of over 600,000 acres of land. Also, 900,000 kilowatts of cheap electric current is to be made available, thus saving coal imports to the value of at least 600,000,000 francs a year. River ports will have to be improved, or if necessary created and joined by rail with the main land arteries of traffic. The Rhone River flows west and south from the Lake of Geneva to the Mediterranean Sea.

Financial.

London advises that the Government will shortly issue £20,000,000 of 3 per cent. local loans stock at 52.

Metal Market.

Latest London quotations: Standard copper, 955 6s. 6d. cash, forward £66 6s.; electrolytic copper, £72 cash, £74 forward; Straits tin, £155 15s. cash, £158 2s. 6d. forward; English lead £24 2s. 6d. cash, £23 15s. forward; bar silver, 39 5-8d.; fine gold, 101s. 1d. per ounce.

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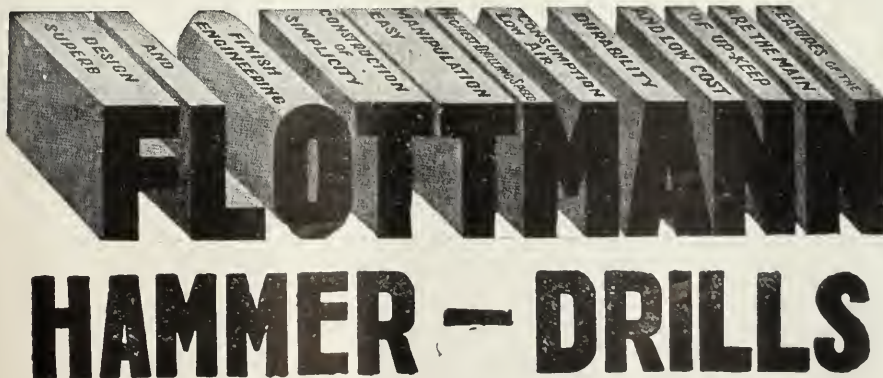
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"The Millionaire":

A PEN PICTURE.

By W. P. Taylor.

When I say he is a millionaire, I don't really mean it, not any more than some people have called me a millionaire. I suppose they thought I would fall to the honour. Honestly speaking, I never did. I dare say, if I took the trouble to count up all the money I ever made, I have made a million, but there are two sides to the scale, and as fast as fortune emptied her tributes on the one side, something always went wrong, and the weights on the other side constantly let me down. I'm afraid I am pretty nearly in the same boat as a good many of our old-time millionaires. This one standing at the corner of the Central News Agency was, at any rate, a real, or as you hear them say, a real Mackay millionaire. Pucker Kimberley blue white, for I only tell what I saw. To-day he furtively glances about him. After waiting and looking about, he restlessly darts to the Post Office, and his figure may be seen moving along Fox Street, the Stock Exchange, or Rand Club. His clothes are thin and shabby. For winter, they are very thin; not cloth, but worn cotton, the pattern faded; summed up—old, worn, faded. His collarless shirt is often covered with woollen muffler, but as the weather brightens he discards wool, and his weather-beaten frame secums molycoddling. A rag hat loosely hangs down; it nearly covers his hair, which is fairly long; it shades his face under its folds and it hides his eyes, and from its depths he peers furtively. Sometimes he looks through glasses, bluish glasses, as the day brightens to hard glare, but when the shades lengthen he peers from under the rag hat's loose rim with one eye. The other eye is false. The millionaire with the rag hat has but one eye, and yet, in his days of power, it was a matter of no moment. As he stands with all the latest fiction at his back, peering from the corner of the Central News, no one would buy his romance in preference to those books, and yet, if truth is stranger than fiction, there is a living novel moving unwritten and unnoticed. If Cecil Rhodes struck an awakening chord and forced mankind to observe a figure moving to a goal; if, as he moved along a wonderful path, he had to tread beside a mate and hold a guiding hand, might he not have had as a companion the millionaire with rag hat? He might. In verity, he did. Yet at these corners there congregate our stiff, our men of the veld, who found and lost and who are too feeble to find again; men who managed mines and drew big pay, some with a tightness in chest that gives them a pension dearly earned. Some drink and dream; needy stiff's borrow from the man who sold his body for high pay, and though he bought his silver dearly he gives it away as generously as a child; but the man with the rag hat is not of these. For he is restless and alone. He never has a mate; he always is expectant. Rarely does he speak, rarely is he spoken to. His life has not always been a silent one, but now he moves and acts with a silent purpose. He has not always stood at corners waiting for a word. I have seen him in the city, garbed in frock coat and top hat, and in company with the foremost brokers on 'Change. I have seen him, earlier still, beside the great Cecil, looking into their mines. His name was a talisman, his word was law. He carried out chapters of work, chapters of the most difficult, and his iron will and determination entitled him to foremost place in Rhodes' most difficult task. He was incessantly called upon; he carried out what others could not undertake. He was fit to stand beside and to walk with Africa's great hero of Imperial advancement, and aid him in his most arduous

work. His name was good on documents for untold wealth, and I have seen him throughout all this. He now stands, a world of real romance before the imaginations of the scried rows of coloured novels in the Central News' window, and as I saw him there, I wondered what were his thoughts. Did he invent the wonder ship that was adopted in the war? Are there other practical thoughts to his credit, or are they but wild imaginations of a haunted brain? I do not know. I do know I have seen him flitting in wide stretches. In Hyde Park the mild spring sunshine warned the flowering chestnuts, laburnums scented the air; in such softness I suddenly felt the dry atmosphere of Africa. I saw a figure—it peered with one eye from colouring to colouring. The same worn thin, shabby clothes, the same hard figure; it was my friend the millionaire with the rag hat. I spoke to him. He told me of diamond mines and lodes of silver, and travelling back to his wealth. I lost him for many years; I saw him again at Kimberley. Sometimes he is to be seen in the Northern Transvaal towns. Single-handed, he fights his way; mysteriously he moves to old haunts. If he does not actually have wealth, he dreams of it. He is secretive; his confidence is never given; he fears. What does he fear? Is it the ghost of the man that passed him in the race? Whether he fears the shades of death or men who live, his wealth—if there be wealth—is his secret. If he has wealth and brings it to the world, his weirdness is unsurpassed and his secret guarded with steel. I know of secrets—reefs with untold wealth, great slabs of quartz with yellow gold kneaded through its hard face, hundreds of ounces to the ton. I know the river on whose banks fabulous riches lie undisturbed; but the man who found it and held its secret is dead, his shrunken corpse beside his wealth; his secret will never come from him, his mouth is filled with the veld's clay, and his secret is sealed forever.

I know; what do I not know? And like the man with the rag hat, we all have our secrets. Yet he is fearful. From whence his fear? What evil demon brought him his curse? Was it the loss of his great fortune, the fortune he had schemed and worked for? Standing before that wealth of modern romance and looking into the void, this silent figure, far from idle chatter, ever moving through strong deep currents, carrying his secrets in silence, past life's passions, sometimes looks back and furtively peers forward. Look back, my friend; you have lived. Look back. Your wealth has done you little good, but take this consolation, it has perhaps done as much or more than some of your wealthier brothers. You live and have your philosophy, your secret hopes. Your philosophy may be a true one. Theirs is gone; they are with all that death has embraced, and their philosophy is with them. Their wealth enplanted has fertilised no growth. Yours has circulated in the world's stream, and though you cannot see its colour in the currents, it lives and flows. In all there are no monuments for posterity. In greed they gathered charity; they never gave but to inscribe a name in gilt, and when their last oxygen passed back to its early atmosphere, charity felt an icy breath pass her wondering cheek. It was in words "that evil was wrought by want of thought, as well as by want of heart." Look back; you will not see a multitude of despoiled widows and orphans. You were no mean ticky snatcher; your wealth was not attained rigging gold shares. There is nothing for you to undo. With your mind, wealth might have been a power. Theirs was but sciled paper, and marked no purpose. Well, they are dead. They had nothing in the making, nothing in the keeping, and their gold is nothing to them now. The world lost in their gain; it gained nothing in their death. Trees may sway in the wind beside their graves, and sigh, but the world has forgotten them. They passed as empty shadows and forget to inscribe their names. Did they forget, or was it shame? You, my poor millionaire with the rag hat, would inscribe your name. It loomed largely once. Your actions moved swiftly, silently, relentlessly, successfully, but broke suddenly.

Ah, well, I leave you in the deep labyrinth of your speculation, and as restlessly you move I wonder if under that loose hat there actually does remain a deep secret filled with purpose, and that some unknown strength leads you to hope.

“The Rand’s Low Grade Tonnages” in this Issue.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

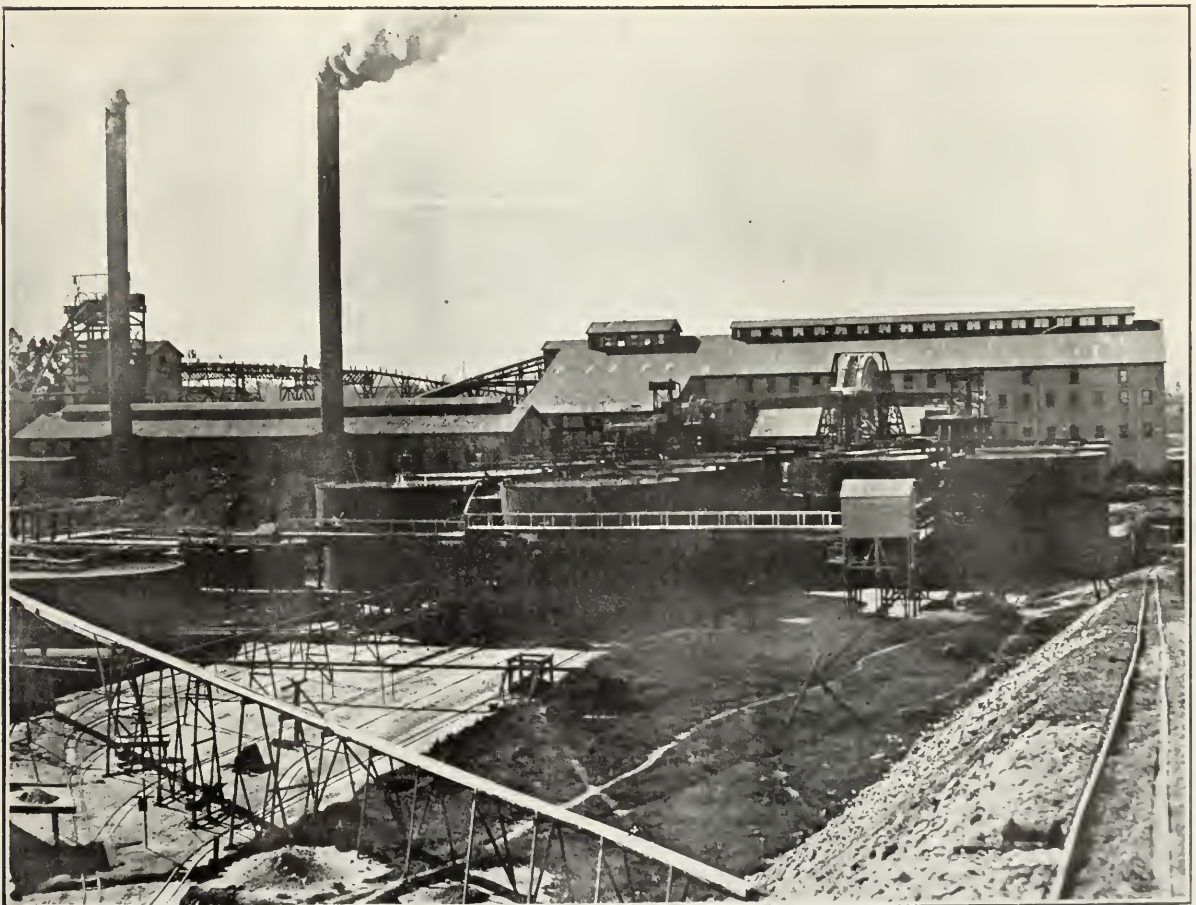
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, NOVEMBER 12, 1921.

No. 1572

A Central Rand Low Grade Mine.



The necessity for reducing Rand working costs to such an extent that our vast low-grade tonnages can be worked at a profit is dealt with at length in this issue. The above photograph depicts the surface works of the Village Deep, a mine which, on account of its depth and low-grade character, would benefit materially from the suggested amendment of the Mining Regulations.

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THE RAND'S LOW GRADE TONNAGES.

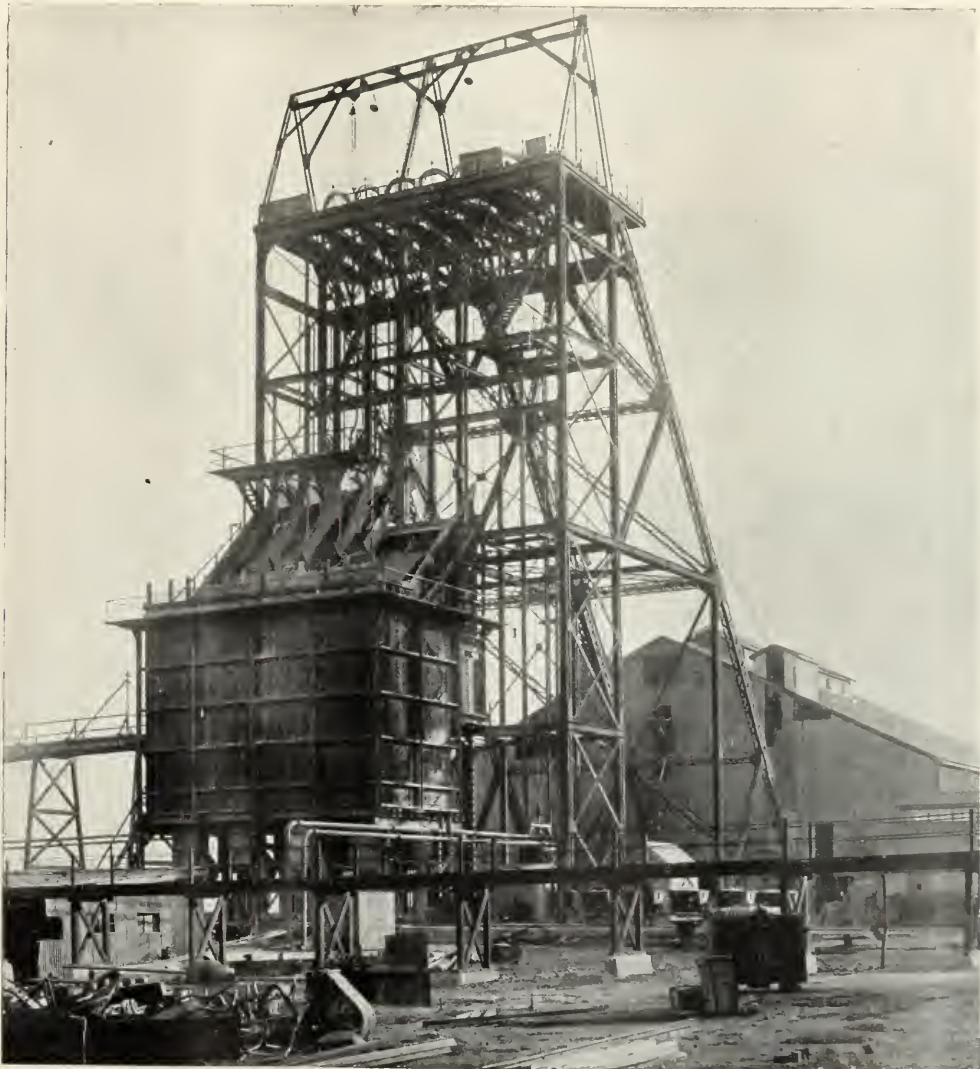
VAST STOREHOUSES OF WEALTH LOCKED BY THE KEY OF HIGH COSTS—HOW TO OPEN THE DOOR TO PROSPERITY—ALL-ROUND BENEFITS FORESHADOWED—A STUDY IN PENNYWEIGHTS—FACTS AND FIGURES IN GRAPHIC FORM—THE EPHEMERAL PREMIUM—HOW TO SET OUR INDUSTRIAL HOUSE IN ORDER—THE PRIME MINISTER PROPOUNDS A PARTIAL SOLUTION—AMENDMENT OF THE MINING REGULATIONS—THE BOGEY OF THE COLOUR BAR—THE MEN'S LEADERS REJECT THE PROPOSAL—ANOTHER CONFERENCE—“ THE ONLY WAY ” TO EXPANSION.

Presiding at the annual meeting of the Nourse Mines, Limited, a few days ago, Mr. E. G. Izod sounded an optimistic note in regard to that company and the whole Witwatersrand when he said the Nourse Mines is only one of many mines on the Rand which have vast stores of gold locked away in its ore reserves. “ I cannot believe,” continued Mr. Izod, “ that any community of white, progressive people, such as we have in South Africa, will continue to be so apathetic towards the great possibilities of the mine as to allow this gold to lie fallow for all time.” We do not always find ourselves in accord with Mr. Izod's utterances, but in respect of his remark as quoted above, we think he has sounded a note which should become a clarion

call throughout the length and breadth of this country. The whole future of the Witwatersrand, and in large degree that of South Africa, is wrapped up in the problem of how to work low-grade tonnages at a profit. There are immense quantities of such ore standing developed or partially developed in the mines to-day, and there are further immeasurable areas of conglomerate beds of poor content to be exploited.

Accumulations of the Years.

These developed and partially developed tonnages represent the accumulation of years of work and of many thousands of feet of sinking, drilling, raising and winzings. It is quite impossible to exaggerate the importance to



The Turf Mines Headgear of the Village Deep, the deepest only one of many mines which would benefit substantially b discussed

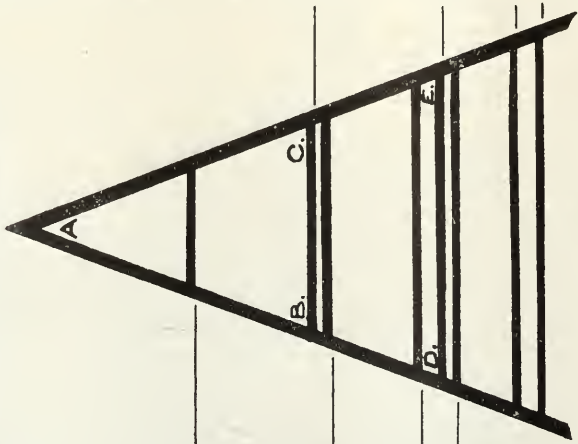
shaft on the Rand. This low-grade and deep proposition is y the suggested amendment of the Mining Regulations in this article.

Jhannesburg, to the Rand, and to the whole of the Union, of realising the colossal amount of wealth locked up in these low-grade reserves of ore. If these immense tonnages could be made to disgorge their auriferous content, many scores of millions of pounds would be put into circulation, the life of the industry—and particularly the life of the Central Rand

All-Round Benefits.

Everyone would benefit and benefit enormously from a prolongation of the lives of the mines and from the lifting—or at least the partial lifting—of the shadow of waning production which darkens the future of the gold mining industry of the country. The shareholders would benefit thereby, the

**VARIATION OF ORE RESERVE
WITH WORKING COSTS AND PREMIUM.**
NOT MATHEMATICALLY CORRECT.

GOLD AT 85/- PER OZ.		ORE RESERVES.		GOLD AT 105/- PER OZ.	
WORKING COST PER TON.	GRADE JUST PAYABLE DWTS/TON.			GRADE JUST PAYABLE DWTS/TON.	WORKING COST PER TON.
25/2	6.0			5.0	25/2
21/-	5.0	3.9	21/-		
17/1	3.8	3.3	17/1		
16/-	3.8	3.1	16/-		

THE ORE RESERVE FOR ANY SET OF CONDITIONS OF WORKING COSTS AND PREMIUM IS REPRESENTED BY THE TRIANGLE ABOVE THE BASE LINE OPPOSITE THOSE CONDITIONS. FOR EXAMPLE, THE TRIANGLE A.B.C. REPRESENTS THE ORE RESERVE WHEN GOLD IS AT 105/- PER FINE OZ. AND WORKING COSTS AT 25/2. IF WORKING COSTS FALL TO 21/- UNDER THOSE CONDITIONS, THEN THE ORE RESERVE IS INCREASED BY B.C.E.D. AND BECOMES TRIANGLE A.D.E.

—would indefinitely be prolonged, the unemployment problem would largely be solved, merchants would greatly increase their turnovers on account of the stores consumed and the wages paid out in the process of mining and milling these ores, and the economic pulse of the whole country would be quickened.

workers would benefit, the railways, the revenue of the State, the merchant, the taxpayer, the man out of a job, the man in affluence and the man in debt, all speedily would feel the beneficial effects resulting from the assured prospect of obtaining from the gold mines of the Rand an additional large amount, perhaps as much as two or three hundred

million pounds worth, of gold. This vast storehouse of wealth is locked to-day by the keys of high working costs. The gold contained in these many millions of tons of low-grade ores can only be realised in one way, and that is by working the conglomerate beds which contain this gold, and it is a moral certainty that no company or group of companies will undertake to mine, hoist, mill and cyanide this vast accumulation of low grade ore and develop other large low-grade sections unless there is the prospect of earning from such operations a fair measure of profit.

Price of Gold and Cost of Working.

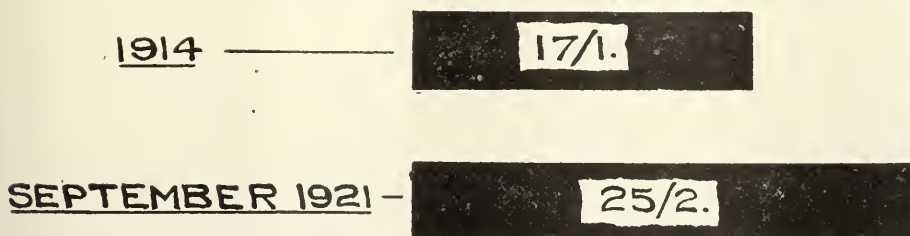
Even with the price of gold standing at 25 per cent. above its normal value, it is impossible to work the great bulk of this low-grade ore. Only the higher grade sections of this tonnage or limited blocks of poor value adjacent to areas of profitable content can be exploited. With gold standing at its present day price of, say, 105s. per ounce, and with

per ton, and in September of this year they were 25s. 2d. per ton. Fortunately for the Rand, the gold premium stepped into the breach in 1919 and temporarily arrested the destructive process of transferring tonnages previously accounted "payable" into the arena of unprofitability. But the gold premium is a purely ephemeral thing, and the only businesslike way of facing the proposition is to look at the problem of the low-grade areas from the angle of a normal price for gold.

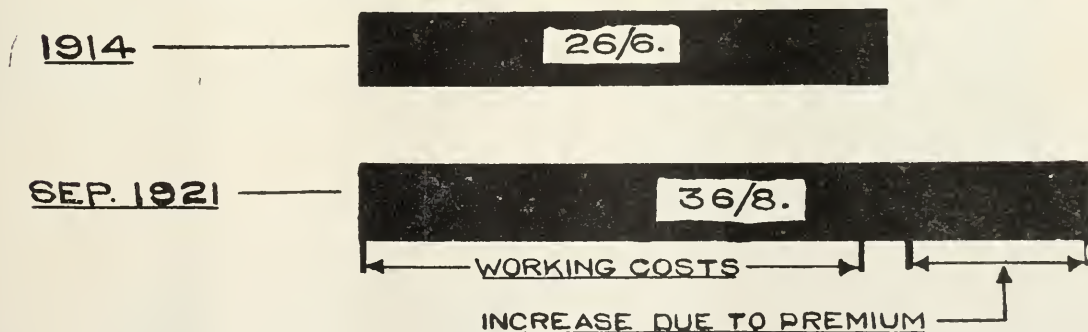
Profits from "Unpayable" Ore.

In nearly every quarterly and annual report that is issued one reads that development for the period was so many thousand feet and that of the tonnage of ore exposed only a certain portion was payable. In the case of numerous mines only about 50 per cent. of the ore developed is capable of being worked at a profit under the conditions obtaining to-day. We cannot increase the quantity of gold in the

WORKING COSTS PER TON



WORKING REVENUE PER TON



This diagram exhibits working costs and revenue per ton in 1914 and at the present day. It shows, too, that but for the gold premium the margin of profit for the whole Rand would be exceedingly small.

working costs at 25s. 2d. per ton, ore containing an average gold content of less than 5 dwts. per ton is unprofitable. It is a perfectly simple and easily understandable axiom that if a thing costing 25s. 2d. cannot be sold for more than 25s. 2d., no sane company will take the trouble or lose the money entailed in its production.

How Expenses Have Risen.

We feel quite certain that the public generally do not adequately appreciate the position in regard to the vast low-grade tonnages of the mines and the necessity that exists for bringing these ores within the scope of industry. Since the outbreak of the Great War these accumulations have been enormously augmented by the automatic transfer of ore from the payable to the unpayable side of the ledger through increased costs of production. In 1914 working costs on the Rand averaged 17s. 1d. per ton. By 1919 they had risen to 22s. 11d. per ton, and the working profit had declined to 5s. 6d. per ton. Costs last year were 25s. 8d.

conglomerate beds. But it should be within the bounds of possibility to so reduce the cost of working that a large proportion of this payable tonnage can, instead of remaining fallow in the mine, be rendered productive.

Millions and Millions of Tons.

How many millions of tons of ore which are to-day lumped under the category of "low-grade" because working expenses are so high that they cannot be worked at a profit, exist in the mines of the Rand, it would be very hard to say. But we do know that the quantity is enormous and that with each decline in the cost of production a certain amount of this ore can be worked at a profit. And as the cost declines, larger and still larger tonnages cross the border line which separates unpayability and industrial stagnation from profitability and prosperity. In order to illustrate in graphic form the incidence of decreased working costs upon low-grade tonnages, we reproduce herewith charts which should enable lay readers to visualise the essential factors in the proposition.

A Graphic Representation.

In the first diagram the pyramid represents low-grade tonnages, and by its sides are depicted columns representing the amounts of gold in terms of dwts. per ton required to realise the expenditure. But in this connection it should be borne in mind that the assay value in situ of the blocks is more than the recoverable value because there are inevitable losses both in mining and extraction. The values in situ may, however, roughly be taken to represent the border line between profit and loss, and it will be observed that as costs decline more and more tonnage is brought within the scope of economic working. It is not contended that the dimensions and scale of the diagram are mathematically correct, or that the proportions are accurate. No complete computations of low-grade ore

the face of a downward trend of gold prices, allowed to continue, we shall be guilty of allowing a sterilising influence as blighting and destructive as the sands of the Sahara or the Kalahari, to creep into and extend within the vitals of our livelihood.

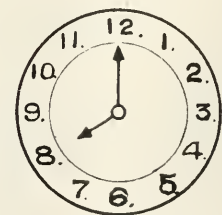
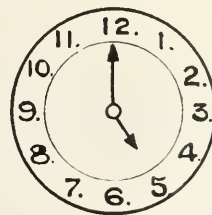
Plain and Simple Logic.

These facts are indisputable, and to contend that if working costs are not reduced by means of a decrease in the aggregate sums of money disbursed on working account, then they must be reduced by means of an augmented product is plain and simple logic; and, moreover, this process of setting our industrial house in sound economic order must not long be delayed. Many of our mines are on their last legs.

EFFECT OF PROPOSED AMENDMENT
ON WORKING HOURS
FOR NATIVES.

OLD **AMENDED**
REGULATION. **REGULATION.**

HOURS PER DAY
PER NATIVE.



OUTPUT PER
NATIVE.



THIS DIAGRAM PORTRAYS THE EFFECT THE PROPOSED AMENDMENT OF WORKING HOURS FOR RAND MINE BOYS WOULD HAVE UPON OUTPUT.

reserves classified according to value in respect of all Witwatersrand mines are available; but the principle portrayed in the chart is correct, and some little study of the diagram will assist in a proper comprehension of the immense importance attaching to the task of making low-grade ores profitable to work.

How High Costs are Sterilising the Rand.

If and when gold comes back to normal selling value and costs remain at their present level, only six dwt. ore will pay to work, and the vast accumulations of low-grade rock, which it is impossible to exploit save at a loss, will further be increased. By maintaining costs at their present high level the Rand is rendering a vast acreage of its golden farm barren and unproductive, and if this destructive process is, in

Inflated costs are hastening their doom. The majority of these properties, once they are closed down, cannot be reopened, and when pumping operations in them cease the operations of adjacent concerns will be jeopardised by influx of water from the idle mines.

A Refusal to Listen to Reason.

In the face of all these irrefutable facts, it is as deplorable as it is amazing that the men's leaders have stated their refusal to acquiesce in the alteration of that portion of the mining regulations which is concerned with the number of hours worked by natives. On Friday week the Prime Minister addressed a deputation from the Mine Workers' Union on the subject. The position of the mines has evidently become so grave that the counsel of an even weightier personage

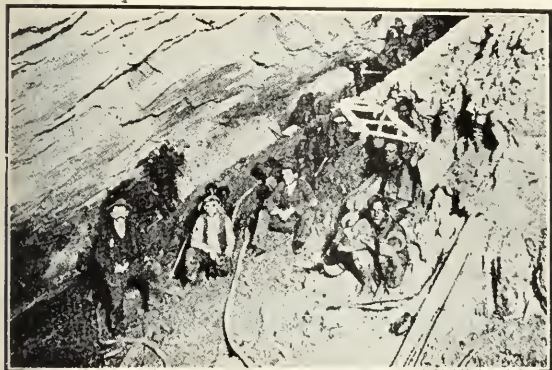
than the President of the Chamber of Mines or the head of a mining house is needed; it is so acute that it has called for the intervention of the Prime Minister himself. We feel quite sure that only the gravity of the position induced Gen. Smuts to plunge into the maelstrom of Rand industrial problems with all their concomitant political complexities and dangers.

The Premier's Panacea.

In the course of his speech, General Smuts is reported to have said: " Looking for a solution of the troubles that face our industry and the danger that threatens our existence in future, I would not look to white labour, I would not look to the removal of the colour bar, and I would not look to the importation of more native labour into the mines, but I would look to one matter, and to one matter only, and that is the working efficiency of the natives that we have here." Admirable as the Prime Minister's speech may have been in its moderation and statesmanlike in its outlook, we cannot help feeling that the view expressed in the foregoing remark does not go far enough.

What About White Efficiency?

The working efficiency of our native labour is but one aspect of the matter. There is plenty of scope for increasing the efficiency of our coloured workers. But there is far more scope for improving the efficiency of their white overseers.



European Miners in a Rand Stope.

If we can obtain more and better working value from Jim Fish and Sixpence, it will be a distinct gain for this struggling industry. But it is idle to look for much improvement from the natives so long as our so-called " miners " of European descent are still in a truculent mood and are not themselves prepared to put their shoulders to the wheel and assist and help in the effort to reduce working costs by every means in their power.

The Ephemeral Premium.

In his address the Prime Minister wisely reminded his hearers that the gold premium was nothing more than a mere fortunate accident. *Inter alia*, he expressed a view that often has been given prominence to in the columns of this journal when he said we do know, that unless we are prepared to incur the gravest risks in regard to the future of this industry, we ought to see, and start early to see, that we are not dependent merely on the gold premium, but that our industry is on such a basis that it can continue to run on for the future, whatever happens to the gold premium.

The Prime Minister, in his speech, pointed out that under the conditions of working as they exist to-day, and under the mining regulations as framed, and the conditions of working that have developed under those regulations, the native worker does not work eight hours underground, but according to the report of the Low Grade Mines Commission he works an average of five hours underground. He spends

a long time underground. He goes down in the morning before the white man, and he sits there and waits until everything is in order and properly prepared and inspected, in accordance with the mining regulations, and then he starts his work. He then leaves the working place, again ahead of the white man, and what with the time wasted in this preliminary inspection and in his clearing out, again ahead of the white man, the result is that while the white man has his eight hours underground, the black man has hours less—five, according to the report of the Low-Grade Mines Commission. General Smuts expressed his views on this matter very fully and frankly, and said: " It is intolerable to have a black labour force, which was intended to work at least eight hours a day, but which, under the regulations as they exist, only work five hours a day, while the white man has to be there for eight hours a day. Not that the native is not underground all the time. He is, and longer than the white man, but under our working arrangements he is debarred from working during that time, and you can see what a difference that makes to the working of the mines. I say it is our duty to apply this eight hours day, which is in force for white men, and is the law of the land for underground mining—it is our duty to apply that to the black man in the same way. If the white man has to work eight hours



General Smuts, Prime Minister of the Union, who has made a telling appeal to the mine workers to set our industrial house in order.

underground to do his daily task, then it is the duty of the black man to do so, too, and we ought to frame our regulations and our law, and arrange our working conditions in such a way that he can do that.

The Proposed Amendment.

And what is proposed now in the amendment which the Minister of Mines has notified to you, is this, that whilst adhering to the principle already laid down, namely, that there shall be a previous inspection before the gang goes into the working place—by another body—that more latitude should be allowed, and the personal supervision of the white ganger, or inspector, or whatever he is called, should not be so close and detailed that he spends too much time over that. The whole idea is to make that a little more elastic."

There was at this conference no suggestion to interfere in any way with the terms of the arrangement recently arrived at by the Federation and the Chamber in regard to white miners' wages or hours. There was, in fact, no suggestion to interfere with the European miner's status in any way, except to better it,

A Proposal Rejected.

The Premier's speech was replied to by several members of the deputation from the Mine Workers' Union. Mr. E. S. Hendrikz, the acting general secretary, was the principal spokesman. The general keynote of the reply in connection with the suggested alteration to the mining regulations indicated very clearly that the mine workers were under the impression that this was not only an attempt to get in the thin end of the wedge for the removal of the colour bar, but that it was practically a case of driving the wedge home; that, in fact, it meant the removal of the colour bar. The speakers stated definitely that they would never agree to the removal of the word "personally" from Regulation 106 (7a) of the Mining Rules and Regulations. This regulation is to the effect that the ganger or miner shall "personally" supervise the dressing down or pulling down of all dangerous rock prior to the commencement of mining operations.

Mr. Hendrikz said that should the amendment suggested by the Government be gazetted, within 48 hours afterwards a general strike would be declared, not only on the Reef, but also throughout the whole of the coal mines.

This terminated the proceedings. The proposal for a conference has been taken up by the Prime Minister, and the first meeting between the Government, the Chamber of Mines and the workers took place on Thursday.

Another Conference.

We can only hope that this conference (like other recent round-table chats concerning this unfortunate industry) will not last for several weeks, perhaps months, and that in the meantime numerous mines will get so far into the mire of financial difficulties that it will be too late to rescue them even if our autocratic democrats consent to the amendment of the regulations.

What It All "Boils Down" To.

We have dealt with these two immensely important matters—the problem of the low-grade ores and the Prime Minister's earnest appeal for assistance for an industry in jeopardy—because the essence of both these subjects may be crystallised into this, that there is urgent need for better labouring efficiency in and on our mines to-day. There is urgent need of this in order that working costs



Going on Shift. White and Native Miners at a Rand Headgear.

The Premier's Disappointment.

General Smuts, in reply, indicated that he had placed the position before them quite clearly and frankly in the hope that he would be able to get their assistance, but instead of offering any solution to the problem—although they were all agreed that some means should be devised whereby a fuller use should be made of the time spent by the natives underground—he was met with a threat of a strike.

A Conference Suggested.

Mr. Hendrikz then suggested that a conference should be called between the Chamber of Mines and the Mine Workers' Union, at which the Government should also be represented, the conference to be held preferably under the chairmanship of the Minister of Mines, when the mine workers would be prepared to submit proposals to attain the desired object without any drastic alterations to the mining regulations now in force.

may be brought down to such a level that the Rand mining industry, upon which the livelihood of each and all of us depends, may be placed on an enduring basis of economic security which will not only insure the continuation of work at many of the poorer mines, but will also admit of the working of our vast resources of low-grade ores which are locked to-day by the keys of high cost of production.

TRANSVAAL G.M. ESTATES.

The following are the particulars of the output for the month of October in respect of the above company:—
Central Mines: Tons crushed 12,500, yielding 3,701 ozs. fine gold.
Elandsdrift Mine: Tons crushed 1,520, yielding 961 ozs. fine gold.
Vaalhoek Mine: Tons crushed 2,020, yielding 759 ozs. fine gold.
Estimated value of month's output, £27,659; estimated profit for month, £4,308. The month's results are based on value of gold of £5 1s. 6d. net per fine oz.

The Origin of the Diamond.

A SCIENTIFIC INQUIRY—CAN ARTIFICIAL BRILLIANTS BE PRODUCED?

By James Ennis.

The following article and the remarkable photograph accompanying it constitute an interesting contribution to the Romance of Science, and we publish them in the hope that they will stimulate thought and elicit correspondence in regard to this entrancing subject. It is some years now since the famous Lemoine experiments momentarily startled the diamond world, and we publish the interesting views of Mr. Ennis on the birth of the diamond, not with any intention of further depressing an already over-nervous industry, but purely with a view to ventilating the scientific aspect of a most difficult subject as viewed by a contributor who has devoted a vast amount of study to the matter.

The production of the pure diamond gem crystal from its natural elements may now be considered as a possibility of the future. Artificial production of pearls, rubies and sapphires are present achievements. The success of the Japanese in the production of the pearl by pearl culture has been attained through the thorough manner in which they have studied nature's method of production. Prolonged investigations along these lines have secured for them a great scientific achievement to the confounding of the pearl experts. The culture of the pearl is dependent upon the mode of suggestion—secret incitement—being compatible with co-existing conditions favouring production at incipient stages. Knowledge is that all bivalves do not produce pearls.

The production of crystals is not governed or restricted by like conditions. This is evidenced by the unrestricted production of artificial crystals. Paris produces rubies and sapphires, synthetically, to the extent of 5,000,000 carats annually. They do not reveal any differentiation to the real gem unless subjected to the searching investigation of the Rontgen rays. Why are these artificial gem stones not so perfect as to pass out as being pervious to the Rontgen rays—the supreme test? It would appear that although the method of manufacture crudely approaches the manner in which they are produced by nature, the faculty have not yet definitely determined the constituents employed by nature in the production of these gems. Will the most precious of all gems, the diamond, lead the way to this determination, and furnish the key to the solution of this problem, which has engaged the unremitting efforts of the savants of the world? The opinion of the discoverer of the parent rock of the diamond, with its true constituents in juxtaposition to the actual crystallisation, is emphatic in the affirmative. The possession of the constituents of the diamond, with a studious conception of the mode of production as exhibited by nature, constitutes a definite basis for laboratory investigations. In co-ordination with existing artificial crystallisation, the possibility of the production of the perfect gem should not be insurmountable.

Sir William Crookes on the Constitution of the Diamond.

Hypothesis has long held the minds of scientists in the matter of probable recognition of the constituents of the diamond. Pure carbon has been the accepted rule of conjecture. The late Sir William Crookes has, however, qualified the theory of the mineralogist respecting the physical and chemical properties of the diamond. "I need scarcely say (he writes) the diamond is almost pure carbon." Converted to ash when subjected to a temperature of from 760° to 875° C., by far the largest constituent of the ash is iron. This definition at one time seemed to coincide with

the opinion of the writer. A diamond recovered by him on the alluvial fields revealed what appeared to be, by the aid of a field glass, a substance within the gem having the appearance of an entomolite. Inter-penetration seems futile to conceive. In the sun's rays a glint, as of metallic substance, was discerned which placed the possibility of iron being the foreign substance. No aid could be obtained from microscopic observation. The inference therefore of the presence of iron was allowed to remain. Since the accurate demonstration of crystallisation of the gem has revealed its secret to the studious observer, the final inclination of



A remarkable copyright Photo illustrating the Birth of a Diamond.

opinion has set the phenomenon to be not a foreign substance, but an imperfection of the gem in its crystallisation. Incipient crystallisation, leaving a microscopic cavity, would show the facet of the cavity as a reflecting object to the observer.

The Great Cullinan.

Referring to Sir William Crookes' description of the Cullinan diamond, he observed "at one part near the surface there was an internal crack, showing well the colour of thin plates." The constituents of the diamond, from which nature has evolved the gem, displayed the lamina and the iridescence in much splendour. The recognition of the elements of the diamond has revealed the affinity of purpose in nature's production of minerals. Nature's revelations render the attendant efforts of production of those who have in the past endeavoured to emulate nature particularly abortive in perspective. Hanmay in 1880 endeavoured to produce diamonds from lithium, bone oil and paraffin. Friedlander fused clivine and stirred it with a rod of graphite. Moissan employed a crucible of carbon in which he placed a mixture of pure iron and pure carbon and the whole was subjected to the heat of the electric furnace. The mask which held the smiling gem of nature beams with indulgence upon the futile efforts of these alchemists, witchery emulators. A groping for the sunbeams in the midnight watch! All honour is due to the laudable efforts of these patient investigators. Yet it would seem feasible to imagine that the diamond has its home of production. To assume that the elementary knowledge of this conclusive fact has escaped

the intuition of the thoughtful mind seems remarkable. To the student of nature, who has devoted years to the subject within the environments of that particularly favoured area of the world's surface where the diamond has been so productive, it denotes a want of perception. Excerpts from various writers on the hypothetical origin of the diamond divulge a stereotyped deduction of intense heat, extreme pressure and the product of great depth.

Driving a Coach and Four through Theories.

The closing of this article will show how beautifully characteristic is the crystallisation of the diamond in its simplicity of structure and how singularly tender was nature at its birth. The history of the diamond would be incomplete even in its most vague form of understanding unless the origin of the gem had been discovered. Numerous writers, who have taken up the task of writing on diamonds, have found the subject of the origin a point on which they touch with hesitation and vagueness. Satisfaction is generally found by them in quoting Gardner Williams' oft-quoted confession, "I have been frequently asked 'what is your theory of the original crystallisation of the diamond?' and the answer has always been, 'I have none, for after seventeen years of thoughtful study, coupled with practical research, I find that it is easier to drive a coach and four through most theories (he could well have gone the full strength and included 'all theories,' for in this he would have been justified) that have been propounded than to suggest one which would be based on any non-assailable data." Unassailable data is now extant in the discovery of the parent rock and evidence of the complete crystallisation of the gem.

A Remarkable Photograph.

A unique photograph of the true matrix of the diamond, clearly defining the caste of origin, has been copyrighted in Pretoria by the discoverer. The delicate striated grooves are well brought out in this photograph as a featured characteristic of the South African gem. This feature is referred to in W. F. P. McLintock's (B.Sc.) guide to the collector of gem stones in the Museum of Practical Geology, thus—"Another point of interest well brought out by the octahedral crystals from South Africa is that the edges of the octahedron are replaced by striated grooves which show that what appears to be a simple crystal is in reality a compound or twin form." The crystallisation of the diamond as shown in the photograph is manifestly genetic. The expulsion of the elements of the diamond through the interstices of the rock is equally manifest. The visionary incipency and matured crystallisation within the influence of the simultaneous crystallisation of the matrix is a unique exemplification of the varied forms the diamond assumes. The made or twin stone may well be conceived as the result of fractional suspension of consolidation. Equally demonstrative is a specimen in the possession of the discoverer, showing the crystallisation of the cleavage. Contrary to all accepted impressions, the cleavage is hereby proved to be not a shattered or broken crystal, but a crystal formed in the matrix clearly defining the crystallisation as a cleavage. Respecting the Cullinan diamond, Sir William Crookes defined it "as a fragment, probably less than half, of a

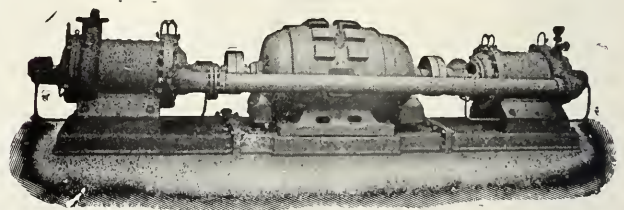
distorted octahedral crystal; the other portion still awaits discovery by some fortunate miner." This impression has been held as a generally accepted phase of phenomena pertaining to cleavage. Nature has divulged the secret of the cleavage, and revealed possibly why the visionary other half of the Cullinan has never been recovered. Sir William Crookes states that "more diamonds are formed in fragments and splinters than in perfect crystals; and it is noteworthy that although these splinters and fragments may be derived from the breaking up of a large crystal, yet in only one instance have pieces been found which could be fitted together, and these occurred at different levels. Does not this fact point to the conclusion that the blue ground is not their true matrix? Nature does not make fragments of crystals."

Evidence of Malformation.

Does not the foregoing strengthen the evidence of malformation. This characteristic cannot be easily ignored in the evidence of the varied forms of crystallisation which is a distinctive feature of the diamond. Nature has left the evidence of this malformation in a distinct caste of apparent fracture. The possibility, therefore, is that more extended investigation may reverse the opinion that nature "does not make fragments of crystals." Nature may make crystals in fragments, i.e., incomplete crystallisation. On the alluvial fields "patches" of diamonds are recovered within a very small area. These phenomena are demonstrated in another specimen in the discoverer's possession, whereby the parent rock exhibits the crystallisation of a patch of crystals. The adamantine sheen or lustre retained in the casts of several specimens, especially the one exhibited in the photograph, is so perfect in its fresh appearance and brilliancy that the crystallisation could well be assumed to have

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been a crystallised manifestation of but yesterday instead of in ages past. This is remarkable because of the circumstances which surround the manner in which they were discovered. Out of the granitic magma, surcharged with all the constituents of the alluvial gravel in all its varied forms, and endowed with the remarkable variety of mineralisation, a superficial lava has issued forth from gash and deeper seated veins. Flowing over the heated magma, the gravel or pebbles have segregated out, each with its characteristic type of mineralisation. Nature has hidden her secret in complete dissimulation. The only clearly defined vein the discoverer has recognised, held as contents crypto-crystalline quartz, Scherb quartz, scintillating with a myriad points of crystals; quartzite, etc., with a lava filling. The assumption geologically entertained that gravel is the detritus of rocks, water worn and rounded by sub-aerial conditions, is crude to the imagination of any who have studied the otherwise perfectly characteristic typification of the gravel on the alluvial fields. Gravel found on the elevated kopjes is a phenomenon no longer demanding an explicit explanation of its presence and origin. So perfectly undisturbed are the gravel patches and areas that to the studious mind each pebble is recognised to be *in situ* where sub-aerial influences have been withheld favouring conditions preventative to its disturbance. The prevailing recognition of the rotten granite on the part of the alluvial diamond seekers as the formation favouring that where diamonds may be found, clearly supports the opinion that the granitic formation is that in which the contemporaneous veins have discharged the superficial lava. The oxidation of the iron as a constituent of the lava has caused the "red brick" appearance of the most favoured ground sought out by the experienced diamond seekers. When the pseudo-lime formation is found to be favourable to the recovery of diamonds, these phenomena are due to the lava being subjected to sulphuretted influence during the passage of the flow, which has converted the lava into a compact sheet of hard or variable soft lime in appearance. The pebbles are here *in situ* in the lava from which they have segregated and remained embedded in the flow. The lava of the "red" ground has disintegrated under sub-aerial influences, leaving the gravel free in the friable soil.

A Scientist's Goal of Success.

Crystallography of the diamond, as pertaining to the manner of crystallisation of the alluvial gem by nature, is a subject which has now passed from the hypothetical to the substantive. The discoverer, who has surmounted the considered impossible achievement of discovery and recognition of the birthplace of the diamond, has reached the goal

of success which has been to the scientist, geologist, and others the ambition and desire of a life's interest. The mystification of the origin of the elusive gem has held the most thoughtful of men bound to conjecture, visionary as alchemy. Nature has hidden her secret in diversification and in the manner which crystallisation has been varied. This has rendered the discovery more elusive than the gem itself. Diversity as existing between hypothesis and nature's simple mode of crystallisation is set forth in the fulness of imagination by Sir William Crookes:—"I have done my best to explain the fiery origin of the diamond, and to describe the glowing, molten, subterranean furnaces where they first begin mysteriously to take shape. I have shown that a diamond is the outcome of a series of titanic earth convulsions, and that these precious gems undergo cycles of fiery, strange and potent vicissitudes before they can blaze on a ring or a tiara."

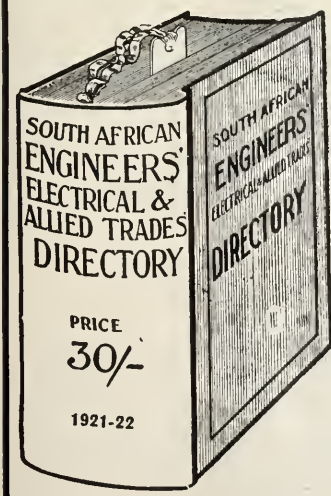
In such manner has the world's imagination been drawn to the brink of this awful visionary birthplace of the gem. How transcendently diverse is nature's revelation. This purest of all nature's manifestations in crystallography divests itself of this lurid stigma of its origin. The foliation of the rose is an index as free from complexity as the foliated laminae of the diamond, which, by its striation at the edges, and which in some crystals embraces the whole gem, proclaims in the most assertive language of nature that, figuratively, the diamond blossomed as a rose.

The Prospect of Producing Artificial Diamonds.

The discovery of the vein stone of the diamond, nature's crucible, has opened up the problem anew respecting the possibility of reproducing the pure gem. Attempts to reproduce the diamond synthetically have failed. This conclusion is apparent to the observer who has had the unique opportunity of investigating the methods of nature's mode of production. Endeavours to reproduce the diamond have failed primarily because the constituents employed in these attempts have been the outcome suggested by hypothesis.

A One Million Pounds Colliery Scheme.

In spite of the difficulties which hinder the development of collieries in Great Britain, one large colliery company has decided to spend over one million pounds on extending electrical working in its various mines. The main power house is to be extended until it becomes the largest private electric power station in the country. One of the resulting changes in the pits will be the complete electrification of all plant which can be suitably operated by electric power. A considerable reduction in working costs will be effected.



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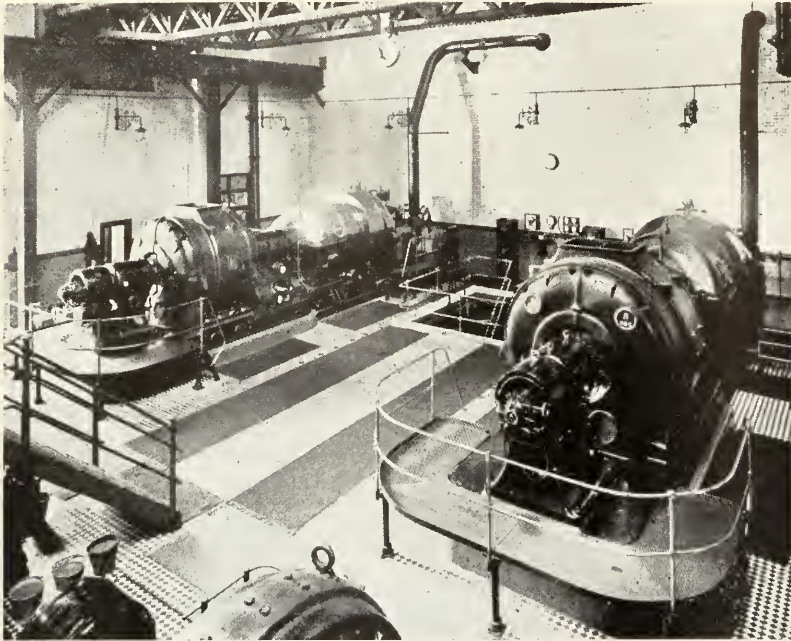
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American Capital for the Rand.

AN INTERESTING LETTER FROM NEW YORK.

The possible association on a large scale of American capital with South Africa is a theme that is being much debated at the present time. Although nothing definite is known, it is, in usually well-informed quarters, believed that more dollars are likely to find their way into this country in the near future than ever have come here in the past. The first-hand information on this subject, contained in the following article, comes from a reliable New York correspondent of the "Mining Journal," and is at least interesting.

It has so often been rumoured that big American interests are about to take a large hand in the development of the Witwatersrand that the public has grown more or less sceptical about these reports. It is, however, fairly generally known that for some months past representatives of one of the largest financial groups in the United States have been touring South Africa and have been investigating various mineral and industrial propositions. Their work has been quiet and unostentatious and various motives have been imputed to them. But whatever the objects of their visit may be, one can safely assume that the representatives of one of the very biggest of the firms in the States are not out here on a health trip.

We have from time to time heard much of and hoped for a great deal from the entry of American capital into this country. Years ago there were rumours that New York financiers were going to acquire Randfontein, and in 1919 an offer from the States to finance the Western Rand Estates was unfortunately refused at a time when negotiations had progressed satisfactorily almost to the point of consummation.

American Capital in South Africa.

More recently we have had the active co-operation of American capitalists in the development of the Anglo-American—Consolidated Mines Selection—Consolidated Diamonds group of interests, and in the Congo Diamond Fields. Thomas F. Ryan and his associates have brought the Kasai areas to a state of production on a fairly large scale. But there have been no very extensive inroads made by Yankee capital into the fields of South African industry. American capital has a stay-at-home tendency, yet signs are not lacking that the dollar is seeking avenues of use and employ-

ment in parts of the Old World as well as the New, and the fact that no other undeveloped country has such vast and varied resources as South Africa assumes a fresh measure of interest when taken in conjunction with the knowledge that envoys of one of the biggest corporations in the United States have been touring the Union, presumably with the intention of spying out the land and the acquisition of attractive interests.

This view is, too, supported by a letter just received from an esteemed and well-informed correspondent in New York. Writing from New Jersey, under date September 29, our correspondent says:—

"Yesterday I was in the office of a friend of mine, the editor of the ————. He was just busy on an article on the South African gold fields. I gave him a lot of information. I learned that ———— & Co. are going into the South African gold business, and this may lead to the placing on this market of some stocks they are to control of some new ventures on the Rand."

FIRST-AID ACTIVITIES.

St. John and Red Cross Joint Demonstration.

The importance of a knowledge of first-aid to the injured is not, as yet, fully realised by the community as a whole, and in order to arouse the interest of the public in this valuable means of saving life and limbs, a big first-aid demonstration is to be held at the Wanderers' Hall, Johannesburg, on Saturday, the 17th December. The demonstration is being organised jointly by the Order of St. John and the South African Red Cross Society, and it is expected that ambulance teams from the other provinces will attend to compete.

There will be separate competitions for both male and female adult teams, each consisting of five members, while the juniors will also be catered for, in that teams of Girl Guides, Boy Scouts and Wolf Cubs will each have separate competitions arranged for them.

The teams for each event will be selected by the several organisations concerned. Keen and interesting contests are anticipated, particularly as this will be the first occasion upon which ambulance teams representing St. John and the Red Cross will meet in friendly competition.

On the evening preceding the competitions (Dungaan's Day) there is to be a grand St. John and Red Cross Ball at the Wanderers, which function H.R.H. Princess Arthur of Connaught has promised to attend. The arrangements for the Ball are being made by a large and influential committee, presided over by Mrs. Chas. Marx, O.B.E.

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Rand Company Meetings.

New Modder's Wonderful Year.

Sir Evelyn Wallers on the Modder East.

How the Premium Affects the Nourse and Cons. Main Reef.

Annual meetings of four important mines of the Central Mining-Rand Mines group were held during the past few days, and full reports of the speeches from the chair at each meeting will be found elsewhere in this issue.

Three-quarters of a Million from the Premium.

The New Modder, which is, of course, the show mine of the group, has had another record year, the scale of operations and the working profit being the greatest ever attained by the company. The total profit reached the magnificent figure of £1,720,202, of which, however, £751,427 was obtained from the gold "premium." Development has yielded most satisfactory results during the year, the net outcome being that all ore mined was replaced, and indeed the ore reserves at 8,884,600 tons, of a value of 8.4 dwt., show a small increase in tonnage when compared with the previous year. During the past four months, *i.e.*, since the end of the financial year, working costs have shown an encouraging decrease, and development has been most satisfactory. A feature of the New Modder meeting is the picture of the development position which the chairman gives each year, and on this occasion Sir Evelyn Wallers showed that of the mine's 1,264 claims, 361 are worked out, 378 represent the intact developed area, and 525 claims still remain to be developed. In other words, about 28 per cent. of the property has been worked out and 72 per cent. remains, including the developed area. Well might the chairman conclude by expressing his satisfaction not only with the extraordinary soundness and strength of the position of the mine, but also with the excellent year's work of the general manager and staff of the mine.

Position at the C.M.R.

Mr. Max Honnet, who presided at the Consolidated Main Reef meeting, had a somewhat different tale to tell. But for the enhanced price of gold, operations for the year would have resulted in a heavy loss. As regards the future of the mine, Mr. Honnet reminded shareholders that for a long time past work had been concentrated on one limited area of the property. That area which was considered to possess the best prospects has fulfilled its promise and has produced a large tonnage during the last two years, upon which the position has been maintained. Unless other payable zones are encountered to the east or west, the ore reserve is bound to decrease in quantity, and the company may be obliged sooner or later to consider reducing its scale of operations. Exploratory work is being continued, and the chairman reminded shareholders that "in gold mining you never know what may turn up."—with which philosophic consolation shareholders in the "C.M.R." must be content to face the uncertain future.

The Outlook for Nourse Mines.

At the Nourse Mines annual meeting the chairman, Mr. E. G. Izod, dealt in detail with the more promising development figures and also made several pertinent remarks on the subject of working cost reduction. He described the mine as a 6½ dwt. proposition, which is not a low-grade one, and said, "It is beyond all reason to contemplate that our mine will work at a loss if gold falls below 96s. per fine ounce, which figure represents the average cost of production of a fine ounce of gold by the mine for the expired portion of the current financial year." Mr. Izod's very sincere warning in regard to the need for reducing the white wages bill is commended to the attention of every white workman on the Reef, and will doubtless weigh with the men's leaders in the present discussion between the latter and the Government and the mines.

Troubles of the Modder East.

At the Modder East meeting, Sir Evelyn Wallers, who presided, gave a very clear picture of the position and prospects of this property. He showed that it is really a very significant example of the absolute necessity for getting the working costs on these fields down to a figure which will represent safety to this community and to the country generally. The chairman's further remarks in elaboration of this theme should be carefully pondered by the public generally because they apply to every section of the community. Shareholders in the Modder East will note that the policy of the Board, although necessarily of rather a "waiting" character, is yet clearly enough defined as summed up in the concluding words of the chairman: "Under present working conditions we must continue to mine ore from our richer blocks somewhat out of proportion as compared with the remainder of our reserves, and we shall do so in the hope and the expectation of efficiency and working costs reaching the position to which I have referred. In that event the position of the company would be such that there is every probability of obtaining the financial facilities necessary to provide for our own equipment, but it would be idle to-day to discuss the nature of the detailed arrangement that may be involved. In the meantime, the policy pursued should enable us to earn profits that will be expended as heretofore in pushing our work of development—the essential feature at the moment." Plainly, the Modder East is most vitally concerned in the efforts now being made to reduce costs and increase efficiency on the Rand.

Concerning Mines and Men.

Mr. A. F. Williams, General Manager of De Beers, has been on a visit to the Rand in connection with the Advisory Board of Science and Industry, of which he is a member.

* * *

Mr. Hugh Marriott, consulting engineer to the Central Mining and Investment Corporation in London, will arrive on the Rand next week on a visit of some months.

* * *

Sir George Smith, J.P., of the well-known firm of Messrs. Bickford, Smith & Co., Ltd., fuse manufacturers, died in Truro, Cornwall, in mail week. Sir George's firm has been supplying fuse to the mining industry on the Witwatersrand for a great number of years. The deceased knight has not long survived his local representative, Mr. J. H. Houghton, who died in Cornwall towards the end of last year whilst on a visit to his native country, the first for nearly 50 years. Sir George was deputy chairman of Nobel Industries, Ltd., of which Bickford, Smith & Co., Ltd., the British South African Explosives, Ltd., and Kynoch, Ltd. (the two latter undertakings having factories in South Africa, at Modderfontein and Umbogintwini respectively), are constituent companies. With Lady Smith, Sir George visited South Africa some eight years ago and made a fairly lengthy stay in Johannesburg, where he met many of the heads of the industry.

GLYNN'S LYDENBURG, LIMITED.

The following are the particulars of the output for the month of October in respect of the above company, which kindly insert in the next issue of your paper:—Tons crushed, 4,003, yielding 1,593 fine ounces; estimated value of month's output, £8,069; estimated profit for month, £2,435.

Note.—The month's results are based on value of gold of 55 ls. 6d. net per fine ounce.

The Macduff Coal Company.

A SENSATIONAL PETITION—LIGHT ON COMPANY FLOTATION METHODS.

The case mentioned hereunder is sub judice, and we refrain therefore from commenting on it.

An *ex parte* application was made by James Howard Pim, sole liquidator of J. R. Macduff and Co., Ltd. (in liquidation) before Mr. Justice Ward, on November 3, in the Witwatersrand Court, to appoint a commission to examine under oath various persons alleged to have been connected with the Macduff Company.

The persons specifically mentioned were Jack Andrew Cohen, John Robertson Macduff, James Gunson Lawn, John Frederick Rutherford, James Huskisson Crosby, Herbert Williams, secretary of the company, and John Munro, joint managing director of the Johannesburg Consolidated Investment Company.

Mr. L. Greenberg, instructed by Messrs. Hayman and Godfrey, appeared for the petitioner, who set out that the Macduff Company was placed in final liquidation on June 30, 1921. This company, he said, was registered as a private company on March 30, 1920, with a nominal capital of £60,000, divided into 60,000 shares of £1 each, whereof 53,000 had been issued.

The first directors were Jack Andrew Cohen (chairman), who held 18,000 shares, Henry Adler, who held 18,000, and John Robertson Macduff, who held the remaining 17,000 shares, and 250 shares standing in Adler's name and 250 in Cohen's name also belonged to Macduff.

About October, 1920, it was alleged, Adler sold to the Johannesburg Consolidated Investment Company, Ltd., his entire shareholding, and on November 3 Adler transferred 7,750 shares to the Investment Company direct, and 5,000 shares to James Gunson Lawn, managing director of the Investment Company, and 5,000 shares to John Frederick Rutherford, an official of that company. It was clear, said the petitioner, that they were purely the nominees of the Investment Company, and Cohen was closely associated in business with the Investment Company.

Reconstruction Agreement.

The petitioner further stated that on November 25, 1920, an agreement was entered into in London between the Macduff Company and the Investment Company, whereby the latter undertook to reconstruct the Macduff Company and to form a new company with a capital of £1,000,000 in shares of £1 each, the new company to purchase the assets and undertaking, and to take over the liabilities of the Macduff Company as at October 1, 1920. The Macduff Company was to receive £50,000 in cash and 150,000 tully paid out shares; and the Investment Company was to apply for, or cause to be applied for by responsible subscribers, 550,000 shares in the new company, paying 4s. per share on application and the balance as required. And it was to receive in consideration of its obligation 300,000 fully paid shares in the new company.

James Huskisson Crosby, also an official of the Investment Company, petitioner went on, was appointed alternate director of the Macduff Company, on June 24, 1920, to Jack Andrew Cohen. Rutherford was appointed a director on April 21, 1920, and Lawn on November 1, 1920. Cohen resigned his directorship on April 22, 1921, and Macduff resigned on May 3, 1921.

Petitioner said he believed that all the shares held by Crosby, Lawn and Rutherford were the shares of the Investment Company, and that they were merely its nominees, and that the board of directors of the Macduff Company was entirely controlled by the Investment Company. In terms of the agreement with the Investment Company, meetings of the Macduff Company had to be convened for the purpose of passing special resolutions for the voluntary liquidation of the company and authorising the liquidator to enter into the reconstruction agreement. The calling of these meetings was from time to time postponed by the directors of the Macduff Company, the first postponement, at the latter end of March, being at the special request of the Investment Company.

The reconstruction agreement was in the highest degree favourable to the Macduff Company.

Matter of General Knowledge.

It was announced in the annual report of the Investment Company after its meeting on November 23, 1920, that they had acquired the business of the Macduff Company, which was being reconstructed with a capital of £1,000,000. This became a matter of general knowledge, and, in the opinion of the petitioner, induced the creditors of the Macduff Company to trade with it.

Petitioner alleged that on or about April 30, 1921, the Investment Company purchased from J. R. Macduff his shareholding in the Macduff Company, namely, 17,500 shares, for £23,000 cash, and a debt of £5,775 due by Macduff to the company on a promissory note was cancelled. About the end of April, 1921, the Investment Company purchased from Cohen his shareholding of 17,750 shares for £20,000 cash. The shares so purchased were transferred to the Investment Company, and its nominee, Crosby, who received 5,000 shares. In consequence all the 53,000 issued shares in the Macduff Company had been held by the Investment Company and its nominees from this date.

The petitioner said that he found from the books and records of the Company that at the time the shares were so purchased by the Investment Company from individual shareholders the Macduff Company could not meet its engagements, and was, in fact, insolvent, and the shares were valueless. Also that this position must have been apparent to the Macduff directors, who one and all were representatives of the Investment Company.

Agreement Had Lapsed.

On June 1, 1921, the Investment Company wrote to the Macduff Company stating that as the special resolutions had not been passed by the Macduff Company, the Investment Company considered the agreement for reconstruction to have lapsed, and added that as the Investment Company on June 1, 1921, held a majority of the shares in the Macduff Company, it was impossible for the Macduff Company to pass the special resolutions. The board of directors of the Macduff Company, which then consisted solely of nominees of the Investment Company, took no steps whatsoever on receipt of this letter, held no meeting until June 15, and then only resolved that this letter should be recorded. At this board meeting they also resolved that in view of the financial position of the company they would not oppose the Bellevue Colliery's petition for the liquidation of the company.

The petitioner submitted that from the foregoing it would appear that the Investment Company with its nominees, the directors of the Macduff Company, endeavoured to arrange for the lapsing of the reconstruction agreement to the prejudice of the Macduff Company and its creditors, and the petitioner believed that the persons mentioned were capable of giving information concerning the trade dealings, affairs or property of the company.

Company's Liabilities.

The statement of affairs of the Macduff Company as on June 16, 1921, the date of the wind-up order, showed a deficiency of £49,231 12s. 2d. of assets to meet liabilities, without bringing the Company's issued capital of £53,000 into account. This deficiency was certainly an understatement, as the assets had not realised the values placed upon them in the statement of affairs, and additional liabilities might result from claims against the company amounting to over £300,000 in connection with which arbitrations were now pending.

The petitioner prayed that an order might be granted in terms of section 151 of the Companies Act of 1909, summoning before the Court, or a commission, the persons specified:

and that J. G. Lawn, John Mumro, and J. H. Crosby be ordered to produce all minutes of the Investment Company relating to the Macduff Company and all correspondence between the Johannesburg and London offices of the Investment Company in connection with the Macduff Company between any of the directors of the Macduff Company or John Mumro and S. B. Joel or G. Inroth, two of the directors in London of the Investment Company; and the petitioner also asked for leave to employ attorneys for all necessary legal work in connection with these proceedings, and for any further legal proceedings and actions that the petitioner might find necessary to bring or defend in connection with the winding-up.

An order was granted, Advocate G. Hartog being appointed commissioner.

MacDuff:

Bleed, bleed, poor country!
Great tyranny, lay thou thy basis sure,
For goodness dare not check thee! Wear thou thy
wrongs,
The title is affeer'd! Fare thee well, lord;
I would not be the villain that thou think'st
For the whole space that's in the tyrant's grasp,
And the rich East to boot. . . .
Sinful MacDuff,
They were all struck for thee! Naught that I am,
Not for their own demerits, but for mine,
Fell slaughter on their souls.

—"Macbeth," Act IV., Scene 3.

Position at Zaaiplaats Mine.

Mr. W. J. Gau, Consulting Engineer to Zaaiplaats Tin Mining Co., in the course of his annual report, writes:— During the past year the results from the mining operations have on the whole been disappointing and no developments of any importance can be recorded. The most promising indications in the No. 13 section, when followed up, did not lead to the opening up of any further ore bodies nor could any definite indications be found as to the extension of the main ore body. A certain amount of good grade ore was obtained from the No. 6 crosscut pipe and the Government lease section, and it is these sections which, in my opinion, still hold out very considerable hope of opening up fresh ore bodies, and, when underground operations are again resumed, should be the first points of attack. The large tonnage of ground treated from the valley alluvium continued to give fair results, but the low price of tin and temporary difficulties of working, and disposal of tailings led to the suspension of operations towards the latter part of the financial year. The tin bearing alluvium in the valley still remains a valuable asset to the company. The severe drop, and the continued low price which has taken place in the price of tin rendered it impossible to carry on operations on any extensive scale at a profit, and it was necessary to introduce a severe scheme of retrenchment. By means, however, of the treatment of old accumulated ore dumps, reclamation ore from the upper sections of the workings, and ore from surface prospecting, it has so far been possible to derive sufficient revenue to preserve the assets of the company and to enable operations to be resumed at full capacity and a minimum cost, should the price of tin warrant it. On the whole the results of the exploration work on the various sections of the Stavoren Mine have given encouraging results. All work had unfortunately to be suspended under the curtailment scheme. The outlook of the property is promising and should become a profitable venture with an improved tin market.

BARNATO GROUP.

Operations for the month of October, 1921:—

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte	45,000	£68,099
Government G.M. Areas	140,000	309,087
Langlaagte Estate	43,600	69,020
New Primrose	21,000	23,326
New Unified	11,200	13,488
Randfontein Central	118,500	180,830
Van Ryn Deep	53,400	151,944
Witwatersrand	40,500	52,266

Totals and averages 473,300 £868,060

September totals 473,600 £903,892

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte...	£51,377	22.784	£17,136
Government G.M. Areas ...	149,732	21.390	160,122
Langlaagte Estate	53,906	24.727	15,513
New Primrose	20,223	19.260	3,369
New Unified	11,345	20.258	2,248
Randfontein Central... ..	166,735	28.141	15,293
Van Ryn Deep	70,403	26.368	83,054
Witwatersrand	44,007	21.732	10,062

Totals and averages ... £567,728 23.990 £306,797

September totals ... £569,449 24.047 £339,995

Note.—The above results are arrived at by calculating the gold at £5 3s. per fine ounce.

FOR SALE.

TWO CAMPBELL TREBLE RAM PUMPS.

Rams 10 inches diameter, 15 inches stroke, each capable of delivering 25,000 gallons per hour when running at 35 revolutions per minute against a total head of 190 feet, including suction, delivery and calculated friction due to 1,320 yards of pipe 9 inches diameter.

TWO CAMPBELL OIL ENGINES

for above, complete with water tanks. Speed, 210 revolutions per minute, diameter and stroke of piston, 12 inches by 22 inches, specified to develop 42 B.H.P. maximum or 37 B.H.P. minimum at or about sea level on heavy fuel oil.

The whole of the above were manufactured by the Campbell Gas Engine Co., Halifax, England, and were inspected and passed by the Crown Agents for the Colonies previous to despatch.

The pumps and engines were never erected and are in perfect condition as delivered. Adequate spares included.

Full particulars and specifications may be obtained from the Director of Public Works, Zanzibar Government.

S. P. BLAND,
Ag. Director of Public Works, Zanzibar.

October Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of October, 1921:—

Company.	Tons crushed.	Yield in Fine Gold Oza.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	90,600	37,097	£188,730	£66,723	26/11
Cons. Mn. Reef ...	50,000	17,538	89,129	14,541	29/10
Crown Mines... ..	198,000	59,831	304,391	63,253	24/4
Dur. Rood. Dp. ...	27,000	9,000	45,788	429	33/7
E.R.P.M.	127,000	33,270	169,153	3,290	26/1
Ferreira Deep ...	32,500	10,076	51,260	9,395	25/9
Goldenhuis Dp. ...	47,321	12,591	63,830	Loss 273	27/1
Knight Central ...	28,500	6,572	33,177	2,675	21/4
Modder B.	59,000	30,661	155,990	78,541	26/3
Modder East	27,000	9,724	49,471	7,016	31/5
New Modder	107,000	49,278	250,703	138,330	21/0
Nourse Mines... ..	44,500	14,767	75,131	5,727	31/2
Robinson G.M. ...	40,200	7,989	40,552	704	19/9
Rose Deep... ..	57,700	13,977	70,985	9,789	21/2
Wouhuter G.M. ...	33,200	8,065	41,031	4,512	22/0
Village Deep	53,200	16,759	85,260	8,967	28/8

Totals and averages ... 1,022,721 337,195 £1,714,581 £413,619 25/5

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of October, 1921:—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	120	58,000	25/9.211
Springs Mines	80	41,400	28/3.027

Totals and averages 200 99,400 26/9.629

	Value of Gold declared.	Yield per Ton.	Working Profit based on stand. and value of Gold.	Working Profit per Ton.
Brakpan Mines	£94,493	32/7.006	£19,767	6/9.795
Springs Mines	73,926	35/8.554	15,444	7/5.527

Totals & averages... £168,419 33/10.645 £35,211 7/1.016

	Estimated Premium taking Gold at £5 3s. 6d. per fine oz. less exchange on remittances.	Total Estimated Profit.
Brakpan Mines	£19,110	£38,877
Springs Mines	15,106	30,550

Totals and averages £34,216 £69,427

Note.—Brakpan placed to gold reserve, 4,540 fine ounces; total reserve at date, 12,358 fine ounces.

WITWATERSRAND DEEP, LIMITED.

The estimate of results for the month of October, 1921, is as under:—Tons milled, 33,170; gold recovered, 9784.639 ounces; average of stamps running, 180; stamps running time, 20,756 days; tube mills, 5. The working expenditure, including head office charges for the month, is £42,496, or 25s. 7d. per ton. The estimated working revenue based on an estimate of £5 3s. per fine ounce (less 1s. 3d. realisation charges) is £49,779 or 30s. per ton. The estimated working profit is £7,283 or 4s. 5d. per ton, from which is to be deducted the capital expenditure for the month of £1,913, leaving a surplus of £5,370.

UNION CORPORATION GROUP.

Particulars of operations on the producing mines of this group for the month of October, 1921:—

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Revenue (Including Sundry Rev.) Total	Profit Per ton
Geduld Prop.	100	46,500	17,282	£88,907	38/3
Modder Deep	70	43,300	24,119	123,456	57/0
Totals and averages	170	89,800	11,401	£212,363	47/4

Company.	Total.	Costs Per Ton.	Profit (Incl. Sundry Rev.) Total.	Profit Per ton
Geduld Prop.	£52,903	22/9	£36,004	15/6
Modder Deep	45,379	20/11	78,077	36/1
Totals and averages	£98,282	21/11	£114,081	25/5

The above results are arrived at by calculating the gold produced at £5 3s. per fine ounce. Realisation charges in excess of normal are debited direct to revenue.

GENERAL MINING & FINANCE GROUP.

The October operations of the producing mines of this group were as follow:—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West... ..	10,130	£13,151	25.96	£13,954	£803
Meyer & Charl. ...	14,500	18,109	24.98	43,390	25,281
New Goch... ..	17,200	18,778	21.83	19,664	886
Rood. United... ..	20,500	22,648	22.10	20,930	*1,718
Van Ryn Est.	33,800	41,776	25.09	48,407	6,631
W. Rand Cons. ...	34,100	42,571	24.97	47,291	4,720

129,730 £157,033 24.21 £193,636 £38,321 +1,718

*Loss. †Less loss.

In calculating the revenue, gold has been taken at a value of £5 3s. per fine ounce, less estimated realisation charges.

Rodepoort United.—The negotiations for working this mine on a co-operative basis having failed, a gradual suspension of operations has been decided upon. All development has been stopped, but production on a limited scale will probably continue for a further short period before the mine finally closes down.

CONSOLIDATED GOLD FIELDS.

The following are particulars in regard to the outputs for the month of October, 1921, of the undermentioned companies of the Consolidated Gold Fields Group:—

Company.	Stamps Running.	Tube Mills.	Tons Crushed.	* Gold declared. Fine ozs.	Profit.
Simmer and Jack... ..	320	7	60,000	13,941	£9,000
Robinson Deep... ..	145	9	61,300	19,167	20,087
Sub Nigel	30	2	10,200	5,810	7,288

Totals 495 18 131,500 38,918 £36,375

Total gold in reserve (fine ounces): Simmer and Jack, 1,200; Robinson Deep, 1,495; Sub Nigel, 2,380.

The revenue derived from gold for the month of October is calculated at the rate of £5 3s. per fine ounce, less estimated gold realisation and exchange charges of 1s. 6d., or a nett figure of £5 1s. 6d. per fine ounce.

Glynn's Lydenburg.

NEW WORKING POLICY.

PREMIUM SAVES THE SITUATION.

The report to be laid before the shareholders of Glynn's Lydenburg at the annual meeting on December 22 will contain details of the company's new working policy. The programme of new development and prospecting which has been sanctioned by the directors will call for the expenditure of considerable sums of money. Progress will depend upon the labour available and other circumstances, but as far as possible work will be energetically pushed ahead. The resultant call upon the company's finances will be heavy, and, although the cash position is quite satisfactory, the profits earned from the mine will have to be largely, if not entirely, devoted to new exploration for some time to come. Under these circumstances the payment of dividends cannot be continued on the basis of monthly profits earned as hitherto. The directors are satisfied that provision for the future life of the company is now the first call upon its resources, and that the best interests of shareholders will be served thereby. It will be the policy of your directors for the future to conserve funds as much as possible, devoting them in the first place to the accomplishment of the new shaft sinking and development programme, and passing or curtailing dividends to such extent as may be necessary until such time as security for the future is reasonably assured.

Mr. R. A. Barry was appointed consulting engineer in April last, and, on his advice, the directors have authorised an extensive programme of development and exploratory work in areas not previously opened up. The main drive south in the Werf Mynpacht and its extension has continued to expose payable ground over too long a distance to be worked solely from the existing approach. A vertical shaft is therefore to be sunk some 1,600 feet ahead of the face to a depth of approximately 350 feet, and development will then be undertaken of the area south and south-west of the present mine, linking up eventually with the present workings. The authorised programme also provides for the further exploration of the southern section of Compound Hill and South Hill. The work has been started, and will be carried on as energetically as circumstances permit. Towards the end of the financial year a re-arrangement of reduction methods was introduced, which is giving satisfactory results, at the same time effecting certain economies in working.

The net profit for the year amounted to £22,191 0s. 7d., to which must be added the sum of £28,835 19s. 6d., brought forward from the previous year (less the sum of £9 10s. paid in respect of dividends previously cancelled), and £19 10s. 1d. Unclaimed dividends written back in terms of Article 127, making a total of £51,037 0s. 2d.

During the year the Transvaal Chamber of Mines decided to erect and operate a refinery on the Witwatersrand to refine the products of the gold mining industry of the Transvaal. The directors have entered into an arrangement with the Rand Refineries, Limited, for the refining of the company's gold. Legislation has been foreshadowed affecting the surface rights of ground held under mining title, and also the control and supply of electricity throughout the Union. The directors caused certain representations to be made to the Union Government on these matters. During the year a Departmental Committee was appointed by the Minister of Mines to investigate the control of that committee was highly favourable to this company and its officials. During December, 1920, there was an outbreak of smallpox at Sabie, seven cases being notified. The outbreak was fortunately controlled and no serious results arose therefrom. The company has resigned from membership of the Transvaal Chamber of

Mines, and it has also introduced sundry economies in administration, including the discontinuance of the services of Paris correspondents. Working costs have remained at a high level during the past year, but there is now some slight relief through a decrease in the price of stores. Under the head of White Labour also a reduction in the cost of living allowances, which have been paid since the 1st November, 1919, has been arranged, and will take effect as from the 1st October, 1921.

In the course of his annual report, the Consulting Engineer, Mr. R. A. Barry, writes:—During the year now under review the enhanced price of gold has once more saved the situation. The working profit was £15,504, but had gold realised only standard value this profit would have been converted into a working loss of £6,319. The following figures show concisely the results, comparatively with the previous year:—

	Year ended 31/7/20.	Year ended 31/7/21.
Total tons milled	39,554	40,140
Yield per ton—dwt.	7.752	7.625
Yield per ton—value	40/3	43/0
Working costs—per ton	33/1	35/3
Profit per ton	7/2	7/9
Profit	£14,201	£15,504
Sundry revenue	£4,795	£6,687
Ore reserves—tons	134,870	125,868
Average value—ore reserves		
—dwt.	8.3	7.7

From these figures it will be seen that the general position is less satisfactory. Working costs remain high, whilst the average gold contents of the ore reserves are lower, showing a further decline on last year's estimates. With increasingly difficult mining problems to face, working costs must tend to increase, added to which the high price of stores and white labour militates seriously against any reduction in expenditure. There is now some sign of improvement in these latter two factors, but with regard to mining difficulties the tendency is in the opposite direction. Future results obviously depend closely upon the price of gold, every fluctuation of which will have its immediate effect upon profits. Any appreciable fall, if unaccompanied by a corresponding reduction of working costs, would wipe out the present somewhat narrow margin of profits from the mine. The remaining factor, grade of ore, does not at present give much encouragement, but your property is an extensive one, and not without indications of values at various points, still unexplored. An active policy of development has now been undertaken with a view to opening up and testing the large extent of ground not previously explored. This will include the sinking of a vertical shaft in the southern extension of the Werf Mynpacht, which area appears to offer good prospects of opening up a new mine. Simultaneously the southern portion of the Compound Hill—South Hill area will also be attacked. By this means reliable data will be secured of the value of the company's hitherto untouched ground on which its future so largely depends. The energetic fulfilment of this programme constitutes a first call on the available labour and resources of the company.

TO MINING OR LAND COMPANIES.

Position wanted as Manager of Planting Company, large Farm or Estate. Fifteen years' experience in various parts of the world. Sound technical and scientific training. Knowledge of surveying. Two years late war as Captain in Royal Engineers. Highest diplomas and credentials. Can commence duties immediately. Apply—

"OFFICER,"

C/o "S.A. Mining and Engineering Journal,"
P.O. Box 963, Johannesburg.

The Week in the Sharemarket.

LABOUR QUESTIONS OVERSHADOW EVERYTHING—A PERIOD OF READJUSTMENT—DIAMONDS, BASE METALS AND OILS STAGNANT.

The market has been quiet and almost inactive during the week, labour questions overshadowing everything. Other factors, of course, have to be considered, such as the wild and disquieting depreciation in the German mark, the Irish trouble, and the drop in the "premium." But the strike at the Crown Mines and the talk of strikes if the Government insists on amending the mining regulations, have created a mere nervous feeling, which has extended to the market for Rand shares in London. It is all to the good that the Government has at last begun to show signs that it appreciates the desperate position of the low-grade mines, and whatever may be the result of the conferences of this and last week, the ultimate effect must be beneficial to the industry. It is a time for plain speaking, and all concerned must be made to realise the simple facts of the position. While things thus remain in the melting pot, we can hardly expect any share market activity, and the only signs of life on Thursday were afforded by Bantjes and Knight Centrals, that animation, paradoxically enough, being said to be due to the prospects of their imminent dissolution! In diamonds nothing was done, the hopes of an improvement in that section being seemingly as far off as ever. After all, diamonds constitute what is known as a "fancy market," and a revival may come upon us just when least expected. The prophets who predicted, a little while ago, a good diamond market at Christmas, are now pinning their hopes on a revival in March, and the fact is, no one really knows. Base metal and colliery shares, for obvious reasons, remain in the doldrums, and even oil shares are affected by the prevailing conditions. The week's drooping quotations are shown hereunder:—

	Fri. 4th.	Sat. 5th.	Mon. 7th.	Tues. 8th.	Wed. 9th.	Thur. 10th.
Anglo-Amer. Corp.	21 9	21 6*	20 6	20 3	19 10½	20 0
Apex Mines	6 9*	—	—	—	—	—
Bantjes Cons.	6 0*	6 1*	5 10*	5 9*	6 3*	6 6
Brakpan Mines	—	50 0*	—	48 6*	—	48 3*
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	—
Cassel Coals	29 0†	—	—	—	—	—
Cinderella Cons.	2 3*	2 3*	2 0*	2 3*	—	2 3*
City and Suburbans.	2 3*	2 0*	2 3*	2 3*	2 3*	—
City Deeps	49 0†	45 6*	46 0*	—	45 6*	46 3*
Clydesdale Colls.	—	—	—	—	22 0*	—
Con. Diamonds	15 6*	15 3*	14 9	14 3*	14 3	14 3
Con. Langlaagtes	13 0*	—	—	12 6*	12 9*	—
Con. Main Reefs	10 6*	10 3	9 9	9 6	9 3	9 0*
Coronation Colls.	38 0†	38 0†	—	—	—	35 0*
Do. Freeholds	—	0 6*	0 7*	—	0 6*	—
Do. Syndicates	—	—	5 9*	5 6*	5 3*	5 3*
Crown Diamonds	3 6*	3 3*	3 6*	3 7*	3 6*	3 7
Crown Mines	36 0*	36 0*	—	37 6†	34 6*	—
Daggafontein Mines.	2 3*	—	2 9†	2 6	2 6*	2 6*
East Rand Coals	—	—	—	—	—	1 9*
East Rand Deeps	0 7*	0 7*	0 6*	0 6*	0 6*	0 6*
East Rand Props.	5 3*	5 0*	5 0	5 0	—	4 4
East Rand Debs.	£85*	£85*	£85*	£85*	£85	£85*
Eastern Coals	—	0 9†	0 9†	0 9†	0 9†	0 6*
Ferreira Deeps	10 0†	—	—	—	—	—
Frank Smith Dias.	4 0	3 9*	3 10*	3 10*	3 9*	3 9*
Geduld Props.	48 6	45 6†	47 6	46 0*	47 0	47 0
Glencoe Collieries	—	—	—	—	11 6*	—
Glynn's Lydenburgs.	9 0*	10 0†	9 6†	9 6†	7 0*	7 0*
Government Areas	82 0†	80 9*	80 0*	80 0	79 6*	79 0*
Knights Centrals	5 0	4 10	4 7*	4 6*	4 6*	4 10*
Lace Props.	6 6*	6 6*	6 3*	—	—	—
Leeuwpoot Tins	7 3*	7 0*	7 0*	7 3*	7 6*	7 6*
Lydenburg Farms	4 9*	4 9*	4 9*	—	4 9*	4 9*
Meyer and Charltons	—	—	—	—	—	75 0*
Middelvel Est.	1 0*	—	1 0*	1 0*	1 0*	1 0*
Modder B.'s	27 9*	27 6*	26 9	26 9	26 6*	26 3*
Modder Deep	14 0*	42 0a	42 9	43 6	43 0	42 9
Modder Easts	8 10*	8 6*	8 6	8 3	7 9*	7 9*
Humo Pipes	16 3†	—	16 0†	16 0†	16 0†	—
Natal Nav. Colls.	—	26 0*	26 6	—	26 0*	—
New Eland Dias.	26 0*	30 0†	25 0*	29 0†	30 0†	—
New Era Cons.	7 0*	7 0*	7 0*	7 3	7 0*	7 0*
New Geduld Deeps.	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfontns.	6 1*	6 6†	6 3†	5 9*	6 3†	5 6*
New Modderfontn.	73 9	73 0*	72 6	73 0	73 0	72 0*
New Primrose	4 6*	4 6*	4 6*	4 6*	4 6*	4 6*
New Unifeds	4 0†	4 0†	4 0†	4 0†	4 0†	4 0†

	Fri. 4th.	Sat. 5th.	Mon. 7th.	Tues. 8th.	Wed. 9th.	Thur. 10th.
Nourse Mines	10 0a	9 6	9 0	8 9*	9 0	8 9*
Pretoria Cements	45 6*	44 0	43 6	43 6	44 0	43 0*
Princess Estates	—	0 11*	—	0 9*	0 10*	0 11*
Rand Nucleus	1 0*	1 0*	1 0*	—	1 2*	1 0*
Randfontein Central	11 0†	11 0†	11 0†	10 6†	11 0*	9 6*
Randfontein Est.	15 0*	14 6*	14 3	14 3	14 0*	14 1½
Roberts Victors	7 3*	7 6*	7 6*	7 0*	7 0*	7 3*
Rooibergs	3 0*	3 0*	3 0*	3 3*	2 9*	2 9*
S.A. Breweries	28 0†	—	28 0†	—	28 0†	—
S.A. Lands	4 0*	4 1*	4 0	4 0*	4 0*	4 1*
Springs Mines	40 0*	40 6†	39 0	38 9*	38 0	38 0
Sub Nigels	10 6	10 0*	10 1*	10 3	10 6	10 3*
Swaziland Tins	8 6†	—	—	—	—	—
Transvaal Lands	15 0*	15 0*	14 6*	15 6	—	—
Trans. G.M. Est.	8 9*	—	8 6*	8 9*	—	—
Van Ryn Deeps	70 0*	70 6*	70 3*	70 3	69 0*	69 0
Village Deeps	8 0*	—	—	—	—	—
West Rand Cons.	2 0*	2 6*	—	2 6*	—	—
W. Rand Estates	3 0*	3 3*	4 0†	—	4 0†	4 0†
Witbank Colls.	—	36 0*	35 0*	—	36 0*	35 0*
Witwaters. Deeps	—	—	8 3*	8 3*	8 0*	8 3*
Woluhuts	2 10*	3 0*	3 0*	3 0*	3 0*	3 3
Zaaiploats Tins	—	2 9*	2 9*	3 0	3 0*	3 1*
Union 5 per cent.	£99½	£99½	£99½*	£99½*	£99½	£99 3/8*
New State Areas	21 0*	21 3*	21 0*	20 9	20 0*	20 6
Rouxville Dias.	—	1 0*	1 0*	1 0*	1 0*	1 0*
S. van Ryn	1 9*	1 9*	1 9*	1 9*	1 9*	1 9*
S.A. Townships	9 6*	9 6	9 6*	9 6	9 6*	9 6*
S.A. Alkali	14 6*	14 9*	15 6†	15 0†	15 0†	15 0†
Transvaal Silver	17 3*	17 0*	16 6	16 6*	16 6	16 6
West Springs	10 3*	10 0*	9 6*	9 9*	9 6*	9 7½

* Buyers. † Sellers. a. Odd lots. b. Ex London.

The Modder East Meeting.

At the Modder East meeting there was considerable discussion after the Chairman had made his speech, and Sir Evelyn Wallers, who presided, had numerous questions to answer. The remarks and queries of Mr. Lewin, Mr. Benjamin and others were not recorded in the daily Press, nor have they been handed to us with the chairman's speech. We have, however, through the courtesy of the Modder East Company, been allowed to see a verbatim report of the proceedings, and we understand that a condensation of the criticisms and questions of shareholders will, as usual, be attached to the official account of the meeting when that document is printed and circulated to shareholders.

* * *

The Water Board Contract.

We understand that the big Water Board contract for steel pipes for the first portion of the ten million gallon scheme was obtained by the National Trading Co. of Cullinan Buildings, the agents for the Mannesmann Tube Co. of Dusseldorf. The value of the order is slightly under £300,000. The National Trading Co. secured the contract in conjunction with Mr. Robert Todd, the local representative of the Mannesmann Co., who has for many years represented the Dusseldorf firm in this country. It may be mentioned that the Mannesmann Co. is one of the largest manufacturers of steel piping in the world, and is also extensively engaged in making tramway, lighting and telegraph poles. The Mannesmann Co. has four great works in Germany and has also a large factory in Austria. Before the War it had a world-wide export connection, and it is now making a big effort to regain something of its former overseas trade in this country. The National Trading Co. is now engaged in perfecting its organisation for the sale of Mannesmann products all over the sub-Continent. British and American tube manufacturers will doubtless learn with interest of this revival of activity on the part of their former German rival, and it is unnecessary for us to point the moral as far as the British working man is concerned!

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EDITORIAL.

LABOUR AND THE COAL TRADE.

The colliery section of the Transvaal Chamber of Mines has delivered a very straight talk to the Industrial Federation, and through it to the white employees, on the subject of reduced wages. The proposal to reduce wages by the collieries was made, it will be remembered, some time ago, and a round-table conference was held between representatives of both sides. On October 22 a lengthy written statement was sent to the Chamber by the Federation on behalf of the men, setting out reasons why the latter regarded the case for a reduction of wages as not proven. This has evoked from the Chamber the straight talk already mentioned, which most effectively demolishes the arguments brought forward by the men. The Chamber lays stress on the fact that an all-round reduction will have to be made if the coal trade is to be held, and that the governing factor

in the end will be pence per ton. The collieries are faced with two alternatives. One is that if they continue working at the present narrow margin they must limit their output to the requirements of the "best-pay" trade; and as tonnage is an important factor in the cost of production, such limitation must bring about an increase in the cost per ton, which in turn would handicap all other industries which use coal, and tend to create further unemployment. The other alternative is to bring about a decrease in cost of production, and to hold and even to increase the present trade, thus maintaining and possibly increasing the field of employment on the coal mines, railways and harbours and in industries which use coal. This can only be done by fostering the overseas trade, and to do this prices must be cut to meet the world competition. The Chamber shows how trade once lost is difficult to recover, and that the cost of oil fuel has been so reduced as to render it a formidable competitor. The second alternative is that which the collieries propose to pursue, and they are not prepared to sit still and see the coal trade they have built up drift to other countries. As it is, the Chamber points out, the position in regard to the overseas trade is most serious and is rapidly becoming worse. Between October 1 and October 24 the 15 colliery companies associated with the Chamber lost in the aggregate no less than 84 working days, owing to the absence of orders for coal as distinct from stoppages due to the shortage of trucks, which were experienced when orders were plentiful. As white employees are being paid full time in respect of the stoppage referred to, the falling off in trade is becoming a very serious matter to some collieries, which, unless an improvement can be effected, will shortly be compelled to operate on a small scale with a decreased personnel, or possibly to close down. In conclusion, it is bluntly stated that the Federation's reply is disappointing to the Chamber in that, although the economic position of the coal trade was disclosed orally and by letter, it appears to have been completely ignored. "To say that a case for a reduction in wages on the collieries is 'not proven' is to ignore the position of the trade throughout the world and all the independent authoritative information available on the subject." Finally, the Chamber reminds the Federation that it originally suggested in its letter of September 27 that the urgency of the position required that the reductions should operate as from November 1, 1921; and now asks that the Federation will take such steps as are necessary to put the whole position as disclosed in this and previous correspondence clearly before the men without further delay.

THE PREMIER'S APPEAL.

In the opening article of this issue we comment at considerable length on the paramount importance of reducing working costs on the mines of the Witwatersrand and on the meeting between General Smuts and representatives of the Mine Workers' Union last week-end. The two subjects are closely interwoven and may well be considered under the same heading. The Prime Minister's mission was to represent to the miners' deputation the extreme urgency of doing something to relieve the present distressing economic situation prevailing on the Rand, and particularly to advise the amendment of the existing mining regulations with a view to securing more work from the native employees. There was no suggestion whatsoever to interfere with the working hours of the European miners or to in any way interfere with the arrangement recently arrived at between the Chamber of Mines and workers. Mr. Hendrikz, the spokesman of the Miners' Union, however, seems immediately to have jumped to the conclusion that General Smuts was merely paving the way towards the breaking down of the colour bar. It is, of course, a belief generally held throughout the length and breadth of this country that most people are more or less enmeshed in the subtle nets of the financial intelligentsia of the Big Houses. But surely it was little short of a gratuitous insult to the Premier to threaten his suggested small measure of relief for the struggling mines

with a strike and openly accused the General of complicity with the Chamber of Mines after his painstaking and lucid explanation of the case and of the partial remedy, which has incidentally been approved of by those Labour stalwarts, Messrs. Forrester Brown and Pohl. General Smuts put his position quite plainly to Mr. Hendrikz. He is reported to have said:—

"You seem to think that I am holding a brief and representing the Chamber of Mines. I have nothing to do with that. I have been dealing with our officials, and the State Mining Engineer and the inspectors of mines, with the Mining Department, to see from the Government's point of view what could be done. What the Chamber of Mines claims is something quite different. They want the removal of the colour bar and the importation of more natives, and I say that those two things we cannot do. But I am prepared to do something else, and that is what not only the majority, but also the minority of the Low Grade Mines Commission reported. What I am doing to-day is reported by the men whose names I have read to you—the representatives of the workers themselves, and, after all, I am entitled to be guided by men like Mr. Forrester Brown and Mr. Pohl, if they say that that is the solution."

Mr. Hendrikz: "Unfortunately, we do not agree with those two men, and have never agreed with them from the time they reported."

The Prime Minister: "I know, but do you blame me? They have agreed on the system, and I say let us try it."

Mr. Hendrikz: "No, the Government is trying to get in a roundabout way what the Chamber of Mines wants."

Nothing, however, resulted from this meeting, but Mr. Hendrikz graciously assented to a round-table conference to debate the question. The matter is one of such extreme urgency and importance that the Government has lost no time in pushing on with it. Mr. Hendrikz, on Tuesday, received a letter from the Secretary of Mines and Industries, informing him that the Prime Minister had arranged for the requested conference to take place on Thursday November 10, at 2.15 p.m., at the New Law Courts, Johannesburg. At this conference representatives of the Chamber of Mines have been present to meet representatives of the South African Mine Workers' Union. The Prime Minister expressed a desire that the outlines of any proposals which the Mine Workers' Union intended to bring forward at the conference with a view to increasing underground efficiency on the mines should, if possible, be communicated to him before the conference. As any decisions arrived at at the conference may have an important bearing on the position of members of other unions affiliated to the South African Industrial Federation, and as the Federation were asked to discuss the questions raised with the Government, the Federation were invited to send representatives, and agreed to do so.

And there the matter rests for the present. We can only hope that some tangible good will come of a further discussion, but the autocratic attitude of "my dear Hendrikz" and his extremist associates, as exhibited at last week's meeting coupled with the absurd strike at the Crown Mines, hardly appears to create a favourable atmosphere in which to debate the question. It should be clear that the vital importance of the issues of this conference cannot be exaggerated, and it is hoped some channel of agreement may be found to get over the difficulty.

Notes & News.

Union Currency.

We understand that there is no truth in the report circulated from Pretoria last week that the Government contemplated introducing another Currency Bill during the next session of Parliament. The recent conference at Pretoria broke up without coming to any decision in the matter.

Bethlehem Oil.

The Bethlehem Oil Syndicate has appointed Mr. A. B. C. Cohen to superintend drilling operations on its property, which, it may be remembered, is on the borders of Basutoland.

* * *

Angola Oil.

Angola Oilfields, Ltd., is the name of a new company registered in London with a nominal capital of £1,000,000 in £1 shares. The objects are to adopt an agreement with Trade and General Trust, Ltd., to acquire and turn to account petroleum, asphalt, naphthaline, coal or oil-bearing lands in any part of the world, and to carry on the business of miners, prospectors, explorers, refiners of and dealers in petroleum and other mineral oils and the products thereof, carriers, wharfingers, shipowners, etc. The number of directors is to be not less than three nor more than seven. The registered office is at Capel House, 52, New Broad St., E.C.

* * *

The Gold Question.

From the Australian papers to hand by last mail we learn that a cablegram from Johannesburg, which was published in the Australian morning press of August 27, stated that it was rumoured on the Stock Exchange here that arrangements were being made for the sale forward of the gold produced in South Africa for two years, thereby saving the industry from the calamities which would attend a heavy drop in the gold premium, and enabling the low-grade mines to continue operations. As this was a matter of particular interest to the Australian gold producers, a cablegram was sent to the Transvaal Chamber of Mines, Johannesburg, asking for confirmation and particulars, and a reply was received from them, stating that they had no knowledge of any such arrangement.

* * *

Cam and Motor Rich Assays.

At the end of August the Cam and Motor Gold Mining Company, of Rhodesia, announced rich developments at its bottom level. A further statement announces, it will be seen, further rich assays at the same (the eleventh) level: "No. 11 level—South drive advanced 50 ft. to 550 ft.; average 434s. over 53 ins., reduced to 68s. Last 135 ft., average £10 10s. over 55 ins. reduced to 50s.; lode not fully exposed. Crosscut at 540 ft., average £30 2s. over 164 in. reduced to 68s. Other development satisfactory." The working results for September were as follows: Tons treated 13,900, yielding 4,771 oz. fine gold; value, £20,233; from premium, £5,500; less royalties, £1,286; sundry revenue, £54; making a total of £24,501. Costs, £19,241 (including development redemption £2,085). Profit, £5,260 (August, £4,057). Capital expenditure, £3,519 (including development, £560).

* * *

A World's Monetary Conference.

Writing in the *Quarterly Report* issued by the Swedish Kreditaktiebolaget, Professor Gustav Cassel suggests a world monetary conference "to settle the general monetary policy to be pursued, and the practical steps to be taken in order to stabilise as soon as possible the internal purchasing power of currencies, as well as of the value of gold." This conference, he thinks, might be invited by the British Government, and that of the U.S.A. would, of course, also be represented; but otherwise it should consist of leading experts and experienced financiers without reference to nationality. The chaos in monetary conditions, the Professor adds, is due not merely to the old fine machinery of international payments having been shattered or greatly impaired, but to its having been looked to for miracles of payment far beyond even its pre-War capacity. He believes, too, that the establishment of equilibrium in the balance of credit of the United States is still an unsolved problem. In any world policy the first practical step can only be to arrest further issues of paper.

The Blackhill Strike Settled.

The dispute at the Clydesdale Colliery, Blackhill, where the men ceased work because of considerations arising out of the retrenchment of two senior men, has been called off. It has been agreed that a Board of Reference shall be held at the Chamber of Mines this morning to consider the matter.

* * *

The Crown Mines Strike.

No further development up to Thursday evening had occurred in the dispute at No. 5 shaft of the Crown Mines, where 400 men are on strike. The Chamber of Mines shows no intention of departing from its attitude that it would be subversive of discipline on the mines, and prejudicial to efficiency, if the wages and conditions of employment of officials were to be determined by the Chamber with unions whose members are subordinate to the officials. Meanwhile, the Mine Workers' Union is notifying members to keep away from the shaft until further notice, and shaft stewards are warned that they are to take no instructions from anyone unless signed by Messrs. Andrews and Richardson, chairman and vice-chairman of the Strike Committee.

* * *

The October Output.

Owing to October's five Sundays, the mine working days were the same number as in the shorter calendar month of September. A gratifying increase of nearly 17,000 fine ounces has to be recorded, but the value has decreased by no less than £155,729. This has been brought about by a fall of 7s. per ounce in the gold premium, which for October has been taken at £5 3s., against £5 10s. in September. The increased output is likely to be attributable to the improved native labour returns, which are in the neighbourhood of 3,000 more than in September. The following are the detailed figures:—

Total output	707,825	ozs.
Increase	16,729	ozs.
October value	£3,645,299	
September value	£3,801,028	
Witwatersrand	690,348	ozs.
Increase	16,191	ozs.
Outside districts	17,477	ozs.
Increase	538	ozs.

* * *

The Outlook for Copper.

Since cotton, through its dramatic turn three weeks ago, served to enliven the whole financial movement in the United States, there is naturally curiosity (says *The Toronto Globe*) as to what commodity may be the centre of the next turn. Arguments are being presented that it may be copper's opportunity. It is reported that 40,000,000 lbs. of copper were marketed in August, and the forecast has been made that the sale in September will prove to be 60,000,000 lbs. That would remove 100,000,000 lbs. in two months from the great accumulation of copper burdening the inventories of the producers. The market for copper is greatly dependent on restoration of normal conditions, including requirements for building and for industries allied with electricity. Japan, Germany and three or four other nations have been heavy buyers of copper in the past, but they have not helped recently in any large way to reduce the stock of accumulated copper in the United States, estimated at 400,000,000 lbs. "It is evident, however," says our Canadian contemporary, "that it would not take many months on the recent scale of buying to restore confidence in the industry and reduce supplies to such an extent that the refineries, which have been closed down for months past, would find it necessary to reopen. It may be that some time in the fall the copper situation will be as suddenly reversed from stagnation to activity as has been the case with cotton," says a writer in *The Wall Street Journal*. "Of course, the cotton market throughout the world is of larger proportions than the copper market. Nevertheless, American copper is one of the chief raw materials upon which other nations must rely in order to quicken their industries, facilitate the reconstruction of telephones and the rebuilding of electric railroads."

Gold Fields Rhodesian Dividend.

Considering that it was an unpropitious period for the operations of mining finance concerns, the Gold Fields Rhodesian Development Company proves to have done not badly during the year ended 31st May last. From the brief preliminary figures issued with the announcement of a final dividend of 6d. per share—making a total of 1s. for 1920-21, the same as for the preceding year—it would appear that the Company netted a profit of £112,800, against £127,800 for 1919-20. The total dividend will absorb about £13,000 more than was earned in the past financial year, but even so the carry-forward will amount to the very respectable sum of over £99,000.

* * *

V.F.P. and the Low-grade Mines.

Presiding at the annual general meeting of the V.F.P. Co., Ltd., in mail week, the Marquess of Winchester said that the year's revenue amounted to £808,419, as compared with £829,470 in the preceding year. The net result for the year, after making provision for all taxation, was a profit of £173,161. Adding this to the amount brought forward from the previous year made the total balance to the credit of the profit and loss account £267,482. In respect of this balance the preference shareholders had received three dividends, two each of 3 per cent. and one of 4 per cent., all less income-tax, and the ordinary shareholders had received a dividend of 5 per cent. less income-tax in respect of the year 1920. Those dividends were paid on July 8, 1920, January 8, 1921, and June 16, 1921, and absorbed £175,000, leaving a balance remaining to the credit of the profit and loss account of £92,482, which had been carried forward to the current year. At previous meetings he had referred to the position of the low-grade mines, who took their share of the power supply, and he had emphasised the importance to the power company of the continuance of mining operations by those consumers. It was a matter of satisfaction that, for the most part, those mines were still at work, and where mines had closed they had found an increase in demand by other consumers who had been able to absorb the displaced native labour.

* * *

F.B.J. and the Grain Elevator Contracts.

Protests have recently appeared in our pages regarding the placing of the contract for grain elevators with an American firm, and we note that Mr. G. H. Loeck, Assistant Director of the Federation of British Industries, has addressed, under date October 15, the following communication to the Secretary, Railways and Harbours Board, Pretoria:—"The Federation of British Industries has been watching with considerable interest the plans of the South African Government for the erection of grain elevators both at ports in the Union and also up-country. When the South African Government raised a loan in this country some weeks ago to the amount of £6,000,000, the Federation noticed that the prospectus announced that the money was being raised for "railways, harbours, irrigation, land settlement and other public works." It was confidently expected, and we think quite rightly, by manufacturers in this country that a large proportion of the necessary work entailed by the various Government schemes above referred to would be placed in this country. Almost subsequent to the successful floating of the loan it was persistently rumoured that your Government had already given a large contract involving an expenditure of over £1,000,000 to an American firm. If this contract has actually been placed, nothing more can be said upon this point, but the Federation regards it as particularly unfortunate that there are further and widespread rumours to the effect that your Government inclines towards giving the work on the up-country elevators to other firms in the United States. Writing on behalf of British manufacturers as a whole, the Federation would like to state that, while the Federation does not ask for the placing of contracts in this country on sentimental grounds, it does feel that at the present time, when money is scarce and unemployment is rife, Dominions borrowing capital in Great Britain should give priority to British tenders, always provided that those tenders are competitive as regards price, and bearing in mind the high quality of British material."

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

The Analysis of Coal.—*The Colliery Guardian*, Oct. 7, p. 999.

The Froth Flotation of Coal.—*The Colliery Guardian*, Oct. 7, p. 1002.

Mining

Ancient South American Milling and Amalgamating Practice.—*Mining and Scientific Press*, Oct. 1, p. 474.

Gold in Black Sand.—*Mining and Scientific Press*, Sept. 24, p. 423.

Applied Geology at Butte.—*Mining and Scientific Press*, Sept. 24, p. 427.

The Magnetometer as an Aid in the Development of Mines.—*Mining and Scientific Press*, Sept. 24, p. 437.

The Whim Well Copper Mine.—*Mining Review*, Oct. 5, p. 5.

Mineral Production in Canada.—*The Canadian Mining Journal*, Sept. 23, p. 766.

Running Fans in Combination.—*The Iron and Coal Trades Review*, Oct. 14, p. 537.

Rock Strata Gasses in Mines.—*The Canadian Mining Journal*, Sept. 30, p. 782.

Mining Institute of Scotland.—*The Colliery Guardian*, Oct. 14, p. 1072.

Metallurgical.

Heat Treatment of Nickel Gun Steel.—*The Iron and Coal Trades Review*, Oct. 7, p. 499.

Ferro-Vanadium.—*The Iron and Coal Trades Review*, Oct. 7, p. 507.

Reversible Thermal Expansion of Silica.—*The Iron and Coal Trades Review*, Oct. 7, p. 508.

Something New in Electric Furnaces.—*Scientific American*, Oct. 1, p. 229.

Agitation in Flotation.—*Mining and Scientific Press*, Oct. 1, p. 477.

Smelting Practice in the Limapan District, Mexico.—*Mining and Scientific Press*, Sept. 24, p. 433.

Mining and Metallurgical.

Present State of the Art of Copper Metallurgy.—*Mining and Metallurgy*, Oct. 1921, p. 13.

Economics.

The New American Tariff.—*The Iron and Coal Trades Review*, Oct. 7, p. 502.

Unemployment.—*The Stock Exchange Gazette*, Oct. 20, p. 2242.

Rise in American Exchange.—*The Capitalist*, Oct. 15, p. 235.

Value of the Mines of the United States.—*Mining and Metallurgy*, Oct., 1921, p. 7.

Present Condition of Mining Industry.—*Mining and Metallurgy*, Oct., 1921, p. 33.

Coal and Fuel.

Combustion of Fuel Oil.—*The Iron and Coal Trades Review*, Oct. 7, p. 504.

Powdered Coal Under Steam Boilers.—*Coal Trade Journal*, Sept. 28, p. 1074.

The Carbonisation of Peat in Vertical Gas Retorts.—*The Colliery Guardian*, Oct. 14, p. 1071.

Industrial.

Scientific and Industrial Research.—*The Iron and Coal Trades Review*, Oct. 7, p. 497.

Engineering.

Developments in Power Station Design.—*The Engineer*, Oct. 7, p. 364.

The Electrification of the Swiss Federal Railways.—*The Engineer*, Oct. 7, p. 376.

Association of Mining Electrical Engineers.—*The Colliery Guardian*, Oct. 7, p. 997.

Tension in Winding Ropes.—*The Colliery Guardian*, Oct. 14, p. 1070.

Mbye Pumping, with Special Reference to the Feuerherd Pump.—*The Colliery Guardian*, Oct. 14, p. 1073.

Measurement of Air Velocities.—*The Iron and Coal Trades Review*, Oct. 14, p. 540.

The Wellman Smith Owen Engineering Works at Darlaston.—*The Iron and Coal Trades Review*, Oct. 14, p. 545.

The Electrification of the Swiss Federal Railways.—*The Engineer*, Oct. 14, p. 389.

Developments in Power Station Design.—*The Engineer*, Oct. 14, p. 390.

Electric Steam Boiler.—*The Engineer*, Oct. 14, p. 398.

Electric Welding.—*The Engineer*, Oct. 14, p. 396.

Large Mercury Arc Rectifiers.—*The Electrical Review*, Oct. 14, p. 493.

Circuit Breakers of Large Capacity.—*The Electrical Review*, Oct. 14, p. 517.

De Beers Annual Meeting.

The annual meeting of De Beers will be held on Friday, December 9, at Kimberley.

METAL REPORT.

Messrs. Henry Bath and Son, Ltd., metal report, October 17th, 1921, to hand by this mail, states:—

The gradual but steady decrease in the cost of living bringing lower wages in its train is now clearly affecting the majority of industries in this country, where slightly lower working costs continue to be shown month by month. More manufacturers are re-opening their works, and although great hardship is still being experienced in many quarters, the outlook is improving.

Copper.

Rather more activity has been shown during the past fortnight. In the first few days, under the influence of stronger advice from America and considerable sales reported there, good buying of standard copper took place in our

ELECTRICAL MACHINERY



DC. AC.—Dynamos and Motors. Turbo-alternators. Rigid Dutch construction.

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The Pilgrims Rest Goldfields.

SMALL MINES AND DIGGERS CONTRIBUTE ONE-THIRD OF OUTPUT—ANNUAL PRODUCTION WORTH OVER HALF A MILLION.

In the course of a paper submitted to the Chemical and Metallurgical Society, Mr. H. C. F. Bell (of the Pilgrims Rest Consolidated Goldfields, Ltd) said:—A great deal has been written lately about the decline of the Rand, and the question of finding new goldfields. It, therefore, seems opportune to give some notes on one of the oldest goldfields in South Africa, namely, the Pilgrims Rest district. The magnitude of the Rand is so great that very little thought is given to outside mining ventures by either mining men or investors. The Pilgrims Rest official mining district is approximately 110 miles wide by 140 miles long. It includes 93 proclaimed farms, 127 farms available for prospecting, and nine concession farms. In the year 1920 the district produced 106,823 fine ounces of gold, which, if valued at 105s. per ounce, would be worth £560,820 15s. This represents an average production of £46,735 worth of gold per month, and of this amount approximately one-third is produced by small mines and diggers. The two largest mining companies at present working are the Transvaal Gold Mining Estates, Ltd., and the Glynn's Lydenburg, Ltd.

There seems to be a prevalent idea amongst some people that the T.G.M.E. hold most of the district and all the plums. This is not so, though it is admitted that some of its properties are the best in the district. There is still room for, and there will certainly be many more, good mines. An old official of the T.G.M.E. recently told the writer of a story of an incident which happened 25 years ago. He had not been out very long from the Old Country when he decided to get his wife out, and when he told the general manager of his intention, the reply came, "Don't be a fool; the mine will be worked out in twelve months' time." The mine is, however, still going strong.

Similar incidents are still happening in the district, and will probably go on happening for another fifty years. Until the world's trade is adjusted to a stable and balanced state the price of gold is likely to remain at a premium. Gold mining will, therefore, be a profitable industry for a long time to come. The present world output is far below the pre-war output. A large number of mining men are being turned out of the Rand mines by the Phthisis Board, and many others are leaving before they lose their good health. Some of these have saved money, and want to acquire small mines either on tribute, or as their own concerns. If such people think of trying their luck in the Pilgrims district they would do well to seek advice and help from someone who knows it, or the people of the district itself. It is not an easy matter for a stranger to come into the district for a few days, or even weeks, and expect to get hold of a small property.

Revision of the Gold Law.

Apart from the possibilities open to smaller men, sufficient mineralised areas are available, and warrant the most thorough and systematic prospecting by strong exploration

companies. The T.G.M.E. have spent a great deal of money on prospecting, but the work has all been on their own farms. One thing which is essential is a revision of the gold law. A great deal has been written on this subject lately, and it is certain that, if many of the recent suggestions be put into force by Parliament, prospecting and mining will be greatly stimulated all over the Union.

The Pilgrims Rest district contains no less than 19 different reefs, which have been, or are, worked, also very many "leaders." The reefs here are totally unlike the "basket" of the Rand. They are true quartz reefs, and lie conformably with the strata dipping at about four degrees west. In thickness they average approximately 12 ins., but various thicknesses are obtained from two inches to 10 feet. The texture is of disintegrated nature, the predominant constituent being quartz. The colour is usually reddish brown, owing to the presence of oxide of iron. The oxide of iron is the residue from the decomposition of iron pyrites, which, at one time, existed in the reef. The presence of "reef gold" (as distinct from "leader gold") is directly associated with the presence of decomposed or undecomposed iron pyrites. The reef is usually friable and easy to pick. When blasting is necessary the holes are set so that the concussion of the charge will loosen the reef and not blast out a bench, as is the case on the Rand. The only exception is on the sandstone reef mines near Sabie, where the reef is unoxidised. Most of the ore is got from the stope faces by picking. Four lb. picks are used. Each pick-boy has two pick-heads and one handle. While he uses one pick the other is taken away by a piccanin. Each stope has what is called a jumper piccanin. He is a small boy, whose rate of pay is usually from 7s. 6d. to 17s. 6d. per month, and his work is to keep the stoping boys supplied with sharp drills and picks. Reef and waste are picked alternately. After the reef is picked down and shovelled away, the footwall is usually brushed up by each pick boy so that the "fines" of the reef will not be lost with the waste. The waste is then picked down and packed behind the stoping boys. Each stope has a timber boy who puts in props to support the hanging. Each prop has a good head board. When the reef lies in soft decomposed ground a stope width, sufficiently big for a boy to sit up in, is carried, but when the country rock is hard then the stopes are kept as narrow as possible so as to avoid blasting. Many stopes are to be found which have stoping widths varying from 12 to 18 inches, and this on a reef dipping at only four degrees. Such a thing on the Rand is unthinkable. In these narrow stopes picking is substituted by chiselling. The reef is chiselled out until near the end of the shift, when each boy drills several short holes. These are blasted at the end of the shift to loosen the reef for the following day.

The Glynn's Reef at Sabie is particularly adapted for clean mining. The reef can be picked out and sent to the mill with the inclusion of only two or three inches of waste. The country rock is usually fairly hard. In some places there lies over the reef a slate from 6 in. to 12 in. thick, which can be barred down and used for waste packing. This has the double advantage of saving timber and of giving a comfortable stope-width. It is evident, therefore, that under such conditions a 12 in. reef, valued at only 10 dwt., can be made to pay. In some mines where the ground is fairly soft, a 5 in. reef, valued at 11 dwt., can be made to pay. This fact must not be lost sight of by people interested, or who have the opportunity of being interested in local mines or enterprises.

Alluvial Deposits.

Having dealt in detail with the various reefs of the district, Mr. Bell said: Apart from the alluvial deposits mentioned under the heading "Black Reef Series," there is still some gold in the famous Pilgrims Creek, but the best of it

MINES DEPT. EXAMS.			
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MANAGERS' EXAM., September, 1921			
We obtained 12 out of a total 17 certificates awarded in South Africa			
	Metal	Coal	Totals
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Rest of S.A.	3	2	5
Total for S.A. 17			
OVERSEERS' CERTIFICATES (Metal).			
So far as we know we have only had 3 failures this year (1921)			
TUITION (Metal or Coal) by class, correspondence or privately			
Mining Institute (Prof. Yates),			
St. James' Mansions, Eloff St. Johannesburg			

has been taken out, and that which remains lies under thick overburden. It will probably be worked on a large scale at some distant future date by the owners, the T.G.M.E. There must be a great deal of rich alluvial wash in the leader area stretching from the farm Lisbon to Marieps Kop, but unfortunately a great deal of St has been covered with very thick surface soil. A considerable amount of alluvial gold has been won on the north and south sides of Spitzkop mountain, also at Hendriksdal and Ross Hill. These places are not totally worked out, but the remaining ground is difficult to handle. Large quantities of alluvial gold have been won from the farms Nooitgedacht, Finsbury and Natalshoop. At the time of writing this, there is news of a rich strike of alluvial gold not far from Lydenburg. Though there is very little alluvial digging going on now, the news of "rich strikes" is periodically heard.

The production of iron pyrites has become an established industry in the district. The main producers are the mines on the sandstone reef at Sabie, next to these are the Rietfontein and the Dientje gold mines. The New Lisbon Berlyn Co.'s mine at Frankfort contains an enormous quantity of sulphide ore, but unfortunately this ore and that at Dientje are too refractory for the ordinary treatment of iron pyrites now in vogue at the various explosive and chemical works. There are several other places in the district where sulphide ores exist, notably at the North Clewer Mine of the Pilgrims Rest Consolidated Goldfields, Ltd. There is a considerable tonnage of pyritic ore in this mine already developed and carrying a high percentage of sulphur and excellent gold values. Recent practical tests made on the ore were very satisfactory. Unfortunately, all the local pyritic ores cannot be disposed of on account of the fact that many of the companies who are producing explosives and sulphuric acid, are importing most of their requirements from Spain; consequently the demand for local concentrates is decreasing. Only a few weeks ago, Kynochs, Ltd., closed down a part of the roasting plant which was used to treat the local pyrites, and converted it to treat Spanish ore. It is hoped that the Government will investigate this question thoroughly and help to build up our local industry, as it would be a calamity if local mining propositions which have been equipped and started working have to be closed down because they cannot compete with the Spanish ore. The loss to this country is greater than at first appears, for most of the local pyritic ores contain high gold values, whereas the imported ores contain no gold at all.

Modder Deep Progress.

The Modder Deep has issued another excellent quarterly report for the period ended September 30. The footage developed was 2,196 ft., of which 1,015 ft. were sampled. The payable reef disclosures were 885 ft., having an average assay value of 15.8 dwts. over 41 inches. The total profit for the three months was £265,263.

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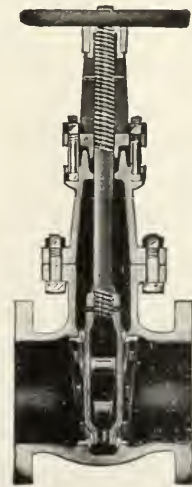
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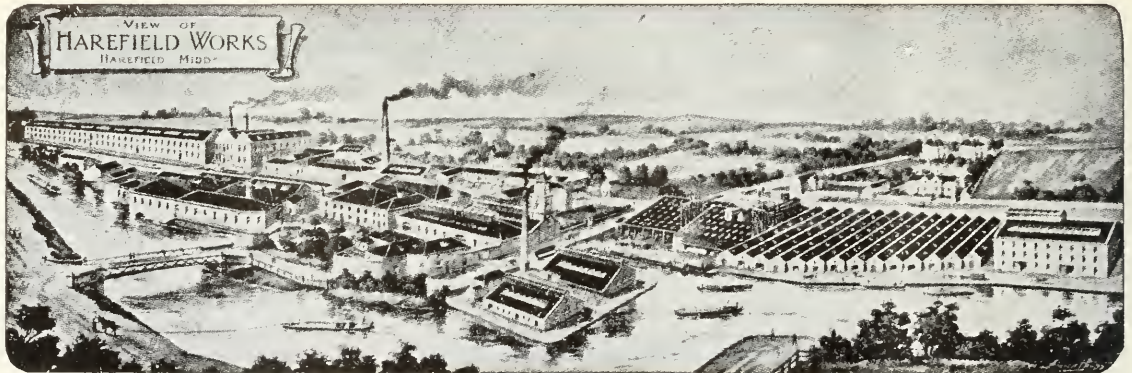
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Letters to the Editor.

CREEPING PARALYSIS.

How to Stop It.

Mr. W. E. Bleloch's Remedy.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—The Rt. Hon. the Minister of Mines and Industries and Professor Lehfeldt were both busy last week with the future of the Rand Gold Mining Industry, prophesying and implying, and one would almost say rejoicing, that its end is not far off, and seeing that the Prime Minister has taken an equally gloomy view, no doubt on account of the conclusions of despair of the Director of the Geological Survey, I venture to send you as a timely antidote the following further remarks on one part of Dr. Rogers' recent paper dealing with the extensions of the Reefs of the Far East Rand in the Heidelberg district.

In the paper referred to Dr. Rogers stated that:—

"The other source of confusion is the assumption that individual conglomerates have lithological characters peculiar to them and that these characters persist on the several horizons where the conglomerates are developed."

It will be obvious, sir, that in a similar superior and assumptive style one might say: *"The other source of confusion is the assumption that individual conglomerates have no lithological characters peculiar to them, etc., etc."* I prefer, however, not to follow Dr. Rogers' assumptive method of argument, and instead I state that:—

It is a demonstrable fact that "the individual conglomerates do have lithological characters peculiar to them and that these characters do persist on the several horizons where they are developed."

Dr. Rogers' regrettable and disastrous error arises through his own most dangerous assumption of distinctive lithological character, not for recognisable sedimentary deposits, but for certain igneous rocks by which he identifies the wrong beds of conglomerates or blanket reefs at Heidelberg as the same as the right beds of conglomerates or blanket reefs in the Far East Rand. Naturally he finds these different reefs different, and consequently he has to adopt the erroneous conclusion that each individual reef changes in character from district to district. We find, on the contrary, that with correct identification of the several conglomerates or blanket reefs at Heidelberg with the same reefs in the Far East Rand there is no such change of character or material in the individual reefs from one area to another.

We find that the individual reefs obviously and conspicuously maintain their distinctive character and material; that they are made up of pebbles and matrix peculiar to them over the many tens of miles of country where they have up till now been located and exposed. That is to say, that although Dr. Rogers and Dr. Mellor may call the Government Reef by its right name at Krugersdorp while they call it "Main Reef Leader" at Heidelberg, we find that it remains the same Government Reef at both places distinctive and unmistakable in pebbles, matrix and character, as well as in geological position and order of bedding. Dr. Rogers and Dr. Mellor may change the name of that reef at Heidelberg, but they cannot change its spots. It still remains the same old, unreliable and unpayable Government Reef there as it has proved to be everywhere else. If development in the Heidelberg district is to be encouraged on that reef, and on that reef only, as the Government cables to the High Commissioner last year decreed, and all other reefs are debarred, then of course, as predicted by Professor Lehfeldt, the end of the industry is certainly in view.

With these facts in sight I will proceed to say that while it is unfortunately true that the Government Reef remains the Government Reef, it is most fortunately equally true that the Nigel Reef remains Nigel Reef and the Van Ryn Reef remains Van Ryn Reef, not only on the Far East Rand, but at Heidelberg and everywhere. Both of these payable reefs continue distinct in character and material each from the other and from all other reefs, and each remains in itself its own distinctive character in pebbles, matrix and material and in appearance, from district to district, over distances exceeding 100 miles. Fortunately, too, the Van Ryn Reef in its extensions in the Heidelberg district, so far as it has been opened up and developed, has given evidence of having the same carrying gold values as it has in the great gold field of the Far East Rand.

The Prime Minister described last week the "creeping paralysis" which with alarming rapidity is destroying our chief mining industry. I submit that one obvious way to stop that disastrous progress toward extinction is to get ahead with a real and natural expansion and growth of the industry and that the only real and natural expansion possible, at once the quickest and best is to be achieved by the immediate opening up and development of new outcrop mines on the extensions southwards of the Van Ryn Reef, our great pay reef of the Far East Rand, the richest and most reliable gold reef ever found. To accomplish this we want (a) a public and definite withdrawal of the uncalled for and insane Government interference by cable which kept away a round million of cash working capital from that urgently necessary work, and (b) complete and immediate removal of the extortionate burdens of claim licences and other Government impositions on the initial stages of mining, which kill all new mining enterprises.

I can assure you, sir, and I can assure the Prime Minister and the Minister of Mines and Industries, and Professor Lehfeldt and Mr. Hendricks and the Mine Workers' Union and this threatened commercial and industrial community, that a regenerative policy which includes these two things is what is chiefly wanted to cure the creeping paralysis diagnosed by General Smuts.

I submit, that seeing the wrong reef of Dr. Rogers has years ago been proved unpayable and unreliable, encouragement should immediately be given to the development on the right reef—the true Van Ryn Reef opened up in the Nigel Area by the Southern Van Ryn Reef G.M. Co., Ltd., on Tulipvale and Klippoortje, and by Houtpoort, Ltd., on the Townlands of Heidelberg by Dr. Hans Sauer, and on Boschfontein by the Nigel Transvaal Goldfield, Ltd., and I go further and say that without development on that reef there can be no expansion and little hope. With it I am convinced that we would soon have in the Heidelberg district another and a greater Far East Rand.—Yours faithfully,

W. BLELOCH.

A PLEA FOR INFLATION.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—May I express the hope that the unfortunate public will give up its bad habit of supposing "economic experts" know what they are talking about. These gentry seem to be invariably wrong. America was to capture the world's trade; she is rapidly losing it. The German mark would appreciate; it has done the reverse. And the means adopted by a committee of experts to stabilise the Indian currency produced effects exactly opposite from those anticipated. The latest decision of our local experts, appointed to deal with the South African currency problem, is that we must return to the gold standard. In other words, our position is to be improved by further deflation. We are to be made richer later on by being made poorer first. We cannot restore the gold standard without deflating, and deflation

entails more restriction of buying power. Yet it is just this lack of buying power, or defect of demand, which is the root cause of the depression.

There is one aspect of the economic situation which has been almost entirely overlooked, and that is that neither now nor at any time is the buying power distributed sufficient to purchase the output of commodities. Prices are fixed to cover items in "cost" which are not balanced by buying power. The only road of escape out of this infernal mess is by inflating and by fixing prices. Inflation always induces trade activity until prices rise, and thus again make the demand inadequate to induce the desired output. Prices should be fixed to show a fair profit, and credit gradually released until the demand threatens to overrun the supply. A committee of ordinary educated persons (not experts) could be appointed to devise the financial machinery.

No doubt the problem is immensely complicated by the dishevelment of the foreign exchanges and the diminution of buying power overseas. But because Mrs. Smith, of Peckham, cannot buy an ostrich feather is no good reason for preventing Mrs. Jones, of Bloemfontein, from doing so should she desire that adornment. Because the demand from Europe for our goods is enfeebled is not the best possible justification for freezing the life blood of our internal trade—and that blood is financial credit. Every country is waiting for some other country to begin putting its house in order. It reminds me of the rhyme once familiar to school boys:

"My Lord Chatham, with his sword drawn,
Stood waiting for Sir Richard Straughan;
Sir Richard, longing to be at 'em,
Stood waiting for the Earl of Chatham."

I submit, sir, that such an attitude would be considered admirable by no one but a Minister of State, or an economic expert jaundiced by thinking in terms of gold instead of in terms of commodities and of life.—Yours truly,

P. E. BARKER.

[We understand that the recent conference of experts, held at Pretoria, failed to come to any decision.—Ed., "S.A.M. & E.J."]

GOLD LAW REFORM.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In view of the inevitable closure of some of the poorer Rand mines, attention should be paid to the gold-bearing areas outside the Rand. Their locality and value have often been pointed out in your columns and elsewhere. They belong to land companies and private owners, and access to them can only be obtained with great difficulty and on terms that render the permission valueless. To proclaim them as public goldfields under the present law is useless, since proclamation is only made after the owner has beached off the accessible faces and watercourses. They could be opened to the public without breach of equity by commuting owners' rights for a tribute of, say, 2½ per cent., which is more than they have any right to expect, since these rights were commandeered from the State in order to be conferred on a favoured class. There is talk about subsidising fresh industries to fill the inevitable gap. Here is an industry that needs no subsidy and merely awaits removal of the embargo placed on it by successive gold laws.—Yours truly,

C. HOWARD.

ARE WE TO BE RUINED BY DEFLATION?

Professor Lehfeld's Views Criticised.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Recently we had added to the saying of a "spineless herring" the "American haddock without a backbone"—and a lot of trouble that unfortunate fish has caused mankind. In addition to the withdrawal of spine and bone we have to-day the process of deflation. We are all to be deflated. Henri Fabre tells of the delightful way in which

the firefly operates on a shelled snail and with what wonderful sensations the snail dreams out its existence, as the firefly absorbs its coagulated flesh. Deflation is another process. Inflation I understand thoroughly. Inflated with optimism and false representations has brought me down from my pedestal many a time; but I never thought this of deflation. To-day, we are all being deflated. There is, as they said in the good old road agents' days in the Western States, a general "hold-up." It commences at the banks. Nothing is attractive. "Sorry, nothing doing!" Then you move about and just as men saw during the flu their early encasement for resurrection purposes, so do they hang their heads and deflate. Everybody, of course, doesn't deflate. For instance, if the mines have to bring down costs, they deflate the man that has to do it. If the storekeeper has to pay down his overdraft, he is deflated and sells his 15s. shirts at 8s. 6d. The man who grows mealies is deflated in every direction. The man who grows potatoes is deflated down to 8s. 6d. a bag, and the gentleman who buys inflates them to £1 and deflates the consumer, but if I went into all the ins and outs of inflation and deflation I would probably fill a 6s. novel and make a fortune, which is distinctly inflation, and I am writing a simple little tale of world wide import on deflation. Deflation has come to us from Europe. It seems to have been bred out of currency; from currency it got into trade. Political purposes have adopted it, and God help the country and everything pertaining to it when the deflating instruments prick it in the wind. The resources of this country have been boomed most systematically in Europe and every known business of inflation has been used there to attract young Englishmen with fifteen hundred pounds apiece. Recently the Minister of Mines and Professor Lehfeld surveyed the country and its gold position, and we imbibed our first dose of scientific deflation. Professor Lehfeld's deductions are professional and put before the public for serious consideration, and although I may appear to write lightly it is not without appreciation of the true worth of his deductions that I approach the subject. In fact, I may say that with all due deference to Professor Lehfeld and His Honour the Minister of Mines, the gold industry of this country is so vast a subject with limitations so wide and unfathomed, that it would require a very great deal more than an academic statement to deflate it. If I had started looking for things without the necessary inflation the Minister of Mines and others would probably not have been employed for deflating purposes. Impelled by burning instincts, we worked and sought and found. In those days there were no deterrents. There was co-operation, and step by step men worked and found their goal. To-day, what incentive is there, when the chief advisers of this country tell you "gold has found its zenith and from now on its production must decrease"? The volume of trade and agriculture is held up and shown to over-balance gold. The cost of gold's production is deducted from its price. Now, where does the cost of production of that gold go to if it does not go to support agriculture and industries? There is the field of raw industries here as well as anywhere else in the world, but the production of gold has given us a great additional internal market. From that market, agriculture and industry have moved to what they are to-day; now we are invited and encouraged to see that great market diminish and agriculture and industry move into its place. Before accepting this statement, look at produce; look at the moratorium farmer; look at the wonderful strides of the great Pretoria steel industry! Look at it! Mr. Malan has drawn attention to it forcibly enough. He has also decried gold and posted telegrams to the world about gold reefs. He may have been right, but it is the same Mr. Malan and the properties have different owners! However, regarding gold: There are hundreds—perhaps thousands—of millions of tons of low-grade ore in this country, which Mr. Malan is paid to find out all about and how it can be treated. Recent experiments show the day is not far off when it will all be remedied without the aid of a stamp mill. There is a process called the oil separation, which should be commended to Mr. Malan. Its process is to-day treating *ninety millions of tons of ore in countries other than South Africa*. The whole face of districts here

carry low-grade ores, hundreds of miles of them; they have not been touched. We have been educated by mine owners and Governments to look for gold from a few deep mines whose wealth decreases with depth and whose numbers are in imminent peril of being reduced from some fifty to thirty. If they do, Professor Lefheld's deductions will be proved to the hilt, but why should they be? Of course, if gold is to be deflated and it costs over five pounds to produce an ounce of it, one can readily understand "the Devil will be amongst the tailors," and this country's premier industry will get a pretty black eye. I do not view the matter as complacently as Professor Lefheld or the Minister of Mines do, although, as some people argue, if twenty mines do succumb it might tend to bring people to their senses; it certainly will bring the Government and the Minister up with the round turn they have required for many years. Whilst Professor Lefheld talks of the gold industry declining, there are the discoveries of the Western Rand lying dormant; there is a great stretch of formation between the Western Rand Estates and the gold mines in Potchefstroom. There is the Far East Rand and its prohibited areas to the south, and there is the immense stretch of the southern rim of the Rand conglomerates showing sporadic gold, but not wanted to resuscitate this great dying industry. Deflation is no new game. It has been played upon this Rand ever since its discovery. It was played in many a mining camp in America before that. It's simply capital holding up enterprise. All the gold mines that are worth anything, or supposed to be worth anything, boom because certain cliques hold the shares. They may not be worth anything; they may be mines such as Bantjes, Vogel Deeps, and one or two others that have been boomed to death by their cliques, and as long as these cliques have power nothing in the country but theirs is good. To-day gold mining isn't popular, because there is the danger in the metal's depreciation, there is labour danger, and there is Government's warning, but for all that I know of a little mine that has arisen out of the discarded debris of a low-grade non-payer; it has paid for all its improvements out of its profits, increased its stamps, and makes good profits. Now, if this can be done on low-grade ore, working at a fairly high cost, what can be done with oil separation and improved methods of reduction? No one has the individual producer's interests at heart except himself. Mr. Trevor, at Pretoria, is sanguine of that class of expansion, but I doubt if the Minister of Mines has ever studied the subject. It is like Professor Lefheld's advice to have the country surveyed to obtain its agricultural value. Why, of course it should be, but if its results are on a par with the mineral survey it won't be of much use. The amateur way of developing a country like this is to put men at the head of departments who do not understand their business. If a man is a schoolmaster, let him stick to education. If he is a mining engineer, let him rise in the mining departments, but here you have a great part of a continent and its Ministers spend happy days visiting great stretches and making speeches on sporadic discoveries. There is no precedent followed in its fundamental building. This country should long ago have had a proper agronomical survey, every part of it. Its bottom land, its bench land, and its mountain land should have been planned and its capacity valued for whatever its various parts could produce. It would then be found that valuable stretches were being wasted by black, by white, and by land companies. The actuary could figure out future displacements and the benefits that citizens would derive thereby. The apple belts, the peach belts, citrus, and various other products of value could all be determined, and it would be only thus the country's capacity for holding white population could be determined. It is useless estimating that ten millions could be supported. Ten millions are no use. The 1820 settlers multiplied from 5,000 to 150,000 in 100 years, and that happened under exceptionally hard conditions. There are some seven million natives in the State who multiply much faster than whites. There is a terrible struggle between black and white to-day to occupy the land. The rapid evolution of the native will accelerate more and more as time goes on. What is the winning factor in the game? It is the female

labour of the black man. The Kafir with his women can produce a bag of mealies at half what a white farmer can. If this is so, the white man requires cheap motive power. He has it. Within reasonable time crude oil will be produced at 6d. a gallon, and land ploughed with a fraction of what it costs to-day. Ploughing is 40 per cent. of the work for a crop. Crude oil will push the native back, but it won't stop his breeding. Seven million natives can produce one hundred millions under our benign protection. Looking ahead, as America did, when it laid out its great country for future generations, provision should be made. It may be necessary to re-arrange the disposition of its natives. So far, provision has only been made for a black man. When you see the scientists and Ministers deploring the want of land for its future white inhabitants, is it not time to study the question of housing our future whites? Our blacks can exist under more difficult positions. Whites can produce valuable products intensively; blacks to-day live on great stretches of most valuable country and produce only a tithe of what they should. A white man is worth £30 to the State in taxes, a native 12s. When economy is studied the truth of these figures will be discovered. In their discovery the possible homes for many millions of whites will be found, but it is necessary, if this country is being governed and developed for white as well as black, to lose no time to get beyond Professor Lefheld's guesswork and find out exactly where whites are to live and what they are to do. The black man can be accommodated, as I have pointed out, on land that will sustain him, whilst the white man can occupy his former reserves. If we have not the minds to consider these questions and lay the foundations securely for our future population, our coming generations will suffer, and the downfall of the white will be the outcome of to-day's weakness. It is not, therefore, deflation that we should fall down before to-day. It is the practical solution of what we see and the wise preparation for what is to come. We must give up looking down deep level mines. We must study the thousands of millions of tons of low-grade ore throughout the Union. We must give every attention to the newly-discovered methods of producing gold and oil cheaply and encourage individual enterprise in every district to work and produce gold and oil. The farmer will find markets at his door and bless the movement, and from this will come renewed activity. There are sixty thousand million tons of coal in the country. For God's sake don't let us deflate this. Let us rather hold up our heads and inflate our lungs with South Africa's heaven-sent atmosphere. Let us as a superior race face our future with hope and confidence, but let us discard the bugbear of fear and deflation, and finding out the true resources of this great land work with wisdom and in our forecast have a true appreciation of the white man's necessities and protect them thoroughly.—Yours, etc.,

ECONOMIST.

A Mutable Electric Sign.

Dwellers in cities have become quite accustomed to the large electric signs which flash out a variety of messages. They have little idea of the complicated mechanism which is required to provide a series of messages, or the ingenuity involved in their design. The latest type, which has been evolved by a British inventor after more than ten years experiment, constitutes a remarkable advance on existing types. Letters, words, sentences, and designs are produced by pneumatic power from movable spheres, each six inches in diameter. By day the spheres twinkle white or in contrasting colours as fancy may dictate, and at night they are automatically illuminated electrically. A sign may be withdrawn and another inserted in its place without stopping the machinery; in fact a whole speech could be expressed line by line, and thus delivered more effectively than by megaphone. There is no end to the variety of letters and words which may be made to appear on this sign. The mechanism depends on a simple arrangement of perforated sheets.

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ENGINEERING SECTION.

The Hartebeestpoort Dam.

By L. L. R. Buckland.

The Hartebeestpoort Dam is located in a poort in the Magaliesberg range through which the Crocodile River cuts its way about 25 miles from Pretoria on the Rustenburg Road. It is being built by the Union Irrigation Department for the conservation of irrigation water and will feed two canals approximately 30 miles long, one on each bank of the river, supplying water to 15,000 morgen of excellent ground, of which two-thirds is owned by the Government, lying in the warm and sheltered valley of the Crocodile.

The dam is of the constant-angle arch type and will have a total height of 198 feet above lowest foundation where it is 72 feet thick; the depth from bedrock to river bed level varies from 25 to 35 feet. The width of the poort at river level is 150 feet, but the crest length of the dam will be 450 feet with a width of 15 feet, over which the main road to Rustenburg will pass. At the crest the radius of the arch is 225 feet to the downstream face.

On the left flank a trough spillway, 125 feet wide on the line of the dam and 415 feet long, is being excavated to deal with the maximum probable flood; the spillway will be bridged to carry the main road from the dam.

The flow of the Crocodile at the poort varies from 40 cusecs in the winter to 200 in the summer, with floods up to 12,000 cusecs fairly frequently and as high as 140,000 cusecs on occasion. As winter floods are rare and have seldom exceeded 600 cusecs, the diversion works were designed to cope with that flow during the low-flow period from May to September, large floods being unknown before October.

Work is being carried out entirely by white labour and was commenced in 1918 when a light railway, 9 miles long, was laid from the works to Brits West, a siding on the Pretoria-Rustenburg line. At the same time quarters, offices, workshops and power plant were laid out. Lack of working space in the poort led to the adoption of electric power, and two Bellis and Morecom sets, with a third one added later as a standby, supply power at 2,200 volts, which is transformed down to 500 volts for use.

To enable the work of placing the foundations to be accomplished in the dry, two curved concrete coffer dams were started. After the upstream dam was completed by divers, it was discovered that solid rock had not been reached. The downstream coffer dam was, therefore, carried down to boulders only. A second diversion rockfill weir was built above the upper concrete diversion dam. It was decided to tunnel through the right bank and completely divert the river through the tunnel. The tunnel, which is 240 feet long, 12 feet wide, and 6 feet deep, with a grade of 1 in 200, was worked from both ends, the headings meeting after six weeks. The river is led into the tunnel from the rockfill diversion weir by a short concrete approach flume, also 12 ft. x 6 ft., and at the outlet another short length of concrete flume delivers the water into a corrugated iron flume, supported on timber piles, which takes the water well clear of the site.

The construction of the diversion weir was commenced early in May, 1921, when the tunnel and most of the inlet and outlet fluming was almost complete. 9 in. x 3 in. deals were driven into the sand and gravel to form close piling, which was backed by rock-fill and faced with a clay blanket which was carried 60 feet upstream along the river bed to reduce seepage.

The river was diverted entirely on the 24th May, and excavation commenced in earnest. The leakage through the weir was inconsiderable and easily dealt with by an 8 inch centrifugal pump. A 10 inch sand pump was installed as a standby—but was never called into use. By this date a commencement had been made with the erection of the concreting plant.

During this critical period, labour troubles were at their worst, and at times the wastage exceeded the supply of fresh labour. The men were restive and unsettled, and this unrest held the work up considerably and threw a large burden of unproductive overtime upon the staff.

The material in the river bed was mainly sand, gravel being reached at a depth of 15 to 20 feet, although under the left bank a number of boulders, ranging in size up to 30 cubic yards, had to be broken up before removal.

Before the diversion of the river some preliminary excavation of sand was done by two 6 in. sand pumps mounted on barges. Just prior to the closure of the diversion weir one of these pumps was moved upstream, but the other was left to assist in the dewatering of the foundations, sinking with the water surface until it was left high and dry at the end.

A 5-ton crane was erected on each bank to command the greater portion of the excavation. Grabs of 2/3 cubic yard capacity were used with these cranes for a short time, but it was found the cranes would not stand up to the heavy work and a graded wire-rope haulage, which was installed subsequently, successfully dealt with the 8,000 cubic yards of material that was removed. The material was all lifted by hand into "Cocopans" and run out direct, the maximum weekly output being 2,300 cubic yards.

Two 6 inch centrifugal pumps (additional to the 8 inch pump behind the weir) were installed to keep the excavations dry from the seepage which came back from the river below the lower coffer dam. These were successful, although the greatest difficulty encountered was to keep the sumps below the general level of the excavation. The favourite time for the pumps to fail seemed to be during the period 11 p.m. to 7 a.m., or the "Graveyard Shift," much to the annoyance of the mechanical assistant, who was repeatedly called away from a warm bed down to the icy river. However, by the middle of July rock was exposed over the whole area. It is a somewhat seamy quartzite, the bedding planes dipping downstream at approximately 20 degrees. It is rather fissured on the flanks, but generally good on the bottom except for some dykes of basic igneous rock—lampphyre—which weathers remarkably rapidly, and some small faults.

All these were followed up and thoroughly cleaned down before concreting commenced. The major portion of the rock required very little stepping except on the flanks, thorough scrubbing sufficing before concrete was placed. A "cut-off trench," 6 ft. wide and from 5 to 10 ft. deep, was excavated right across the poort just at the upstream face of the dam wall.

On July 29 work was sufficiently advanced to commence placing concrete. It had been found impossible to erect, in the short time available, the concreting plant in such a position as to command the dam during its whole construction, and in order to bring the wall above river-bed level during the short period before summer floods could be expected, a purely temporary lay-out had to be adopted on the right bank low down in the poort itself at a height just sufficient to command the wall up to the required river level. A quarry was opened at the back of a large boss of rock known locally as the "Pimple," from which the rock was allowed to roll down the hillside for tramping to the crushers, whence a conveyor belt raised it to the main bins above the mixers.

Sand-collection proved a difficulty at first, but the problem was solved by a method which, at first in the nature of an experiment, was found to work wonderfully well. A sump, consisting of a section of 4 ft. diameter concrete piping, was sunk close to the spoil dump of the sand removed from the excavation. The suction pipe of a 6 in. sand pump was inserted into the sump near the base; water was syphoned into the sump through a 6 in. pipe from the adjoining flume, and sand was shovelled in through a screen. The pump delivered the sand through some 600 feet of piping to a sandbag dam, near the mixing plant, where the water was allowed to drain off. From this dam the sand was lifted by cranes to temporary storage bins of 150 cubic yards capacity, whence it was tramped to the main bins. Cement was brought to the bins by a 1-ton cableway from the main store on the left bank. This cableway was also of value for the general transport of materials to the river bed. The concrete mixing plant is in two complete units, each consisting of rock, sand and cement bins from which the materials run through gates into adjustable measuring boxes from which they pass to the mixer through a chute. The gates from the measuring boxes to the chute are operated by compressed air.

As the materials pass into the mixer, of one cubic yard capacity, a measured quantity of water is added. The mixers tip direct into one cubic yard capacity cocopans which are hand tramped to the wall. All the concrete was placed by the two 5-ton cranes which, re-erected in commanding positions, lifted the pans off their frames, and tipped them

into the wall. The whole of the concreting plant was designed on the works, and the results obtained have been extremely gratifying.

It was decided first to carry the front section of the dam, some 20 feet wide, up to six feet above river bed so that in case of a bigger flood than 600 cusecs the upstream rockfill weir would not have to be renewed. Two 8-hour shifts were worked on concreting from 7 a.m. to 11 p.m., with a night shift from 11 to 7 doing any cleaning up necessary to give the morning shift a clean start. A bonus system was instituted based on the yardage placed, and this roused keen competition between the two shifts. The limiting factor was the quarry. Rock could not be supplied as fast as the mixers demanded it, but nevertheless excellent results were obtained, the maximum outputs of concrete being 40 cubic yards per hour, 429 per day, and 2,060 per week. The narrow front wall grew at such a pace that trouble was experienced with the shuttering, and the remainder of the dam was carried up as a whole.

On September 7 the task aimed at was accomplished, and with a total of 9,500 cubic yards placed the whole wall was 6 feet above river-bed level. Plenty of time before floods was still on hand, and consequently additional concrete was placed, a wall 10 feet high being carried up along half of the front face of the dam and a 5 ft. wall along the remainder of the face, thus enabling work to be carried on over one-half, should a flood too great for the tunnel come down and overtop the lower portion of the wall, when concreting is recommenced.

The whole of the plant in the river bed is now being dismantled and re-erected on the top of the left bank in a position to enable the construction of the remainder of the dam—which it is hoped to resume in December—to proceed uninterruptedly to a finish.

The Hartebeespoort Canals, as far as construction is concerned, are an organisation independent of the dam. Up to the present but little work has been done on them, about 200 white labourers are employed, but lack of funds prevents any extensive operations. Available funds have been carefully guarded to ensure that there is no shortage as far as the dam is concerned.—From *S.A. Irrigation Magazine*.

ANSWERS TO CORRESPONDENTS.

A letter awaits Mr. T. Hutt, prospector, at this office.

E.G.W., Gwanda.—We suggest that you communicate with the President of the Chemical, Metallurgical and Mining Society of South Africa, Technical Societies Club, Fox Street, Johannesburg.

A. MITCHELL (Selukwe).—We cannot give share market tips.

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Railway Electrification.

LESSONS FROM AUSTRALIA—SUCCESSFUL FRUIT OF SCHEME RECOMMENDED BY MR. C. H. MERZ.

Victoria is the only State in Australia which has any electric railways, as distinct, of course, from tramways. Only a few of the suburban lines of Melbourne have so far been electrified, but the expensive change over from steam to electric traction has already justified itself from every point of view, writes the Melbourne correspondent of the *Daily Telegraph*. It has given us the best suburban train service in Australia—a five-minute service at the rush hours and a ten-minute service at other times. It is also paying for itself handsomely, and if all goes well with the construction work now in hand, every Melbourne suburban railway line will be run by electricity within eighteen months. The 700,000 suburban residents of Melbourne will all then be sharers in the faster and more frequent train service which electric traction alone can make possible, and Melbourne as a city will gain from the reduction of the smoke evil.

It was in 1908 that Mr. Charles H. Merz, of Messrs. Merz and McLellan, Westminster, presented his first report on the electrification of the suburban railways of Melbourne, by direction of the then Premier, Sir Thomas Bent. If the State could have been convinced at that time of the general additional conveniences and rapid means of transportation offered there would have been no hesitation in accepting the scheme as it stood. But it involved a large capital outlay, and there was strong opposition from the Parliamentarians representing country constituencies. . . . The wonder is that the scheme was ever approved in a Parliament like that of Victoria, in which country representatives have always predominated. That the project was sanctioned was due to Mr. W. A. Watt, who became Premier a few years after Sir Thomas Bent. Having realised for himself the value of the scheme, he threw his whole heart into the task of winning Parliamentary sanction for it, but it needed the full force of his strong personality and his great gifts of eloquence to bring this about. He triumphed in the end, and Melbourne residents owe him much for the fight he put up.

War Interruptions.

No large construction scheme could possibly have been begun at a worse time. The work had hardly been entered upon when the War broke out. There was no power station. The plant required had not been agreed upon, and many of the essentials were in an embryonic stage only. There were many interruptions due to the War. Machinery which was being imported was sunk by submarines, and war conditions sent up the cost of the scheme enormously. The first electrified line, a stretch of 18½ miles, between Sandringham and Essendon, was opened in May, 1919. Now we have four other lines, totalling 25½ miles, running by electricity, and they have been running long enough for the financial results to be analysed. To operate the present electric service the chief power house consumes 54,000 tons of coal a year, costing £70,000. To provide, with steam locomotives, an equally frequent service, but at much slower speeds, would require 97,000 tons of coal, costing £128,000 a year. A steam train requires three men to operate it, whereas electric trains are run by two. The rolling-stock used on the electrified lines has been reduced by fifty locomotives and twenty-five cars. This means a saving of £50,000 a year in wages and rolling-stock maintenance. Since the electric service was begun there has been a large growth of revenue on all the suburban lines, but the increase on the electric lines has been considerably above the average. This is undoubtedly due to the better service provided by electric traction, for the electric trains travel at 30 per cent. higher speeds than the steam driven local trains. The value of the additional revenue directly traceable to electrification amounts to £95,000 a year. Thus, in coal, wages, rolling-stock maintenance and increased revenue, the monetary

benefits of the electrification of five lines amount to £191,000 a year. In addition, electric traction has postponed the necessity for costly duplications and extensions, which would otherwise have been necessary. In this way it is saving at least £150,000 a year in interest on the capital outlay thus deferred.

Electric Goods Trains.

When the whole scheme is completed we shall have ninety-eight miles of electrified suburban railways, and it is claimed that no other city in the world of the same size will have such rapid suburban transportation as the city of Melbourne. The capital cost of the whole of the electrification scheme will be £5,000,000. The total estimated additional interest and working expenses for the complete scheme is £500,000. Against this has to be set the economies and additional revenue resulting from electrification. So far only a third of the scheme has been completed, but, as has been shown, the partial scheme is already showing a financial advantage amounting to £191,000 a year. In order to eliminate waste and to effect further economies in staff, it is intended to introduce electric locomotives for suburban goods work and for shunting purposes. As the traffic on main country lines develops, it will become justifiable to electrify busy sections which are within reasonable distance of a cheap power supply.

THE FIRST STEP IN S.A.R. ELECTRIFICATION.

At a special meeting of the Railway Board, held on Wednesday, a final decision was come to on the question of railway electrification. The pros and cons of making a start with the electrification of the Durban-Maritzburg section of the line were discussed, and it is understood that a decision was reached in favour of proceeding with the work. It is believed that this decision was influenced by the receipt by the Board of a brief but strongly worded statement on the subject of railway electrification drawn up by the two chief engineering societies of the country, the S.A. Institute of Engineers and the S.A. Institute of Electrical Engineers. Notwithstanding the severe financial struggle through which the country is passing, the decision of the Railway Board will, we feel sure, be welcomed, as a valuable extension of the transport facilities of the country, making in the long run for considerable economy.

A New Flow Meter.

Many ingenious devices have been invented to measure the rate at which water or other fluid is flowing along a pipe, and one of the simplest and most effective is a new type produced by a leading British firm of instrument makers. The essential part of the instrument is a small paddle wheel placed inside the pipe so that it rotates as the fluid moves along. This paddle wheel has attached to it a magnet, and in a separate steel chamber immediately outside there is another magnet which rotates like the first. When the paddle wheel moves and carries its magnet round with it, the movement of this magnet pulls the second magnet round, and the speed of this second magnet therefore indicates the rate of the flow in the pipe. The advantage of this arrangement is that the indicating part of the mechanism is quite distinct from that through which the fluid is passing. All risk of the fluid finding its way into the indicating chamber is avoided, and the instrument is therefore particularly well suited for use where crude or hot oil is employed. The makers suggest that this instrument is well adapted to measuring the rate of flow of oil in lubricating systems, and also the flow of oil fuel or cooling water in oil engines.

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BUSINESS RESTRICTED—IRON AND STEEL—DUNSWART'S NEW FURNACE—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—EXPLOSIVES—LOW GRADE MINES. NATIVE LABOUR EFFICIENCY AND FALLING GOLD PREMIUM—GERMAN ACTIVITIES—FINANCIAL—METAL MARKET.

General Review.

The Commercial Exchange this week has been rather quiet, and business, apart from the usual beginning of the month demands from the mines, restricted. Mining and building materials remain on the whole without quotable change of prices, except in the case of fencing material, some brands of which have hardened somewhat, but Continental wire quotations are checking any undue inflation in this article. Speaking generally, in view of the approaching stocktaking month before us and other factors which are looming somewhat prominently at the moment, no improvement in general business conditions is expected before we are well into 1922. As we have maintained for some time past, the industry is reaching, slowly perhaps, but surely, bed-rock in respect of accumulated stocks, and that this prediction will be verified in next month's stocktaking is generally believed. This should give a fillip to business; the industry cannot continue indefinitely on a starvation basis. Uneasiness prevails in many circles that the gold premium may drop below the point at which many of our lower grade mines will be able to work at a profit. Although no drastic decline in the rate is anticipated for some time, the fact is not being lost sight of by the commercial community that this premium is in its very nature a very precarious prop to the Rand gold mining industry, which must sooner or later give way and leave us in difficulties unless we have in the meantime, as the Prime Minister recently said, put our house in order by bringing about great reductions in the costs of production. It would indeed be a pity if some of our propositions—which, given reasonable working conditions, could continue profitable operations for many years to come—were compelled to close down when the gold premium approaches normal again, as assuredly it will sooner or later. The general position as regards working costs was very appositely stated by Sir Evelyn Wallers at the meeting of the Modder East and confirmed by chairmen's statements at other meetings of the week. The further collapse of the German mark to over 1,000 to the English pound is causing grave anxiety on both sides of the water; the huge increase in the paper circulation in Germany angers badly for forthcoming reparations commitments and, in the opinion of some experts, for Germany's present and future economic welfare. In the meantime German factories are overwhelmed with orders, and dates of deliveries are stated at anything from six to twelve months from receipt of orders. Turpentine, owing to shortage, has hardened from 100s. to 105s.

Iron and Steel.

Overseas, according to latest cable advices, iron and steel appears to be settling down on definite lines, and it is thought that the worst of the Continental competition has been seen. Locally business during the past week has been confined within narrow limits, and the Commercial Exchange has exhibited little activity. There has been a fair demand for steel plates, which in many sizes have a firming tendency. Large inquiries exist for mine trucks, and, whereas until recently these were made locally, a German firm has within the past few days secured a large order at a price at which it is impossible for local merchants to manufacture these trucks—much to the disappointment, it is needless to say, of local firms.

Latest quotations.—Dunswart, 21s. 6d. per 100 lbs. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 35s. to 42s. 6d.; larger sizes, 32s. 6d. to 40s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 32s. 6d. to 34s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 33s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 32s.; steel, 35s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 32s.; channels and joists, 37s. 6d.; shafting, $\frac{3}{8}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. per lb.; 1 in., 8½d.; 1¼ in. to 2 in., 7d.; larger sizes, 6½d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7½d. to 8½d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5½d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{3}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool

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Steel Making: Opening of Electric Furnace at Dunswart.

The formal opening of the new industry which the Dunswart Ironworks Company have established near Benoni took place last Saturday, when a number of interested engineers and others were present. This company have since 1911 been engaged in converting scrap iron into bar and sheet iron. A furnace, with a capacity of nearly 70 tons, which will give an output of nearly 500 tons per month, has been laid down capable of taking a current of 6,600 volts through three 9-inch graphite electrodes. Scrap iron thus treated is reduced to a molten condition in five hours. The metal thus melted will be turned into ingot moulds. These ingots are subsequently treated in the cogging mill. The experimental results have been entirely satisfactory, and the works are capable of turning out steel castings up to seven tons weight. The party were much interested in the inspection of the new works and the casting of the ingots, which the management are prepared to test against the best Sheffield alloy steel. As the Dunswart Ironworks had the distinction of producing the first puddled iron in South Africa, so now they can claim to be the pioneers of turning out the first tool steel produced in South Africa. The Dunswart Company will now be in the position to supply the mines with manufactured steel, and the highest results are guaranteed. As a matter of fact some elisels manufactured from the steel produced are already in use, with very satisfactory results.

Engineering Shops and Industrial Opinions.

Business in the engineering shops continues to show a steady improvement, orders being very fair and full time being worked. In this connection the partner of an influential engineering firm said in the course of a chat that we found on every hand to-day labour in conflict with the employer, but in no case could it be generally said that the employer is making more than a living. He suggested that labour should reconsider its attitude and be perfectly sure that it quite understands where the shoe pinches. Leaving out of the question the profits disclosed in the case of Messrs. John Orr & Co., Kimberley, and others, there was, he thought, no industrial, mining, farming or any producing concern to-day making more than a living, and this has been so for a number of years, ever since the War began. There is no owner of industry or shareholder in a mine who can be accused of making exorbitant profits. Whether the same can be said for the commercial community is a horse of another colour, and it is a matter of opinion whether the big profits from time to time disclosed as made by commercial magnate houses are in the best interests of the country or not. Big industrial undertakings such as the mines, through benefit societies, etc., ensure that their employees are not overcharged in such matters as medical attention and medical supplies by chemists, etc. Speaking regarding the mines, he thought the time was about ripe when this principle should be more generally applied. What, he said, was

to hinder industrial bodies from insisting that their employees should be supplied with at least the necessities of life at a low price, or at a price showing only a reasonable profit to the distributor? He thought that labour might be likened to a mad bull, which is being pricked and goaded in some instances to desperation, but only sees the red rag and not its real tormentors. Labour, he said, is suffering; employers and producers are suffering; who is benefiting?

Timber and Building Materials.

Inquiries this week have been small and the amount of business transacted not very extensive. Merchants generally do not look for any decided improvement this year. Stocks of timber are plentiful, and though prices remain unchanged, advices from the Baltic indicate that present quotations may harden very shortly.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 1s.; beaver board, 4 $\frac{1}{2}$ d. to 5d.; floorings, 6 $\frac{3}{4}$ d. to 7d.; ceilings, 5d. to 5 $\frac{1}{2}$ d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9 $\frac{1}{2}$ d. to 10 $\frac{1}{2}$ d. Furniture timber: Burnah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak, 1s. 2d. at the coast; Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at the mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks, in the absence of building activity, remain unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s. 6d., 46s. 6d., 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

There is no change to report in the second-hand iron and timber yards; business has been quiet with but few inquiries. Prices are unchanged at about 6d. to 7d. for iron and 10d. to 1s. for timber.

Blue Hydraulic Building and Plastering Lime.

Trade in this section has been more or less steady, speaking generally of conditions throughout the country, and it is evident that as soon as things improve and money becomes easier the building trade will begin to advance. The lime trade at the coast has fallen somewhat. This has been caused by the importation of large quantities of cheap cement, which is being used for brick mortar by most of the contractors there. Prices to-day are: Building lime, 3s. 9d. per bag; plaster lime, 4s. 9d. per bag. These prices are based on standard products, but one or two merchants are occasionally cutting the above prices with inferior lime. The large works outside Krugersdorp have liquidated, having had a short existence, mainly due to the failure of their gas-fired kiln. The works are in the market now as a going concern, but no doubt they will eventually have to dispose of the works for the value of the plant alone. Speculators are nervous about going into the lime business just now, owing to the keen competition.

Electrical Goods.

Business in this section is still improving both in town and country; inquiries and orders are very encouraging. Prices remain much about the same, with no immediate prospect of any change. Britain, although doing its best to meet Continental competition, has as yet advised no declines, and dealers are of opinion that the present low prices of Germany as compared with Home products are likely to continue, at any rate for some time. In especial, cleats are being received from Germany at practically half the British prices, in which respect the former country is favoured by having the raw material in abundance and of superior quality, and so are able to knock us completely out of the market. A prominent importer said that one of the biggest electrical wares firms in England, Messrs. MacIntyre, Burslem, had reported that it was impossible for

them to compete with Germany in this line. As regards the Power Station, the new auxiliary plant of 6,000 set has already been installed about a couple of months, but has been of comparatively little help as far as new current is concerned. A little relief has been given, but not until another set of 6,000 is installed can the public expect any large accession of current. This set, we understand, is already ordered, but not expected until February next. Electrical goods dealers report generally that financial restrictions have eased off recently and the banks are not worrying so much about obligations as hitherto. One merchant, doing a very large business, said accounts of nine, ten and twelve months' standing are now coming in by degrees, and he really thought things were now getting better.

Explosives.

The British South African Explosives Co., Ltd., state there is no change to report generally in conditions; they are using up stocks purchased by them at high prices, and no reductions can be expected before some time next year. The stoppage of diamond mining has, of course, affected the diminution of accumulated stocks very appreciably. A shipment of nitrate, arrangements for which were made a year ago, has just arrived, which, if it could now be utilised, would effect a saving in explosives of several shillings a case, but the present high-priced stocks have first to be worked off. Glycerine, the most important constituent of explosives, is still very strongly held at Home.

Cheaper Coal in Britain.

An official of the National Wages Board expresses the opinion that the minimum wages under the coal settlement will apply to most districts by December. He estimates that many collieries will then be able to sell coal at 20s. a ton f.o.b.

A cable from Melbourne states that a scheme has been tentatively adopted to convert all the Australasian railway systems into a standard 4ft. 8½ in. gauge at an estimated cost of £57,000,000, for which it is proposed that the Commonwealth float a loan.

Lost the War, but may Win the Peace.

The real "German peril" in regard to the industrial situation in Germany is beginning to excite interest, not to say apprehension, in all countries of the world. The reason is that Germany is busy. Capital there is ready to accept reduced profits, and labour is accepting lower wages and longer hours, and giving greater skill and efficiency, in the material effort of a nation submerged in debt to dig out. The result is that German products are selling throughout the world cheaper than those of other nations. This invasion by Germany requires just as serious consideration as a military invasion, and will signify industrial disaster if it is not met by equal efficiency. While labour is well employed in Germany, Britain and the United States have millions of idle men, many of them on strike. Neither capital nor labour can afford to fight each other when its home field is open to or threatened by the invasion of foreign competitors willing to produce at profits and wages and hours which capital and labour at home are not willing to accept. How far this threatened invasion may penetrate is not the only serious consideration. Paralysis of industry means not only the home market unguarded, but abandons the foreign market, which is scarcely less essential to the prosperity of our industry. Times of depression call for the most strenuous and intelligent effort. It is much more necessary to be up and doing when business is dull and

needs pushing than when business is active and goes without pushing. Less of unnecessary expense and of waste in management, a disposition to accept smaller profits, a willingness to be satisfied with reduced wages, and a serious determination to increase efficiency in labour are the essentials in righting our position at the present time. Germany has gone farther in radical reductions of cost of production than we need to go, but the example which her practice affords is deserving of our serious consideration.

Germany's Cotton Activities.

At the recent London wool sales Germany bought large parcels, and is said to have obtained as much as three months' credit from Dutch, Swiss and American bankers, which would enable the importing mills to manufacture and dispose of the woven goods, and thus meet their obligations at due date. Germany's imports of American cotton this season were 374,000 bales, compared with 335,000 imported by England.

American Enterprise in Middle Europe.

Negotiations have been completed in Paris whereby the vast estates of Archduke Frederick of Austria and his son, Archduke Albrecht—estimated to be worth more than £50,000,000—were taken over by an American syndicate, which includes many of the most prominent American business men. Vast land and industrial holdings purchased include the great steel works and mines in Feschen, which are partly in Czecho-Slovakia and partly in Poland, and numerous other industries, factories, etc.

Near West Rand.

We hear that some small properties of five to ten stamps are being profitably worked in this district, and that one of them has made a clear profit of upwards of £1,000, which is a proof that the Rand is not exactly finished yet.

S.A. Reserve Bank.

The statement of liabilities and assets as on the 5th inst. showed the ratio of cash reserves to liabilities to the public to be 73 per cent.

A British West Africa 6 per cent. loan of £5,000,000 is being underwritten at 95. The money will be devoted to railway, harbour and other general developments, which it is expected will result in large increases in the production of raw materials. This loan is, it is said, the first instalment of a plan for thoroughly developing Colonial natural resources, which, it is stated, will amount to some £50,000,000 within the next five years.

British Empire Exhibition Fund.

Up to the present upwards of £700,000 has been guaranteed towards this movement, the objects of which we have referred to in previous notes.

Metal Market.

Latest London reports state that the metal market has shown little change during the past few days. Copper has been firm, and Straits tin fairly well supported. Lead has received a slight set back. Tin plates have been strong, and, owing to increased orders, the number of mills in operation is likely to be increased. Standard copper, £67 17s. 6d. cash, £67 5s. forward; electrolytic copper, £73 10s. cash, £75 10s. forward; standard tin, £153 17s. 6d. cash, £150 12s. 6d. forward; foreign lead, £23 12s. 6d. cash, £23 7s. 6d. forward; quicksilver, £9 15s. per bottle; bar silver, 39½d.; fine gold, 10½s. 1d. per ounce.

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NEW MINING COMPANIES.

We are indebted to the Mines Department for the following interesting list of new mining companies registered in the Union in the ten months ended October 31 last. It will be seen that a round dozen of the registrations are concerned with gold, three with diamonds and with oil, six with coal, and one each with asbestos, silver and lead, and mica. The majority of these companies are registered in the Transvaal, but three are registered in the Orange Free State and One in the Cape Province:—

Rietfontein and Sabie G.M. Co., Ltd.; registered address, P.O. Delmore; Transvaal—gold.

Nigel (Transvaal) Goldfields, Ltd.; Box 3692, Johannesburg; Transvaal—gold.

Bechuanaland Asbestos Co., Ltd.; Kuruman; Cape Province—asbestos.

Consolidated Silver and Lead Mines, Ltd.; Box 1196, Johannesburg; Transvaal—silver and lead.

Transvaal Coal and Oil Shale Corporation, Ltd.; Box 3692, Johannesburg; Transvaal—coal.

French Rand, Ltd.; Box 94, Johannesburg; Transvaal—gold.

North Oogies (Witbank) Collieries, Ltd.; Box 1167, Johannesburg; Transvaal—coal.

D.B. Prospecting Syndicate, Ltd.; Box 1586, Johannesburg; Transvaal—coal.

Transvaal Coal Corporation, Ltd.; Box 2269, Johannesburg; Transvaal—coal.

Himeville Oils, Ltd.; 5 and 6, Club Arcade, Durban; Natal—oil.

Durban Roodepoort Mining Syndicate, Ltd.; Box 98, Roodepoort; Transvaal—gold.

Premier Oil (Shale) Syndicate, Ltd.; Box 7286, Johannesburg; Transvaal—oil.

New Deep Water Diamonds, Ltd.; Box 1744, Johannesburg; Transvaal—diamonds.

Gold and Base Metal Concentrating Co., Ltd.; Box 53, Pretoria; Transvaal—gold.

South African Coal Estates (Witbank), Ltd.; Box 5036, Johannesburg; Transvaal—coal.

Boshof Oils, Ltd.; Box 2641, Johannesburg; Orange Free State—oil.

Shamon Mica Mines, Ltd.; 207, Main Street, Johannesburg; Transvaal—mica.

Station Colliery, Ltd.; Box 5379, Johannesburg; Transvaal—coal.

Klerksdorp Gold Recovery, Ltd.; Box 4378, Johannesburg; Transvaal—gold.

Haynard Syndicate, Ltd.; Box 92, Durban; Transvaal—gold.

Leeuwvult Diamond Syndicate, Ltd.; Box 2641, Johannesburg; Orange Free State—diamonds.

New Southern Van Ryn G.M. Co., Ltd.; Box 3692, Johannesburg; Transvaal—gold.

Bourke's Luck Syndicate, Ltd.; Box 1411, Johannesburg; Transvaal—gold.

Consolidated Oils, Ltd.; Box 454, Johannesburg; Orange Free State—oil.

The Tributaries, Ltd.; Box 1744, Johannesburg; Transvaal—diamonds.

Fox Mining Syndicate, Ltd.; Box 4078, Johannesburg; Transvaal—gold.

Monarch Syndicate, Ltd.; Box 388, Pretoria; Transvaal—gold.

Northern Development Syndicate, Ltd.; Box 6442, Johannesburg; Transvaal—gold.

Madagascar Railways to be Electrified.

It is understood that the electrification of the chief railway lines in Madagascar over a total distance of 360 kilometres has been decided upon by the Government of that island.

COMPANIES STRUCK OFF.

The following companies appear in the list of those struck off the register, and therefore dissolved:—Lancaster Gold Mining Company, Ltd.; Transvaal Oil Shale Syndicate, Ltd.; The Rietspruit Diamond Syndicate, Ltd.; Weigel Exploration Company, Ltd.; C.L.S. Syndicate, Ltd.; The South Midas, Ltd.; The Eclipse Brick Company, Ltd.; Komati Exploration Syndicate, Ltd.; The Mia Mia Syndicate, Ltd.; Macdonald Estates, Ltd.; Good Hope Tin Syndicate, Ltd.; Goffe and Company, Ltd.; New Banket Reefs, Ltd.; Guy Fawkes Tributing Syndicate, Ltd.; Christiane Asbestos Company, Ltd.; The African Roof Cooling and Preservation Company, Ltd.; Rand Securities, Ltd.; African Madagascar Agencies, Ltd.; Broad Roberts, Ltd.; Meat Exporters Alliance, Ltd.; Moonstone Diamond Syndicate, Ltd.; Satic (South African Technical Industries Company), Ltd.; Pyramids Diamond Works, Ltd.; The Adelaide Timber Company, Ltd.; British Re-inforced Concrete Sleeper Company, Ltd.; Pretoria Base Metals, Ltd.; African Alca, Ltd.; Dominion Industries, Ltd.; Garrard's Garage, Ltd.; H. and S. Syndicate, Ltd.; Brown's Motors (Africa), Ltd.; Matzap Diamonds, Ltd.; Frank S. Corder, Ltd.; South African Motor and Cycle Importers, Ltd.; and Norton's Outcrop Syndicate, Ltd.

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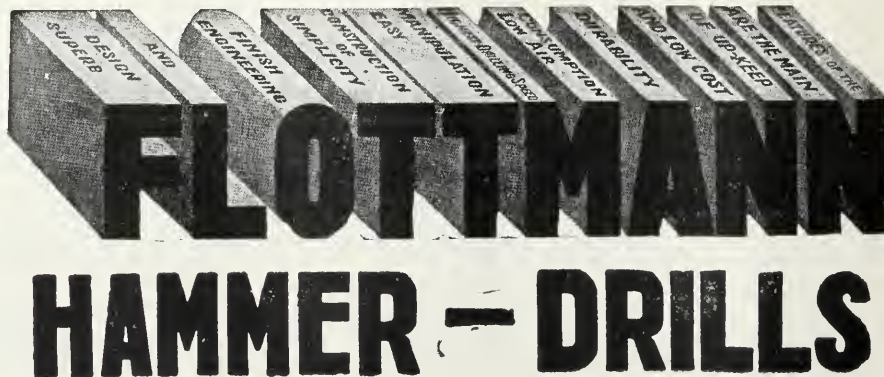
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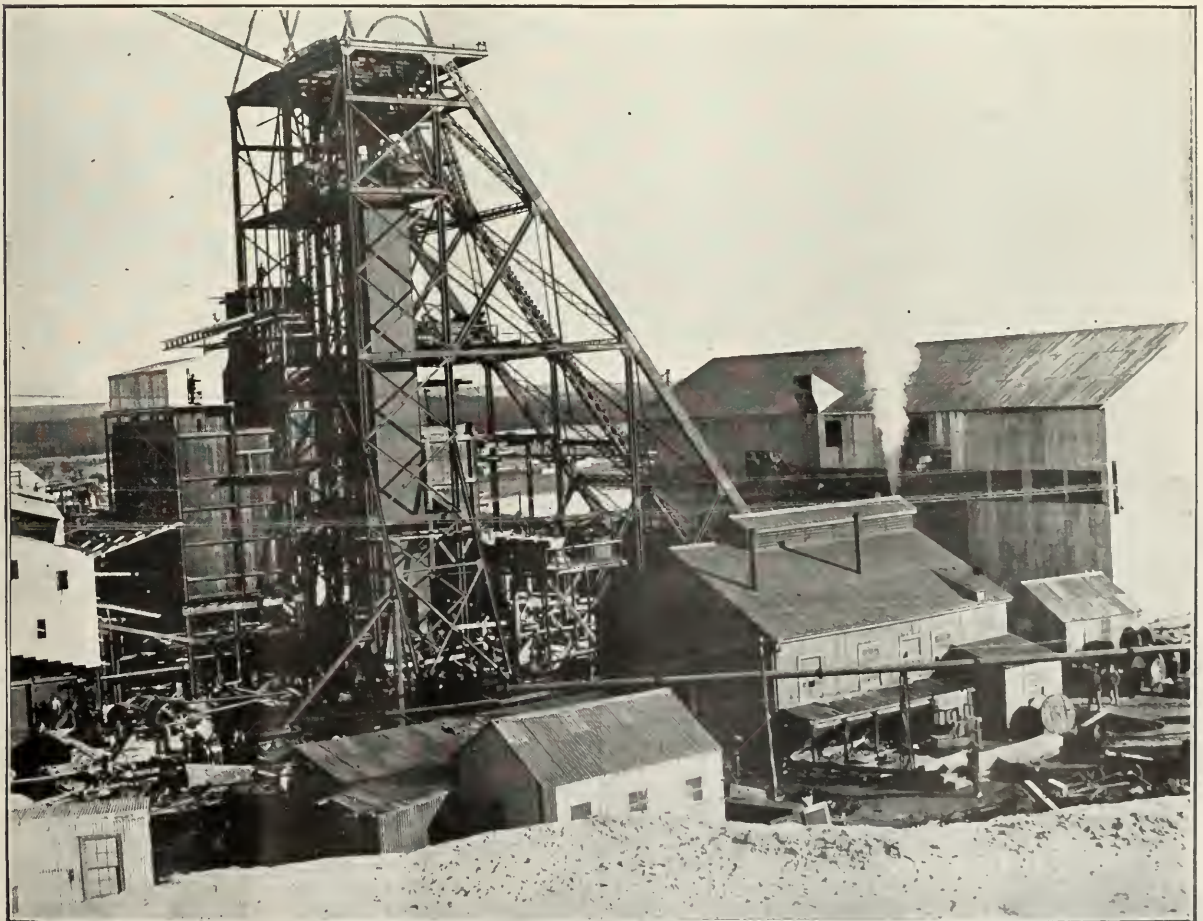
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JOHANNESBURG, TRANSVAAL, SATURDAY, NOVEMBER 19, 1921.

No. 1573.

Where Another Strike Started.



No. 5 Shaft of the Crown Mines, where the men have been on strike for a week. The matter is commented on elsewhere in this issue. On Thursday night the deadlock existing between the management and the men took a more serious turn, and at the moment of going to press it is stated that an ultimatum is being sent by the Unions concerned to the Chamber of Mines.

RESULT OF THE MINING CONFERENCE.

AMENDMENT OF THE REGULATIONS AGREED TO—A TRIUMPH FOR THE PREMIER—A MEASURE OF RELIEF INADEQUATE TO MEET THE INDUSTRY'S PRESENT NEEDS—SIR EVELYN WALLERS EXPOUNDS THE CHAMBER'S VIEW—OPINIONS OF THE MEN.

The sub-committee on the mining regulations met at Room No. 31, New Law Courts, Johannesburg, on Tuesday, the Prime Minister (the Hon. J. C. Smuts) being in the chair. There were also present: The Hon. F. S. Malan (Minister for Mines and Industries), Mr. Warrington Smyth (Secretary for Mines and Industries), Sir R. N. Kotze (Government Mining Engineer), Mr. Malcolm Ferguson (Inspector of Mines, Krugersdorp), Sir Evelyn Wallers, Prof. J. G. Lawn and Mr. F. G. A. Roberts (Chamber of Mines), Mr. E. S. Hendrikz and Mr. George de Meillon (S.A. Mine Workers' Union), Mr. J. Thompson (Acting President, S.A. Industrial Federation), and Mr. J. George (Department of Mining Industry, S.A. Industrial Federation).

After an hour and a half of discussion the suggested amendment to a portion of the mining regulation dealing with the working hours of natives was agreed to by all parties. The regulations, as accepted, were as follow:—

in the work of making safe. He shall not permit any person, other than those required to assist him, to enter the working place until it has been made safe.

(3) At any mine included in the list of mines framed under section I of Act No. 40 of 1919, the ganger or miner making the examination prescribed in sections (1) and (2) shall also thoroughly wet the reef, sides and floor, as well as the broken rock, before admitting to the working place the members of the gang other than those required to assist him in making safe.

(4) If the working place becomes, or is found to be unsafe during the shift, the ganger or miner in charge shall take measures for making it safe and for safeguarding the persons in the working place whilst it is being made safe.

(5) Equal present Regulation 102 (1).

(6) Equal present Regulation 102 (2).

The Hon. F. S. Malan (Minister for Mines and Industries) stated that the regulation will be issued immediately.



The Great Randfontein Central Mill. As pointed out by Sir Evelyn Wallers at the Conference, Randfontein, despite the gold premium, earns no dividends for shareholders under present conditions of high costs.

Regulation 106 (7) (a) to be deleted and (b) to become Regulation 106 (7).

Regulation 102 to read as follows:—

102 (1). Save as is provided in section (2) of this regulation, each working place shall before the commencement of a shift be thoroughly examined by a competent ganger or miner, who shall remove or make secure any loose or loosened rock, mineral, or ground, which might endanger the safety of persons. He may be assisted in this work by other persons working under his personal supervision and control, and where he deems it necessary in his actual presence, and shall take adequate precautions for their safety while they are engaged in the work of making safe. He shall not permit any person, other than those required to assist him, to enter the working place until it has been made safe, and his responsibility for the safety of any person lawfully present in the working place shall continue until the ganger or miner in charge of the oncoming shift enters the working place.

(2) If the working place is not examined and made safe prior to the commencement of the shift as provided in section (1), it shall be examined and made safe by the miner or ganger in charge of the shift at its commencement and also after any blasting that may take place during the shift. He may be assisted in this work by other persons working under his personal supervision and control, and where he deems it necessary in his actual presence, and shall take adequate precautions for their safety while they are engaged

So much for the acceptance of this much-debated amendment. The results of carrying the new regulation into force and the question whether this amendment will secure a sufficient measure of relief for our languishing industry, are discussed in the leading article appearing in this week's issue.

At this point it may be well to touch on some of the points elucidated at the conference and briefly to discuss the present position of and outlook for the mining industry of the Witwatersrand, particularly with regard to the selling price of our product and the cost of production.

The fact that the only two Rand Gold Mining stocks which appreciated in price on last week's sharemarket were Bantjes and Knight Centrals, both of which companies are said to be in imminent danger of dissolution, was commented on in our last issue.

A Paradox with a Moral.

That the shares of these two concerns should move up on liquidation prospects, whilst the price of the stocks of companies in the heyday of their lives should weaken, affords a striking commentary on the present parlous plight of the Rand mining industry. It simply means this: that the outlook at the present time is so unpromising in the face of a falling gold premium, high working costs, and the approaching exhaustion of several of our old Central Rand mines, that the prospect of liquidating a company

and selling up its assets is more entrancing to shareholders than is the continuation of mining operations. That such a state of affairs should exist clearly proves that something is radically wrong with our industrial house. The point need not be laboured that something is wrong, and most radically wrong, with the gold mining industry of the Witwatersrand. Moreover, it is not necessary to point out what is wrong with the mines. It is common knowledge that working costs are far too high and that working efficiency is far too low.

The Premium in Danger.

We have frequently pointed out that the majority of our mines are merely existing through and by the grace of the premium. General Smuts emphasised this point at the first meeting with the miners' deputation, and referred to the possibility of the total disappearance of the premium consequent on the abolition of the war debts and the re-establishment of parity as between British and United States currencies. The cancellation of the colossal debts contracted by the Allies during the War is generally regarded as the easiest solution of the present world depression. It is



Important figures at the recent Conference. Mr. H. O. Buckle, President, Transvaal Chamber of Mines.

argued that the chaotic exchanges which undoubtedly are in large degree responsible for trade depression and financial stringency would return to normal by the writing off of war debts.

Question of War Debts.

It is, of course, common knowledge that nothing has been said in official American circles to warrant the belief that the United States—the greatest creditor nation of the world—is prepared to cancel the colossal sums owing her by Great Britain, that on the contrary President Harding's policy does not incline towards such action, and that public opinion in America is against such a sacrifice. Yet the view is widely held that in this direction relief from the present universal poverty and chaos may best be sought.

Colour has been lent to this view by the sensational fall in the value of the mark, which in financial quarters is regarded as a sign of Germany's intentions to publicly declare herself bankrupt and to dare the Allies to do their worst. The Washington Conference, too, although it will deal primarily with disarmament and questions concerning the Far East, will, it is hoped in some optimistically inclined quarters, pave the ground for a consideration of the problem of adjusting the world's tangled finances.

Civilisation is undoubtedly at the cross-roads to-day, and no one can foretell what the next few months will bring forth or what effect events in Europe and America will have upon our own affairs on the Rand. It is, at any rate, clear that there is dire need of re-organising the gold mining industry of South Africa so that the mines can continue working without the fortunate accident of the premium. The conferences of Government, Chamber of Mines and miners on Thursday of last week, and on Tuesday, were held with a view to affording the industry much-needed relief through amendment of that portion of the mining regulations which deals with the number of hours worked by natives underground.

Far-reaching Reorganisation Required.

But the meetings of the conference have clearly shown that a much larger measure of relief than can be expected from the mere re-drafting of a paragraph in the mining regulations are required if the mining industry of the Rand is going to survive and if widespread unemployment and distress is to be averted.

The full official reports of the conferences occupy a vast amount of space in the daily papers. They take up more room than this journal possibly can devote to the subject.

Arguments at the Conference.

The whole scope of inquiry of the conference is, however, of such paramount importance that we shall accord



Sir Evelyn Wallers, who ably stated the case for the Chamber at the Conference.

as much space as we can to the speeches of the representatives of the Government, the Chamber, and the men.

In the first place we would draw attention to a communication received from an esteemed correspondent on the subject. Without necessarily agreeing with his interpretation of the cause of the decline in the gold premium, we commend this letter, which is written by a gentleman in Rhodesia, and who sees the Rand from afar, to the common-sense instincts of all who are dependent upon the mining industry for a livelihood. The letter is as follows:—

There can only be one inference read into the continued appreciation of British sterling in the U.S.A., and that is the, as yet unpublished, arrangement come to between the heads of international finance to cancel the debts as between the Allied Nations, an arrangement which only awaits the endorsement of the conference now taking place between the representatives of the Allies in America. How, otherwise, can we construe this continued appreciation of British sterling at a time when the great sea-side movement of crops from America to Europe is in progress, and when by all the rules of finance and commerce the exchange should be going steadily against Great Britain? Having realised this fact, what then is going to be the effect on the South African gold industry? Firstly, the so-called premium will disappear, and quite suddenly. I should not be surprised to wake up one morning within the next two months and find the premium a thing of the past. That means, if the industry

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is run on the present abnormal and expensive basis, that the unclosed low-grade mines will close down, like an oyster shell, suddenly; that a period of unexampled depression will ensue, and that unemployment, at present a pressing problem, will be inexpressibly more acute. Will not the leaders of the S.A. Miners' Federation see these facts as they stand at present. Have they to wait until the cloud-burst is right upon their trust before thinking of moving into the shelter of conciliatory bargaining and fair dealing?"

This letter goes straight to the kernel of the present conference. It echoes in a very eloquent and plain-speaking manner the view expressed by Sir Evelyn Wallers at last week's conference.

The Chamber's Case.

After General Smuts had opened the conference and explained its objects, and after Mr. Hendrikz, on behalf of the Mine Workers' Union, had debated at great length the question of deleting one word in the mining regulations, Sir Evelyn Wallers, upon the invitation from the Premier, stated the Chamber's case as follows:—

"Well, sir, the view we hold is that we have read with great care the speech you made to the members of the Mine Workers' Union, together with the discussion that followed, and there is no need for me, on behalf of the industry, to elaborate the gravity of the situation. That was made perfectly plain at that meeting, and Mr. Hendrikz realised it then, and realises it again to-day, so I need not elaborate that point at all.

"You suggested an amendment in the mining regulations, and, while that amendment would be of assistance to the industry in arriving at that degree of efficiency that we have got to arrive at between us—while it would be of assistance, in our view, it does not go nearly far enough, and it does not carry with it more than the germ of a solution for the present grave situation.

"At the moment, the industry and the gold producers are obtaining a premium, but it has dropped, and signs are not wanting that it will drop still further; but even with the considerable premium that exists to-day, you have two huge concerns, like Randfontein on the West and the E.R.P.M. on the East, employing 3,000 white men, neither of which last month paid their standing charges, wages and staff.

The Highest Importance.

"Well, we feel that the amendment you have suggested, even if it were accepted, would, of itself, achieve not a great deal. What is in the development of the industry a matter of the highest importance is the obtaining from the workmen—the native workman and the white workers—a full day's work. But we feel this, and I want to state it quite frankly, so that there shall be no misunderstanding. We feel that other issues will be involved and are involved in the present situation, apart from the regulations altogether, and apart from any consideration between you and ourselves, except, of course, that the Government is the protector of the community as a whole. Well, sir, even if that amendment were accepted—it is in the development of the situation and the putting into force of underground reorganisation (which we believe is essential if we are to get back to a safe position) that we should come into conflict with what would be described as 'trade union restrictions.' . . .

"The status quo agreement, as you know, is an agreement entered into in 1917, when a strike was threatened or took place for a short time on the question of coloured drill sharpeners on one of the mines, and it was found that certain natives were doing certain kinds of work on certain mines, whereas on other mines white men were employed doing that kind of work.

"The Union's argument was that, where natives were employed on work like drill sharpening, they should be relieved and white men put in. Our argument was that the native should maintain the positions he had obtained.

"Well, after a great deal of discussion we arrived at that status quo agreement, which governs certain classes of work, not in all classes of work, but in some classes of work of a semi-skilled character, or partially-skilled character.

We believe it will be necessary in the men's interests, as well as our own, to abandon that status quo agreement.

White Labour's Position.

"There may be other agreements that will have to be reviewed or revised. Well, you will say at once that this involves the colour question, that it may mean the retrenchment of a certain number of white men, but we want to meet the position as fairly as we can. We have suggested to you that the mine managements should be at liberty to allocate and distribute and use their labour in whatever direction it is thought fit, without the operation of any trade union restriction, and the unions may say that that leaves the ground too open for us to dispense with as many of the white men as we think fit. I think the term 'colour bar' is applied much too loosely, and it conveys the impression that the whole of the white workmen are to be swept out. That is quite wrong, but to meet that point we would be prepared to consider—if it is agreed that we are to proceed on the lines I have indicated—we would be prepared to consider some ratio as between the number of natives and Europeans throughout the industry, in order that a considerable measure of protection should be afforded to efficient white workmen.

Inadequacy of the Amendment.

"That is a very brief statement of what the Chamber feels on this matter, and I have made it in order to show you, sir, and these gentlemen that, in our view, to find a remedy for the situation that faces us at present and will become more acute as time goes on (and unemployment will result as time goes on) that more is necessary, much more is necessary, than the mere amendment of a regulation.

"The solutions to which Mr. Hendrikz has referred, we have discussed before. We discussed them and investigated them, along with representatives of labour, with great care, and these points occupied a great deal of time at the meetings of the Low Grade Mines Commission. They include

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the alleged shortage of compressed air, and the inability of white workmen underground to exercise authority over their natives; also the food question, on which we shall welcome investigation; but I think you will find that there is no question of the native not having sufficient food available. It is available for him, and the whole native diet is open to the closest investigation."

Other Views.

We quote hereunder extracts from some of the other speeches made at the meeting:—

Mr. Hendrikz: I shall give you one solution of the question in our opinion, which will mean the employment of more white men, more efficiency among the natives, a larger tonnage for the mines, and perhaps also a better profit for the miners: that is, the Chamber of Mines employs extra men whose duty will be—well, I will put it this way. During the night shift, the examining shift, the man is appointed to go through certain working-places during the night. He takes a gang of boys with him, puts each stope in order, dresses it down and sees to it that it is safe, and he goes on to the next stope in the same way and does the same work there till he has completed his eight hours. When the ganger comes on the next day for breaking the rock everything is ready for him and for the trammer, and he can go on right through his shift without any delay. This solution will mean the employment perhaps of a few extra men.

"We are now faced with the unemployment question. Well, we contend that this will do a lot to solve that, and, what is more, it will give the Chamber a larger tonnage. They will have the full eight hours of native labour, and it will mean an increase in their profit as well.

Mr. Pate and Native Ratios.

Mr. Pate (Springs): "The ratio of blacks and whites should be, in my opinion, a national concern. That being so, and this industry being a national one, I think the ratio question properly settled would alter the necessity of having the word 'personal' in the regulations. My meaning is this: that at present we have 8.2 natives employed to one white person on the mines. That includes all white persons in your mines, including the manager, and I dare say the directors appertaining to the mines.

"I would suggest that the ratio be on a national basis, namely, the population of the country as blacks are to whites, or the population of the province of blacks as to whites.

"I am of opinion that the efficiency of the mines would be greatly increased where there is better white supervision and a lesser number of natives to whites employed. At present a trammer is called upon to supervise from 100 natives down, and over a large area. It is quite within reason to suggest that a trammer hardly has time to see every one of these natives during his shift. I would suggest that in bringing this into force a trial be given on a property such as the Government Gold Mining Areas. The Government are largely concerned in that mine, I understand, and a trial could be given in a section of that mine with suitable men and suitable natives to see the practicability of that scheme.

Man and Machines.

"I for one believe that there are too many machines allocated to one man. We have continually argued this point with the Chamber of Mines and their representatives, and the schemes put up individually from numbers of ourselves on the different mines are never given a fair trial. I contend that one white man to one machine would be an efficient way of working the mines, especially on the Far East Rand, where it could be given a trial for a start.

"I am prepared to be that demonstrator, if necessary, as a practical miner. And if this system of employment of natives as to whites according to the population of the country is given a trial, then, I think, you would be going a long way towards solving the unemployment question and the efficiency question.

"I am quite satisfied that the mines have not got sufficient enterprise. They do not try sufficient schemes whereby

efficiency can be got. It is more a matter of seeing how many natives they can squeeze into a mine, and how few white men they can put in. That seems to me to be the position.

"As I said before, the men cannot supervise a large number of machines efficiently, and if, as the cry of the Chamber of Mines is that there is a shortage of native labour—I notice lately they have quoted the highest figures they have had for a considerable time, so it is no great concern at present; but when the natives drop again it would be necessary, in my opinion to keep the production of the mines up to the highest standard, and in view of your remarks that there is a likelihood of a shortage of natives through the Mozambique Convention, and through the refusal of the Mozambique people to give us as many natives as we desire for the industry—I consider that it would be very necessary from the Government's point of view to insist that these trials be made in or about the mines, particularly underground.

Overhead Charges.

"I would suggest, further, that the question of overhead charges be gone into very seriously on all properties. That is a matter which cost the mining community a considerable amount of money. Probably it will be worked out on the tonnage basis, and it will not look very much. We, as workers, do not look upon it from the point of view of profit on the individual mines; we look upon it more or less from a national standpoint.

"... We are looking for employ for our out-of-workers, and we feel that it is the Government's duty, if necessary, to pool the whole of the industry and see it worked from a national standpoint on a ratio of five or six natives, whatever that ratio may be, to one white man, and then there would be no qualms about the removal of the word 'personal.'"

After further discussion it was agreed to constitute a small working sub-committee to discuss these matters in detail now, and try and come to some conclusion.

It was agreed that this committee should consist of eight members—two from the Government, two from the Chamber of Mines, two from the Mine Workers' Union, and two from the Industrial Federation.

The results secured by this Committee are now well known and are commented on in a leading article in this week's issue.

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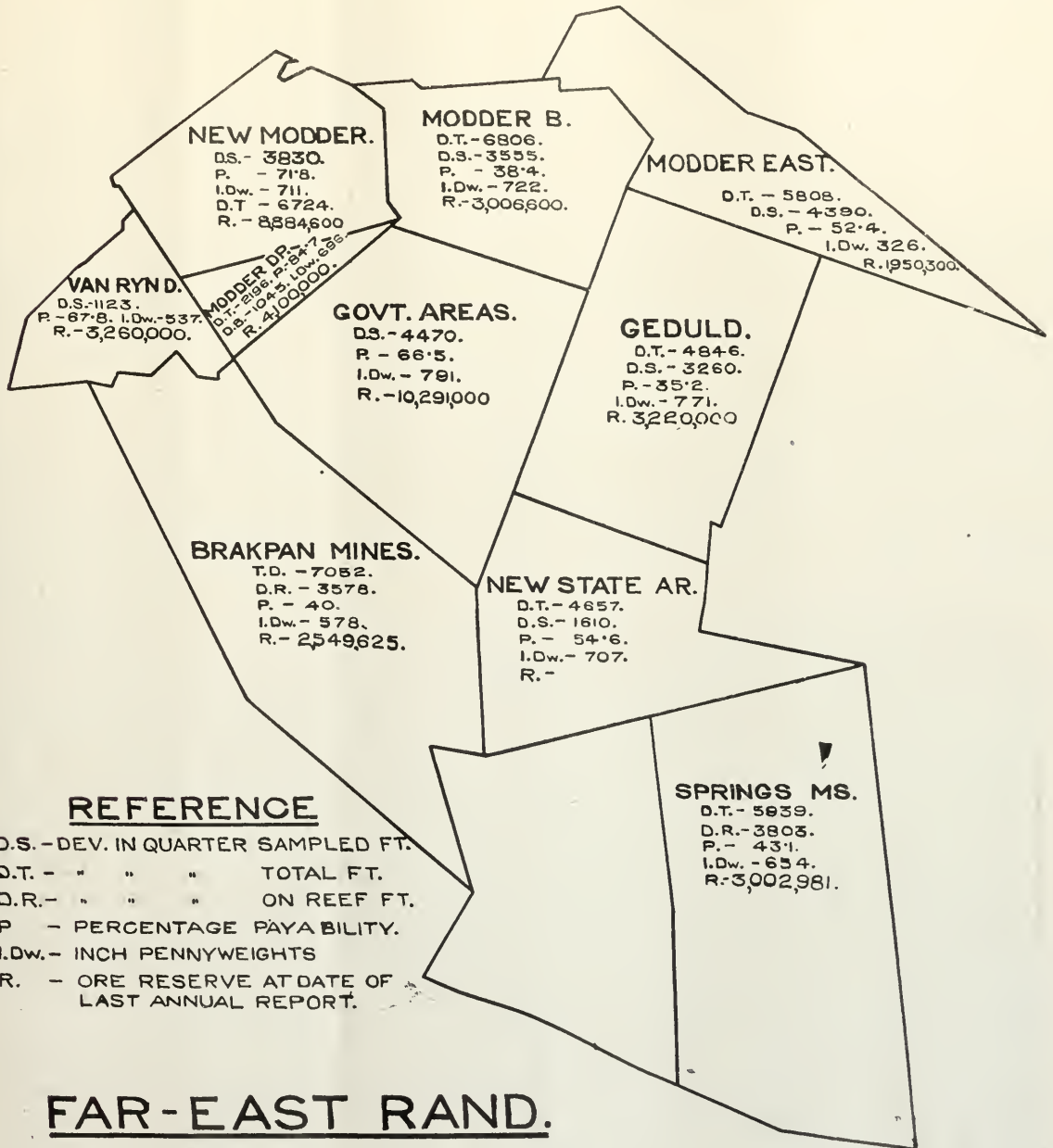


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How Development on the Far East Rand is Progressing. A Valuable Diagram.



The above chart graphically represents the positions of the principal mines of the Far East Rand. The development in each case is that stated in the last quarterly report of the mine concerned. The percentage of payability and ore reserves have been computed on the present basis of working costs, and should any reduction in this item of expenditure be made in the future, then both the ore reserves and percentage of payability will be proportionately increased.

SPECIAL ENGINEERING SECTION.

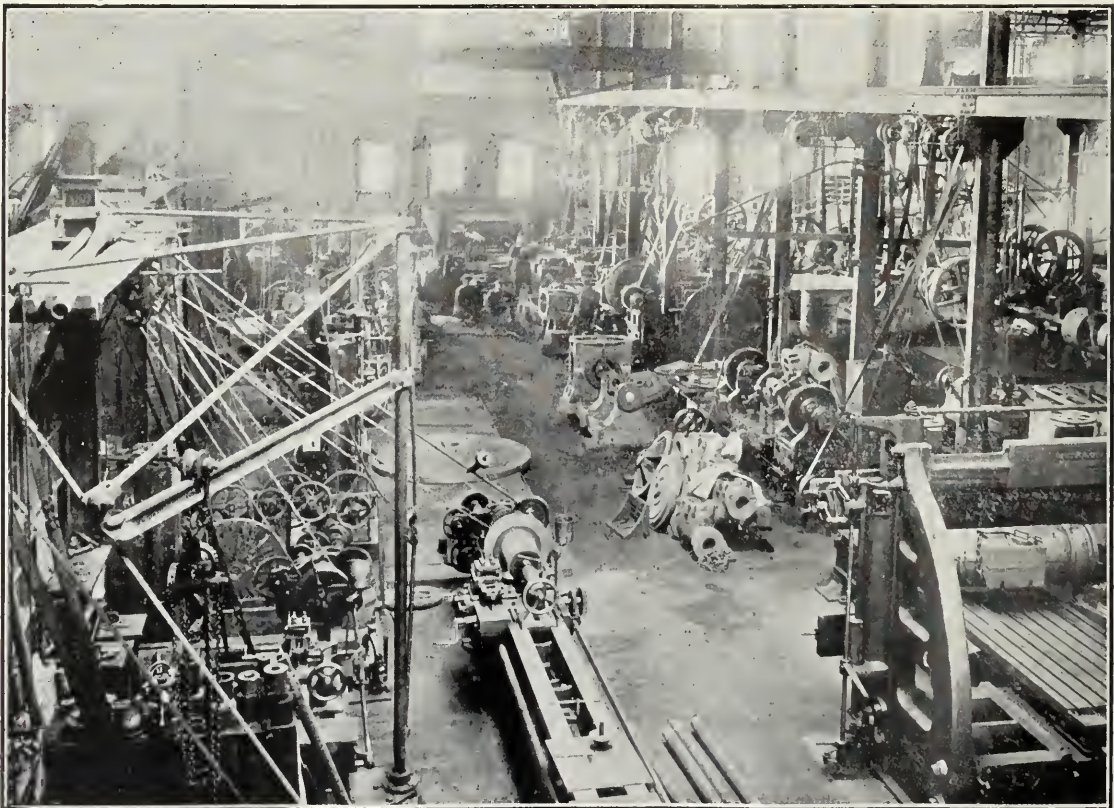
This portion of the "S.A. Mining and Engineering Journal" is devoted to articles of interest to engineers on engineering subjects. The Journal is the oldest engineering publication in the country, and it is intended to increase the usefulness of this section of the paper and more and more to make these pages representative of engineering activities of all kinds throughout the Union and Rhodesia.

Engineering Works and Foundries in South Africa.

WRIGHT BOAG & COMPANY, LIMITED., MECHANICAL ENGINEERS AND FOUNDERS.

In this issue we commence a special series of illustrated articles on engineering works and foundries in the Union. It is our intention to deal first of all with Rand enterprises of this nature, and thereafter to publish articles on foundries and engineering works, etc., in the Transvaal and in other parts of the Union and Rhodesia.

The engineering works of Wright, Boag & Co., Ltd., cover a block of ground between Delvers and Polly Streets, with their offices centrally situated at No. 6, Troye Street, Johannesburg. A passer-by in that neighbourhood would view the drab, brick, wood and iron buildings, which cover a big stretch of ground, with indifference, little thinking that within the wheels of industry are busily engaged supplying the various needs of the industrial activities of this country. The exploitation of the natural resources of any country is always attended by a certain measure of depreciation of the machinery employed, and for the good of the country such depreciation must be

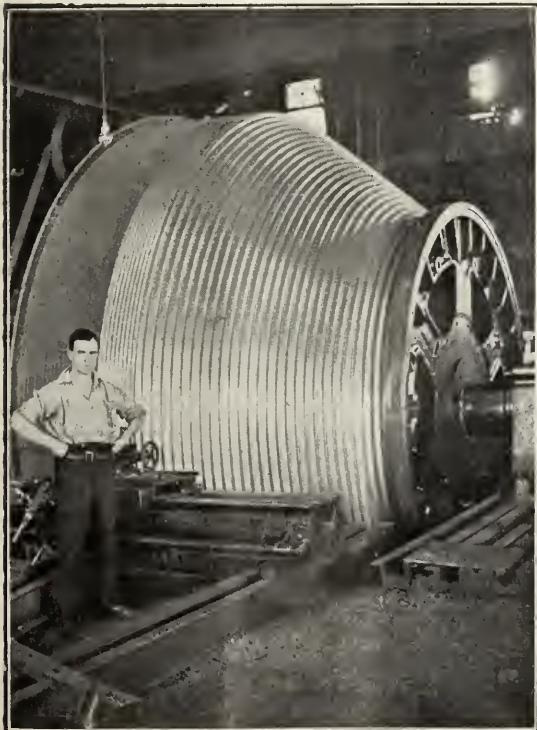


South-East portion of Machine Shop.

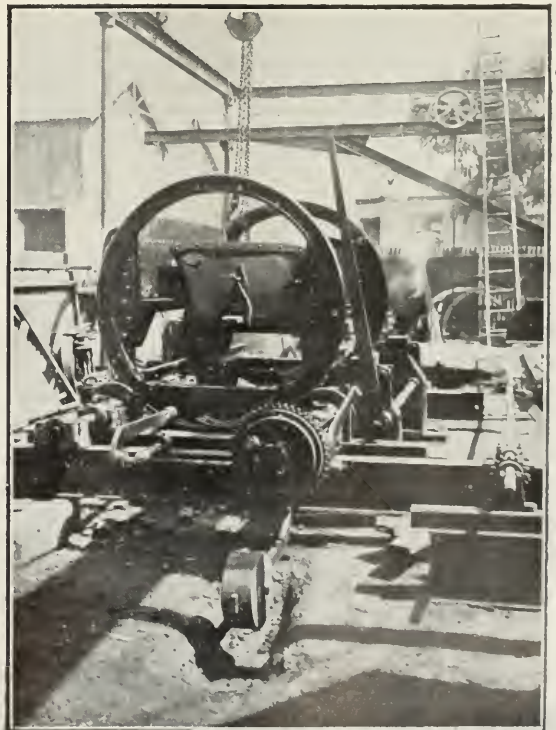
Views at the Works of Wright, Boag and Company, Limited. Some Local Engineering Achievements.



Train Load of Mine Cages leaving the Company's Boiler Shop.



Winding Drum, 18 ft. diameter, weight over 60 tons. Light coloured portion is the part made and added by Wright, Boag & Co., Ltd.



Underground Tipplers, manufactured and erected by Wright, Boag & Co., Ltd.

met by the substitution of new parts for the old and worn in the industrial machine. The importance of mechanical means and engineering methods in facilitating and improving the efficiency of modern methods of production need hardly be mentioned, as its results are obvious, even to the most inexperienced. South Africa is a young country, and in the development of its mining and other industrial activities a great demand for engineering products has arisen. Such demand was largely met by outside competition in the earlier stages, but it is gratifying to note that enterprising local engineering firms sprang up, as it were, and expanded together with the development of the country, and are to-day in a position not only of supplying the worn-out parts of the industrial machine, but also manufacturing the requirements of any new industrial undertaking. The engineering works of Wright, Boag & Co., Ltd., is one example of engineering progress accompanying the development of this country, and to-day stands as an important factor in the industrial expansion of South Africa.

The engineering works of Messrs. Wright, Boag & Co., Ltd., have been erected on a large piece of ground, and housed in substantial buildings of brick, steel and galvanised iron construction. The work conducted by the company may be divided and considered under the following departments:—Designing, pattern making, founding, forging, boiler making and erecting.

Designing.

Although this department has not developed to any extent in these works, as will be explained later, a certain amount of attention is paid to it and work of that nature carried on to a limited extent. By designing is meant the planning, calculating and drawing of any structure, machine, or part of a machine. It is the work of the technically trained engineer and draughtsman, and its importance cannot be overestimated. The strength and reliability of any structure or machine depends primarily upon the person responsible for its design; hence any work of this description has to be executed with the greatest of care.

Local engineering firms cater chiefly for the mining industry, and the latter all have their engineering and designing departments. It follows then that the mines prepare all their own plans and designs, and submit these to the engineering firms whenever work is required. For this reason the designing departments of the local producing firms have not developed to any large extent. The plans or designs for any structure or machine are usually submitted in both assembled and detail form. By the latter is meant that each part of the structure or machine is separately drawn, and the several parts manufactured as specified. Different parts of a machine are sometimes made of different kinds of material. For example, some parts may be made of cast iron, while other again of steel, mild steel or wrought iron. Parts may have to be either cast into the shape required, or forged, and if necessary machined. All machine parts thus owe their origin to the foundry or forge.

Pattern Shop.

Before an article can be cast into shape a mould has to be made, and from the mould the final article takes its shape. The mould is thus a very important unit in the production of a casting, and great care has to be observed in its making. The mould is usually built out of a specially prepared moulding sand to a pattern which is a representation, usually in wood, of the article to be cast. The pattern shop, where these wooden patterns are made is, as it were, the birthplace of the article finally produced. Although the great importance of the pattern shop can be understood, it does not represent a very large space when compared to the remainder of the works. It is fitted with wood-working machines driven by mechanical power. In the construction of patterns allowance is made for shrinkage which takes place in castings on solidifying or cooling. When a pattern has been made, it is forwarded to the foundry, where the moulds are made.

Foundry.

In the foundry work in both cast iron and brass is carried out. Castings of anything up to 10 tons in weight can be executed, and overhead electric travelling cranes are provided to cope with the heavier articles. Local as well as imported pig iron is employed in making castings, and it is gratifying

to note that the locally made article is of excellent quality and eminently suitable for this type of work. Some notable castings have been executed in this foundry. Large numbers of the Robeson-Davidson tailings and slimes pumps have been made here, and an array of the working parts of these was seen. Amongst the heavy work this company had recently completed, the enlargement of two winding drums for a local mine specially figured. In the latter case the finished article weighed over 60 tons. It was cast in sections, and two of these were executed. Another winding drum, measuring 14 feet in diameter and weighing 20 tons, has also been cast recently. The pig iron used in the foundry is melted in three cupola furnaces, which are supplied with compressed air from an electric turbine blower. The molten pig is run into ladles, and these conveyed by travelling crane to that portion of the foundry where the moulds have been made. Some difficulty is being experienced in obtaining suitable moulding sand, but it is expected that suitable supplies will undoubtedly be discovered in this country.

Forging Shop.

Articles or machine parts required to be made out of material which cannot be cast are usually rough shaped in this shop. Its equipment consists of two steam hammers of five and fifteen hundredweights respectively. The material to be treated is heated in furnaces and then hammered into the required shape. The jobs executed in this department include general heavy mine work.

Machine Shop.

All work which has been cast into shape in the foundry, or rough forged in the forging shop, that requires further and more accurate shaping, is treated in the machine shop. The machine shop equipment consists of lathes, of which one of the biggest has a 12 ft. radius; planers, capable of taking jobs up to 4½ tons in weight; shapers, slotting machines, special gear-cutting machines and milling machines. The scope of this department is very wide. Articles from the smallest motor wheels to a winding drum 18 feet in diameter and weighing about 60 tons, can be handled and worked in this department.

Boiler-making and Plate-working Shop.

In this department all articles which require to be made out of steel or wrought iron plates are handled. The shop is equipped with shearing, rolling, bending and punching machines. In it plates, etc., are cut into required shapes prior to being assembled in the erecting shops. Work of the following character is usually carried out: general plate work, colliery plant, picking belts, boilers, mine skips, cages and tanks.

Erecting Shop.

Here all parts belonging to a machine or structure are finally assembled, and the finished article in general turned out. The shop is provided with overhead travelling cranes of 10 tons and 5 tons capacity. These facilitate the handling of large and heavy finished parts. Of the many articles which have been assembled in this department, the following may be mentioned: large hauling engines, portion of the chlorination plant of the gold refinery, winding engines, skips and cages, colliery plant, picking belts, jiggers and screening plant, the Delagoa Bay coal tippler, and Robeson-Davidson tailing pumps.

Raw Materials.

The raw materials used at these works consist of both local and imported materials. The local pig iron used in the foundry has given excellent results, but local manufacturers in raw materials are urged to produce steel and wrought iron plate as well as the other products. At present imported plate is used, and often considerable waste occurs in the cutting up of such plate, as its size is often such as to render waste unavoidable. Plate locally manufactured could be made to specified sizes, and thus affect considerable saving in some directions.

It is gratifying to note that such a large engineering undertaking as that of Wright, Boag & Co., Ltd., is making full use of the product of the basic industries of South Africa, and further urges the production from them of steel plate. It is only by such co-ordination between the various industries of this country that a firm industrial footing can be gained.

The Durban--Maritzburg Electrification.

SOME DETAILS OF THE FIRST STEP IN THE ELECTRIFICATION OF THE SOUTH AFRICAN RAILWAYS.

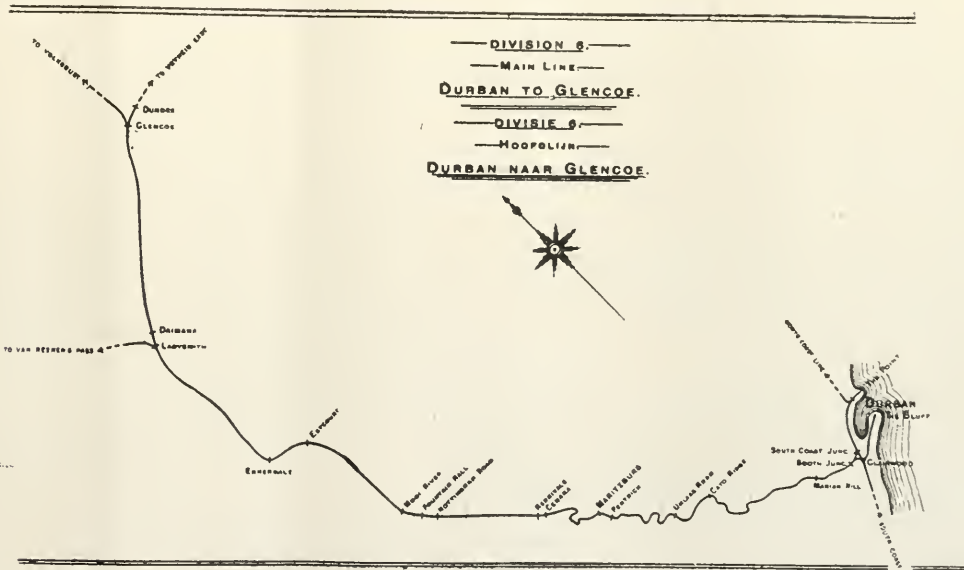
In our last issue we announced the decision of the Railway Board to proceed with the electrification of the Durban-Pietermaritzburg section of the S.A. Railways. This section, of course, forms part of the larger Durban-Glencoe section, which was reported upon in the following passages by Messrs. Merz and McLellan:—

The traffic on the section between Durban and Glencoe, which, including the line to the Bluff, is about 249 miles long, consists principally of goods trains conveying coal from the Natal coalfields in the neighbourhood of Glencoe to Durban, and of a certain number of through goods trains containing imports of machinery and general merchandise for the Transvaal and elsewhere. There is also the through passenger traffic between Johannesburg and Durban, which is fairly heavy during certain seasons of the year. Owing to the conformation of the country the line in many places

marshalling of trains during the journey of 240 miles. For example, according to the statistics supplied to us relating to a short period of observation, the average daily numbers of trains in the down direction on each of the six portions of the line mentioned above were 16, 22 1, 26, 23 1, 11 0, 26 1, in the order given.

Increase of Traffic.

In accordance with your instructions, we have taken into account in our estimates an increase of 50 per cent in both goods and passenger traffic. The total gross tonnage of down goods trains to be provided for is therefore approximately 20,000 tons per day. If the present system of working is continued, for example, on the Mooi River-Maritzburg portion of the line, the increased traffic will consist of about 39 goods trains in each direction per day, and something like



Sketch Map of the Durban-Maritzburg Section, showing probable extension to Glencoe.

contains exceptionally steep gradients and sharp curves, the maximum gradient being 1 in 30, and the minimum radius of curvature 300 feet. Durban is, of course, at sea level, and the altitude of Glencoe is about 4,300 feet. This, however, is not the highest point, the maximum altitude between these two places being over 5,000 feet. The rise from Durban to Glencoe is far from uniform, there being many reverse gradients, which create difficulties in working the traffic. In general it may be said that this section, on account of the heavy traffic and the special nature of the line, is by far the most difficult of all the sections in the South African Railways, and in consequence the one in which the advantages of electrification show up most plainly.

Dealing first with the goods traffic, the total gross tonnage despatched under present conditions from Glencoe to Durban is about 13,000 tons per day. The line as it is worked at present is divided up into six portions, viz.:—Glencoe-Ladysmith, Ladysmith-Mooi River, Mooi River-Maritzburg, Maritzburg-Thornville Junction, Thornville Junction-Cato Ridge, Cato Ridge, Durban; and, owing to variation in the ruling gradients, the average load per train differs for each section, thus necessitating frequent breaking up and re-

eight passenger trains of one kind or another. Thus the daily train service will include 94 trains in both directions, some of which will have to be assisted by banking engines. This is clearly beyond the working capacity of a single line, even with crossing places spaced on the average three miles apart. It will be obvious, therefore, that in the normal course of events very extensive alterations to the line will have to be taken in hand if the increased traffic is to be dealt with on the present system. As will be seen from what follows, no such alterations are necessary if electric working is introduced, the capacity of the existing single line being quite sufficient for the much smaller number of trains required.

Durban-Maritzburg Alterations.

Between Durban and Maritzburg certain alterations have already been decided upon, and are now in course of construction. These are as follows:—(1) A new deviation between Pentrich and Umlans Road, in which the maximum gradient against the loaded traffic will be 1 in 100 compensated, and against the return trains 1 in 70. (2) A new deviation between Cato Ridge and Clairwood, in which the maximum gradient against the loaded traffic is 1 in 150,

and against the return trains 1 in 66 compensated. (3) A new marshalling yard at Booth Junction, where trains will be made up for Durban and the Point, and for the Bluff. Alterations consequent upon this reorganisation of traffic will be made to the shunting yard at Durban.

The general question of increasing the capacity of the line to enable the increased traffic to be worked by steam has been considered by the Divisional Superintendent at Durban, and we are advised that, with certain alterations, it is possible to get the traffic through. These alterations are as follows:—(1) The completion of the new deviations between Durban and Maritzburg will enable the traffic to be dealt with on this section. (2) The construction of a new deviation between Cedara and Nottingham Road would enable the traffic to be worked from Maritzburg to Mooi River, trains being banked between Fountain Hall and Nottingham Road, and on the down journey between Merrivale and Cedara. (3) The doubling of the line between Estecourt and Ladysmith would enable the traffic to be worked from Mooi River to Ladysmith and on to Glencoe. As there are already two alternative routes on certain sections, these alterations would be practically equivalent to providing a double track over the whole distance from Durban to Ladysmith.

Except on the Durban-Maritzburg section, where the ruling gradients will be much reduced by the completion of the new deviations, the alterations detailed below will have little effect in reducing the number of trains. The doubling of the line will, however, eliminate delays at crossing places, and the easing of the gradients between Cedara and Nottingham Road will reduce the amount of banking necessary between those points. Between Durban and Maritzburg we have assumed that the loads of all down goods trains will be made up to 950 tons, and the average loads of up goods trains about 400 tons. This will reduce the number of goods trains passing over the section from a maximum of 78 per day to 42. In estimating the cost of working the increased traffic by steam we have taken this improvement into account. Similarly we have made allowance for the reduction in banking and the elimination of delays at crossing places on the Maritzburg-Ladysmith section.

Some Effects.

With electric working the arrangement of the goods traffic would be greatly improved due to the introduction of much more powerful and adaptable locomotives. Block loads of 1,200 tons would be made up at Glencoe and would be hauled through without alteration to Booth Junction. The trains would be assisted by single-unit banking locomotives between Ladysmith and Estecourt and by double-unit locomotives between Nottingham Road and Merrivale, but the train engines would remain attached to the trains for the whole

distance, the crews being changed at Maritzburg. We are informed that this arrangement would greatly simplify the working of the traffic, especially by cutting out delays at the principal intermediate stations, viz., Ladysmith, Mooi River, and Maritzburg. By this reorganisation the annual train mileage of through goods trains would be reduced from 4,683,400 with steam to 3,013,400 with electric working. At the same time the average speed of travel would be increased, the total time for the double journey from Glencoe to Booth Junction and back being reduced from about 56 hours to about 26. These figures will provide an explanation of the power of electrification to increase the capacity of a line and to reduce the expenditure on the wages of engine men and guards.

The bulk of the goods traffic on this line consists of through goods trains. Intermediate traffic would be provided for by pick-up trains, which would collect and distribute the local traffic as required. There would be 4 such trains between Ladysmith and Maritzburg and 2 between Maritzburg and Durban, and those would be worked electrically. Between Ladysmith and Glencoe there are a number of private sidings, and on this account it would be simpler, for the time being, to work the pick-up trains between these points by steam engines.

We understand that provision should be made for a general increase of 50 per cent. in the passenger traffic. At present there are, on the average, 6 up and 5 down trains daily, with special arrangements during the Durban season. These trains contain on the average 8 coaches each, weighing in all 306 tons, excluding the locomotive.

(To be continued.)

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Low Temperature Carbonisation of Coal.

It is claimed that the problem of low temperature carbonisation of coal has at last been solved. This is the outcome of twenty-one years of experimental work in the face of almost incredible difficulties at a plant at Barnsley. Over forty different types of retorts were erected and experimented upon, and over 200,000 tons of coal utilised.

The process of low temperature carbonisation may be said to be conducted on the same principle as ordinary coking practice except that temperature of carbonisation is much lower. It ranges about 550 degrees Centigrade inside the retorts, while in coking practice the temperature is in the neighbourhood of 1,000 degrees.

The result of this lower temperature is that the complicated series of chemical reactions resulting in the decomposition of the coal is quite different in character from that of high temperature carbonisation, a portion of the volatile matter being still left in the coal forming the well-known smokeless fuel "coalite," while the yield of valuable liquid products, especially motor spirit, is much higher. The essential figures for each of the three processes are as follows—

Products from 1 Ton of Average Coal.

	Low Temperature Carbonisation.	High Temperature Carbonisation.	
		Gas Works.	Coke Ovens.
In retorts	14 cwt. of smokeless fuel coalite	13½ cwt. soft coke	14-14½ cwt. hard coke.
Gas	6,000 cubic feet rich gas (700.750 B. Th. U. per cubic foot)	12,000 cubic ft. of gas, 550 B. Th. U. per cubic foot	11,500 cubic ft. of gas, 450 B. Th. U. per cubic foot
Liquid products	20 gallons, including 3 gallons motor spirit and Diesel, lubricating and fuel oils	10 gallons	8 gallons
Sulphate of Ammonia	15 lbs.	25 lbs.	28 lbs.

That is to say, the yield of liquid products (coalite oil) is very much higher than the coal tar of high temperature carbonisation, and also the composition is different. Coalite oil does not contain the higher and more complicated organic compounds such as naphthalene and anthracene, and a much greater proportion of the simpler organic compounds, benzols, toluols, creosols for creosote oil, etc., as compared with coal tar, and is a liquid of much greater commercial value.

A Cheerful Fire.

As regards coalite itself, this is already well known for its valuable properties, and the only difficulty has been to make it. It is a bright, crisp, clean porous solid, which burns with a cheerful fire without smell, but with the emission of a great amount of radiant heat, and entirely without smoke. From the point of view of household fuel, the radiant efficiency of the ordinary average fire is 22-24 per cent., and taking into account the small amount of converted heat and the warming of the brickwork surrounding the grate the total efficiency is probably about 30 per cent.

Since household grates heat chiefly by radiant heat, it will be obvious that coalite is a fuel of the greatest value. The radiant efficiency of a coalite fire is very high, about 35-37½ per cent., making a total efficiency of about 45-47½ per cent. In my opinion, taking everything into consideration, the different qualities of household coal on the market and the different types of grate in use, I think that a conservative figure is that one ton of coalite is equal to 1¾ tons of coal.

Difficulties Overcome.

As regards the technical difficulties that have been solved at Baruch by the new retorts patented throughout the world, the chief of these has been that when coal is carbonised at low temperatures it swells up and becomes viscous or sticky, so that it will not come out of the ordinary

retort without the greatest trouble. When extracted it bursts into flame in the air and when quenched with water (as with coke) it falls to dust. Also the fire-clay retorts are porous and the gas penetrates the sides and ignites on the outside, rendering the proper temperature control impossible.

The whole of these and other difficulties have now been solved by the new retorts patented throughout the world. These retorts are divided down the centre by adjustable iron plates so that there are two layers of coal only about 5 inches thick, and the coalite formed is absolutely homogeneous. When the carbonisation is finished at the end of the 7-8 hours the two plates are brought close together in the middle, and the coalite then drops out of the bottom without the slightest trouble in the way of sticking.

Engineering Triumph.

The trouble due to the porosity of the retorts has been got over in the most ingenious manner by applying the suction of the exhausters to the top of the retorts so that the pressure in the retorts is balanced by this suction and there is no tendency for the gas to pass through the walls of the retort. It should be pointed out that the ordinary gas retort, or coke oven, is absolutely useless for the production of coalite. If the temperature of these retorts is lowered the result is not coalite at all, but a mixture, chiefly of coke on the outside of the mass and unburnt coal inside. A mixture of half-baked coal and coke has no resemblance whatever to coalite, which is a homogeneous product, with 12 per cent. volatile matter in a definite physical condition of porosity and texture.

A final point of the greatest importance is that in the first place it is not necessary to use all-coking coal in the process, and mixtures containing up to 70 per cent. non-coking coal are quite satisfactory, while all the small slack, both coking and non-coking, now practically a waste product of the collieries, can be utilised.

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The S.A. Iron Industry.

AVAILABLE IRON ORES—PHYSICAL CONDITIONS—IMPORTANCE OF GEOGRAPHICAL POSITION IN RELATION TO MARKET—MATERIALS AND PRODUCTS.

By E. E. Buttner, D.Ch.

Raw Materials.

A recent survey by Dr. P. A. Wagner, Government geologist, has definitely shown that South Africa has vast reserves of iron ores, which appear to place her second only to Brazil as far as both quantity and quality are concerned. Our iron deposits include three of first magnitude in the siliceous ironstone horizon of the Pretoria series, the titaniferous magnetites of the Bushveld Complex, and the haematite deposit on Farm Buffelshoek No. 151 and adjoining farms in the Rustenburg district of the Transvaal, and the Blinkklip breccia deposits of Griqualand West, all of which can be ranked as great iron ore deposits of the world, while other important deposits include those of the Pretoria town lands, on the farm Kromdraai, of South-West Africa, and Natal. South Africa has missed a tremendous opportunity by not developing her iron industry during the war, and every year lost reduces her inherent advantages over other countries, so that artificial ones have to be made in the shape of Government assistance. At the present day progress is, of course, being made, and when considering the establishment of an iron industry the following considerations are vital. The value, from a commercial point, of an iron ore does by no means depend chiefly on the content of metallic iron, and for anybody to hold up the percentage of iron in a stone as evidence for success is extremely misleading. Many other impurities, though small in amount, greatly affect its value. An ore may be too rich to work satisfactorily by itself, as it may not have enough gangue to furnish a sufficient slag volume. Although many iron-making districts have available varieties of ores to furnish a suitable mixture in this respect, the trouble is to get a mixture that will give the correct slag. After the iron and silica in an ore, sulphur is the most important element to consider. If the sulphur is not readily oxidised, the ore is useless for iron making, no matter how desirable it may be otherwise. Otherwise an ore rich in sulphur means roasting, and this implies extra plant and outlay. The percentage of phosphorus allowable depends on the purpose for which the pig iron is to be used. Then it is necessary to ascertain whether the silica is present as quartz or shale, and in any case the pure silica, not merely the insoluble residue or siliceous matter, should be shown. It must be shown whether the lime is present as carbonate or silicate; whether the sulphur is present as calcium or barium sulphate, or as pyrites; whether the iron exists as ferrous oxide, ferric oxide, or the

magnetic oxide. The foregoing basis of valuation is from the standpoint of composition only. Of very great importance is also the physical condition of the ore. In general, fine ores are undesirable because they do not work well in the furnace, causing serious irregularity in operation. The reducibility of the ore is an important factor, because it affects the fuel consumption and the rate of driving and output. The red hematites are the most desirable ores. Although titaniferous ores were rejected once, new methods of smelting have reduced their disadvantages. A prime consideration determining the value of an ore or its availability is its geographical condition or location with reference to mining, to fuel, to markets, and to transportation either of the raw materials or of the finished product or both. The distributing centres of the products are looked upon as the best sites for the plants in the Middle West of the United States, the ore being conveyed over rail to the plants. In America the development of the markets further west than Pittsburg has resulted in a much greater development of the industry in the Chicago district and the shifting of the market determining the availability of an ore for a given location. The same factor of proximity to markets causes English and German industries to fix their plants in England and Germany instead of Spain, Norway or Sweden, where the high-grade ore is imported from. Reduced tariffs on ore exported from Sweden to America have not transferred the furnaces to any other point than the American markets. It is impossible for anybody to form a definite idea of the future of any venture or adventure in the smelting of new ores without having first made laborious experiments on a commercial basis; other experiments are unreliable.

Plant.

From the foregoing it will be seen that the plant has to be erected on a site that is as close to the centre of distribution of products to the markets as possible, if the products are mainly destined for the market. In South Africa the centre of distribution is, of course, the Rand, where the greatest concentration of our population exists. If, however, the main products should be made for the Government, to be delivered only to the siding, then proximity to markets will not be so urgent. If the main products are to be exported, proximity to the sea will have a great influence. Since South Africa can scarcely hope to compete for long in the world's market, proximity to the market locally is more urgent than in most countries. Conditions in the com-



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GOVERNMENT EXAMINATIONS.

MINE MANAGERS' EXAMINATION

Total certificates (metal) granted to date 1921 — 35

Secured by students of Messrs. Lucas & Wolfe — 24

Balance for S.A. — 15

In addition to above we obtained 5 coal certificates last two examinations

OVERSEERS' EXAMINATION

During 1918 and 1919 we secured the majority of the certificates granted. 21 certificates in 1920, and 23 certificates to date 1921 (metal and coal)

SURVEY EXAMINATION

We have obtained practically all the certificates granted by the Mines Dept. during recent years and have secured 62 certificates to date

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mercial world are getting more normal every year, and a young country like South Africa could not reasonably, with cheap and therefore inefficient labour, dare to compete with older countries where no such inefficient labour as that of our natives is used. When treating ores whose behaviour in the furnace is unknown, it is most desirable to commence smelting on the smallest commercial scale possible, the aim being to prove the case, and not dividends. In case the ores prove a failure from a commercial view, the loss will not be so appalling than if operations were on a larger scale. To open up an iron industry in these days is an extremely delicate undertaking for even the specialist, as there are so many variable factors that have to be accounted for. Once small-scale experiments have proven the feasibility of establishing an iron industry, the next step should be the immediate erection of a plant of the largest possible and most moderate style so as to be able to sell the products at least locally in competition with outsiders. It is the greatness of foreign industries that reduces costs so as to enable export into countries making the same goods. Then again, a small plant will, during the course of experiments, enable the accumulation of raw iron which could be cast into parts for the following large plant, thus killing two birds with one stone, and reducing the cost of the larger plant. The nature of valuable experiments are such that would presumably ruin any furnace, and seeing that inventions and cheapening improvements are often made by such drastic experiments, the desirability of a small plant is emphasised all the more.

Materials and Products.

Besides ironstones, the composition and locality of coal, flux and others, such as refractories and steel-improving elements like vanadium, chromium, nickel, copper, etc., have to be considered; the latter not being vitally important. Not every coal of a low sulphur content is of satisfactory physical condition when coked. Hardness and strength of coke are essential. Soft coke cannot well support the burden of the charge and is too readily dissolved by carbon dioxide, localising the action of the furnace and preventing intense temperature where it is needed. Some cokes are hard and brittle, while others are soft and strong. Certain Transvaal and Natal coals give a suitable coke. The larger the furnace the more is strength and hardness desired. The purity of coke is also important. The carbon must be high; the ash and sulphur must be very low. Where the iron industry fluctuates much, the beehive coke oven is very flexible and adaptable for irregular working; its initial cost is low, also that of maintenance, together with simplicity of operation, needing less skilled labour. It also produces the best coke possible. The retort ovens yield extra by-products, need skilled labour, and cost more to build and erect, as well as to maintain. Whether limestone or dolomite is best as a flux depends on the content of alumina in the ironstone; bad results of magnesia showing more decidedly in the presence of high alumina.

Whether the products and by-products can be sold depends upon proximity of markets. Rails and railway materials are taken by the Government at the place of manufacture, but mining and agricultural machinery must be made close to the central distributing station such as Germiston. It is certain that Germiston will hold this place for a long time. The Rand would be considered as the market. A young country like South Africa must have some peculiar advantage if its iron industry is to succeed. Cheaper labour is very misleading, as the case of the boot factories have taught us to our cost. The only real advantage that would enable us to hold our own consists of Government assistance in the form of special railway rates and preferential patronisation in the matter of its orders, or special tariffs levied on imported iron goods. The assumption that the known extra-African sources of iron ore of present-day commercial grade are within measurable distance of exhaustion is no advantage because Russia and China have huge untouched deposits as well as other countries, besides coal, and labour in China is cheap and good. It must also be remembered that a plentiful supply of water is essential, and of electric power very desirable.

In conclusion, it has been repeatedly shown by specialists and experts that it is easily possible to construct in South Africa a flourishing iron and steel industry. Australia and India are giving us an example of how to make money.

Concerning Mines and Men.

Mr. C. Distall, of the Corner House, has returned from a six months' visit to Europe.

* * *

Mr. C. Dethelm, of Messrs. Sulzer Bros., has returned to the Rand after an absence of six months.

* * *

Mr. C. L. Butlin, manager of the Modder "B," has returned to the Rand after a six months' trip to England.

KOMATI POORT COAL FIELDS.

The owners of a large area adjoining the Government Reserve, railway passing through same, are prepared to negotiate with a view to further development and sale; an option given. 4 feet seam discovered at about 70 feet.

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MORE ABOUT NEW RAILWAYS & HARBOURS.

THE LURE OF ZULULAND—DELAGOA INTERESTS—AN OPPORTUNITY FOR A LEADER.

By a Special Correspondent.

The absolute necessity for a new harbour and railway to enable the Eastern Transvaal and Northern Zululand to develop their natural resources is recognised by all, and we here give a few more details of these districts.

Northern Zululand.

The North Coast Railway runs to Somkele, about 25 or 30 miles from St. Lucia Bay. The distance from Durban to the terminus is 167 miles. Some of the richest sugar lands at present developed are at Empangeni, 122 miles from Durban, but practically all the country north from Somkele to the Portuguese border is known to be equal to the finest at present worked. Colonel Reitz in his recent tour amply confirmed this. This large area of good land is, roughly, 100 miles long by more than 30 miles wide, or equal to almost 2,000,000 acres.

The Zulus are a cattle-loving nation, and most of this area is hot bush country, and therefore there are comparatively few natives in it. The natives prefer the higher and more open country. Under the Natal Native Ordinances parts of Zululand are set aside for native occupation, but this area is not, for the above reasons, the favoured one. For tropical farming it is, however, of the best, and the white settlers already near it are proving that climate is no bar to their progress.

In sugar output we are only just able to supply ourselves, even when getting the surplus output from Mozambique.

If South Africa is to expand and her population is to increase as we all wish, then the development of more sugar, cotton and grazing lands must be kept in view, and this part of Zululand and Natal contains the only large potential areas of such undeveloped land we have in the Union.

Coal.

The only great expansion of population which may be looked for for many years is in connection with mineral wealth, and our greatest mineral wealth is in our vast coalfields.

The axis of our best coalfield may be taken as a line running from Witbank to Vryheid past Bethal and Ermelo.

How Railways will Develop Markets.

Without a new northern railway sugar from Zululand will require to be brought *via* Durban, 680 miles at least, to the Rand markets, and 600 miles to the coalfields. With a new line constructed to Piet Retief the distance to the coalfields will only be 250 to 300 miles, and about 400 miles to the Rand.

Northern Zululand is to-day almost valueless owing to distance and lack of communication. Its possibilities are well known, but lack of railways and markets prevents its development.

This area is all Crown lands, and the increase in value through being given railways would almost wholly pay for these lines.

Then there is the long rich valley of the Pongola, fertile and well watered, at present only winter grazing for High Veld stock and natives and baboons in summer. Shrewd business men like Rouillard are getting in, knowing full well it is only a question of time till this huge country is opened up.

Competitive Distances and Rates.

A railway alone will do all that is necessary for the agricultural industry in Zululand, but for the mineral wealth of the Ermelo, Piet Retief and Wakkerstroom districts nothing but a new harbour will serve. Taking Sheepenoor as a point in the coal belt from which to measure distances, the distance to Durban by existing railways is 431 miles, and to

Delagoa Bay about 300 miles. Hlobane Collieries are 311 miles from Durban; Enyati, Buffalo and Northern Navigation are a little more. Even with the most favoured mileage rate in normal times these collieries no doubt found it hard enough to compete with collieries at Glencoe and other districts with a much lower rate. The day is fast approaching when each and every class of traffic on the S.A.R. will require to be self-sustaining, and neither Sir W. Hoy nor anyone else will ever be able to give a rate for a colliery at 450 miles from a market to enable it to compete with one at 250 miles.

Laurencø Marques, 300 to 350 miles away, may also be ruled out; the railway to Delagoa Bay is difficult and expensive to operate. Delagoa, moreover, is a foreign port. But apart altogether from this is the outstanding fact that technically and politically it is an impossible position to depend on a foreign port, however good it may be and however friendly its owners are at the moment, and by doing so to neglect a huge tract of the very best agricultural land in our own country, and to penalise by at least 100 miles of railway carriage one of the finest coalfields in the world.

A Notable Article.

In the much-discussed article by Mr. Danks, published last May, he advocated burial of all parochial prejudices and going straight for the best harbour possible for our mineral exports. The Government to-day seems to be following this policy, and it is to be hoped no pressure will divert them from the straight path.

The Portuguese and other interested parties are, in the daily Press, making a lot of fuss about broken promises in connection with the Swazi railway, and the loss they have incurred on their Goba line. The Portuguese want their progressiveness in connection with their port affairs. If they are as smart as they wish us to believe, how is it they have failed to make economic use of this Goba line? Here is a railway in flat, fertile country, and they say its construction has been a dead loss to them.

Another Scrap of Paper?

As for Lord Milner's promise, Mr. Danks in his article contended that this free country cannot be bound forever by his acts. There is nothing in our Act of Union binding us to acts of past rulers. Amongst ourselves many an act of the Milner *régime* was scrapped as soon as the Transvaal Government got responsible government: the retrenchment of civil servants after having been induced to leave other and high-paid services to come here is a case in point.

MINES DEPT. EXAMS.

CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 3 failures this year (1921)

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St. Johannesburg

Besides, has the management of the Portuguese port and the forwarding of goods always been so perfect that they should continually nag and pin-prick about broken conditions and promises?

What do they think we are that they always hang the threat of withdrawal of native labour over our heads? And what a flimsy excuse they make when they say they require the labour for the development of their own territory? Where do they market their sugar and the other products of their province? Do they for one moment imagine that they can erect a fence at Kessano Garcia which will keep in the natives and still have a gate through which to let through their produce? Let our Portuguese neighbours once and for all dismiss from their minds any idea they may have that they could keep back the natives. The "boys" have tasted the fleshpots of Egypt, and no wages the Portuguese could pay them, with our markets closed, would keep the boys down there once the craving for the high wages of the Rand seized them.

The Financial Aspect.

For a project having such a potential value to the Union as has the new harbour, there should be no trouble with finance to begin with; there would be half a million acres of Crown lands brought within ten miles of the new railway. This land is known to be the finest sugar land in the Union. Its value could not be assessed at less than £3,000,000, so there is in this a nice nest-egg to start off with. A township for the new harbour would bring in another large sum.

As the coalfields by this new line would be the nearest in Africa to a seaport, and the railway specially designed to carry coal, like the Prince Rupert Canal, at a minimum cost, a lower rate than obtains from the present collieries would pay its way. The difference could be put on as an export tax, and the proceeds set aside for amortisation purposes.

Some months ago you published that strong and thoughtful article, "The Land Without a Leader." Let us have the leader, the strong man, in this. Let General Smuts openly proclaim that he intends to develop the mineral resources in the Eastern Transvaal, and funds will be forthcoming. Should there be any trouble about finance, remember times change and we change with them. Reverse the policy of only developing by Government railways and harbours, and proclaim that in this instance they would accept tenders for construction and operation for a number of years, and there are at least half a dozen responsible firms who would be in the rush to tender. But by whatever means it comes about, let us get a move on and get it done. Give us a lead, and give us a leader.

B. G.

An Automatic Railway Coupling.

An automatic coupling for railway purposes, which it is claimed will mean saving the lives and limbs of shunters, has been invented by Mr. A. E. Hamblin, member of the staff of the Grahamstown Veterinary Laboratory. Shunters frequently have to stand between the carriages or trucks in order to link up the coupling. Hamblin's invention renders this operation by the shunter unnecessary. The invention involves a trigger block fitted in the buffers, and when one truck approaches another to be coupled the link operates the trigger block of the opposing buffer and releases the coupling pin, which automatically drops into position. The working parts are extraordinarily simple, and the inventor claims that the device can be fitted to any of the various forms of buffer in use on South African railways at a cost of a few shillings per buffer. Negotiations are proceeding with the Railway Administration for a demonstration of the invention to take place at an early date in Uitenhage railway workshops.

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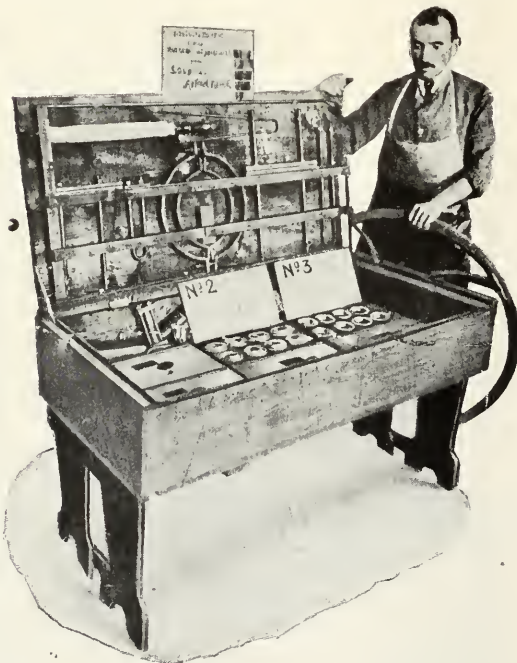
We have had an opportunity during the week of looking into the merits of the "Castolin" auto-chemical welding process which is now on the market. The first point about the "Castolin" method of welding is that it does not, as in the case of other processes, require specially-skilled operators—the work can be done by a smith or handyman. Any kind of iron and steel, and most of the other metals in commercial use, can be welded each to itself or to the others. "Castolin" is therefore invaluable in the workshop of industrial establishments, and especially to those—as in outside districts—not having easy access to repair shops. Not only can all ordinary breaks be welded by the "Castolin" process, but it is also admirably adapted for the filling up of faults, cracks, blow-holes and other defects; the adding of metal to weak, wasted, worn or porous parts; building-up lost parts; reinforcing weak castings with steel, and constructional work with fresh materials. Articles of all sizes, from typewriter parts up to large castings and other parts of engines and machines, can be welded by the "Castolin" process. Those too large to be manipulated on forges are dealt with by means of the

pistons, glands, cog-wheels, sidebars, typewriter parts and other pieces of precision, can be welded without deformation of the metal. No annealing away from the weld is necessary when articles are welded by this process. The cost of the "Castolin" welding materials is under three-pence per square inch of surface to be welded. The time occupied in the actual welding is but little more than that required for properly heating and cooling the piece to be welded.

It may be added that the process is in use by the Admiralty, the War Office, the Port of London authority, the Thames Conservancy, the London County Council, etc., etc., and in a large number of constructional, repairing and industrial works connected with marine and land engineering. The makers are the Castolin Chemical Works, of which the South African agency address is Box 2265 or Phone 4404, Johannesburg. The agents will be pleased at any time to arrange demonstrations of the process.

Railway Electrification.

Elsewhere in this issue will be found an illustrated article on the electrification of the Natal portion of the S.A. Railways from Durban to Glencoe. An official statement on the subject is eagerly awaited, and will, we understand, be forthcoming this week-end. There is reason to suppose that the Railway Board has had under consideration the question whether first to electrify the Durban-Maritzburg section or the Glencoe-Maritzburg section. In view of the fact that the former is now practically duplicated, it may be that the greater benefit to the whole section, regarded as a coal-carrying line, would result from first electrifying the Glencoe-Maritzburg section, leaving the Durban-Maritzburg section till later.



The Complete "Castolin" Outfit.

"Castolin" blowpipe, or in temporary furnaces built up with fire bricks, sheet iron, etc. It is noteworthy that the nature of the joint made is a weld and not a "brazed"; there are great and essential differences between a "Castolin" weld and a brazed joint; the latter will stand no definite test, a "Castolin" auto-chemical weld will. Breaks welded by "Castolin" become the strongest part of the casting welded, and will not break again in the same place. "Castolin" welds withstand tensile strains per square inch of over 10 tons in the case of cast iron, and over 20 tons in the case of steel. The temperature required is "cherry red" or, say, a temperature between 1465° Fahr. and 1740° Fahr. or 800° Cent. and 950° Cent. It follows, therefore, that the "Castolin" process does not involve the deterioration of the mechanical and chemical properties of iron, steel, etc., which is inevitable in the case of high temperature methods of welding. There is, moreover, no distortion of the articles operated upon; such things as engine cylinders,

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Production of One Million Volts and Tests.

Cables recently appeared in the daily papers stating that in America they have produced for the first time alternating current potential of one million volts. We now learn that successful generation of electric power at more than one million volts at commercial frequencies was accomplished for the first time in the history of the transmission of electrical energy at the High Voltage Engineering Laboratory of the Pittsfield Works of the General Electric Company at Pittsfield, Massachusetts, U.S.A., on September 13. During the course of the experiments much valuable data was gathered, indicating the feasibility of considerably higher transmission voltages. Physical laws applying to high voltage phenomena were found to hold good at these enormous potentials. In the course of the experiments the gap spacings for sphere and needle spark gaps were carefully checked up and prolongation of existing curves (750,000 volts and below) were found correct up to 1,000,000 volts. Arc over-tests were also made on strings of standard 10in. suspension insulators up to 1,100,000 volts. The laws of corona were checked at similar potentials, and found to hold. A short transmission line was tested for corona conditions, and results indicated that a line using 4in. diameter conductors or larger would be necessary at 1,000,000 volts.

The successful conclusion of the tests is the result of more than 30 years of constant experimentation, during which time transmission voltages have risen steadily from the first 15,000 volt line built in Pittsfield in 1891 to the present record-breaking voltage of 220,000 volts, equipment for which was recently shipped from Pittsfield and is now being installed on the Pacific Coast. The tests at Pittsfield confirm the belief of the engineers there that it will be commercially feasible to use considerably higher voltage in the transmission of power, and indicate the extension of long-distance transmission beyond limits heretofore believed possible. Electrical engineers are now in a position to forecast results.

In commenting on the achievement Dr. Charles P. Steimnetz, chief consulting engineer of the General Electric Company, said:—"One million volts is so far beyond the comprehension of the ordinary layman that it is interesting to recall how rapidly high voltage development in this country has progressed. It is about forty years since Edison first transmitted electricity at constant voltage. He used 110 volts, and later 220 volts. At this pressure electricity can be sent economically for about a mile. In these forty years voltages have increased until now we are actually using 220,000 volts, a pressure just a thousand times greater than that which was considered the safe pressure when Edison began his experiments. This voltage of 220,000 volts is to be transmitted 250 miles, and is to be utilised in California. Now we have the interesting announcement of a million volts which the General Electric Company has just attained. While electricity, as these tests show, can undoubtedly be transmitted in large bulk, if so desired, for possibly thousands of miles, it is probable that the millions of horse-power available at various points—such as Niagara, for instance—would find a market and be consumed within a few hundred miles of their source."

F. W. Peck, jun., laboratory director at the Pittsfield Works, under whose direction this achievement was accomplished, says of the experiment:—"For some time engineers have been able to predict with certainty the corona and spark-over characteristics of high-voltage transmission. These predictions were based on laws of corona established by crucial tests made up to about 250 k.v. and on spark-over curves established on needle and sphere gaps and line insulators at somewhat more than double this voltage. Commercial apparatus has already been built for 220 k.v. operation. It was of great present theoretical and probably future practical interest to determine experimentally if there was a discontinuity in the established laws and curves at a million volts or over. Although no deviation was expected,

we could not be certain until actual tests were made. We might, for instance, speculate that because of the great length of lightning sparks the air must be relatively weaker at the very high voltages. Tests up to about 1,100 k.v. were made on the various elements entering a transmission line as follows: (a) The spark-over curve between points showed no discontinuity. The spark-over at 1,000 k.v. was found to be about 105 inches. (b) The spark-over curve between 75 c.m. spheres showed no great deviation from calculated values. (c) Tests were made on strings of line insulators, and the spark-over voltages were as expected; for instance, a string of 18 standard suspension insulators arced over at about 900 k.v., while a string of 22 insulators did not arc over at more than 1,000 k.v. (d) Visual corona tests were made on 3½in. diameter brass-tube lines operating a single phase. The corona starting voltage (about 900 k.v.) checked with the calculated value."

Mining Men and Matters.

Our old friend, Mr. E. H. A. Cohen (familiarily known throughout three continents as "Alphabetical Cohen"), has been appointed consulting engineer to the Bethlehem Oil Syndicate. Mr. Cohen has had a great deal of field work experience on oil formations, particularly in America and North-West Canada, and his practical knowledge should be of the greatest value to the syndicate in question.

* * *

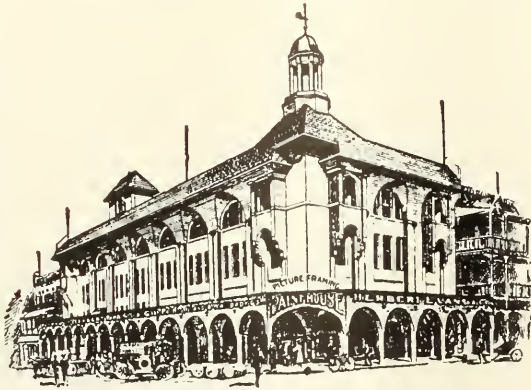
Mr. G. M. Clark has been appointed a member of the Advisory Board of Science and Industry.

* * *

The death is announced of Sir Douglas Fox, the celebrated civil and mechanical engineer, who was associated with the building of the Capetown-Wellington and Capetown-Wynberg railways. He was joint engineer on the Rhodesian and Mashonaland railways, the first consulting engineer to the Cape Government railways, and designer of the world-famous bridge over the Victoria Falls.

The Crown Mines Dispute.

The position with regard to the Crown Mines dispute took a grave turn on Thursday night, when a meeting of the Joint Executives of all the unions in the mining industry was held at the Trades Hall, Johannesburg. Over sixty representatives were present and the discussions lasted for two hours. At the conclusion of the deliberations, the following official statement was made for publication:—"The Mine Workers' Union stated their case with the ultimate result that the unions unanimously agreed that they should be supported. But as a last effort to settle the dispute without extending the strike, it was decided to request the Federation to demand an immediate Board of Reference in terms of its agreement with the Chamber of Mines. A serious complication has arisen owing to the dismissal of six mechanics on the Crown Mines, who were ordered by their union to refrain from doing work regarded as scab work. This automatically involves other unions in the dispute. Unless a settlement is arrived at before the week-end, a ballot to strike would appear to be the inevitable outcome of the deadlock. The decision of the Commission of Enquiry (with regard to Walthew) was not considered either equitable or acceptable."



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EDITORIAL.

THE RESULT OF THE CONFERENCES.

It is a matter for all-round congratulation that a way—and a satisfactory way—has been found out of the *impasse* threatened by the Mine Workers' representatives in regard to the much-needed amendment of that portion of the Mining Regulations which deals with the number of hours worked underground by Rand mine boys. After the tone adopted by Mr. Hendrikz at the opening conference, and after the enunciation of the economically impossible "National Ratio" requirements of Mr. Hendrikz's associates, one feared that the passage of this new Bill through the Legislative House of the Industry would be a stormy one, if indeed Labour did not altogether obstruct the suggested alteration.

The conferences held in Johannesburg during the past few days, at which the position of the mining industry has been so fully and frankly discussed by the Prime Minister, representatives of the Government, the Chamber of Mines, and the workers, have been of vast importance to the Rand and to South Africa as a whole; and in view of this we have devoted in another portion of this issue considerable space to a review of the essential points which have been debated at these meetings. No one, not even the most extreme of the Labour representatives, has attempted to deny the seriousness of the situation on the Rand. The only question has been how best to introduce a measure of remedy which will have a beneficial and immediate effect. Indeed, it is held in many quarters, by those who are in intimate touch with the industry, that a mere amendment of the Mining Regulations will not go sufficiently far in order to pull the Rand round again into channels of prosperity and industrial stability.

At Tuesday's conference Sir Evelyn Wallers eloquently represented this view. Sir Evelyn claimed that underground reorganisation is essential if the industry is to get back to a safe position. He spoke very frankly and wholly to the point in regard to the restrictions imposed on the industry by trades unions and contended that something much more than a mere amendment of the Mining Regulations is required to put gold mining on the Witwatersrand on a sure basis of prosperity. In the course of his speech the Past President of the Chamber remarked: "... We feel that that question has to be faced by you and ourselves quite frankly. We do not think, if it is not faced frankly, that we shall really achieve salvation as far as the permanent employment of the greatest number of white men in this industry is concerned. The trade union restrictions, as they operate to-day, are making management in some directions difficult, and more and more difficult as time goes on, and, in the view of our managers and ourselves, after consideration of the subject, are obstructing the road to that efficiency that we have to achieve."

Sir Evelyn continued: "I need not particularise the various directions in which reorganisation would be necessary. They are many. The contract system is one; the number of machines to be worked by one white man is another; and there is a variety in other directions. Then there is another point, and that is the agreement that exists between the Chamber of Mines and the Mine Workers' Union described as 'the *status quo*.' We feel that it is necessary, and will be necessary, if you are to achieve what we are after and what you are after too, that it will be necessary to abandon that agreement in so far as it applies to classes of work underground that are usually described as semi-skilled."

These views are in reality only an elaboration of what this journal has preached consistently in and out of season for months past. Long ago we urged that the Chamber should take a firm stand in connection with reducing working costs and in regard to the arrogant autocracy of trades union demands. What with a surfeit of Governmental legislation on the one hand and the continual restrictions of trades unionism on the other, this low-grade industry of ours—and it is in reality nothing more—has no chance of expansion or of earning profits at all commensurate with the sums of money invested in it. If expansion of operations is to be obtained—if, indeed, restriction of the present scale of operations is to be avoided—efficiency must be improved, the cost of working will have to be reduced, and managers will have to be allowed a greater latitude in regard to the manner in which they seek to work and earn profits from the mines under their control.

The average manager on the Rand to-day has little time to attend to the technical direction of a mine. He is so occupied with grandmotherly legislation and with averting strikes and threats of strikes that he must often deplore the years and the money that have been spent on his mining education and wish rather that he had been trained in the legal profession, that he had mastered Carl Marx instead of Le Neve Foster, and that he had graduated in Sociology, Collective Bargaining, and the other official language of the Union instead of in mining and metallurgy.

We are not surprised that at Tuesday's conference Sir Evelyn Wallers should have sounded a note of anxiety in regard to the new Regulations and should have asked for a clear understanding on both the spirit and the letter of the substituted paragraph in order that the amendment should not be followed by fresh industrial trouble.

The Regulation concerning the inspection in advance of working places is stated in the lengthy article appearing elsewhere in this issue on the subject of the conferences. It is a matter for congratulation that this much-needed amendment of the Mining Regulations has been secured. As it stands in its final form it suggests a specialised attention to the condition of the underground workings which should satisfy the most exacting of the champions of "Safety First." And theoretically, at any rate, the additional hours which the native will now be able to work should substantially increase tonnage and bring about some reduction in working costs. All this is, as General Smuts remarked, "very satisfactory," and for what has been accomplished the industry owes a great debt of gratitude to the Prime Minister who, by his tactful and patient handling of the matter, has in a few days secured more probably than the mistrusted Chamber of Mines would have obtained after perhaps weeks of bargaining punctuated by days of strike fever. But whilst we are extremely grateful to General Smuts for his timely intervention and able chairmanship at the conferences, and whilst we gladly accept the measure of relief proffered by the result of these conferences, let us make no mistake about it—the mere amendment of the Mining Regulations is not going to so transform our industrial position that we can claim immediate salvation from the morass of perilous uncertainty into which the mines have for so long been drifting. We need more, much more, than increased working hours from the native before we can truly sight the haven of safety and prosperity; and primarily we need the close co-operation of the white miner in a whole-hearted effort to reduce working costs to such a degree that the Rand may be independent of the gold premium. Our real industrial salvation lies in the direction of being able to earn profits commensurate with the capital involved from ores that yield as little as twenty shillings per ton. When we have achieved that—and not until then—we may indeed shout that we are out of the wood that at present darkens the whole of our outlook.

Notes & News.

Spaarwater in Liquidation.

Amongst the latest companies to be placed in voluntary liquidation we note the Spaarwater Gold Mines, Ltd., which had a nominal capital of £700,000. The company, it will be remembered, was a Barnato flotation with rights over the farm Spaarwater, in the Heidelberg district. The liquidation means that the rights are being abandoned in view doubtless of the difficulty of raising capital nowadays to develop a deep level proposition of this sort. Speaking at the first annual meeting of the company, the Chairman, Mr. John Munro, said, *inter alia*:—"The property consists of the perpetual undermining rights of three farms comprising Spaarwater No. 154, the combined area of which is 5,718 morgen 572 square roods, or about 11,500 English acres, adjoining the Sub Nigel Mine. The Sub Nigel Company recently struck the reef in the new shaft, which is situate not far from our south-eastern boundary. Where struck, it did not give payable values, but it is well known that, although the whole reef in this district contains some gold, enrichments occur in well-defined shoots or zones, and I have no doubt development from this shaft will expose some of these rich shoots. Then, again, work has been re-started on the farm Maraisdrift by the Amalgamated Props. with every confidence of success, and as this farm contains the outcrop of the reef dipping into our property, we await the result with interest. On the advice of Professor Lawn, the Board of Directors has decided to await developments in this district. We are to-day in possession of a large sum of money, which is earning interest at good rates, and the

policy of your Board will be to leave the company's funds on deposit until such time as developments in our immediate vicinity justify the expenditure that will be necessary to explore and open up the reef on your property."

A Postmas Reconstruction.

We understand that the Postmas Diamond enterprise is to be reconstructed with additional capital, which will enable it to enter the producing stage when the diamond market recovers. Influential London support has been enlisted, and it is hoped that the mine may yet justify the high hopes of its prospects originally entertained.

Frank Smith Diamonds and Options.

The ordinary general meeting of this company will be held on Tuesday, November 29th, at 12.15 o'clock, followed by a special meeting, at which a resolution will be submitted extending the period of the options over "new shares in the company during a period of three years expiring on the 28th February, 1923, in terms of the option certificates issued by the company, dated 1st March, 1920, and accordingly that the rights granted under the said option certificates be extended from the 28th February, 1923, either by a period of two years or by a period equal to the time the mine remains closed down, whichever of such two periods may be the less. In the event of the latter period being applicable, notice of re-startment of the mine shall be given by the Board by advertisement in newspapers in Johannesburg and London." From the directors' report we learn that the total weight of diamonds recovered during the washing period was 4,002 carats, which was slightly reduced upon re-weighing when amalgamated into one parcel and increased by a few small finds before operations began in November, 1920, to 4,041½ carats. The directors received an offer of £20,000 cash for these diamonds, and in view of the saving of interest on the loan which was thus secured, and the fact that no other market could be found for the stones at as good a price, they deemed it in the best interests of the company to accept the offer, and the deal was, therefore, put through. The amount received averaged £4 19s. 0d. per carat.

Lace Proprietary.

The annual meeting of this company will be held on Tuesday, November 29th, at 11.45 in the forenoon. No mining work has been done on the company's farms during the year, the directors deeming it prudent to conserve the company's funds pending developments on neighbouring properties.

Coal Trade Statistics.

In the course of its latest monthly report, the National Bank gives the following brief review of South African coal trade statistics:—The total tonnage exported overseas during the eight months ended August, 1921, was 1,186,027 tons, an increase of 322,883 tons compared with the similar period in 1920. During September 74 collieries were producing in the Union, the total tonnage mined being 1,187,527 (tons of 2,000 lbs.), a decrease of 44,570 tons as compared with August. By-products produced were Tar, 10,883 gallons, and coke, 2,041 tons. Total coal sold amounted to 990,315 tons, to the value of £420,469 (at pit's mouth), a decrease of 45,179 tons, and in value £27,579 as compared with August. During the latter month 192,956 tons of coal were shipped at Durban, compared with 187,485 tons in July, while 118,490 tons were shipped at Delagoa Bay, as against 75,188 in July. Since our last report the price of coal and freight have dropped considerably in England, and this has re-acted on prices in South Africa. Coal for export purposes has been reduced by 4/- per ton, and a reduction in railage of 1s. 3d. per ton will be made as from November 1st. With keen competition from England, however, it is not anticipated that these prices will be low enough to secure new business. At the present moment orders for export and bunkers are very scarce, particularly the former, and the majority of collieries take a somewhat serious view of the prospects of obtaining sufficient business in the immediate future to keep their mines fully occupied.

Springs and Its Mines.

The minute of the retiring Mayor of Springs (Mr. Evan Evans) has the following interesting reference to mining in the district. Mr. Evans says:—"The year has been one of anxiety, culminating with the closing of Daggafontein and one of the shafts at West Springs. A commission was appointed, at the request of the Council, to go into the question of the closing of Daggafontein, and statements were made that the sole reason for closing was the exhaustion of available funds and the impossibility of raising further capital at that time. It is sincerely trusted, with an easier money market, that this property will be reopened at an early date. We are buoyed up with hopes that within the next year or two Grootvlei will be an active mining proposition, and this may lead also to the opening up of other properties to the north and east of Springs."

* * *

The Crown Mines Strike.

Up to the time of going to press the Crown Mines strike had not been settled, but there is every reason to believe that by the time these words appear in print a settlement will have been reached. An official enquiry into the causes of the dispute was begun on Tuesday under the presidency of Major U. P. Swinburne, Chief Inspector of Mines, assisted by Mr. Grey, the Inspector of Mines for the Johannesburg district. The mine was represented at the enquiry by Mr. A. J. Walton (General Manager) and Mr. Healy, who has been acting for him during his absence. Mr. E. S. Hendrikz (acting General Secretary) represented the Miners' Union, and the leaders of the Strike Committee were also present. The chief witness was the shift boss Mr. R. Walthew, whose dismissal was the immediate cause of the trouble. Lengthy evidence was led regarding the dispute between Mr. Walthew, Mr. De Castle, the Mine Captain, and Mr. Kellett, the Underground Manager. A perusal of the evidence would go to show that there seems no insuperable reason why the matter may not be amicably settled by the exercise of a little "give and take" on both sides, and we hope the well-known tact of the Government Inspectors will be successful in bringing the parties together. The intervention of the Government is due to the fact that the Chamber of Mines did not regard the dispute as one for a Board of Reference, as the principle at stake, in the view of the Chamber, had already been decided.

* * *

Zululand Mining.

The *Natal Mercury's* Melmoth correspondent writes: "It would seem as if Melmoth, after many years of waiting, was actually coming to the fore, judging by reports that the Austin Syndicate on the farm Konigsbern is really doing good work. Gold is being produced, although labour at present is scarce. However, when matters are in thorough working order, great things are expected. Mr. Marks, from Johannesburg, who has been in this district frequently of late, after an absence of some years, and whose visits have been the subject of various speculation in connection with the different mining industries, is now stated authentically to be associated with Mr. W. Cooper in the opening up of the copper property in the Umhlatuzi Valley. It is situated about 18 miles from Melmoth, near the junction of Melmoth and Umhlatuzi, and would have come forward sooner had it not been delayed owing to the War. The last report registers 22 per cent. copper. A discovery of coal is also reported."

* * *

Tati Company, Limited.

The annual meeting of Tati Co., Ltd., held in mail week in London, was of more than usual interest this year owing to the fact that the chairman, Mr. A. Dodds Fairbairn, accompanied by the secretary, Mr. T. P. Patterson, have recently returned from a visit to the company's property in South Africa. They received a cordial reception from the

settlers, who stated that they had always been treated fairly by the company. After consultation, the Board has decided to adopt a new policy to attract small settlers, and for this purpose an area of about 50,000 acres, consisting of farms already surveyed lying to the north of Francistown and mostly to the west of the railway line, has been specially set apart. The prices fixed for these farms vary between 9s. and 12s. 6d. per acre, according to situation. Under the company's ordinary permit of occupation agreement, the rent payable is 6 per cent. per annum of the purchase price, which need not be paid for 10 years, and a further agreement will be entered into with each new approved settler, whereby he will receive stock on loan. The mineral prospects of Tati are also promising. If the territory is incorporated into Rhodesia, a greater mining activity would take place, as the company would receive all the benefits, by way of claim licences, royalties on gold and timber, as well as improved trading. At the last session of the Rhodesian Legislative Council, the question of incorporation with Rhodesia was brought up, and met with unanimous approval, and a petition will be sent to the Colonial Secretary. No objection was raised when the subject was discussed with the Commissioner for the Bechuanaland Protectorate.

* * *

Delagca's New Coaling Plant.

We understand that the new coaling plant for Delagoa Bay, for which Messrs. Head, Wrightson and Co., Ltd., are the contractors, is now complete in so far as the work of manufacture is concerned. The sub-contractors both on the Rand and in Durban have done their work with commendable promptitude, but the fact that the foundations for the plant at Delagoa Bay are not yet ready will cause some delay. Every effort, however, is being made to expedite the latter portion of the work.

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THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgical.

The Scientific Training of the Mining Engineer.—*The Colliery Guardian*, October 21, p. 1143.

Suggestions for the Standardisation of Geological Sections of Strata Proceed in Boreholes, Shafts, etc.—*The Colliery Guardian*, October 21, p. 1140.

Charcoal and Cyanidation.—*Mining and Scientific Press*, October 8, p. 493.

Flotation of Precious Metals.—*Mining and Scientific Press*, October 8, p. 497.

Status of the Metal Mining Industry.—*Mining and Scientific Press*, October 8, p. 508.

Coal and Fuel.

Pit Shafts.—*Iron and Coal Trades Review*, October 21, p. 573.

Measuring Gas at the Coal Face.—*Iron and Coal Trades Review*, October 21, p. 575.

The Study of Fusain.—*Iron and Coal Trades Review*, October 21, p. 578.

Causes and Prevention of Dust Explosions.—*Queensland Government Mining Journal*, October 15, p. 408.

Engineering.

The Electricity Generating Station at Blackburn.—*The Engineer*, October 21, p. 416.

The Commercial Motor Exhibition.—*The Engineer*, October 21, p. 432.

Notes Concerning Contact Pyrometers.—*The Electrical Engineer*, October 21, p. 526.

A Hydro-Electric Installation.—*The Electrical Review*, October 21, p. 547.

Electric Welding of Cast Iron Rope-Drive Flywheel.—*The Colliery Guardian*, October 21, p. 1138.

Economics.

Unemployment.—*The Engineer*, October 21, p. 429.

Restoring the Vitality of the Engineering Industry.—*The Engineer*, October 21, p. 436.

The Principles of Wages Determination.—*The Electrical Engineer*, October 21, p. 521.

Industrial.

Liberation of Nitrogen from Coal and Coke as Ammonia.—*Iron and Coal Trades Review*, October 21, p. 582.

Modern Portland Cement Manufacture.—*The Engineer*, October 21, p. 420.

Scientific and Industrial Research.—*The Engineer*, October 21, p. 430.

Industrial Standardisation.—*The Engineer*, October 21, p. 431.

FORTHCOMING COMPANY MEETINGS.

New Thor Diamonds, Kimberley, December 8th.

Blaauwbesch Diamonds, Kimberley, December 8th.

Pniels, Ltd., Kimberley, December 8th.

West End Diamonds, Johannesburg, December 15th.

Premier (Transvaal) Diamonds, February 24th.

The next meeting of the Chemical, Metallurgical and Mining Society will be held on this (Saturday) evening at the Scientific and Technical Club.

The C.M. and M. Society is paying a visit to the S.A. Institute for Medical Research on Saturday, December 3.

FOR SALE.

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S. P. BLAND,

Ag. Director of Public Works, Zanzibar.

The Week in the Sharemarket.

GOLD LOWER—THE MINING CONFERENCE—SELLING FROM LONDON.

The fact that the gold "premium" continues to fall—touching £5 3s. 9d. on Tuesday—offset the good effect of the result of the mining conference. Had it not been for the selling from London, due to the drooping price of gold, the market would doubtless have responded at once to the settlement reached on Tuesday night. Business up to Wednesday was practically stagnant, the second test cricket match providing members with a welcome and convenient excuse for awaiting the result of the round-table conference. Wednesday's market was, however, irregular and disappointing, and Thursday's was only a little better. One good feature of the position is the more reasonable attitude being displayed generally by white labour on the Reef, and this despite the trouble at the Crown Mines. The effect of the Prime Minister's intervention seems to have brought home to the men the seriousness of the position, and it is hoped that this improvement will continue to make itself felt. The native labour supply, in point of numbers, is also more satisfactory. Apart from gold shares, Transvaal Silvers were something of a feature and improved sensibly on good news from the mine, the public evidently becoming educated up to the fact that development in galena properties is subject to fluctuations. Diamonds are dull, but better prices for base metals, as cabled, may prove the herald of some revival in tin shares. The quotations for the week were as follows:—

	Fri. 11th.	Sat. 12th.	Mon. 14th.	Tues. 15th.	Wed. 16th.	Thur. 17th.
Anglo-Amer. Corp.	—	20 1	20 1	20 0	20 0*	20 0*
Apex Mines	7 6*	—	7 6*	6 3*	—	—
Bantjes Cons.	6 9*	6 9	6 9*	6 8*	6 6*	6 6*
Brakpan Mines	—	50 0*	—	51 0*	—	50 0*
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	0 7
Cinderella Cons.	—	2 3*	—	—	—	2 0*
City & Suburbans	2 6*	2 6*	2 6*	2 3*	2 3*	2 6*
City Deeps	—	46 3*	—	46 0*	46 3*	46 6*
Clydesdale Colls.	23 0*	22 0*	23 0*	23 0*	23 0*	—
Con. Diamonds	14 3	14 6	14 3	14 3*	14 3*	14 3*
Con. Langlaagtes	—	—	—	13 0*	13 5*	13 6*
Con. Main Reefs	9 6*	9 6*	9 6*	9 6*	9 9*	9 6*
Coronation Colls.	38 0*	38 0*	38 0*	—	38 0*	35 0*
Do. Freeholds	—	—	—	0 6*	0 6*	—
Do. Syndicates	5 0*	5 0*	5 0*	1 9*	—	4 6*
Crown Diamonds	3 9	3 7*	3 9	3 6*	3 6*	3 6*
Daggafontn. Mines	2 6*	2 6*	2 6*	2 9*	2 9*	2 6*
East Rand Coals	1 10*	—	1 10*	1 9*	1 9*	—
East Rand Deeps	0 8*	0 6*	0 8*	0 6*	—	0 8*
East Rand Props.	4 9*	4 9*	1 9*	4 9*	4 9*	4 9*
East Rand Debs.	£85*	£85*	£85*	£85*	£85*	£85*
Eastern Golds	0 9†	0 9†	0 9†	0 9†	0 6*	0 9†
F. Smith Diamonds	3 7	3 7	3 7	3 6*	3 7*	3 8*
Geduld Props.	47 0	46 6*	47 0	46 6*	46 9*	46 9*
Glynn's Lydenburgs	7 0*	—	7 0*	9 0*	7 0*	—
Government Areas	79 6*	80 3	79 9*	79 6*	79 3*	80 6
Knights Centrals	4 9*	4 9*	4 9*	4 9*	4 9*	4 9*
Lace Props.	6 0	—	6 0*	—	6 0*	—
Leeuwpoot Tins	7 3*	7 3*	7 3*	7 0*	7 0*	7 0*
Lydenburg Farms	—	—	—	4 9	4 6*	4 6*
Meyer & Charltons	75 0*	82 6†	75 0*	80 0†	75 0*	75 0*
Middelylei Est.	1 0*	1 0*	1 0*	1 0*	1 0*	—
Modder B's	28 9*	27 0	28 9	27 0	27 0	27 0*
Modder Deep	43 0	43 0	43 0	43 0*	44 0	41 6*
Modder Easts	7 10*	7 9	7 9	7 10†	8 0	8 0
Natal Nav. Colls.	—	—	27 3*	27 0*	27 6*	28 0*
New Eland Dias.	—	27 6†	27 0†	24 0†	—	26 0*
New Era Cons.	7 0*	7 1*	7 0*	7 0*	7 0*	7 0*
New Geduld Deeps.	1 4*	1 4*	1 4*	1 4*	1 4*	1 4
New Kleinfontus.	5 6*	5 6	5 7*	5 6*	5 7*	5 6*
New Modderfontn.	72 0*	72 6	72 0	72 0	73 0a	73 3*
New Primrose	—	4 6*	4 9*	4 9*	4 9*	4 9*
New Unifields	1 0*	4 0†	3 6*	3 6*	3 6*	4 0
New State Areas	20 6	20 3	20 0*	—	20 9a	20 0*
Nigels	—	—	—	—	4 0*	4 0*
Nourse Mines	8 10*	9 0	9 0†	9 0†	9 3	9 3*
Pretoria Cements	42 6*	42 6*	43 0*	43 6	43 0*	43 0
Princess Estates.	1 0*	0 11*	0 11*	0 11*	—	1 0*
Rand Nucleus	1 0*	1 0*	1 0*	—	1 0*	—
Randfontn. Cents.	—	9 6*	—	9 6*	9 6*	9 6*
Randfontein Est.	—	14 3	14 3	14 0*	14 3*	14 6
Roberts Victors	—	7 3*	7 3*	7 3*	—	7 0*
Rooibergs	3 0†	3 0*	3 0*	3 0*	3 0*	3 0*
Rouxville	—	1 0*	1 0*	1 0*	—	1 0*
S.A. Alkali	14 9†	16 9†	13 0*	13 0*	14 0†	12 6
S.A. Breweries	28 0†	—	28 0†	—	28 0†	—

	Fri. 11th.	Sat. 12th.	Mon. 11th.	Tues. 15th.	Wed. 16th.	Thur. 17th.
S.A. Lands	1 1*	4 1*	4 1*	4 1	4 0*	4 0*
S.A. Townships	9 6*	9 6*	9 6*	9 6*	9 9	9 9*
Springs Mines	28 6	38 3*	28 0*	38 3	38 0	38 0
Sub Nigels	10 3*	10 6*	10 6*	10 3*	10 6*	10 6*
S. van Ryn	1 9*	1 9*	1 9*	1 9*	1 9*	2 0*
Swaziland Tins	—	—	9 0†	—	8 6†	—
Transvaal Lands	—	—	—	—	15 3†	—
Trans. G.M. Est.	8 9*	8 9*	—	8 9*	8 9*	8 9*
Transvaal Silver	16 6*	17 0*	17 0	16 6*	17 6*	19 0
Union 5 per cent.	£99 3/8	£99 1/4	£99 1/4	£99	£99 1/4	£99 1/4
Van Ryn Deeps	—	69 6*	69 3*	69 3*	68 9	68 9*
West Springs	9 3*	9 6	9 0*	9 3	9 0	8 6*
West Rand Cons.	—	—	2 6*	2 0*	—	—
W. Rand Estates	4 0†	4 0†	—	3 9†	3 0*	3 0*
Withbank Colls.	—	—	—	36 0*	36 0*	—
Witwaters. Deeps	8 0*	8 0	—	8 0*	—	—
Wolhuters	3 0*	3 3*	3 3*	3 3*	3 3	3 0
Zaaiplaats Tins	3 0*	3 0*	2 9*	3 1	2 16*	3 0

* Buyers. † Sellers. a. Odd lots. b. Ex London.

A notice in the *Government Gazette* says:—"In accordance with the provisions of the Precious and Base Metals Act, 1908, Transvaal, it is notified that it is the intention of His Royal Highness the Governor-General to proclaim as a public digging for precious metals certain two portions of the farm Langlaagte No. 13, Mining District of Johannesburg, Transvaal Province, in extent 395 square rods and 1 morgen 565 square rods respectively, according to the diagram prepared by Land Surveyor W. H. Visser, dated August, 1917, approved by the Surveyor-General on the 20th November, 1917, under No. S.G. No. B.42/17, which are registered in the name of the Industrial and Commercial Timber and Supply Company, Limited."

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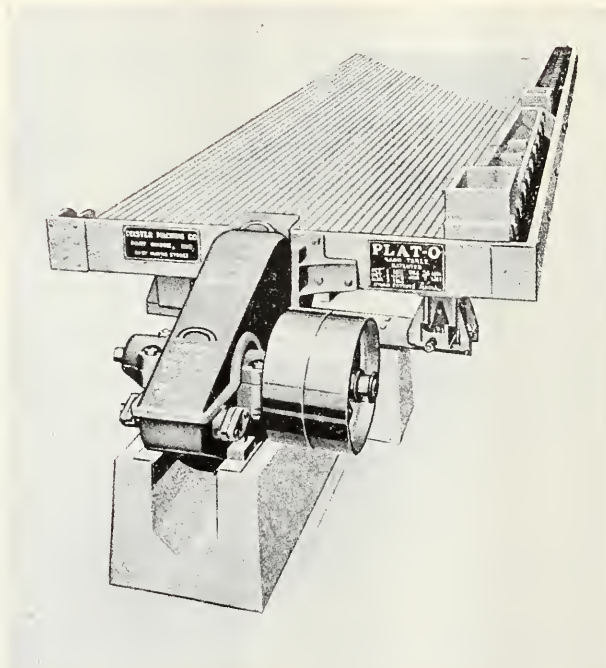
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Letters to the Editor.

THE ORIGIN OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—There are many statements in the article by Mr. J. Ennis in your issue of the 12th inst. which require elucidation, but as I do not wish to trespass unreasonably on your valuable space I will refer, with your permission, to a few only of the points which I think call for comment and interrogation. Mr. Ennis, if I understand him correctly, terms himself "the discoverer of the parent rock of the diamond." Are we, then, to understand that he has discovered something new and unknown to geological science, and that kimberlite is *not* a parent rock of the diamond? Are we also to understand that on account of his self-claimed discovery the genesis of the diamond cannot be traced to any other rock except that which he claims to have discovered?

The photograph you publish is supposed to illustrate the "birth of a diamond." I must say I am unable to accept the photo as evidence of "the birth" without some accessory facts relating thereto. May I, in the first place, invite Mr. Ennis to state with certainty, if he can, the nature or name of the rock which contains the diamond? He declares that the crystallisation of the diamond in the photo is "manifestly genetic." Before accepting that statement, I would like to know something about the rock itself, and also an explanation of the following: "The expulsion of the elements of the diamond through the interstices of the rock is equally manifest." If the "element" (carbon) has been expelled, how is the presence of the diamond to be explained? And how does Mr. Ennis follow the "expulsion" of the carbon through the "interstices" of the rock?

He states that "it would seem feasible to imagine that the diamond has its home of production." I think we may accept this as a fact requiring no "imagination" whatever; but Mr. Ennis accuses the world of science of having overlooked the fact for "want of perception." He continues: "Unassailable data is now extant in the discovery of the parent rock and evidence of the complete crystallisation of the gem," which statement suggests that the complete crystallisation of millions of diamonds in kimberlite or any other rock is a matter of secondary importance in his estimation. Indeed, his views are tantamount to the dictum that kimberlite is *not* a parent rock of the diamond. This is an old view, held years ago by a number of geologists for various reasons, but the later discovery of many diamond-bearing kimberlite fissures has, I think, caused the old view to be entirely discarded.

The next passage perplexed me considerably, as Mr. Ennis leaves the reader entirely in the dark as to the geological features of the country he writes about, and the age of the formations he refers to. As I wish to follow Mr. Ennis as closely as possible in the expounding of his views, I trust he will be as explicit as possible. If I rightly understand him, there must have been quite a lot of lava or "heated magma" flowing about the country on top of the (?diamondiferous) alluvial gravels. He says: "Out of the granitic magma, surcharged with all the constituents of the alluvial gravel in all its varied forms, and endowed with the remarkable variety of mineralisation, a superficial lava has issued forth from gash and deeper-seated veins. Flowing over the heated magma, the gravel or pebbles have segregated out, each with its characteristic type of mineralisation. Nature has hidden her secret in complete dissimulation." I think Mr. Ennis ought to favour us with a little of his inside knowledge about this "dissimulation," which has so completely escaped every other observer. From the context of what follows I am inclined to think Nature has been playing a little game of "hide and seek" with Mr. Ennis, and left him thinking! If this is not so, he would surely not place so much importance on the "red brick" gravel formed partly by the cementing action of hydrrous iron oxide; nor would he place any importance on what he

terms a "pseudo-line formation," which he quite erroneously believes to be due to some extraordinary "sulphuretted influence which has converted the lava into a compact sheet of hard or variable soft line in appearance." It is quite evident that Mr. Ennis is not aware of the fact that the calcareous tufas of the South-Western Transvaal and Barkly West district (to which I presume he refers) are due very largely, if not entirely, to capillary action on the Dwyka beds which overlie (or have overlaid) so much of the country in which the diamondiferous gravels are found. Moreover, a period of many millions of years has intervened between the sulphuretted exhalations of the Ventersdorp lavas of that region and the deposition of the lime tufa and alluvial gravels. His reference also to "pebbles" in the lava having "segregated" suggests that he is confounding the amygdalae of the lavas with the pebbles and weathered-out amygdalae found in the gravels.

If Mr. Ennis is not really having a little game of "hide and seek" all on his own he might give an explanation of the serious allegation made against the geological world in the following remarkable effusion (the italics are mine): "The assumption geologically entertained that gravel is the detritus of rocks water-worn and rounded by sub-aerial conditions is *crude to the imagination* of anyone who has studied the otherwise perfectly characteristic typification of the gravel on the alluvial fields. Gravel found on the elevated kopjes is a *phenomenon* no longer demanding an explicit explanation of its presence and origin. So perfectly undisturbed are the gravel patches and areas that *to the studious mind each pebble is recognised to be in situ* where sub-aerial influences have been withheld, favouring conditions preventative to its disturbance. The prevailing recognition of the rotten granite on the part of the alluvial diamond-seekers as *the formation* favouring that where diamonds may be found *clearly supports the opinion* that the *granitic formation* is that in which the *contemporaneous veins* have discharged the *superficial lava*." What granitic formation? What contemporaneous veins? What superficial lava? And what has all this got to do with the genesis of the diamond and its presence in alluvial gravel?

With regard to the granite, I would ask Mr. Ennis to state clearly what area of rotten granite he refers to, and I invite a reply to the following leading question: Does he really believe that the underlying granite referred to is the source of the diamonds which were found in the gravels overlying it?

There are many other contentious points in the article, but I will not trespass further on your space by discussing them.—I am, yours, etc.,

"MYSTIFIED."

WHITE vs. NATIVE LABOUR.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I perused your issue of the 5th inst., containing an article on the above subject, by Mr. J. E. Parker, and I am of the same opinion as yourself, that one cannot agree with many of the suggestions he makes. I certainly hold no brief for the native, but I do know that, properly used, he is South Africa's greatest industrial asset. Regarding mining as known on the Rand, I am not in the position to be able to give my opinion on some of the points raised by Mr. Parker. However, as an ordinary farmer, I can assure him that white labour, for a wage, will never pay, as even the most indifferent sort of white labour works out at 5s. per diem, whereas coloured labour only works out at 2s. per diem, and the class of work you get accomplished for these two values is about on a par.

South Africa, from a farming point of view, cannot be classed with either Canada or Australia; for the simple reason that, owing to the difference in the climatic conditions, these two countries can produce more per acre than we can; they can also run more stock to the acre than we can. In making this statement, I am, of course, only generalising, as there probably are very small sections in

this country at present of which the foregoing doesn't hold good. To all intents and purposes we are to-day 6,000 miles away from the markets of the world, and to be able to compete with other countries which have not this drawback, we have naturally to cut down expenses somewhere, hence the native labour at 2s. per diem—a living wage for the native, but a starvation wage for the white labourer. Dealing with State enterprise for any industry, mining, pastoral, irrigation or manufacturing, I would like to ask Mr. Parker to point to any really successful proposition, run by the State entirely, apart from such institutions as the Post Office or Railways. One has only to look at the experiences lately in Australia, New Zealand, Canada, England, and even here in South Africa, to come to the conclusion that State Control of any industry is not a success. Enterprises, on the other hand, which have had State financial assistance, but private control, have come through very well as a whole. The reason for this is, of course, that there is not the same keenness in running an industry for the State as there is in running a thing for oneself.

Then again, can Mr. Parker point to any State which has been able to solve its own labour problems? I think that the experience of the world at large goes to prove that the less the State interferes with matters of this sort, the better for all sections of the community. There are no short cuts to the solutions of economic problems. I think that here in South Africa we may toy with the idea of segregation, and an all-white labour community, but we will find that the correct solution to things will evolve quite naturally, resulting in a grading up of the workers all round, the introduction of native labour into semi-skilled branches eventually, the consequent lessening of the cost of production, which will eventually lead to the expansion of all our operations.

I don't profess to know much about mining, but do a bit of asbestos mining on my farm, when there is a market for the stuff. Latterly I have had occasion to make several adits and clear several faces. Competent mining men who have seen the work reckoned that it was well done and exceptionally cheaply executed. This work was all done by natives, paid 2s. per diem, and supervised by natives paid 3s. per diem. With all the drawbacks that the asbestos industry has to encounter in these outlandish parts, such as donkey transport, railage, oversea freight, etc., I think that the use of white labour would just make the difference between showing a small profit and a small loss, and as an outside observer I think that the same applies to the low-grade mines we are hearing such a lot about at present.—Yours, etc.,

W. B. COLLINS.

Goedgedacht, Postmasburg, C.P.,
10th November, 1921.

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"MANCHESTER GUARDIAN COMMERCIAL."

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I am sending you a copy of the Manchester Year Book, compiled by the *Manchester Guardian Commercial* and published by the Manchester Guardian, Ltd. I hope you will find it interesting enough to review in your columns. There is little doubt that many of your readers have direct business relations with Lancashire, and might be glad to know of the Year Book's existence. It is, strangely enough, the first comprehensive publication of its kind dealing with this part of the world. The price of the book is 6s. post free, and a fair proportion of copies have been set aside to meet the overseas demand.—Yours, etc.,

K. RUSSELL BRADY,
Business Editor.

June 23rd, 1921.

WHERE THE GOLD GOES.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In your issue of 24th September your correspondent, "Engineer," asks me if I can furnish data showing the amount of gold consumed annually in the arts and industries and hoarded in the East. The following figures, covering five-year periods, are given by Joseph Kitchen in *The Times* (Annual and Commercial Review), 28th January, 1921 (in millions of pounds of gold):—

	India,	Egypt,	Balance	Total
	Industry, & China,	for Money.	Output.	
1900-1904	79	48.7	178.2	305.8
1905-1909	95	63.5	272.3	430.7
1910-1914	120	130.1	246.2	469.7
1915-1919	87	66.8	272.6	426.4

—Yours, etc.,

S. J. SPEAK.

BRITISH INCOME TAX REFUNDS.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Although as the result of my previous letters I have had the pleasure of advising many of your readers as to what claims for repayment of British income tax they were entitled to make, I find that there are many who have been misinformed by their advisers in this country and are ignorant of the fact that they can reclaim a considerable sum. For the benefit of these readers may I trespass upon your valuable space to point out again that: (1) Every British subject resident out of the United Kingdom is entitled to recover a proportion, if not all, British Tax paid since April 5th, 1920. (2) Every person who has served the Crown or a Protectorate of the Crown or a missionary society, or is forced to reside abroad for the sake of his health or that of any member of his family, can claim a refund as above since April 5th, 1918. (3) Every person, British subject or otherwise, in receipt of British War Loan interest or dividends from non-British funds and companies, *e.g.*, India Stock, Canadian Pacific Railway, Rand Water Board, etc., can recover every penny of tax deducted since April 5th, 1918, even where the securities stand in the names of trustees. (4) Where British and Colonial income tax is paid in respect of the same source of income, a refund can be obtained. If anyone interested in the above matter will write to me, I shall be pleased to advise them, without charge, exactly how they stand.—Yours, etc.,

WILFRED T. FRY.

24th October, 1921.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET BUT HOPEFUL—WORKING COSTS QUESTION MORE CHEERFUL—IRON AND STEEL
—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—UNION & BRITISH TRADE STATISTICS
—UTILISATION OF WASTE PRODUCTS FOR GAS PLANTS—METAL MARKET.

General Review.

The result of the Miners' Conference last Tuesday, when an important regulation affecting underground working and the more efficient working of natives was adopted, has been well received in mining and commercial circles. The successful issue of the Premier's efforts in this respect has been welcomed as foreshadowing a real and earnest endeavour on the part of all concerned to bring down working costs to such a level as will enable us to carry on profitable operations. It would seem as if the miners' unions on behalf of the men are alive to the perilous position of the industry in the very near future unless drastic measures are adopted to reduce the present high costs of working and to ensure a higher level of efficiency by the workers. Commercial circles hope that there will be fewer academic quibbles over unimportant details and that the miners will realise the gravity of the situation as it exists to-day and co-operate wholeheartedly in an endeavour to bring working costs down to a level which will allow the industry economically to exploit the millions of tons of low-grade ore now awaiting treatment. Despite previous disappointments, it is thought that the miners will, in the event, see the present position of the industry in its true light and follow the lead so successfully given by General Smuts at the recent conference. Business during the week under review has on the whole been rather quiet, although signs are not wanting of a better tendency generally; inquiries have been distinctly encouraging and warrant the belief that better conditions may prevail within a few month's time. In the opinion of a prominent commercial man, the Government appears inclined to divert a portion of the recently raised loan to various departments in order to develop our resources, which will, of course, tend to improvement in business generally. Prices are being well maintained, in fact some lines are inclined to show slight increases if anything. It must not be forgotten that some articles, of which we had very large stocks, are by the law of attrition getting down to normal again to-day, and merchants generally are not so anxious to sell at a loss as they have been of late owing to this resumption of normal conditions. It is true that cutting of prices still continues on the Commercial Exchange, which is due more or less to the paucity of inquiries and to the desire of some merchants to make a certain turnover at whatever sacrifice. The authority before referred to finds quite a number of lines opening out into the old channels, due largely to the speculative element in business having been eliminated during the past six months. Merchants, he said, are looking hopefully to the New Year to see an improvement in the volume of business and in prices ruling, provided a satisfactory solution is found to the labour question. There may be a dull period experienced in December, due largely to stocktaking along the Reef, as storekeepers do not care to bring in too much stock into their balance-sheet when balancing their books at the end of the year, but with the turn of 1921 we should see signs of greater activity, provided always that matters political in Europe improve, or, at any rate, become no worse.

Iron and Steel.

Business has been rather quiet during the past week, although inquiries have been somewhat better than of late, especially for cast steel, which is somewhat harder in price.

The general opinion is in commercial circles that the New Year will usher in an improvement in business conditions. Fencing material has been firmer at increased prices owing to cost of replacement being even higher than local quotations.

Latest quotations.—Dunswart iron 22s. 6d. per 100lb. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 35s. to 42s. 6d.; larger sizes, 32s. 6d. to 40s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 32s. 6d. to 34s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 33s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 32s.; steel, 35s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 32s.; channels and joists, 37s. 6d.; shafting, $\frac{1}{2}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 4d.; ingot lead, £30 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per doz.; 12 lb., 25s. per doz.; black baling wire, 11 gauge, 22s. per coil, 100 lb.; screening 3s. to 9s. 6d. per sq. yard; cyanide for outside mines, 1s. 6d.; zinc shavings, 1s. per lb.

The African Iron and Steel Products, Ltd., have installed a plant to prepare the sand-moulds required for the casting process in connection with their patent steel alloy known as the Sheeley steel mixture, which is in great demand as a liner for tube mills on account of its peculiar hardness and resistant properties against the attrition of the pebbles which are used in the tube mills as grinders. This means that hand-moulding will now be a thing of the past. Although tube mill liners-end and shell liners, screws and grids, constitute the largest feature of the company's activities, they are also developing many other lines, such as truck bearings, cart-wheel bushes, builders' sundries, etc. The Sheeley mixture is so hard that it cannot be chipped like ordinary iron, and all rough edges have to be ground off with emery wheels. The prospects of building up an important local industry are very great indeed. Experiments are continually

in progress so that the works may keep well abreast of the latest requirements of the mines and industries generally.

Engineering Shops.

Business continues fairly active generally in our local engineering shops, but no great development is anticipated until after the turn of the year. It must not be forgotten that a large amount of the work presently being done would have been looked upon as unsatisfactory a few years ago.

Second-hand Machinery.

With regard to the second-hand machinery market there is still a large demand for all mine requirements and a scarcity of many lines, particularly second-hand battery spares. New machinery has not been coming through in such large quantities, and it is predicted that there will be a scarcity of many mining requirements before long. It is understood that the mines are making up their orders for the coming year and better times, it is confidently expected, will be seen in business next year. Boilers and engines are always inquired for, but as stocks have depreciated considerably during the past two years, and there is a scarcity of this particular class of machinery, prices have maintained a high level. There is a scarcity of 3-16th second-hand plates and other sizes, so that requirements have to be met by purchasing new, although stocks are very depleted. Several new mines on the Far East, those which are in the constructional state at present, are buying pretty freely, particularly girders and steel plates. Second-hand rails have had a big fall owing to the large quantities of German material imported now coming into the market, and it is depressing to merchants that imported English grades cannot be landed here at anything near the price of German.

Tin Plates.

London advises that home users of tin plates are showing more interest and are covering near requirements. The oversea demand is more widely distributed. In iron and steel the home position is unchanged, but export business is improving. Cleveland pig iron No. 3 is now ruling at 110s.

American Notes.

Cotton is likely to rise somewhat in price shortly owing to this season's attenuated crop which is estimated at 1,588,000 metric tons. Rubber goods also are inclined to harden; recently there were some very considerable reductions in rubber goods generally, but no further decline is anticipated for a long time to come. Business in the United States is improving slightly and the factories are getting back to normal with increasing outputs, and generally the outlook is more hopeful for next year than it was at the commencement of 1921.

Fencing wire is again up in America from 1 dollar to 3 dollars per ton for plain and barbed wire. A leading American importer said wire was still being sold here considerably under landed cost. Stocks at the coast had been extensively reduced. He himself had disposed of all his stocks at the coast four or five weeks ago at a better price than

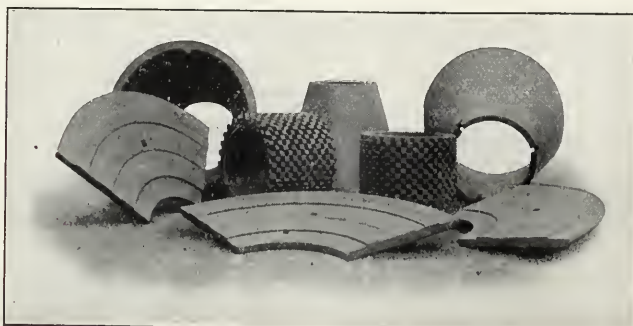
he was getting three months ago. He said that within a few months the mines would have to replace their stocks, which they are now getting at landed cost, at a much higher price, especially steel plates and similar commodities. The United States Steel Corporation recently announced a new steel price of 40 dollars per ton for rails. The sheet and wire goods market is active, operations in the heavier productions are, however, small. Pittsburgh district operations are about 40 per cent. of capacity compared with 18 per cent. in June and July last.

In the States the question is constantly being asked why do not conditions mend? The answer is simple. Credit is lacking. Nothing is so timid as money. Money is not scarce in America, but credit is. Never was there so much gold in the United States. If it keeps pouring in at the rate it has been coming for the past two years, there will be cause for worry while other countries are being stripped of the yellow metal. It is not safe for one country to have an over-balance. America has been increasing its hoard enormously for more than a year. Soon she will have half the gold of the world. The flow must be corrected. The twelve Federal Reserve Banks show net earnings available for dividends for the first six months of 1921 at the rate of 108 per cent. per annum on the capital paid in. If they ever are going to reduce their discount rates they should do it now. In some sections not a few banks are doing little more than marking time. That is bad. It delays recovery. Business will begin to come back when it gets credit at the bank. There will have to be a reversal of the long time practice of the banker, loosening up to the utmost limit in flush times, and tightening up like a drum when there is a sign of trouble. There would not be so many business concerns in the hands of bankers to-day if prudence had been displayed by the financiers in the time of wild extravagance and vaulting prices. Conditions are sound in America, but the legions of business need the support of credit confidence, and credit can work a mighty change within 12 months. These remarks to a certain extent apply also to the Union of South Africa.

Timber and Building Materials.

Business has been fair during the past week, but shows signs of slackening off in view of the approaching Christmas holidays. The building trade, however, has been better during the last two or three months than previously and a big improvement is looked for about next February.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver board, 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{3}{4}$ d. to 7d.; ceilings, 4 $\frac{3}{4}$ d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s.; corrugated iron, 9 $\frac{3}{4}$ d. to 10 $\frac{1}{2}$ d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak and Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at the mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving,



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to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks unchanged at 70s. for blue stock; 60s. mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s. 6d., 46s. 6d., 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Things remain very quiet in the second-hand iron and timber yards. Stocks are abundant; prices are 6d. to 7d. for iron and 9d. to 10d. for timber.

Electrical Goods.

The improvement noted during the past month or six weeks continues, and dealers appear to be fairly busy as compared with recent months. Stocks held are plentiful and continue to arrive here in fair quantities. Prices, merchants state, appear at present to be balancing themselves both at Home, Germany and Holland. America, as previously stated, is very seriously handicapped on account of the Exchange. Although there are no big contracts going at present, there is a fair daily amount of house-wiring, people apparently having come to the conclusion that the present offers a good opportunity to fix up small orders without waiting for further falls in prices of material and labour. The price to-day of house wiring is 25s. to 40s. a point, as compared with about 32s. 6d. to 45s. which obtained for some considerable time, but has now declined to the present figure. For a double storeyed house the price is about 40s., but for a single storeyed house, thrown together quickly, about 25s. to 27s. 6d. is the price.

British South African Trade Statistics, 1920—1.

IMPORTS.		
	1920.	1921.
January	£5,005,599	£6,963,798
February	6,163,440	5,387,597
March	6,134,941	5,136,547
April	7,059,021	4,457,784
May	7,747,537	3,962,203
June	8,268,166	3,684,814
July	10,176,557	3,405,831
August	9,264,423	3,530,234
September	9,345,183	*
October	8,873,677	*
November	9,346,688	*
December	7,478,298	*
EXPORTS.		
	1920.	1921.
January	£11,771,462	£4,327,630
February	8,046,237	4,727,498
March	8,583,861	4,639,955
April	8,416,633	5,179,191
May	6,982,435	4,464,356
June	4,997,993	4,331,719
July	6,131,578	5,455,117
August	4,419,996	4,598,890
September	5,535,530	*
October	5,778,162	*
November	4,630,180	*
December	6,094,969	*

* Not yet available.

Proportion of British to Foreign Merchandise Imported.

7 MONTHS ENDED 31st JULY, 1921.		
		%
From United Kingdom	£17,846,358	54.1
From other British possessions	3,287,990	10.1
From Foreign Countries	11,864,226	35.9
Total	£32,998,574	100
7 MONTHS ENDED 31st JULY, 1920.		
		%
From United Kingdom	£28,035,501	55.5
From other British possessions	5,888,826	11.6
From Foreign Countries	16,630,934	32.9
Total	£50,555,261	100

It will be seen from the above that from May last onwards the total monthly imports have remained at about 3½ millions, and exports, with the exception of July, at 4½ millions. Comparing the respective periods of eight months ended 31st August, it will be seen that there has been a decline in imports of 39 per cent. this year and in exports of 36 per cent. Exports, however, now exceed imports by rather more than £1,000,000, as against a balance of close upon £500,000 the other way in 1920.

October Trade Statistics.

The Board of Trade returns for October, which show that the imports were £81,000,000, compared with £149,000,000 in October, 1920, and exports £62,000,000; compared with £112,000,000.

Re-exports amounted to £10,000,000, compared with £16,000,000 in October last year.

The imports of raw cotton and wool each declined by nearly £1,000,000 and the exports of manufactured goods by £45,000,000, while in cotton goods the decline amounted to £15,000,000.

The decrease in iron and steel manufactures was £7,000,000 and in woollen manufactures nearly £6,000,000.

Gas Engine Plants and Utilisation of Waste Products.

Investigations for the more economic utilisation of coal and the substitution of other sources of power have led to some astonishing results in the use of all sorts of hitherto waste substances which, when dealt with by modern methods, have been found to have a high calorific value. This will prove of great value to South Africa, especially in districts far removed from the coal fields. Apart from the engines and plants to run on anthracite coal or charcoal, gas engines and plants for the utilisation of bituminous coal, loco. smoke-box char, green wood, mealie cobs, sugar-cane refuse, spent wattle bark and practically any negotiable refuse not containing more than 50 per cent. moisture are now being manufactured. Also airless cold starting engines from 20 h.p. upwards to run on mineral oils, such as crude, residual, semi-refined and vegetable oil, such as monkey nut, cotton seed and palm oil, are being sold in ever-increasing quantities. The Lonely Mine (Rhodesia) has decided to discard its steam engines and to instal three 44 h.p. horizontal multi-cylinder engines for running alternators in parallel and one 333 h.p. for direct coupling to an air compressor. The gas plants to be employed consist of four suction producers, cross-coupled and gasifying the local Rhodesian woods. Three of those engines and plants have been in commission for some months and are reported to be giving the utmost satisfaction. Many other gas plants have been installed in South Africa which are running on wood and products other than coal.

Motor Spirit from Straw.

Dr. Hargreaves, Director of Chemistry in the South Australian Industrial Department, states that there is produced annually, within a 100-mile radius of Adelaide, upwards of 500,000 tons of straw, practically all of which was allowed to go to waste, but from every ton of which 80 gallons of alcohol could be obtained, or 40,000,000 gallons of alcohol produced from the straw wasted—in other words fourteen times as much as all the petrol imported into South Australia. He knew of no other proposition for producing motor spirit which was so promising as straw.

Collieries and Electrification.

Notwithstanding the present gloomy outlook of the coal industry in Britain one large colliery company has decided to spend over £1,000,000 on extending electrical working in its various mines. The intention is to extend the main power house until it becomes the largest private electric power station in the country and completely electrify all plant in the pits which can be suitably operated by electric power. The reduction in working costs will, it is expected, be very considerable.

Agricultural Implements.

Although business is better now than it has been for the past six months, it yet leaves a lot to be desired, said a prominent importer. The farmer's desiderata are, of course, more rain and more money, both in credit facilities and in the price of products.

Motor Car Industry Improving in Britain.

That the motor-car industry in Britain is recovering from its recent lethargy is evidenced by the attendance of 50,000 persons at the International Motor Show at Olympia. Motor agents have secured large orders for the immediate future, one Welsh firm alone ordering 300 cars, another firm 600 at an average of £400, and further sales and orders are announced amounting to over £1,000,000.

The Gravity Petrol Jet Control.

The Gravity Petrol Jet Control is an invention to produce a varying mixture to give a varying piston head pressure which will automatically maintain a fixed speed over any road gradient that the car is capable of taking with a fixed throttle: say that on a steep hill climb your car required the maximum power one gas to eight atmospheres, which should give approximately 160 lb. pressure per square inch on piston head. On rounding the hill top the gravity jet control automatically weakens the mixture, reduces the piston pressure, and still maintains perfect combustion. The variation due to mixture alone has a range from 60 lb. to 160 lb. per square inch, so that if use is made of that range, the petrol bill will be reduced by 20 per cent.

Railway and Harbour Earnings. Week ended Nov. 5.

The weekly statement issued by the S.A.R. and H. for the period ending November 5 shows that the approximate earnings on the railways were £423,012, or £12,190 less than the estimates; and by the harbours £21,867, or £1,147 less than the estimates. There was a falling off of £27,102 in the coal traffic.

S.A.R. and Coal Traffic.

The latest bulletin issued by the General Manager of the S.A.R. has the following, *inter alia* :—

Railway earnings for the three weeks ended 15th October, 1921, showed a slight improvement, although still much below the estimate. Earnings for the week ended 22nd October declined to £395,663, or £39,539 below the estimate and £80,330 less than the earnings for the corresponding week last year. The decrease was principally due to a falling off in passenger and coal traffic. Although very large stocks of maize and meal are on hand at up-country stations, there has been a steady falling off in this traffic, despatches having dropped from an average of 32,000 bags daily at the end of August and the beginning of September, to 4,000 to 5,000 bags daily during October. From 1st July to 25th October last, 2,289,281 bags of maize and meal were railed to the various ports, while 1,722,602 bags were shipped, leaving a balance of 540,642 bags on hand at the ports and 26,037 bags in transit. The falling off in maize and meal traffic has led to decreased demands on truckage generally, of which there is at present a surplus. On 26th October there were 41,091 tons of coal on hand at Durban, 26,020 tons at Delagoa

Bay, and 29,559 tons at Table Bay. 187,511 tons of coal were shipped at Durban during September, compared with 192,956 tons in August, while 84,924 tons were shipped at Delagoa Bay, compared with 118,490 tons in August. Low freights for export coal from Great Britain, coupled with reduced prices for Welsh coal, has resulted in a set-back to the South African coal trade. Owing to the shortage of orders many of the mines have only been working part time. From 1st to 24th October a considerable number of mines closed down for periods varying from one to seven days. On 11th October, only 6,000 tons of empties were required to meet the requirements of the Natal mines, compared with the usual order for 15,000 tons daily. New collieries at Hlo-bane are being developed and it is anticipated that an output of from 300 to 400 tons per day will be available for export shortly. One company is said to have concluded a contract with one of the principal South American Railways for a minimum of 100,000 tons of coal per annum with an increasing yearly quantity up to 300,000 tons, the contract extending over a number of years.

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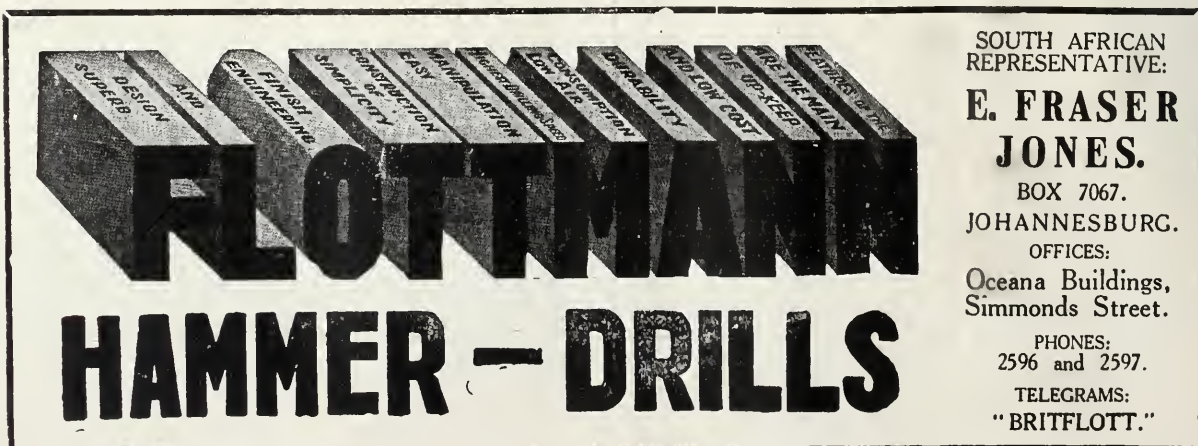
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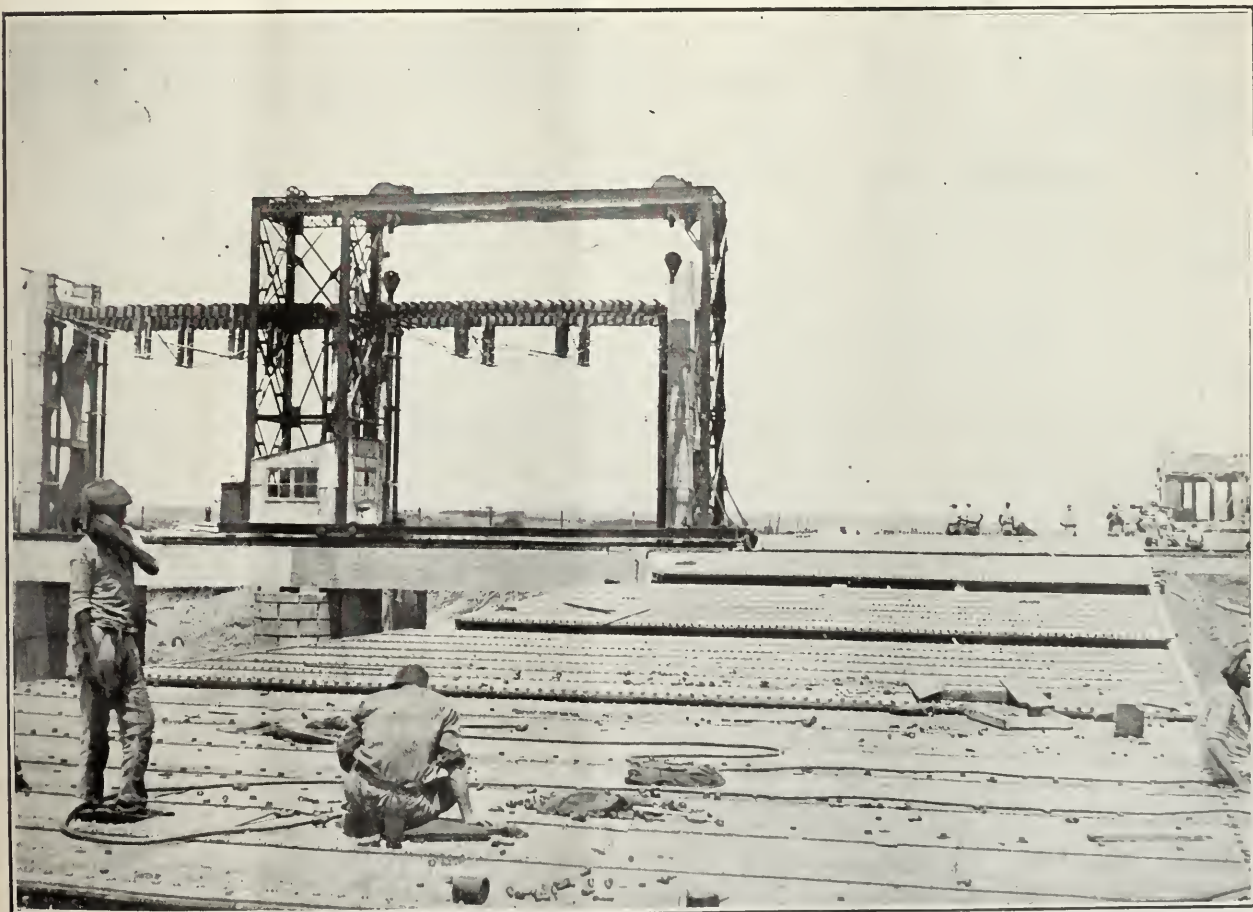
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, NOVEMBER 26, 1921.

No. 1574.

The Great Vaal River Barrage: Goliath Crane and Steel Gate assembled in Foreground.



The above picture shows the Goliath crane erected at the Vaal River Barrage; also, assembled in foreground, one of the great steel gates which, installed between concrete piers, make the barrage. There are 36 of these gates, each 25 feet high and 32 feet 6½ inches wide, weighing 26 tons. With the balance weight, operating gear and other appurtenances the total weight for each opening is about 100 tons. The pressure on each gate is roughly 300 tons when the reservoir is full.

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THE POSITION OF THE E.R.P.M.

A GOVERNMENT ENQUIRY PROCEEDING—RETRENCHMENT RUMOURS—THE PARLOUS FLIGHT OF THE PROPERTY—UNPROMISING OUTLOOK FOR BOKSBURG—THE LESSON OF KIMBERLEY.

A Government Commission of Inquiry is now investigating the position of the East Rand Proprietary Mines. It is common knowledge that the E.R.P.M. has been skating on thin ice for many months past, and that but for the gold premium the company would long ago have had to suspend operations. Numerous chairmen's speeches and engineers' reports have made it quite clear that the great constellation of Near East Rand mines is to-day in an exceedingly perilous position.

Skating on Thin Ice.

The E.R.P.M. is what may be termed a £5 per oz. proposition. In other words, it costs round about one hundred shillings to produce an ounce of gold, and it must be obvious that when the price of the product falls below this figure the company is operating at a loss. The present price of gold is perilously near this bed rock figure. With its large debenture debt and high overhead operating charges, the E.R.P.M. cannot afford to do this.

Retrenchment Inevitable.

It is not surprising, therefore, to learn that the position of the company is again being most carefully investigated, and particularly so with a view to retrenchment. It may be possible to effect retrenchment gradually so as to lessen the burden of hardship on the employees and the community at large. But it seems that little short of a miracle can place the proposition on a satisfactory basis. It will doubtless be possible to continue productive operations on a large but modified scale for some time to come. But unless some tremendous effort is made by the employees to pull the mine round, and even now it may be too late, we fail to see how the E.R.P.M. can continue to carry on for any length of time. And the E.R.P.M., it should be made clear, is one of the largest employers of white labour in the country.

£700,000 a Year in Wages.

The wages bill of the E.R.P.M. is in the neighbourhood of £700,000 per annum. Stoppage of work at the property



A Scene on the Cason Section of the E.R.P.M. in the days of the company's prosperity.

Scattered Ore Reserves.

The proposition is a difficult one to work. It is essentially a low-grade venture, and the only remaining blocks of comparatively good grade ore are so scattered that the cost of mining cannot but be high; under present working conditions it is so high that it is difficult to see how the property can continue working except on a much reduced scale of operations. The general public have heard so much about the plight of this mine, once regarded as one of the Consols of the Rand, that they have come to regard talk of closing down the E.R.P.M. as a cry of Wolf. But the true facts of the case are that unless there is a sharp rise in the price of gold or a very substantial reduction in working costs the outlook for the East Rand Proprietary is well nigh hopeless.

would be an unprecedented misfortune to the whole district, but the economic calamity would not stop at that, as within a few months the neighbouring mines would be flooded unless arrangements had been made to cope with the water. Even curtailment of operations will have a well nigh ruinous effect upon Boksburg, and this in turn will react on Johannesburg, the Reef, and the country generally.

The Moral of Kimberley.

The lesson of Kimberley should hang over our heads here in Johannesburg and make us realise that just as Kimberley depends upon diamonds for its prosperity so do Johannesburg and the Reef towns depend upon gold. And unless something is done, and done speedily, to arrest the rot and

to destroy the canker which is gnawing at the vitals of the gold industry the Reef may very quickly become as depressing and poverty-stricken a place as Diamondopolis is at the present time. But the effect of any wholesale suspension of mining operations on the Rand would be far more disastrous to the whole country than has been the collapse in the diamond industry. And there is only one way in which the position can be remedied, and that is by reducing working costs, not by a penny or two per ton, but by several shillings per ton.

Where Our Industrial Salvation Lies.

As we said in our last issue, the mere amendment of the Mining Regulations is not going to so transform our industrial position that we can claim immediate salvation from the morass of perilous uncertainty into which the mines have for so long been drifting. We need more, much more, than increased working hours from the native before we can truly sight the haven of safety and prosperity; and primarily we need the close co-operation of the white miner in a whole-hearted effort to reduce working costs to such a degree that the Rand may be independent of the gold premium. Our real industrial salvation lies in the direction of being able to earn profits, commensurate with the capital involved, from ores that yield as little as twenty shillings per ton. When we have achieved that—and not until then—we may indeed shout that we are out of the wood that at present darkens the whole of our outlook.

A Geological Survey.

The Age of the World—An Interesting Lecture by
Mr. T. N. Leslie.

On Monday evening Mr. T. N. Leslie lectured at the Scientific and Technical Club on "Problems in Local Rocks and Storms." In the course of his address Mr. Leslie remarked that the dolomite—the magnesium limestone of this country—was immediately below these series. It was the great water-storing rock of South Africa, and for that reason was most important. It was also important from an economical point of view; it was important geologically, and for the connection with one of the gold-bearing rocks—the

black reef. There was a strip of South African country 300 miles in extent, which was the history at present of the dolomite. The formation was not pure limestone, but had about ten per cent. of silica or quartz intermixed, thus giving its valuable water-storing characteristic. A number of slides were shown indicating the glacial conglomerate, and exhibiting specimens of plant fossils of types distinct each from the other in the Northern and Southern Hemispheres. The lecturer, dealing with meteorological conditions in South Africa, showed several interesting slides illustrative of cloud forms, which were the precursor of storms.

Dr. Orenstein, who presided, expressed thanks to Mr. Leslie, which were cordially endorsed by those present.

In the past there had been many attempts made to show how old the earth really was. A new method had replaced Kelvin's, which brought a computation of from 20 to 100 millions of years. Other well-known scientists had since discussed the question. Lord Raleigh pointed out that radioactive substances had been discovered of which Kelvin had no conception whatever. The age of the carboniferous rocks had been since estimated at something like 550 million years. The primary rocks—the introductory to the book of Geology—were much older. The lecturer, dealing with the surface measures of the Transvaal and Free State, mentioned that they were older than most of the other rocks in the Northern Hemisphere, of which the mountains were built. While the great change of conditions was going on—continents in the north being built up and in the south being lost—the total effect of climate itself had remained stationary through the enormous periods of time. There was very little difference in its type. "The whole of South Africa has been planed down," Mr. Leslie said. We had only one or two chapters of the first volume of the history. The second, third and fourth were missing. But in this country there was, to the lecturer's knowledge, one recent incident of the building up that was in constant progress. He spoke of the site of an old-world lake near Vereeniging. In a thickness of seven feet to ten feet of recent deposits, over the most ancient forms, were found specimens of the handiwork of prehistoric man. Mr. Leslie illustrated with lantern slides some interesting facts concerning the coal measures and associated rocks of South Africa. The Karroo Series, highly developed over the Cape Province, he remarked, were representative of the permo-carboniferous rocks of Europe.

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Retrenchment on the Diamond Mines.

PLIGHT OF KIMBERLEY AND JAGERSFONTEIN—OUTLOOK IN THE PRETORIA DISTRICT.

From both Kimberley and Jagersfontein comes news of further retrenchment on the diamond mines in view of the continued depression in the market. The New Jagersfontein mine is, of course, controlled from Kimberley, and the policy of its directors is dictated by De Beers. It appears that, as far as Jagersfontein is concerned, working expenses are to be cut down by one-third, this being effected by a reduction in white wages and the discharge of a number of natives. Apparently much the same policy will be pursued at Kimberley, though we have no official statement on the subject. De Beers declare that during the past year they have paid out a million sterling in order to maintain in employment a thousand men on non-reproductive work, and in view of the absence of any sign of an early revival in the diamond market they are forced to adopt a drastic policy of economy. The local Chamber of Commerce has, naturally, taken fright at this prospect and has interviewed the board of directors of De Beers, from whom it was elicited that the drain on their capital resources had been such that their funds are "nearing the danger point" and they are "painfully and reluctantly" compelled to retrench. In doing so they give the assurance that they will sympathetically remember the claims of old servants. One thing is clear, that the position in the diamond mines, unless it improves, will be immediately reflected among the commercial community of the diamond fields and that to the

already large ranks of unemployed there will be serious additions. Evidently the Chamber of Commerce realises that the industry is the victim of world circumstance, for it has publicly expressed "sympathy with De Beers in their trouble" and assured them of its earnest desire to co-operate with the Board in combating the danger of unemployment.

Position at the Premier.

Although no announcement has been made, it is safe to surmise that the Premier people will have to follow the De Beers example and still further cut down expenditure. This will naturally mean further curtailment of the present restricted scale of operations at the mine. The plain explanation of the whole thing is, of course, that the depression is so prolonged and shows so little prospect of amelioration that the diamond companies must trim their sails to meet the altered conditions. In other words, they must plan to make their rapidly dwindling cash resources go further, and, in the circumstances it is difficult to see that they have any other alternative. The lesson must not be ignored by the communities and the Government which live and depend for so much of their revenues upon the diamond mines, and all that can now be done is to pray for some rift in the clouds that now darken the diamond markets of the world.

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A Remarkable Balance Sheet.

FINANCES OF THE ROGERSTON COLLIERIES—SOME PERTINENT QUESTIONS.

A copy of the balance sheet and report of the Rogerston Collieries, Ltd., for the year ending 30th June, 1921, has come into our possession. This is such a remarkable document that we feel bound to comment on it. The financial statement is enough to make one gasp. First of all, however, to deal with the operations of this company, which has been in existence for many years and from which, so far as we know, shareholders have never received a penny in profit. The report states:—

“As intimated in the previous reports the company secured a substantial interest in the Grootpan Collieries, Ltd., transferring to the new venture the complete outfit of the mine closed down at Onspoed, and holds 8,824 fully paid shares in an issued capital of £20,000. The equipment of Grootpan Mines is now completed, drives are opened up from an incline hauling shaft, and coal of an excellent quality is being marketed. This colliery is adjacent to Minnaar station, on the Johannesburg-Delagoa Bay line, loaded and empty trucks being handled by the Railway Department there, rendering haulage by the company unnecessary—an obvious advantage from an economic point of view. The seams of coal appear to correspond with those of Tweefontein, the nearest colliery, about three miles distant, which is a big producer. The prospects for Grootpan are therefore very satisfactory. One of your directors, Mr. Hay, has been elected chairman of the new company.

“The investment of £2,500 in S.A. Iron & Steel Corporation, Ltd., amply justifies the confidence of your directors, allocation of shares in the re-floatation being at the rate of two new for one original share, the Rogerston Company therefore receiving 5,000 shares in the new company. Mr. Romyn, who has so long been associated with the Rogerston Company directorate is chairman of what promises to be one of the greatest industrial undertakings in the Union.

“The policy steadfastly pursued by directors for a number of years in conserving the assets has resulted in placing the company on a firm footing, in spite of discouragements arising from the failure of the original coal propositions, both at Waterval and Onspoed. The former heavy indebtedness has been replaced by investment in an admirable coal property, and an iron industry which are certain of future success, the patience of shareholders being rewarded by securing a sound value for their shares. The future prosperity of the company is now practically certain, so far as can be ascertained.”

For the shareholders' sakes we sincerely trust that the optimistic expressions of opinion regarding the S.A. Iron & Steel Corporation will be justified by future results, but inasmuch as the corporation has never yet done anything more than talk about what it is going to do one day, we ourselves can hardly echo the exuberant note sounded by the directors of the Rogerston Collieries.

The Company's Expenditure.

Turn now to the financial aspect of the concern. The report states that during the financial year ending with June 30, 1921, the Rogerston Collieries, Ltd., made a book

loss of £64 1s. 6d. and that the income from all sources including the balance of £186 17s. 9d. carried forward from last year amounted to £692 10s. 11d. The profit and loss account for the year shows on the debtor side the following items of expenditure:

Travelling Expenses	£17 0 0
Charges	70 12 2
Salaries	150 0 0
Bonus	50 0 0
Directors' Fees	250 0 0
Audit Fees	10 10 0
Interest	76 0 3
Commissions	132 10 0
	£756 12 5

Questions which need Answers.

What are the “Charges” referred to above? To whom was the £50 bonus paid, and why? And what is the explanation of the item, “Commissions, £132 10s.”?

The company's income for the year, including £186 17s. 9d. carried forward from the previous year, is stated to be £692 10s. 11d., and in view of this and the fact that last year's operations resulted in a loss of £64, one may pertinently ask whether the directors' remuneration is not too large, and just exactly why the expenditure in regard to “Bonus,” “Charges” and “Commissions” was contracted and to whom payment of the amounts mentioned was made?

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An Improved Method of Treating Zinc-Gold Slimes.

HOW WORKING LOSSES CAN BE REDUCED IN THE REDUCTION WORKS OF SOME MINES — DESCRIPTION OF A NEW PROCESS.

By a Special Technical Correspondent.

Much has been said and written of late with regard to reducing working costs on the gold mines. As the greater portion of working costs is incurred by work underground, attention has lately been focussed on that department, and surface works have been comparatively neglected. It is also generally taken for granted that the surface works have reached a state of perfection, and that little or no improvement can be made in that department. However, this article shows that not inconsiderable losses do occur in the reduction of gold, and the investigator has gone into the matter very fully, and claims that substantial savings can be effected by the adoption of the process here described. A saving in costs amounting to 1.5 pence per ton of ore treated is not to be lost sight of at the present time, and an improvement of this description is well worthy of the attention of the industry.

Briefly, the process consists of the following: Wet zinc-gold slimes are subjected to the action of steam and heat in a specially designed plant whereby the metallic zinc present is oxidised and rendered more soluble in the acid or ammonium carbonate treatment that follows. The more complete removal of the zinc from the slimes lessens the losses of gold in smelting and cupellation, and thus the saving, claimed by the originator of the process, is affected.

The main objects of the process are as follows:—

(1) The Complete Elimination of Zinc from Gold Slimes Prior to Smelting.

That the Tavener process now in use exposes the gold to great risks of loss through volatilising is acknowledged by many metallurgists, such loss being due to the presence of zinc in the gold slimes to be smelted.

With regard to these losses I would draw your attention to the following: These tests are the work of Professor Furness, and represent work on an assay scale, similar to the Tavener process on a larger scale.

- (a) Average loss without zinc in cupellation, 0.296 per cent. of gold contained.
- (b) Average loss with zinc in cupellation, 6.76 per cent. of gold contained.
- (c) Average loss with zinc in cupellation, following scorification, 5.265 per cent. of gold contained.

On a local mine, with output 170,034 ounces cyanide gold:

- At .296 per cent. loss of gold = 503.3 ozs. per year.
- At 6.76 per cent. loss of gold = 11,494 ozs. per year.
- At 5.27 per cent. loss of gold = 8,960 ozs. per year.

(2) Less Handling of the Rich Product.

The plant is automatic, and therefore the handling losses are centralised and localised, and are recoverable.

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(3) Quicker Recovery of the Gold.

The time being estimated at 2½ days.

(4) Less Locking Up of Gold in Furnaces.

This locking up occurs in the Tavener process to-day, due to the corrosive action of lead on the bricks of the furnace.

(5) Cheaper Recovery.

The present costs equal 2.05 pence per ton treated.

In comparison with this the only costs incurred by this process, taking labour as equal in both cases, would be the cost of coal and steam. Moreover, the recovery of zinc oxide, lead nitrate and ammonium carbonate, are further saving factors.

A modest estimate of cost saved would be in the neighbourhood of 1.5 pence per ton of ore treated.

(6) Reduction in Bulk of Gold Slimes to be Smelted.

With sulphuric acid treatment, 12 lb., oxidised product reduced to 1.5 lb.

With ammonium carbonate treatment, 12 lb., oxidised product reduced to 1.8 lb.

(7) Immunity of Theft.

(8) Bigger Recovery of Gold.

Taking the losses under the different percentages over 1,945,000 tons treated:

- At 0.296% loss of gold = 0.31 pence per ton treated.
- At 6.76 % loss of gold = 7.09 pence per ton treated.
- At 5.27 % loss of gold = 5.50 pence per ton treated.

The above tables are submitted to show that a process in which there is a theoretical possibility of these enormous losses is dangerous in the hands of non-technical men.

This process was brought to the notice of the Mines Trials Committee and commented upon favourably. It was passed for more exhaustive trials to be conducted under the auspices of that body. Through doubts as to the oxidation of the zinc being possible by the methods suggested, it was finally discarded.

These doubts having been dispelled and the reasons of incomplete oxidation having been proved, it is the wish of those responsible for these further trials of the process that it should be tried on a larger scale on one of the mines in the Witwatersrand, as it is quite certain that the enormous saving in costs to the mining industry which have been indicated will then be fully demonstrated.



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E. W. Tarry & Company, Limited, the well-known Rand engineering firm, have their workshop situated at the eastern end of Anderson Street, and have selling departments at 23, Simmonds Street, and 42, Joubert Street. The engineering works depend to a large extent upon the gold mines for the greater portion of their work, but also undertake engineering work for other industrial concerns such as cement works, acid works, and coaling plants. Innumerable pistons in cast iron as well as special aluminium alloy for motor cars have also been executed in these works. The firm's advancement has to a large extent gone hand in hand with the development of the gold mining industry, and at present to a certain extent feels the depression under which the latter industry is suffering. The conditions which have been brought about by the war forced industrial undertakings to rely to a greater

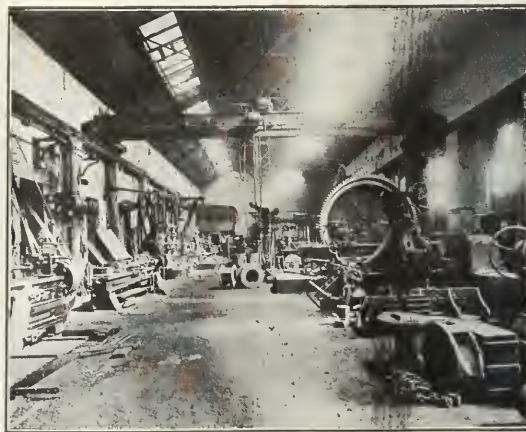
It has been cited by local engineers that orders for very big work come in so seldom that the installation of special machine tools to handle such big work is not worth the while. Occasionally such big work has been undertaken and executed to the credit of the engineering industry, and if such is possible in isolated cases, then more orders of that nature should be placed with the local engineering firms in order to enable them to stabilise that branch of their work and make the installation of the necessary big machinery a commercial success.

The engineering works of E. W. Tarry & Company, Ltd., are situated on a large block of ground, and housed in substantial brick, wood and iron buildings. All the essential departments of an engineering works of this



Tarry's Foundry (Eastern end).

extent upon local engineering firms for the manufacture and supplying of their needs, and the magnitude of the work locally executed has gradually increased. This state of affairs has definitely proved to the people of this country that our local engineering works are fully capable of supplying all their wants, and that there is very little justification in placing orders with overseas firms when the work can be executed in this country. The future prosperity of this country is largely dependant on its industries, and it is only with closer co-operation between these that more rapid strides towards that ideal can be achieved. It is thus hoped that, with the revival of the mining industry, our engineering firms will not only be looked upon to supply the needs of the already existing mines, but also be called upon to supply the whole plant, or as much of it as they are capable of producing, of any new industrial undertakings of the future.



Portion of Machine Shop (Western end).

description are included, and are made up of the following: Offices, Pattern Shop and Loft, Foundry, Smith Shop, Machine Shop and Boiler Shop.

Offices.

A noteworthy feature in connection with the offices is the complete record which has been kept of all patterns and work executed in the works. Such records date as far as twenty years back, and supply all details concerned with its making. In connection with these records a very useful compilation—known as "List of Patterns of Spur, Mitre, Bevel and Helical Gearing Wheels"—has been made up by the management. The book has been circulated amongst the mines, and contains all the detail necessary in specifying any required gearing wheels. For instance, if a mine requires a gear wheel of some description, the one suiting their requirements is locked up in the book, where details such as diameter of pitch circle, pitch, etc., are given, as well as an index number. All that is necessary then is that the figures

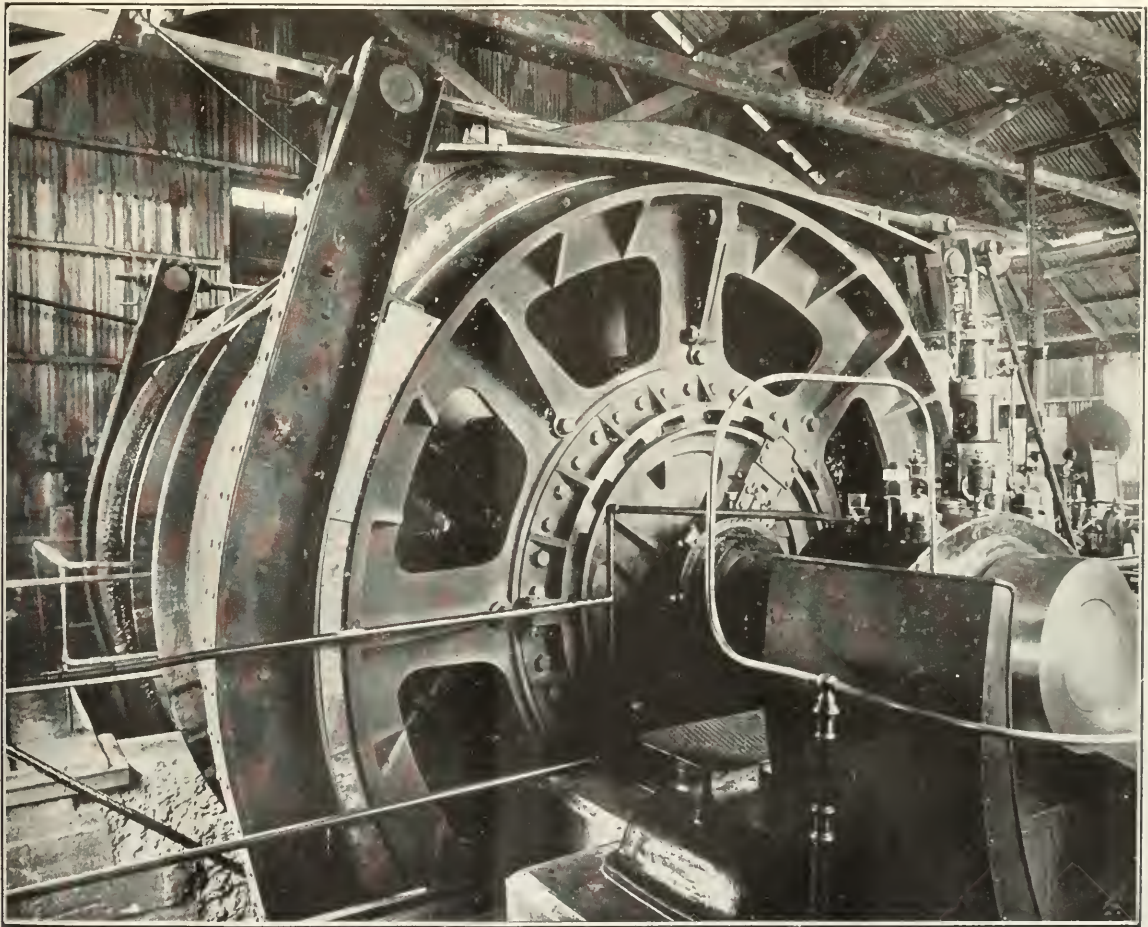
stated in the book be sent to the works, and from them all the details concerned in the production of the last article of that description can be obtained in a very short space of time. The pattern last used in that case can also be obtained at a few minutes' notice by consulting the index numbers, and the work can be executed with a minimum of delay.

Pattern Shop.

The pattern shop is an indispensable department where pattern work of any description is done. Here the shape of the finished article is wrought in wood and other suitable materials, and very great care has to be executed in its making. Any fault in the pattern is reproduced in the finished casting, and in order to save unnecessary expenditure all work here has to be done with utmost care.

was melted in two cupola furnaces, and when molten, was run into two ladles. These, when full, were conveyed by means of an overhead travelling crane to the mould, and pouring conducted from two sides. The finished casting is allowed to remain in the mould for 48 hours in order to cool and contract properly.

The pig iron used in making castings consists of Scotch, Australian, Bengal, as well as local pig. The supply of moulding sand available is not too satisfactory, and could be better. Suitable sands can be obtained from the coast, but the cost of transportation on the railways prohibits their use, and local foundries have to make the best of the supply available here.



Winding Drums for Modder Deep (40 tons each), constructed by Tarry's.

All patterns made in this shop are given an index number and name, and these are carefully filed in the office. When the work required of them has been cast they are stored in the pattern loft, where they remain till further use is required of them. A visit to the pattern loft displayed thousands of patterns, which had been used as far back as twenty years ago, and were ready for use should occasion arise.

Foundry.

In the foundry castings in cast iron weighing up to 11 tons have been executed. At the time of visiting, a casting weighing about 9 tons was in progress, and formed part of a winding drum for the State Mines. The actual casting had taken six men seven days to produce. The cast iron used

Casting work in lead, brass, and special aluminium alloy is also conducted at these works. With regard to lead castings, it is interesting to note that the oleum (sulphuric acid) plant at the dynamite factory was made in these works. In this connection work in lead totalling 120 tons in weight was made, of which the largest casting weighed 6 tons. A large number of motor car pistons are cast in this foundry in both cast iron and special aluminium alloy, the latter being an alloy of aluminium with smaller amounts of copper, nickel, and magnesium.

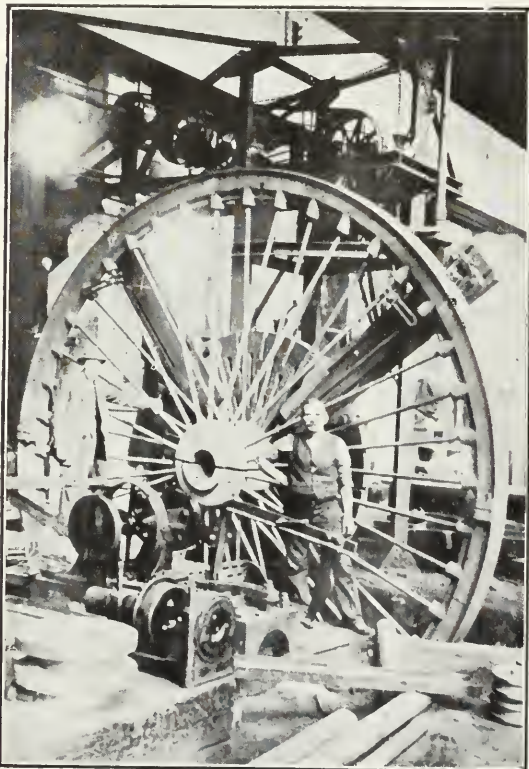
The smith shop is equipped with both a heavy and light steam hammer, and the furnaces are all coke fired. The machine and boiler shops adjoin the smith shop, and the former is fitted with all the necessary machine tools to meet

requirements. Lathes, both large and small, planers, shapers, milling machines, and bevel wheel-cutting machines are all to be found. Work in rawhide is also conducted, and a large stock of rawhide pinion blanks are in stock. The boiler shop contains shearing, punching and bending machines, as well as a pneumatic rivetting and other tools. Work recently conducted in this shop consists of large single and double-deck cages for the West Springs Mines.



Mcrtar Boxes for Robinson Deep, turned out by Tarry's.

The magnitude of some of the work done by this engineering firm is specially noteworthy. This clearly demonstrates that local engineering firms are capable of producing and completing large jobs. The photographs reproduced herewith fully bear out this statement. The electrical winches for the Delagoa Bay coaling plant rank among some of the achievements of E. W. Tarry & Co., Ltd.



Built at Tarry's—16 ft. diameter Pit Head Sheave.

Lowmoor Iron.

**MESSRS. SAMUEL OSBORN (S.A.) LTD.,
SOUTH AFRICAN AGENTS.**

Messrs. Samuel Osborne (S.A.), Ltd., the well-known Sheffield steel and hardware manufacturers (represented in South Africa by Mr. W. Raeburn Snow, of Cott's Buildings, Johannesburg), have been appointed agents in South Africa and surrounding territories for the sale of the world-famed Lowmoor iron. Engineers and mining men are well acquainted with Lowmoor iron, which claims to be "the best iron in the world." Lowmoor iron is used for all important work where life and limb depend on it, and this iron has upheld this high reputation without interruption since 1790—a long stretch in the industrial life even of the Old Country—when it was first manufactured at the world-known Lowmoor Works, near Bradford. A special ore and coal is the basis of this iron, both of which can only be obtained from the company's own mines. In this connection it is interesting to note that both the coal and ore requisite for the manufacture of Lowmoor iron are found on the estate on which the company's works are situated. The discovery of the iron ore was not made until years after the coal seam manifested itself. It will doubtless interest users of the metal to know that it is made by a special process, whereby the metal is all times under perfect control, and samples are taken during the process which afford accurate information regarding the degree to which the phosphorus, sulphur and other impurities have been eliminated. The resulting metal is then puddled and converted into wrought iron. Afterwards it is piled, heated, and hammered and rolled into faggots, approximately two inches square, which, in turn, are piled and cross-piled, heated three times, and hammered after each heat; finally becoming a bloom for the rolling mill, when it is rolled into the necessary sections required. Lowmoor iron, as supplied in the finished section, is as pure as it is mechanically possible for it to be, as will be seen from the approximate final analysis.

C.	Si.	S.	P.	Mn.
.06/.08	.08/.1	.008/.010	.07/.1	Trace.

It should be mentioned that a little time since Messrs. Robert Heath and Co., Ltd., absorbed the Lowmoor Company, Ltd., and the joint title of the firm now is Messrs. Robert Heath and Low Moor, Ltd. As before mentioned, the sole South African agents of the new firm are Messrs. Samuel Osborn (S.A.), Ltd., whose headquarters in this country are Cott's Buildings, Johannesburg.

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The Glencoe-Maritzburg Electrification

SOME DETAILS OF THE FIRST STEP IN THE ELECTRIFICATION OF THE SOUTH AFRICAN RAILWAYS.

In view of the decision of the Railway Board to make a start with the electrification of the S.A.R.—as announced exclusively by us in a recent issue—we print the following further extracts from Messrs. Merz and McLellan's now historic report dealing with the electrification of the Glencoe-Durban section of the line. The announcement in our last issue that the Glencoe-Maritzburg section would be the first to be dealt with has been confirmed during the week by the Pretoria correspondent of a daily contemporary. The decision of the Railway Board is generally welcomed as wise and far-seeing, and as proof of confidence in the industrial future of the country. To Sir William Hoy in particular credit is due for his powerful advocacy of the scheme.

With electric working we should not propose to increase the number of trains, but to add four more coaches, in order to provide the necessary additional accommodation. On the other hand, we have assumed that with steam working the number of trains would have to be increased by not more than 35 per cent. to provide for the 50 per cent. increase in traffic anticipated. The local trains between Maritzburg and Merrivale would continue as at present. It is proposed to institute a new suburban service between Durban Marian Hill on the Cato Ridge-Clairwood deviation, and the costs of working this have been included in the comparative estimates of working expenses.

Shunting.

A large amount of shunting by special engines is carried on at present at Durban, The Point, and The Bluff. With the completion of the new marshalling yard at Booth Junction the bulk of this work will be transferred to this place. There is also a considerable amount of shunting at Glencoe, Ladysmith and Maritzburg. At the two last-mentioned places the amount of work to be done would be much reduced by the adoption of electric working, but not entirely eliminated.

Rolling Stock.

For dealing with the through goods traffic between Glencoe and Booth Junction we estimate that 41 double-unit locomotives would be required; for banking between Ladysmith and Estecurt 8 single-unit locomotives would be sufficient, and 7 double-unit engines for banking on the Nottingham Road-Merrivale section. For the goods traffic between Booth Junction and Durban, The Point and The Bluff, 4 single-unit locomotives would be needed, and for the pick-up trains between Booth Junction and Ladysmith 8 single-unit engines.

On account of speed restrictions due to curves and the comparative short distances between stations, we are of opinion that there would be very little advantage in providing engines of the express passenger type, as recommended for Division 1, for dealing with the passenger traffic in this section. It would be simpler and better in many ways to use single or double-unit goods engines according to the weight of train to be hauled. We estimate that even with these comparatively slow speed locomotives the time of travelling from Durban to Glencoe could be reduced from about 14½ hours to about 11½ hours. The interchangeability of all locomotives employed on the section (with the exception of special shunting engines) is also a considerable advantage. For working the main line passenger service 10 double-unit locomotives would be required, and for the local and

suburban passenger service 5 single-unit engines. The total amount of shunting to be worked is 1,550,000 engine miles per annum. We estimate that 54 special shunting engines would be sufficient for this, of the same design as those recommended for use at Capetown. Of this number, 42 would be stationed at Booth Junction, 1 at Maritzburg, 5 at Ladysmith, and 3 at Glencoe.

The total number of new electric engines would therefore be 137. The number of existing steam engines allocated to the service at present is 218, of various classes. Of this number six would be released by the elimination of banking on the new Cedara-Nottingham Road section on the completion of the new deviation between these points, leaving 212 to be released on account of electrification. For the additional traffic a considerable number of new steam locomotives would be required, and we are advised that these would consist of 49 of the 12th class, 6 of the 14th class, and 4 of the 16th class. The saving in new wagons due to the acceleration of service would be very considerable. We estimate that this would amount to approximately 423 40-ton wagons or the equivalent. Similarly a saving of 93 40-ton wagons would result from the reduction in fuel consumption.

The principal engine shed for this section would be situated most advantageously at or near to Booth Junction. Goods train engines would run from there to Glencoe and back with a short interval at Glencoe for examination and adjustment if necessary. Passenger train engines would also be stationed at Booth Junction, but would pick up their trains at Durban. Running sheds would be necessary at Maritzburg and Ladysmith for the accommodation of banking and shunting engines, and at Glencoe for inspection of the main line train engines. We have made provision in our estimates for the erection of a completely new shed at Booth Junction and for alterations to the existing sheds at Maritzburg, Ladysmith and Glencoe to make them suitable for the reception of the electric locomotives.

Power Supply.

The proposed arrangements for power supply for this section have already been fully dealt with. Sub-stations in which high tension alternating current would be transformed to direct current at about 3,000 volts for distribution to the trains would be situated at fairly regular intervals along the line. In view of the large amount of work to be done at Booth Junction, we consider it advisable to erect one of the sub-stations at this point. This would supply power for the lines to Durban and the Bluff, as well as that going towards Maritzburg. At Maritzburg, Ladysmith and Glencoe, the main line is joined by branch lines, which may at some later date be electrified. We recommend, therefore, that a sub-station be erected at each of these places. Others would be provided at suitable intervals between these points.

Estimates.

The cost of line equipment would amount to £779,700 and of sub-stations to £660,000. The expenditure on electric locomotives would be £1,302,000, but this is offset by the credit for steam locomotives and new wagons, there being a small credit balance of £163,050. The estimated cost of the track alteration, *i.e.*, the Cedara-Nottingham deviation and the doubling of the track between Estecurt and Ladysmith, is £751,137, which is included in the general estimate as a credit item. The net capital outlay, including contingencies and engineering expenses and other small items, is £952,713.

Details of the annual working expenses with steam and electric working are given, from which it is seen that the total cost for steam is £835,550, which, compared with £451,140 for electric working, leaves a balance in favour of electrification of £384,110, representing a return of 10.3 per cent. on the net capital outlay.

S.A.R. Electrification Costs.

COMPARATIVE PRICES—COPPER FLUCTUATIONS—ROLLING STOCK THE CHIEF ITEM.

In the course of their report on the electrification of the South African Railways—with which a beginning is now being made—Messrs. Merz and McLellan write:—

In working out the estimates in detail, it has been necessary to consider what price basis to adopt. At the present moment it is impossible to foresee what current prices are likely to be at the time when contracts may be placed for the generating plant, locomotives and other material requisite for carrying out the electrification of any section. Towards the end of 1918 prices which had been steadily going up during the whole period of the war had reached a level approximately 100 per cent. above the pre-war level, the cost of some materials having risen rather more than this and of others less. In the future it is reasonable to anticipate that prices will sooner or later go down again; but it may be taken for granted that they will not in the immediate future, if ever, return to the general pre-war level. After careful consideration we have thought it best to work out all the estimates on the basis of an all-round increase of 50 per cent. on pre-war prices, except where the cost of any work depends to a large extent on the price of copper, such as that of the distribution system. Prior to the war, the basis price of electrolytic copper was in the neighbourhood of £60 to £70 per ton. During the war the basis price was for some time above £130 per ton. For the purpose of our estimates we have assumed that drawn copper wire suitable for transmission and distribution lines would be purchased at the rate of £120 per ton, including delivery to South Africa. This rate would correspond to a basis price for electrolytic copper of about £90 to £95 per ton depending on freight charges and other factors.

Copper Prices.

In considering the estimates it will be useful to be able to calculate how far the cost of the distribution system will be modified by reason of any variation in the price of copper from the assumed value of £120 per ton delivered. We have, therefore, inserted a figure which shows the tonnage of copper required for the distribution of that section.

Locomotives and Wagons.

For the prices of new and existing steam locomotives and wagons we have assumed the same ratio of increase above pre-war values, viz., 50 per cent. New locomotives are charged for at 50 per cent. above the pre-war contract prices for each class, including the cost of transport to South Africa and of re-erection in the railway workshops. The credit for existing locomotives is calculated on their present book value (*i.e.*, original cost less depreciation) plus 50 per cent. In most of the sections considered there would be a large number of engines released. At the present stage it is difficult to form any close estimate of this credit, as individual locomotives are sometimes transferred from one division to another, and frequently work for only part of their time on any particular section. We have thought it advisable, therefore, to assume a uniform figure for the depreciation of all engines displaced, and we have taken this at 50 per cent. Thus the credit for a locomotive costing originally £6,000 has been taken as £3,000, plus 50 per cent., *i.e.*, £4,500. The cost of new wagons will depend to a certain extent on the type of wagon purchased. We understand that the large majority will be high capacity coal wagons suitable for a load of about 80,000 lbs. From particulars and prices supplied to us by the Chief Mechanical Engineer it would seem that an average figure for modern wagons used in South Africa was before the war about £9 per gross ton (tare plus load). We have, therefore, based our estimates on an average price of £13 10s. independent of the type of wagon selected.

The principal item in the gross outlay is the cost of rolling stock, and, further, the net outlay on rolling stock

after deducting the credit on account of steam engines and wagons is very small. As both the gross outlay and the credit for rolling stock are affected to an equal extent by the assumed increase above pre-war prices, it is clear that so far as the principal item of new material is concerned the exact ratio of increase assumed is comparatively unimportant.

Comparative Estimates of Working Expenses.

In order to arrive at the estimates of saving in working expenses to be expected as the result of electrification, it is necessary to take into account only those items of expenditure which are affected by the change of system. The costs for each section are given, and are dealt with under the following heads, some of which apply to steam working, some to electric working and others to both:—

- Coal for locomotives.
- Water for locomotives.
- Electrical energy.
- Wages of drivers, firemen and guards.
- Running shed expenses.
- Lighting and heating charges.
- Repairs of locomotives.
- Depreciation of locomotives.
- Depreciation, maintenance and working expenses of sub-stations.
- Maintenance of track equipment.
- Shunting.

The costs for steam working have been calculated throughout on the basis of figures supplied to us by the Expenditure Office in Johannesburg, modified in certain sections to allow for alterations in the working of the traffic, *e.g.*, by the completion of new deviations now in course of construction. These modifications are referred to in detail in the sections dealing with the traffic arrangements in each division.

Electrical Energy.

The power required for electric locomotives and trains is calculated in detail for each section from the amount of traffic—goods, passenger and shunting—to be dealt with in accordance with the figures supplied to us. The annual train mileage of each class of traffic is shown, and the average weight of trains is given separately. Due allowance is made in all cases for the gradients and curves, the direction of movement of the loaded traffic, and the possibility of reducing energy consumption by regeneration

MINES DEPT. EXAMS. CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 3 failures this year (1921)

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),

St. James' Mansions, Eloff St. Johannesburg

A New Type of Secondary Crusher.

A CONTRIBUTION TO THE "NEW METALLURGY" BY A SPECIAL TECHNICAL CORRESPONDENT.

For years past engineers, mine managers, and contractors have felt the want of an economic secondary crusher. Many attempts have been made by investors to evolve a secondary crusher on the lines already in existence, and utilised in primary crushers of to-day. But with the exception of the various patterns of rolls, the results have been disappointing to all. These are some of the chief reasons why success has not been attained in the past.

No. 1. In a jaw crusher, and even in a gyratory crusher, as used to-day to crush materials to, say, 2in. to 1½in. mesh, a swinging movement is imparted to one of the crushing surfaces and as long as this movement is of sufficient magnitude, a certain amount of impact is imparted into the moving member. The more of this force we have to deal with in any crusher the more efficient the crusher becomes. In other words, the sharper the "impact" the better the results. For this reason it is, that if we close up any type of jaw crusher, until it will deliver, say, a product of 1in. mesh maximum, the impact is lost, and the whole operation becomes one of crushing by "sheer force" and this is expensive both in power required as well as wear and tear per ton of material crushed.

One of the results of the above experience has been the introduction of rolls for secondary crushing, and rolls if properly designed as secondary crushers certainly save a considerable amount of power per ton crushed, yet the saving has not been sufficient to displace the gravity stamp, for the simple reason that the gravity stamp, with all its drawbacks, makes use of the impact. And the value of this impact has been sufficiently great to deal with all the materials subjected to crushing from, say, 2in. mesh down until it pushed the rolls out on account of higher efficiency. This then proved that the gravity stamp stood supreme as the most efficient all-round apparatus for secondary and final reduction of the ores, until finally the rival in the shape of the tube mill challenged the position held by the gravity stamp in being able to make the final reduction of the ores more economically. This was at once taken advantage of, in the following manner: coarser screens were put on the mortar boxes, and thus the tube mill established itself as the supreme finisher of the process. This then puts the gravity stamp into the position of simply an intermediary or secondary crusher.

The Factor of Impact.

If we analyse the position it will be found that impact is the chief factor again. The finer the screens on the mortar boxes the less the impact becomes of the stamp, for the reason that some of the already partly crushed materials act as a cushion for this impact, thus reducing effective results in a 10 stamp mill running at 92 drops, there would be 920 impacts per minute. Now look at the tube mill of standard size, say, 5ft. 6in. and 22ft. 6in., running at, say, 30 revolutions per minute with sufficient pebbles of, say, 3in. to 1in. mesh; a simple calculation will show that there are at least 14,000 to 16,000 effective impacts per minute. And this is the chief factor of success with the tube mill. Each individual impact does its quota of work as regularly as the power is put in to rotate the mass, and thus provide fresh surfaces for it to act upon. The proof of this is if a tube mill is run at too low a speed until the impact is lost, the output at once becomes reduced to such an extent that the tube mill under these conditions would never have become a competitor with the gravity stamp. Allowing that this argument so far is correct, it naturally follows that the more force there is exerted at the point of impact the greater the results, always provided that this force is in harmony with existing conditions.

In the tube mills of to-day quite a good percentage of pebbles are allowed to work out at the end of discharge. These pebbles vary in size from about 1½in. to 2in. mesh, and are to-day taken back to the gravity stamp for further

reduction, and then put back into the tube mill for final reduction. If they were put back in the tube mill again before crushing the results would be that in the end they would accumulate in the mill until there would be no room for the largest pebbles to form any impact. And the impact made by these small pebbles is not sufficient to do any crushing, owing to their light weight. Hence abrasion would be the only reducing agent, and that is too slow and too costly in power. For this reason I maintain that it is not good practice to feed a tube mill with too coarse a material; there would be too large a percentage of spent pebbles. The power factor would at once increase, and the output be reduced. Based on the above conclusions gained during a long and varied experience, the ideal reduction plant would be as follows:—

Primary crushers from 1½in. to 2in.

Secondary crushers from ½in. to sand.

Tube mill sand to slimes.

Having delegated the gravity stamp to a secondary crusher only, it becomes a costly and inefficient apparatus. And it is my firm conviction, that in the future it will be replaced by a more economical and efficient apparatus, which will utilise the value of impact in the full sense.

To Replace the Gravity Stamp?

Such a machine is already in existence and is now being tried out. I have great hopes that in the end it will replace the gravity stamp entirely. For smaller propositions it certainly has a great field as it is. It may be described as a horizontal steam stamp requiring no foundations or other preparation. A boiler being available, it is just coupled up to the steam pipe and all is ready. Two hammer pistons, floating in a perfectly lubricated cylinder, deliver a blow at each end of the stroke, thus making the crusher double ended and duplex in action.

Each blow is transmitted through a dolly on to a pitman. The material to be crushed is fed in between the movable pitman and a fixed anvil block at the end. Here the material is crushed by the sharp impact of the blow delivered by the floating piston. Both crushing faces are placed in a vertical position so that as soon as the material is crushed it falls down, and out, while more material takes its place ready for the next blow from the pistons. Thus there is a constant flow of material through the crusher. By arranging the anvil blocks to suit the products required, any size product can be obtained. Thus for contractors dealing with concrete work the machine supplies a long felt want, as it will deliver both sand and aggregate in any ratio desired. Another feature in connection with this machine is that it is universal in its application. For asbestos it has been found excellent for cobbing the smaller seams. For tin ores it will also be excellent. It can be used wet or dry as occasion demands, is simple, inexpensive and portable, and there is a large field for its use.

At present the number of blows delivered by the piston equals 230 of crushing face, and as there are 4 faces the total number of impacts is 230 x 4, or 920 per minute—just the same as a 10 stamp mill. While the area of crushing surface in a 10 stamp mill would be approximately 600 square inches, the crushing area of this crusher is at present approximately 120 square inches. (This will be increased to approximately 200 square inches in our next crusher.) The output of this crusher approximates a 5 stamp mill, which all tends to show that the impact is again proving its superiority.

ANSWERS TO CORRESPONDENTS.

"HOME."—Nos. 1 to 5 are, we believe, valueless, and three, at any rate, of these companies are in liquidation. We have never before heard of No. 6 Whitehill Estate and G.M. Co. and have no knowledge of the Canadian Coal Co.

The World's Largest Electric Steel Furnaces.

In view of the installation of electric steel furnaces on the Rand, the following description of electric furnaces, which represent a ten-fold increase in capacity over the first commercial furnace of the sort operated in the States, will be read with interest.

To France we all accord the honour of being the birth-place of the modern electric steel refining furnace, chiefly through the work of Dr. P. L. T. Heroult, but the United States is in a position fully as well established in electric furnace development and application.

The tapping of the first heats from the two 40-ton Heroult steel refining furnaces at the U.S. naval ordnance plant, South Charleston, W. Va., on February 2, 1921, marked a considerable step forward in the electrometallurgy of steel and iron, and consequently is of great interest and value, not only to the electrical engineer, chemist and metallurgist, but, in this specific case, to those concerned in the manufacture and application of ordnance and armour.

In the early days of electric steel furnace development there were conflicting opinions respecting the relative merits of arc and resistance heating, and this difference of opinion continues to the present time. The arc furnace, however, steadily demonstrated its superiority for general work and soon out-distanced the induction furnace in number and output. This relationship may be changed in the future for special applications, as the 2-ton furnace recently completed a run of 555 heats on one lining at the Pittsfield Works of the General Electric Company. This is an exceptional performance, specially when we consider that each heat consisted in melting high silicon steel scrap on a magnesite lining; but as the desired results could not be obtained in any other way, it was necessary to follow this apparently incongruous practice. Assuming that the same results could be obtained with the arc furnace, the lining cost of induction furnace is considerably below the single item of electrode cost in the arc furnace while the figures for power consumption are comparable.

The first commercial electric furnace in the United States for melting and refining steel was a single-phase, 4-ton, 2-electrode equipment installed at the Halcomb Steel Company, Syracuse, N.Y., from which the first heat was tapped on April 5, 1906. Other important installations of the Heroult furnace in the United States were:—

Location.	Capacity.	Date when heat was tapped.
Halcomb Steel Co.	4 tons	April 5, 1906.
Illinois Steel Co.	15 tons	May 10, 1909.
Carnegie Steel Co.	25 tons	November 17, 1916.
U.S. Naval Ordnance Plant	40 tons	February 2, 1921.

The Halcomb furnace was supplied with power from a 60-cycle, single-phase, General Electric generator driven by a reciprocating steam engine. After approximately eleven years of operation, the generating equipment was replaced by a 500-kv.a. transformer taking power from an 11,000-volt, 25-cycle circuit. Later on this transformer was replaced by a 900 kv.a transformer, the increase in power being in line with developments up to the period referred to.

The original Thury regulator, after a long period of successful operation succumbed to the wear inevitable in a steel plant and was replaced by a General Electric electrode regulator in which the voltage and current were both used to control the electrodes. It is interesting to note that Siemens used an automatic regulator in his experiments of 1880, recognising at that early date the necessity of eliminating the human element in controlling the power and allowing the operator the fullest benefit of this source of heat in his metallurgical operations. Even with this splendid example of foresight, there still exist those who believe there are some objections against automatic control,

such as higher cost, but the superiority of the automatic control is graphically illustrated by a wattmeter record of two furnaces of the same design making the same product, the upper curve showing the good results of the automatic control while the lower shows the bad results of hand control.

Several electric steel furnaces have been built and operated at the Schenectady Works, and extensive research has been conducted in the development of satisfactory control equipment, transformers, switches, cables, etc. This research has placed the Company's engineers well in advance of commercial electric steel furnace practice and they were well prepared to specify and design the electrical equipment for the two 40-ton Heroult furnaces at the South Charleston naval ordnance plant when the order for this equipment was received.

These furnaces are operated in conjunction with two 75-ton basic open hearth furnaces using natural gas of 950/1000 B.t.u., and after dephosphorising the molten steel is transferred to the electric furnace to be desulphurised, deoxidised, and brought to the final temperature.

Due to using a considerable quantity of scrap from the electric furnaces, the molten steel coming from the open hearth furnaces occasionally goes as low as 0.009 per cent. phosphorous and 0.008 per cent. sulphur. The phosphorous content is not changed by the electric furnace but the sulphur content on rare occasions is reduced to 0.006 per cent. The steel is tapped from the electric furnace at a temperature of 1650 deg. C., and is then poured from the ladle into the ingot molds through a 2-in. nozzle. It is of interest to note that the metal losses, including slag losses, handling metal, etc., in the open hearth furnace are 8 per cent. to 12 per cent., while in the electric furnace they are $\frac{1}{2}$ to $1\frac{1}{2}$ per cent. Both open hearth furnaces are being operated with basic linings at the present time, but on account of the purity of the scrap from the electric furnace product it is possible that one of the open hearth furnaces will be operated with an acid lining, in which case final treatment in the electric furnace may not be necessary for part of the product.

The metallurgical results are justifying the selection of the electric furnace for this important task, the quality exceeding all expectations.

Each furnace is normally rated at 40 tons holding capacity, each charge being handled separately so as to keep the metal as clean as possible, and large ingots will be formed from two ladles through two runners. One of the furnaces is fitted with 24-in. carbon electrodes and the other with 14-in. graphite electrodes, thus giving current densities of 46.8 and 137.5 amperes per square inch respectively, with the transformer at its maximum output of 21,200 amperes per phase. On the basis of 2500 kv.a., giving 13,130 amperes per phase, the heat generated in a 100-in. length of electrode is respectively 21.5 kw. and 28.3 kw., amounting to 1 per cent. and $1\frac{1}{3}$ per cent. of the total input respectively on the basis of 85 per cent. power-factor—a small amount but contributing to the total useful heat in the furnace.

The electrical equipment for each furnace consists of one transformer, one switch and instrument panel, one electrode regulator panel, one operator's panel and three electrode motors and a tilting motor.

Each transformer is of the 3-phase water-cooled oil insulated type, supplying 17,300 amperes per phase, with 110 volts between phases, or a total of 3,300 kv.a., the high voltage winding being designed for operation from a 6600-volt, 3-phase circuit. Taps are provided in the high voltage windings so that full input can be obtained at 100 or 90 volts as desired, the last connection giving 21,200 amperes per phase. Although not the largest 3-phase transformer built by the General Electric Company for electric furnace work, it is unusually well adapted for this particular furnace installation.

For transformers of such large current capacity the efficiency of 98.2 per cent. is still high enough to indicate a very careful electrical design.

Each switchboard consists of a switching and instrument panel, an automatic regulator panel and an operator's panel. On the instrument panel are mounted three ammeters, one voltmeter, one indicating and one curve-drawing wattmeter, one watt-hour meter, and one power-factor indicator, together with various relays and switches for controlling the solenoid operated 15,000-volt., 500-ampere oil switches.

The automatic electrode regulator is so well known as not to require description; and the same is true of the operator's panel.

The tilting motors are of 35-h.p. capacity at 725 r.p.m. and take power from a 230-volt direct-current circuit. They are provided with drum controllers for reversing and with solenoid brake.

The electrode motors, whose important duty it is to control the movement of the electrodes in response to the action of the electrode regulator, are designed to deliver 5 h.p. at 1,150 r.p.m. when taking power from a 230-volt direct-current circuit. They are totally enclosed and provided with self-lubricating bearings.

All the electrical equipment used with these furnaces is practically standard and it is a comparatively simple matter to increase the capacity when circumstances decide that such action is necessary. It is not difficult to picture installations in the immediate future containing units of double or treble this capacity, perhaps having six or more electrodes and becoming more and more effective against its only real competitor, the open hearth furnace.

Some Advantages of Oil when used as a Fuel in Boilers and Engines.

Speaking at a meeting of the S.A. Institute of Engineers the other day Prof. Dobson stated that one of the results of the Great War was the unexpected and extraordinary development and activity in the use of oil for power production. Then followed the spur of the coal strike in Great Britain, and for several months ordinary coal supplies for the industries of the country were entirely stopped and the lack of fuel exercised such a strangle-hold on industry that great concerns all over Great Britain were forced to take up the question of the use of oil for the production of power.

Oil Superseding Coal.

In many instances oil fuel was rapidly and permanently superseding coal. The relative cost of coal and oil is the

principal factor which decides the financial and economical aspect of the use of one or the other for steam-raising. Owing to the higher wages and stores paid in coal mining now as compared with pre-War conditions, and owing to the higher calorific value of oil and the greater efficiency of combustion obtainable, and the other numerous advantages, such as certainty of composition, easy storage, greater saving in labour for stoking, cleaning and handling, and the great flexibility and no standby losses and the absence of smoke and ashes, oil fuel can show financial and economical advantages over coal when oil costs twice or even three times as much as coal.

Advantages to Railways.

In railway working, in addition to the principal advantages already referred to, there is the great advantage that full steam pressure can be attained much more rapidly than with coal, and there is entire absence of smoke; and what is more important in many parts of the world is the elimination of plantation and other fires caused by coal-fired locomotives.

It is generally recognised that the only way to obtain the maximum value from liquid fuel is by applying it directly to the cylinders of the Diesel type. Its economic use in this respect is, of course, primarily limited by the relative cost of oil fuel as compared with coal. The advantages will be appreciated when it is remembered that no boiler-house is required, and in the case of ships, as well as on land, the supply arrangements are very simple and cheap, requiring a minimum of handling and storage charges as compared with the coal and the resulting ashes in any steam scheme.

The Diesel Type.

The Diesel engine operates on the slow combustion principle. There are numerous types of Diesel engines as made by the army of manufacturers now devoting their skill and experience to this class of prime mover.

Under existing conditions in South Africa there is no possibility of oil being used as fuel for steam raising in lieu of coal. It is within the range of possibility, however, that the future regular lines of mail ships, etc., plying between England and South Africa may be fitted out with Diesel engines, replacing steam.

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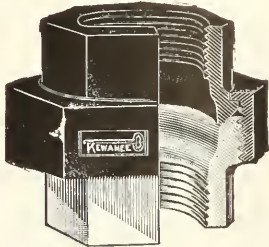


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EDITORIAL.

THE CRISIS IN THE MINING INDUSTRY.

The industrial situation on the Witwatersrand is still under a cloud at the moment of writing. It may undergo a material change before these lines appear in print, but the position at present is that all the mine workers on the Crown Mines have been called out on strike in sympathy with the men involved in the Walthew case at No. 5 shaft, and, moreover, it seems not altogether improbable that the trouble will not be confined to the Crown Mines alone, but may extend to the Reef generally. And so whilst we are faced with the prospect of curtailment of operations

at other mines on account of high working costs and poor labouring efficiency, whilst the pitiable plight of Kimberley stares us in the face and teaches, or should teach every one of us, that when the mines in the vicinity of a town which is in reality nothing more than a glorified mining camp cease or curtail operations, that town and its inhabitants and survivors suddenly come face to face with poverty, whilst Sir Lionel Phillips and Professor Lawn are uttering grave warnings as to the sombre outlook for the Rand and the whole country unless there is a large and immediate improvement in the industrial position, whilst all this is in progress the extremists of the Labour Party are threatening a general dislocation of the industry. It is clear from what Mr. Hendrikz said of the members of the S.A. Industrial Federation who waited upon the Transvaal Chamber of Mines, and from the more dignified reply of the Federation to the criticisms of Mr. Hendrikz, that there is a serious split in the ranks of labour. Not only is this evident on the Witwatersrand; it has also been evident at Durban and in other portions of the Union—and altogether it seems clear that there is a large body of labour secessionists desirous of breaking away from the existing Unions and the policy of unending industrial strife to which these Unions seem to be wedded. The fact that there are still moderate minded men in the Union Executives is of course a satisfactory feature. But this is more than counterbalanced by the presence of a large number of extremists in the Union and by the regrettable fact that some of these extremists, who were dismissed by their Unions because of the part played by them in the senseless strike at the Consolidated Langlaagte in the earlier months of the current year, are now apparently locked upon as the leaders of organised labour. It is at any rate clear that these extremists have secured a large, if not a representative, following, and it is too equally obvious that so long as the policy preached by these demagogues falls upon credulous ears, there can be no spirit of co-operation amongst the mine workers of the Witwatersrand, no real industrial peace, and no honest or sustained effort to pull the mines out of the mire into which they have sunk largely on account of unwarranted concessions granted to the workers in the past.

The Crown Mines strike is merely symptomatic of the spirit of unrest which is abroad on the Reef to-day, and has indeed been abroad ever since the first serious labour troubles of fourteen years ago.

Having failed to bring off a big anarchical coup in 1913 and again in 1914, the policy pursued by labour agitators on the Rand during recent years has been to indulge in a series of pinpricks aimed one day at the East Rand, another day at one of the Central Mines, and another day at the West Rand, and always behind the localised strike is the threat of a general insurrection of workers from Randfontein to Springs. If the Crown Mines strike is settled to-morrow, it is a moral certainty that before the month is ended there will be further trouble at another mine. The Rand is becoming exhausted by this never-ceasing unrest. The whole community is tired of it. As Professor Lawn said at the Johannesburg meeting, we shall not surmount our difficulties by crying Peace, Peace, when there is no peace, but only by recognising the position and facing it frankly. It has come to this then. The present position of the industry is both intolerable and impossible. A complete change of front is required. If the workers choose to quarrel with their own bread and butter, and to listen to the harangues of the agitators (which are denounced as rash by the Labour Federation of the country), well, then, it is best that the mines should at once, in the language of Professor Lawn, recognise the position and face it frankly. Moreover, it seems to us that the unsettled dispute at the Crown Mines and the threats of an extension of that strike give the Chamber a very good opportunity for endeavouring to set our industrial house in order, once and for all, by means of far more drastic remedies than have as yet been attempted to reduce the cost of working, to have freedom from unnecessary Trades Union restrictions, to improve efficiency, and to dispense with the services of a large number of costly inefficient and mischief-makers.

THE JOHNNIES MEETING.

The annual meeting of the "Johnnies" Company, otherwise the Johannesburg Consolidated Investment Co., is always rightly regarded as one of the principal Board Room events of the year in Johannesburg. For the J.C.I. ranks with Rand Mines, Ltd., and other controlling companies with headquarters in South Africa, as one of the principal industrial concerns of the country, and the remarks made by the chairman of Johnnies always merit attention and command interest. At this year's gathering Professor Lawn presided, and spoke very much to the point on the dependence of the gold mines on the premium, the intolerable pin-pricking policy of labour, and the necessity that exists for reducing working costs and improving the efficiency of labour on the Reef. Professor Lawn very rightly declared that it is in respect of white labour that there is the greatest room for a reduction of the cost of working our mines. This view would seem to be in conflict with the expression of opinion voiced by the Prime Minister at the recent Mining Conference; but it is nevertheless the more accurate one.

Professor Lawn did not mince matters. He declared that there are more white workers employed on the mines than are necessary, and he reiterated what this journal has urged for months past when he said:—"The constant and unending agitation and hunt for grievances, the constant harassing of the mine managers and other officials, the frequent sectional strikes, are all evidences of the position. There is great talk of co-operation and mutual bargaining, but it has mostly been one-sided. It has been a case of concession after concession on the part of the mines until the position has become well nigh impossible, and is only sustained at all by virtue of the gold premium. It is quite clear that a large number of white men must always be employed—both in skilled work and in supervision—but every unnecessary white man means a high wage and increased costs in native wages and stores. Indeed, it would be much cheaper for the industry to support these men in idleness at the coast than to keep them on the mines. In spite of a situation bristling with difficulties, I have every faith in the common sense of those interested in the industry, both directly and indirectly, and believe that the difficulties will be surmounted; but it will not be by crying peace, peace, when there is no peace, but by recognising the position and facing it frankly."

With these words we most heartily agree. The time for concessions on the part of the Chamber has long since ended. We are exceedingly glad to have this plain and straightforward statements from the joint managing director of one of the largest mining corporations in the country on this point, and we sincerely trust that the Chamber will be encouraged to resist all future demands that may be imposed upon the industry, and if necessary to fight to the bitter end for the salvation of the mines.

Professor Lawn reviewed the operations of the subsidiary companies at considerable length, and dealt with the plight considerable length, and dealt with the plight of the diamond industry and also with the slump in the coal trade. With regard to the gold mine subsidiaries of the group, Professor Lawn said of the Consolidated Langlaagte Mines, Ltd., that for the year ending December 31, 1920, the mine made a profit of £166,585. With the exception of the month of February, when a strike occurred on this mine, the profits have been maintained. Development has been more encouraging lately. As to Government Areas, the profit for this mine last year was £1,697,973. Although the monthly profit has been fluctuating on account of the gold premium, the tonnage milled has been maintained, and for the last four months the plant has been working to full capacity. The sinking of the circular ventilating shaft has been decided upon, and its cost will amount to £125,000. Development continues to be satisfactory and values are well maintained. The profit of the Langlaagte Estate and Gold Mining Co. for 1920 was £148,867. During February and March of this year profits were not satisfactory on account of the strike, but by July improvement had taken place and a 5 per cent. dividend was declared. Development continues to be satisfactory, and on the whole the position of the mine is encouraging. The 1920 working profit at Randfontein

Central was £158,100. Considerable improvement has been shown during the current year, but the full effect of the reorganisation has not yet been felt. The delayed delivery of the new electric hoist for the south shaft has held up operations. Two new inclined shafts are being sunk to open up the battery reef. The work of sinking the two shafts of New State Areas was completed before the end of 1920. Careful consideration is being given to the question of ventilation. The main connecting drive is expected to be complete by March next. On the whole the results of development have been very satisfactory and give every promise of a profitable mine being opened up. The success of the experiments at Springs Mines on the elimination of the stamp mill and all sliming has led to a decision that this process will be adopted at New States. It is hoped that a considerable saving in capital expenditure will be affected. A reduction plant is being designed with a capacity of 50,000 tons per month.

With regard to the coal interests of the group, Professor Lawn said that the hopes that were entertained with regard to the coal trade have not altogether been realised. England has again entered the world market, and acute competition prevails. South African coal trade is handicapped by high railway rates and working costs. The three Transvaal collieries of the company are now working at a small profit, which will be considerably augmented when the output can be increased. The Natal Cambrian Collieries, Ltd., has a well-equipped colliery developed and capable of producing a considerable tonnage per month; but here again the difficulty is to find a steady outlet for the production.

Professor Lawn's address was listened to by a large and attentive audience. It was a plain and unvarnished account of the company's operations during the financial year, and a telling denunciation of the crippling methods adopted by labour in South Africa. For this latter reason, at least, we commend the remarks of the chairman of Johnnies to the public generally, and particularly to the men employed by this great gold industry, which has now reached a critical stage—perhaps the most critical stage—in its history.

THE HANDLING OF RAND LABOUR.

The mine manager of the present day Rand has, as we remarked in our last issue, exceedingly little time to devote to the purely technical aspects of his job. The greater part of his work nowadays has to be devoted to the settlement of industrial disputes, the averting of strikes, attendance at Boards of Reference, and the thousand and one other problems of industrial sociology inseparable from a world "made safe for democracy," which in other words means a planet despoiled by the despotism of trade unions.

As time goes by and the world progresses or retrogresses, it becomes more and more evident that the handling of men is a most important—perhaps the most important—function of a manager of a mine, a foundry, a shipbuilding works, a cement factory, or in fact any other branch of industry. And this is particularly true of the Rand. This fact was fully recognised by the Transvaal Chamber of Mines when the Executive of that body appointed Mr. H. O. Buekle to the important position of paid and full time President of the Chamber. Mr. Buekle is not a mining man. But he has had a vast and valuable experience of that cantankerous branch of the *genus homo* which is known as the Rand mine worker. The urgency of the human element problem of the industry has, too, been further recognised by the appointment of an official styled the Labour Adviser to the Chamber of Mines. This leads us on to the point we wish to make here. And that point is simply this: that it would well be worth while for each mine—each large mine at any rate—to have a senior official whose sole duties would be concerned with the keeping of industrial peace amongst the white employees. We are not quite sure as to the type of man required for this position. Presumably he should be a tactful, pleasant mannered, bilingual person, preferably with a sense of humour. Perhaps the type of man represented by a former Bishop of a Rhodesian See, who combined the properties of a good, kind and gentle Churchman with an expert knowledge of how to use his fists, would appeal to the Reef. We are not quite sure on

this point. But we do believe that the suggestion here thrown out is worthy of some consideration. On every large mine to-day there is a controller of natives underground. And we think that an official acting in a similar capacity in respect of white labour would constitute a most valuable adjunct to the management and would allow of the technical men attending more to their technique than they can at present do. In so far as white labour is concerned, such an official would not, of course, be styled a controller. He would rather be a mediator and peace-maker, whose express purpose in life would be to smooth away difficulties as between the management and the men and as between various departments of service on the mine. A really tactful man filling such an office might have prevented the present deplorable strike on the Crown Mines. For the Crown Mines *impasse*, like many other industrial disputes, had its beginnings in a situation which might easily have been controlled by a little diplomatic handling at the start. It has now grown to a very serious business indeed, and the only satisfactory feature of the strike is that the Chamber of Mines appears to be taking up a firm attitude in the matter.

Notes & News.

Mine Benefit Societies.

At a meeting held last week the question of amalgamation of mine benefit societies, which has long been hanging fire, was discussed, and a decision of far-reaching importance arrived at. A full report on the whole question of amalgamation of mine benefit societies was laid before the meeting, which showed that the position is now a critical one. The committee have been unable to obtain the necessary 60 per cent. of acquiescence by members stipulated for by the Chamber of Mines as one of the conditions in its offer of support to the amalgamated societies if the scheme goes through. So far only 55 per cent. of the members of the societies have expressed themselves as in favour of the scheme. The lowness of this percentage was partly due to the objection of the executive council of the South African Mine Workers' Union, conveyed through its shop stewards, to the representation of the employers on the central executive body of the proposed amalgamated society. The executive at that time issued an instruction to its members not to take any part in the ballot, which was held to determine whether amalgamation should be put through on the basis of the draft constitution or not. The constitution committee subsequently interviewed a sub-committee of the executive of the Mine Workers' Union and asked for a conference with their executive council, but the reply was received that no good purpose would be served by holding such a conference, as the council had resolved that it could recommend no scheme of amalgamation in which the employers were represented on the managing body. It is believed by those interested in the scheme that had it not been for the attitude of the Mine Workers' Union it would have gone through by a big majority. It is further pointed out that owing to the representations made from time to time by the Mine Workers' Union, the proposed representation of the Chamber of Mines on the managing body has been reduced from four down to one. Thus the control of the amalgamated benefit societies would practically be vested in the members on the same basis as is the case with the societies at present.

* * *

Consolidated Goldfields' Finances.

In its annual report for the year ended June 30 the Consolidated Goldfields of South Africa, Ltd., state that in the absence of a dividend on the holding in New Consolidated Goldfields, Limited, the total income for the year amounts to £3,608 6s. 5d., to which must be added the balance brought forward from last year, namely, £162,635 12s. 3d., a total of £166,243 18s. 8d. Against this has been charged dividends on the first and second Preference shares totalling £108,901 6s. 5d., leaving £57,342 12s. 3d. to be carried to the credit of the current year's profit and loss account.

New Consolidated Goldfields, Limited, announce that the realised profit on the operations for the year ending 30th June, 1921, is mainly derived from dividends received on investments, and after deducting all outgoings shows a balance to credit of £371,451 12s., from which South African and French Government taxes have been provided, leaving £360,515 1s. 4d. To this balance has been added the sum of £20,528 6s. 2d. brought forward from last year, showing a credit balance of £381,043 7s. 6d. Against these profits have been charged a depreciation of £92,286 17s. 9d. in order to reduce holdings to market prices in the case of quoted securities or to their estimated value in the case of unquoted securities, leaving a debit balance of £111,213 10s. 3d. to be carried forward to the ensuing year. The directors regret that the position, which is entirely caused by the severe fall in values during the year, necessitating the writing off of the amount referred to above, precludes the payment of a dividend. The company's investments show on current market prices and on an estimate of unquoted investments a large unrealised profit. Investments stand in the books at average cost or under, and are taken into account at prices at or below those current at the date when the accounts were made up. The annual general meeting of shareholders has been fixed for Thursday, the 1st December.

* * *

Mr. D. C. Greig and the Gold Premium.

In the course of the discussion that followed the chairman's speech at the annual meeting of the New Modder the other day, Mr. D. C. Greig remarked: "The decline in the gold premium will affect this company, though not to the same extent as other companies. We saw in the Press to-day a reference to the Conference, which has recently been sitting in Pretoria. This brings forward in a very prominent way the fact that the return to the gold standard is a practical question now before the Government and before the country, and I wish to point out that if adopted it would mean the abolition of the premium. Of course, theoretically, as you know, this ought to be offset by the cost of our imports, and by a consequent reduction in working costs. On the other hand, by placing ourselves in a position with regard to exchange similar to that ruling between New York and London, we would turn from a position of comparative stability to one of instability which would affect all our exports, including gold. I think it is quite fair to recognise that there would be an increase of unemployment in this country which would be offset by a decrease of unemployment in Great Britain. That is probably from an Imperial point of view, a first-class thing; but I think it is our duty here to look after our own interests. The Chamber of Mines, which always looks after our interests, should see that nothing is done hastily or without proper consideration, and that all people should recognise what the results of such a change would be, so that they may be able to face them, knowing the facts. I would strongly insist that those who advocate the return to the gold standard should state explicitly in pounds, shillings and pence, the advantages of that change. The disadvantages are perfectly clear, but the advantages are never explicitly stated by the advocates of the gold standard."

* * *

Rapid Development.

What is believed to be a record in rapid development has been accomplished by the Durban Navigation Collieries Ltd., of Dannhauser, Natal. A distance of over 600 feet has been driven in a developing drive in a month of 26 working days, which represents an average of over 28 feet per day. This has been done at the company's No. 2 pit, which is under the management of Mr. J. C. Ferguson.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Industrial and Metallurgical.

Scientific and Industrial Research.—*The Engineer*, October 28, p. 450.

Aluminium Alloys as Substitutes for Steel.—*The Engineer*, October 28, p. 457.

Some Alloys of Aluminium.—*The Engineer*, October 28, p. 461.

Sheffield Association of Metallurgists and Metallurgical Chemists.—*The Iron and Coal Trades Review*, October 28, p. 613.

Mining

Standardisation in Mine Rescue Work.—*The Colliery Guardian*, October 28, p. 1208.

Modern American Coal-Mining Methods.—*Iron and Coal Trades Review*, October 28, p. 615.

Valuation of Placer Deposits.—*Mining and Scientific Press*, October 15, p. 529.

Development of Copper Precipitating Apparatus.—*Mining and Scientific Press*, October 15, p. 533.

Status of the Metal Mining Industry.—*Mining and Scientific Press*, October 15, p. 539.

Scheduling Mine-Operations to Suit a Power Contract.—*Mining and Scientific Press*, October 15, p. 545.

Engineering.

Stainless Steel for Turbine Blades.—*The Colliery Guardian*, October 28, p. 1210.

Electricity in Isolated Buildings.—*The Electrical Review*, October 28, p. 557.

Electrical Enterprise in Spain.—*The Electrical Review*, October 28, p. 579.

Electricity Supply in the United Kingdom.—*The Electrical Review*, October 28, p. 582.

Developments in Power Station Design.—*The Engineer*, October 28, p. 445.

Aluminium Alloys.—*The Engineer*, October 28, p. 447.

The Commercial Motor Exhibition.—*The Engineer*, October 28, p. 452.

Factors which Influence the Size of Rolling Mill Drives.—*The English Electric Journal*, July-October, 1921, p. 291.

Mechanical Advantages of Electric Locomotives Compared with Steam.—*The English Electric Journal*, July-October, 1921, p. 283.

Economics.

An Abnormal Monetary Situation.—*The Capitalist*, October 29, p. 260.

Trade Depression.—*The Capitalist*, October 29, p. 262.

World-Wide Unemployment.—*Investors' Chronicle and Money Market Review*, October 29, p. 486.

Unemployment and the Cure.—*The Electrical Review*, October 28, p. 580.

Foreign Finance and Commerce.—*The Stock Exchange Gazette*, November 3, p. 2332.

Coal and Fuel.

Coal Handling Section.—*Coal Trade Journal*, October 19, p. 1138.

Silica Brick for Coke Ovens.—*The Colliery Guardian*, October 28, p. 1204.

Low Temperature Carbonisation.—*The Colliery Guardian*, October 28, p. 1207.

Coal Banking Under Control.—*The Iron and Coal Trades Review*, October 28, p. 609.

Future Oilfields of the World.—*Iron and Coal Trades Review*, October 28, p. 614.

Civil Engineering.

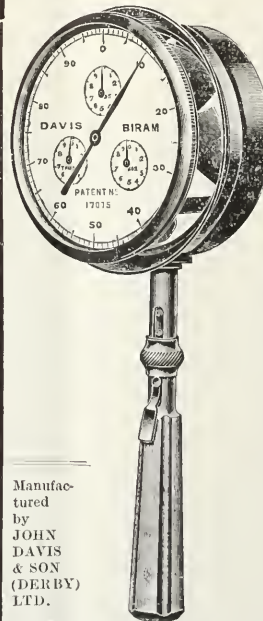
A New Method of Making Concrete Roads.—*The Engineer*, October 28, p. 465.

On Tuesday, on the London Metal Market, standard copper closed at £66 12s. 6d. cash and £67 12s. 6d. forward; electrolytic copper at £71 10s. cash and £76 10s. forward; standard tin at £161 12s. 6d. cash and £163 7s. 6d. forward; foreign lead at £24 15s. cash and £24 5s. forward; quicksilver (middle) at £10 5s., bar silver (spot) at 38d., and bar gold at 103s. 3d.

Mining Men and Matters.

The death has occurred of Mr. Henry Wilson Fox, Unionist M.P. for North Warwickshire since 1917, and a former editor of the *S.A. Mining Journal*.

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The Shale and Coal Oil Industry.

SOME NOTES ON ITS EARLY HISTORY AND DEVELOPMENT A SUBJECT OF GREAT IMPORTANCE TO SOUTH AFRICA.

We are indebted to Messrs. A. F. Craig & Co., Ltd., Caledonia Engine Works, Paisley, for the following interesting notes on the early history of the shale and coal oil industry. In sending us these notes, Messrs. Craig & Co. write:—

"You have published several informative articles on the shale oil industry, indicating that there is wide interest therein, and, in particular, that the working of the Natal shales is under consideration. We have reason to believe that in some districts the local conditions there are more favourable than those with which the Scottish industry is surrounded. For instance, the shale is more easily mined, and the residue after treatment more easily disposed of. The oil contents are greater. Imported oil is handicapped by freight charges and import duty. The Natal shale can be treated successfully by the Pumpherton retort, differing in this respect from shales which have physical and chemical characteristics making their treatment in any existing type of retort difficult or even impracticable. One unfavourable condition may be the absence of a market for ammonia. In your issue of 11th June, 1921, Mr. J. E. Mills Davies described very fully the modern plant and methods of the Pumpherton Oil Company in Scotland; and it has occurred to us that this might be usefully supplemented by a brief outline of the early history of this industry and the coal oil industry from which it grew. Our excuse for presuming to offer you the following notes on that subject is that we have had close connection with the shale industry since 1880, when we erected the first retorts for the Clippens Oil Co. This connection has been maintained ever since. We have furnished plant to all the Scottish shale oil companies which have operated during that period and also to foreign companies. In all we have supplied, and in many cases erected complete, including the brickwork, over 100 benches of oil shale retorts, and a large amount of oil refining and wax extracting and refining plant, including recent developments in these lines."

In 1681 a patent was obtained by Becher & Searle for making pitch and tar from coal. In 1694 Edele Hancock & Portlock made "pitch tar and oil out of a kind of stone from Shropshire," England. In 1761 oils for medicinal purposes were distilled from black bituminous shales. In 1781 the Earl of Dundonald distilled oil from coal. About 1812 it was known that an oil resembling turpentine, and also varnishes, could be distilled from coal tar. In 1815, near Sunderland, England, Featherstone produced "petroleum" and ammonia from coal. In 1830 Laurent distilled paraffin from bituminous shale, and in 1833 suggested working the Autun shale in Saône-et Loire, France. Soliguet took the hint, manufactured products from this shale, and obtained patents for the manufacture of paraffin. He made considerable progress before 1845, and even manufactured ammonium-sulphate. The shale oil industry is still carried on in France, but has not developed to anything like the extent of the Scottish industry. About 1851 paraffin oil was produced from shale in Germany.

Scottish Oil Industry.

Probably the first extraction of oil from shale in Scotland was as described in the *Glasgow Weekly Herald* of 18th November, 1865. A coal miner, Douglas, was attracted by the appearance of some samples of shale known as "Sealy Blaes." He filled a clay pipe with small pieces, covered the charge with moist clay, and placed the bowl in a fire. He soon had, issuing from the stem, first gas, and then a dropping black fluid which he suspected might contain paraffin. He could not verify this himself, and, preferring to keep his secret, his experimental success was not followed by practical working.

The commercial use of Scottish shale for producing oil came about as a sequel to the use of various grades of coal for that purpose. The pioneer in this industry was Mr. James Young, of Kelly, in Renfrewshire, who, beginning his

working life as a carpenter, studied chemistry in the evenings, became an assistant professor and demonstrator, and then held positions of responsibility in chemical works. About 1843 his attention was directed to oil oozing from fissures in sandstone in a colliery at Alfreton, in Derbyshire. He leased the oil-bearing section of the colliery, and with the assistance of a former fellow student, Meldrum, produced from the crude oil of the colliery in 1848 a light oil for lamps and a heavy oil for lubricating.

Young took out a patent (No. 13,292 of 1850) "for obtaining paraffin oil, or an oil containing paraffin, and paraffin, from bituminous coals." Extensive use was made of his processes in the United States, and by some companies organised in England also, until the competition of the natural petroleum from wells made the business unprofitable. His supply of colliery oil was exhausted in 1851. He had anticipated this and set himself to imitate artificially the natural process which he believed had produced the oil, namely, subterranean heat acting on coal. He made a series of experiments, and in 1850 obtained oil from cannel coal. Then his attention was directed to "Boghead" coal, also known as "Torbanehill Mineral," and he got from it as much as 120 to 130 gallons of oil per ton of coal. He continued his experiments and found a number of coals from Fifeshire that gave good results. Works were erected at Bathgate and began to produce oil in 1851.

Some of the paraffin separated out automatically in the process, and this was burned as fuel or as waste. The remainder was left in the oil as sold. By 1854 the extraction of the paraffin by artificial cooling was begun and it was stored up against the time when a satisfactory process for refining it should make it saleable. John Galletly, chemist, devised a practicable method in 1858, and in the following year the paraffin was on the market. In 1851 oil was being produced in small works at Crofthead, but in 1852 the Bathgate works alone were operating in Scotland. In 1853 the Clydesdale Chemical Co. started at Cambuslang. They carried on for about nine years and then had to give up because they infringed Young's patents. They dealt first with "Parrot" coal, and later with "Boghead" coal.

It is reported that Robert Bell, while searching for coal at Broxburn in 1859, found large shale beds, and erected experimental retorts which led to the systematic manufacture of mineral oil from shale in 1862. This constitutes the virtual beginning of the Scottish shale oil industry on a practical commercial basis.

Meanwhile Young, aware that the "Boghead" coal was nearing exhaustion, was seeking a substitute, and settled on the Addiewell shales which he found had a larger percentage of burning oil than the other available shales. He completed his Addiewell works about the end of 1865. His friend, Dr. Livingstone, the missionary and explorer, laid the corner stone of these works.

After 1860 many new companies were organised, no fewer than 38 in the year 1864 alone, when Young's patent expired. About this time the importation of kerosene from the United States began to affect the Scottish oil industry adversely by forcing prices down, and a fierce struggle for survival followed. In 1866 the well-known Young's Paraffin Light and Mineral Oil Co. was formed with a large capital to take over Young's business while retaining his services.

In the first 45 years of the industry in Scotland, at least 117 coal or shale oil works were started. Most of them had a short life. There remain to-day about six companies, all controlled by Scottish Oil, Ltd., closely associated with the Anglo-Persian Oil Co. These companies have been able to continue through most trying times by persistent effort to improve and control their processes so as to obtain their products in such proportion as would yield the best financial results in the prevailing market conditions. Sulphate of ammonia and paraffin became of prime importance and oil came to be considered almost a by-product.

In the distillation of shale a suitable type of retort is essential. This apparatus has to be designed to distil the oil vapours at a temperature of about 900 deg. Fahr. and also to further subject the shale to a temperature of about 1,300 deg. Fahr. to recover the ammonia. The modern retort has been evolved as the result of a long series of experiments by trial and error. It has enabled the Scottish oil industry to persist through many and severe trials, although the shale yields only from 20 to 30 gallons of oil per ton and is subject to the competition of foreign oils derived from natural wells and imported duty free.

The order of development of the retorts was roughly as follows:—

(1) Horizontal retorts in a great variety of shapes and sizes. At Bathgate Young began with "D" shaped horizontal retorts as used in gas works, each fitted with a slowly revolving longitudinal screw. The coal was fed into a hopper at the front end and discharged when spent into a water trough at the back end.

(2) About 1853 Young erected at Bathgate a group of three cast iron vertical retorts, circular in cross section, 18 inches in diameter and about 11 inches high. They were enclosed in a common furnace and had separate hoppers at the top, and their bottom ends projected into a water trough. Very much better results were got from these than from the horizontal retorts, but there was trouble from the coal clogging in the retort and having to be freed and forced down by the use of long iron bars from the top.

(3) The next step was to make the retorts tapered with the large end down. Each was fitted with a central screw revolving very slowly. This was a great advance and was used for about eight years. An additional screw apparatus for removing the spent shale from the bottom was tried but abandoned because of the high cost of upkeep.

(4) Next A. C. Kirk devised a retort with flat sides and rounded ends and with a very pronounced taper the long way of the ellipse. This gave a large heating surface in proportion to the amount of material contained and a reduced thickness of material through which the heat had to penetrate. The taper was intended to prevent clogging and the feeding screw was dispensed with. A larger amount of oil of higher quality was obtained and less fuel was required. The superiority of the vertical over the horizontal form was established.

(5) About 1860 it was found that the introduction of superheated steam near the bottom of the vertical retort increased the oil product nearly 50 per cent. The steam was practically useless in horizontal retorts, merely passing over the surface of the contents.

(6) The McBeath retort was intended to economise fuel by deriving the heat for distillation from carbon in the spent shale, but it had defects which prevented its adoption.

(7) The Henderson retort employed as fuel both the carbon in the spent shale and also the incondensable gas from the distillation. There were four retorts in each group. They were flat sided with rounded ends like Kirk's retort. Provision was made for easy charging and discharging. A saving of about one-third of the labour and half of the fuel was effected. The oil vapours were drawn downwards through the shale on their way to the condensers, and a larger amount of finished products was obtained except ammonia which was much less.

(8) Bielby's retorts had cast iron upper parts jointed to fire clay lower parts. To these again cast iron bottom parts were jointed with their lower ends dipping into a water trough. They were circular in plan. Variations of temperatures caused cracks in the fire-clay portions, furnace gases leaked into the retorts and caused explosions. The retorts were not economical of labour and not commercially successful. They went out of use in 1883.

(9) William Young got out a retort very similar to Bielby's, but of cast iron throughout. The lower part quickly burned out. It was never used except experimentally.

(10) William Young and Bielby in collaboration in 1882 brought out retorts, sometimes called the "Pentland." They were an advance on all previous designs.

These retorts were circular in plan, in groups of four, connected to one distilling chamber at the top. The upper parts were cast iron jointed at their lower ends to lower parts built up of fire brick. The firing arrangements were such that ammonia was recovered from the coal fuel as well as from the shale, which was a new gain. A later method was to build these retorts entirely of brick, 24 in. diameter at the top and 36 in. at the bottom, and 50 ft. high from the ground to the top. Results were satisfactory and the cost of running lower than with the Henderson. The production of crude oil was slightly less than with the Henderson, but of ammonia nearly four times as much. This retort came into extensive use.

A modification of this retort was adopted at Philipstoun by James Ross & Co. and was known as the "Crichton" or "Philipstoun" retort. The principal difference was in the method of removing the spent shale at the bottom of the retort. The refuse was drawn by hand-operated shafts passing through the bottom hopper equipped with suitable scrapers. This was not economical in working and did not command extensive use.

There have been developed from all these various designs three modern types of retort which have been commercially successful. These are the Pumpherton, the Henderson, and the Young & Fyfe. They all have cast iron upper parts and fire brick lower parts and are of much greater size than the earlier retorts, standing as much as 60 ft. from the ground to the top of the hoppers.

The Young & Fyfe is a modified Young & Bielby. Mechanical means are provided at the top for poking the shale downwards to prevent clogging, and at the bottom for regulating the discharge of the spent shale. The modern Henderson retorts have flat sides and rounded ends. The spent shale is removed at the bottom by slowly revolving spiked rollers. The Pumpherton, also known as the Bryson, the joint design of Messrs. Bryson, Jones & Fraser, is extensively used. It has a very simple effective device for withdrawing spent shale, which keeps the whole mass of shale moving slowly, and minimises clogging and wear and tear. Under the bottom of each retort there is a circular iron table which supports the charge of shale. Through this table a vertical shaft projects carrying a steel arm immediately above the table. The shaft is slowly revolved by ratchet gearing causing the arm to sweep out the spent shale at a rate which is under complete control. The shale escapes around the circumference of the table between it and the brick work of the retort, and falls into a closed hopper. From there this refuse is emptied at intervals into dump wagons to be transported to the spent shale "bings."

It may be of interest to add that the recovery of ammonia from the water drained from the condensers originated in an accidental way. Up to 1865 this water had been run as waste into streams. Mr. Robert Bell, of Broxburn, having come under the censure of a River Pollution Commission, turned the effluent on to a field. It was soon noticed that the growth of grass in this field was very vigorous. Investigation showed that the water contained ammonia—a fine fertiliser. Mr. Bell began to manufacture sulphate of ammonia and had it on the market in May, 1865, a very opportune time to assist in the competition with imported oil.

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RHODESIAN SECTION.

The Goldfields Rhodesian Development Coy's Year.

The report of the Goldfields Rhodesian Development Co., Ltd., to May 31 last states that realised net profit on year's operations amounts to £114,064; adding balance brought in, £111,906, and deducting interim dividend of 6d. per share paid May 20 last, amounting to £62,855, and Rhodesian income-tax, £1,267, there remains available £161,908. Directors recommend cash dividend of 6d. per share, less tax, making 1s. per share, equal to 10 per cent. for year, leaving £99,052 to be carried forward.

In accordance with terms of arrangement made in 1916, Lord Harris and Messrs. H. G. Latilla and H. C. Porter are resigning, but are eligible, and offer themselves for nomination as directors. The Consolidated Goldfields of South Africa, Ltd., will give effect to the nominations as expressed by the votes of the shareholders in general meeting. Attention of shareholders is drawn to resolutions which will be submitted with the object of bringing the company's articles of association into accord with the practice of the last few years, respecting the election of directors by shareholders, and extending the engagement of the Consolidated Goldfields of South Africa, Ltd., as managers of the company.

A list of the company's principal investments as at May 31 last shows: Asp Gold Mining, 75,214 shares; British South Africa Co., 50,000 shares; *British Central Africa Co. (8 per cent. debentures), £12,000; De Beers Consolidated Mines (50s. shares), 1,500 shares; *Falcon Mines, 52,198 shares; *Falcon Mines (6 per cent. debentures), £78,092; Planet-Arcurus Gold Mines, 274,755 shares; Rhodesia Gold Mining and Investment Co., 15,044 shares; *Rhodesian and General Asbestos Corporation, 124,000 shares; Rhodesian King Asbestos Co. (10s. shares), 51,110 shares; *Shanva Mines, 301,211 shares; Standard Arsenic (South Africa), 9,000 shares. Except where otherwise stated, the above shares are £1 each, fully paid. Those marked * are dividend or interest-paying.

The general manager, after a lengthy review of the period, says: "In conclusion, the company may, I think, congratulate itself on the results attained in a year which has presented so many difficulties. Fortunately, the losses attendant on the industrial troubles of February and March last, and the increased working costs on the different mines, were to some extent offset by the premium on gold, and it is to be hoped this will continue. As regards fresh business, though

our engineers have lost no opportunity of inspecting properties which seemed to hold out good prospects, nothing sufficiently attractive was put before us during the past year. In a country so highly mineralised as this is, one can reasonably look for fresh discoveries of value during the next year or two on other than 'old workings'—which have been the source of practically all the mines in operation to-day and since the inception of the mining industry—or the satisfactory opening up of claims now only in the early prospecting stage; and your company will, no doubt, be able to acquire interests in any such discoveries, should they be of a sufficiently promising nature. A considerable number of farms have been taken up during the year by new settlers, and though there is little demand for land to-day, owing to the prevailing depression, your farm holdings may be looked upon as increasingly valuable assets, while on your Kenilworth Estate you have the nucleus of a really promising herd of beef producers. As for the country generally, the outlook for the next twelve months does not appear to be as hopeful as usual, with falling metal prices, the severe slump in the grain, as well as beef markets, the general slackness of trade, and the difficulty of securing capital for promising enterprises. Rhodesia has, however, successfully emerged from such periods of depression in the past, and no doubt an era of prosperity will again set in once industrial conditions at home and throughout the world become normal, and capital is again available. We have at times had differences of opinion with the railway company and the Government over various matters; but they, like ourselves, have many difficulties to contend with, and I have always found both ready to listen sympathetically to our troubles, and help as far as they could, and for their frequent assistance I would desire to express my appreciation."

The consulting engineers' report concludes as follows: "Although the cost of stores and labour has mainly continued upwards, the mines we manage have yielded profits during the year, with the exception of the Falcon. Expenditure on the Slate-Arcurus is severe, owing largely to coal, but this item is now being slightly reduced. It is, however, a property where costs are likely always to range high, unless railway rates fall materially. Stores and labour have now, we think, reached their highest mark, and should in the future tend to fall."

A New Asbestos Find.

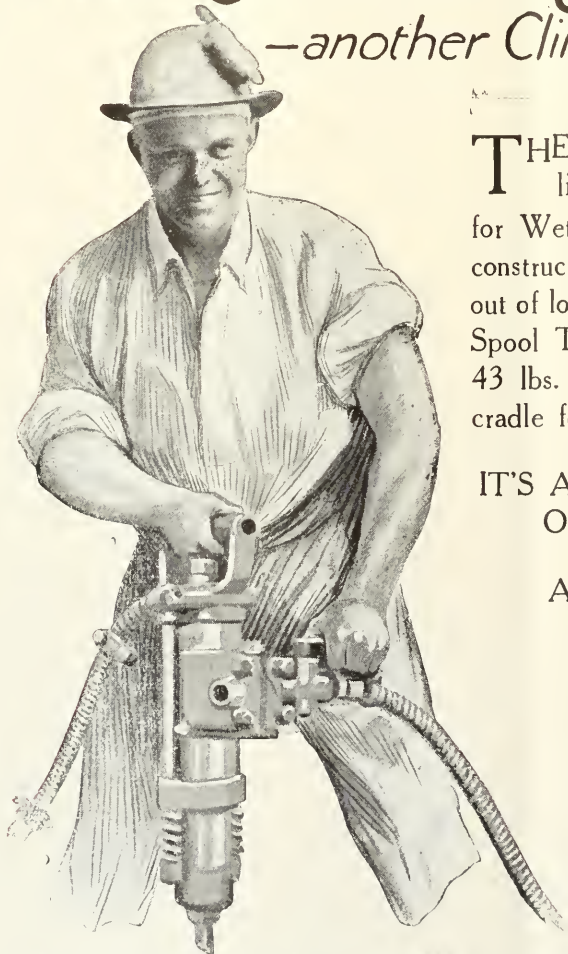
IMPORTANT DISCOVERY IN MASHABA DISTRICT.

A correspondent of the *Bulawayo Chronicle* writes from Mashaba as follows:—Considerable interest is being shown in the location of a very large strike of asbestos in this district. Mr. G. Epstein, of Shabani, spent a considerable amount of time in examination of the field, and he reports that he has defined a practically unbroken strike of six miles, commencing in the Olga claims, and continuing on to and through the Sapiaenia extensions. At the Olga work has been done to a depth of 35 feet and at that level a crosscut has proved the width to be 80 feet, with several very fine two inch seams exposed. At the Sapiaenia work has been done to a depth of 70 feet, at which depth water was struck, but the fine asbestos is still going down; a crosscut of some 150 feet on this property shows over 50 seams of marketable fibre, of which a very large proportion is half-inch and over.

The fibre is of exceptionally fine quality. The section of the strike which has created the present excitement is the central portion which is held by Mr. E. Francis, of King's Mine fame. This section has shown extraordinary fibre, several three-inch seams close to the surface being visible, while a great number of one-inch seams are in evidence, and the fibre is of the same high quality which characterises the whole strike. Mr. Francis was the original pegger of the King's and he confidently expects to repeat his luck. The whole strike has been pegged by various interests and work is proceeding apace. Prospectors are still busy in the locality, and further discoveries are expected. Some of the fibre recovered has been put through the mill at the Eva Mine, and experts declare the product to be a very superior fibre.

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The Week in the Sharemarket.

DULL AND RESTRICTED—AWAITING LABOUR DEVELOPMENTS—NEW UNION LOAN.

Labour troubles have overshadowed the market during the week and greatly restricted business. The warnings issued by Sir Lionel Phillips and by Professor Lawn have been the chief topics of conversation, and it is recognised that they may do much to clear the air. The next few days may have momentous issue for the Rand, and, naturally, there is little disposition to deal in shares till the outlook clears. The "Johnnies" meeting drew a large audience of bankers, brokers and mining men, and the chairman's remarks on the position of the gold, diamond and coal industries were carefully noted and greatly appreciated. It would seem that the coal trade is, like the diamond industry, passing through a time of severe trial, and the prospects of an early improvement are none too bright. Diamond shares are, of course, very much out of fashion, and De Beers are back again at a low level, the Preference shares having fallen below £10. Transvaal Silvers have been a feature of the week, registering a considerable improvement on the excellent development returns. The ex-enemy share settlement has not affected the prices of the stocks chiefly concerned, as it is recognised that the financing of the purchases has yet to be arranged. Among industrials S.A. Alkalis and Pretoria Portland Cements fell away during the week, and there does not seem to be much support in the market for anything, at however tempting levels. Among debenture issues, to which more attention has recently been given, it may be noted that Consolidated Diamonds are quoted at £105; East Rand Props., £85; Modder East, £86; Randfontein Estates, £80; and Rand Water Board, £95—all buyers. The only features of the market on Thursday were a steadiness in gold stocks and a pronounced weakness in diamonds, due doubtless to the depressing news from the diamond fields. A satisfactory feature of the week was the issue of a Union six million loan at 9½%, bearing interest at 6 per cent. The loan will be used to take up maturing Treasury notes and other short-dated bills. The week's quotations are as follows:—

	Fri 18th	Sat. 19th.	Mon. 21st.	Tues. 22nd.	Wed 23rd.	Thur. 24th.
New Kleinfontems	6 7½	—	—	5 6	5 6*	5 3*
New Modders	72 9	73 0	73 6	73 0*	73 6*	73 3*
New Primrose	1 9*	—	5 0*	—	5 0*	5 0*
New Uniteds	3 6*	—	—	3 6*	—	3 6*
Nigels	4 6*	5 3*	4 3*	4 9*	4 3*	4 3*
Nourse Mines	8 9*	8 6*	8 9	8 0*	8 6*	—
Pretoria Cements	42 6*	—	42 0*	40 0*	42 0	40 6
Princess Estates	0 11	—	0 11*	0 11*	—	0 11*
Rand Nucleus	1 0*	1 0*	—	1 0*	—	1 0*
Randfontein Est.	14 0*	14 1*	14 3*	13 9*	14 6†	14 0
Roberts Victors	—	7 0*	7 6	7 0*	—	—
Rooibergs	3 0*	3 0*	3 0*	3 0*	3 3†	3 0*
Ryan Nigels	—	—	—	3 6	—	—
S.A. Breweries	—	—	—	27 0†	—	—
S.A. Lands	3 11*	4 1*	4 1*	4 2	4 0*	4 2
Springs Mines	37 6*	37 6*	37 9	37 9*	37 6*	37 9
Sub-Nigels	10 7*	10 6*	10 6*	10 9	10 6*	10 6*
Swaziland Tins	5 0*	5 0*	7 0†	7 0†	—	—
Trans. G.M. Est.	8 9*	8 9*	8 9*	8 9*	8 9*	9 0†
Van Ryn Deeps	69 0	69 0	68 9*	68 9	69 0	69 0*
Village Deeps	—	—	—	7 6*	—	7 6*
West Rand Cons.	2 6*	2 0*	2 0*	—	—	3 0†
Western Rand Est.	—	3 3†	3 3†	3 0†	2 6*	3 0*
Witbank Colls.	36 0	—	—	35 0*	—	35 0*
Witwatersrands	—	—	—	11 6*	—	11 9*
Wit. Deeps	3 0*	7 6*	7 9*	7 6*	8 3†	8 0†
Woluhuters	3 0*	3 0*	3 0*	3 0*	3 0	3 1*
Zaaiplaats Tins	3 0*	2 10	2 9*	2 9*	2 9*	2 9*
Union 5 per cent.	£99½*	£99½*	£99½*	£99½†	£99½	£99½*
New State Areas	20 0*	20 0*	20 0*	19 0*	20 3†	19 6
Rouxvilles	1 0*	1 0*	1 0*	1 1*	1 0*	1 1*
S.A. Townships	9 9*	9 9*	9 9	9 6	9 6*	—
S.A. Alkali	11 0	11 0*	12 0	11 3*	12 0	12 0*
Transvaal Silvers	17 6*	19 9	22 0	21 9*	22 0	21 3
West Springs	7 6*	8 0*	8 0	8 6*	8 3*	8 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

NEW MINING PATENTS.

- Ferdinand Mora Canda.—Ball Milling Apparatus.
- Ferdinand Mora Canda.—Apparatus for forming balls.
- Samuel Hardman Berry.—Water Power Wheel.
- Fredrick Reeves Barratt. An improved inverted cock.
- The Consolidated Mines Selection Co., Ltd.—Improvements in ore reductions.
- David McNale Ramsay.—Improvements relating to vacuum brakes.
- Thomas William Stainer Hutchins.—Improvements in apparatus for the distillation of carbonaceous material.
- Harold Christian Berridge.—Improvements in or relating to winding engines or motors.
- Ascar Vincent Pooley.—Improved reinforced steel wire rope pick or hammer handle.
- Charles John Robinson.—Improvements in or connected with apparatus for separating solid particles from air.
- Alfred Barnes and Antonio Jose Des Santos.—A mixture for the prevention of phthisis and similar affections.
- Aktiebolaget Atlas Diesel Brunkebergstorg.—Improvements in pneumatic rock drilling machines.
- George Desmond Richard MacCarty and Solin Butter.—Improvements tube mill liner.
- Oscar Anderson, John Rowe and George Chisholm.—The Androme in renewable liner plates.

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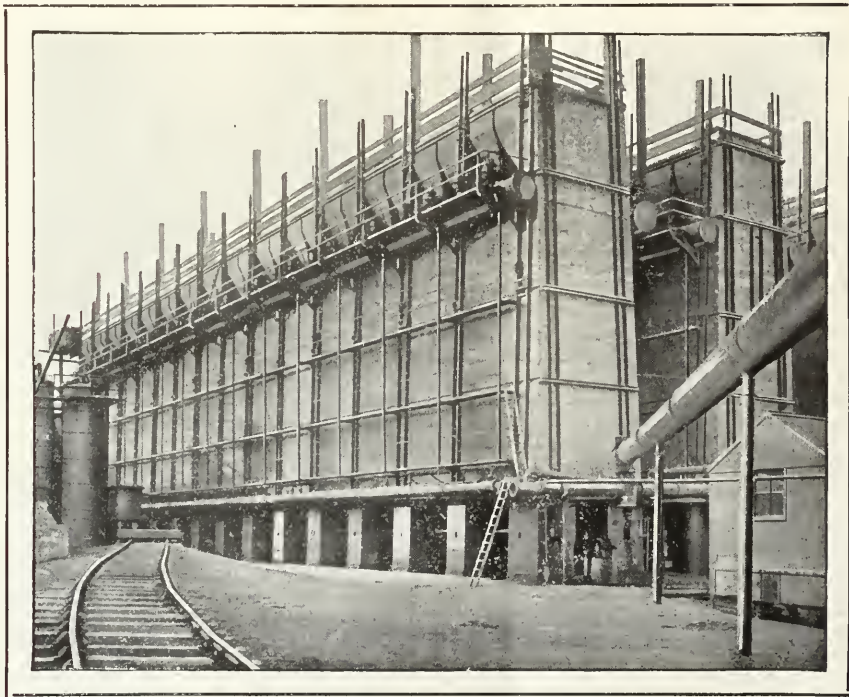
	Fri. 18th	Sat. 19th.	Mon. 21st.	Tues. 22nd.	Wed. 23rd.	Thur. 24th.
Anglo-Am. Corp.	19 7*	19 6	19 6*	19 4½	19 0*	19 0
Bantjes Con.	6 6*	6 7½	6 7*	6 7*	6 7½	6 6*
Brakpan Mines	49 6*	49 9*	—	—	—	—
Bushveld Tins	0 7*	0 7*	—	—	—	—
City and Subs.	—	2 7½	—	2 3*	2 0*	—
City Deeps	46 3*	46 9*	46 6*	46 6	47 0*	46 6*
Clydesdale Colls.	23 6*	—	23 6*	—	23 0*	—
Con. Diamonds	14 0*	14 0*	14 1½	13 9*	13 0	12 3*
Con. Investments	—	—	—	20 6*	20 6*	—
Con. Langlaagtes	13 6	13 0*	13 0*	13 0*	12 9*	12 9*
Con. Main Reefs	9 6*	9 6*	9 6*	9 6*	9 6	9 3*
Coronation Colls.	—	38 0†	38 0†	38 0†	—	38 0†
Do. Freeholds	—	0 7*	0 7*	0 7*	0 7*	0 7*
Do. Syndicates	4 6*	4 6*	4 6*	4 9*	—	5 3*
Crown Diamonds	3 6*	3 7*	3 7*	3 6*	3 6*	2 10*
Crown Mines	35 0*	—	—	—	—	36 0*
Dagga. Mines	2 9*	2 9*	2 9*	2 9*	2 9*	2 6*
E.R. Coals	1 9*	1 9*	1 9*	1 9*	1 9*	1 9
E.R. Deeps	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
E.R. Proprietary	4 9*	4 9*	—	—	4 9*	5 3*
E.R. Debentures	£85*	£85*	£85*	£85*	£85*	£85
Eastern Golds	0 9†	—	—	0 9†	0 6†	0 8†
Ferreira Deeps	—	—	10 0†	—	10 0†	—
Frank Smith Dmds.	3 8*	3 8*	3 8*	3 6	3 1*	2 9*
Geduld Props.	46 6	46 6	46 3*	46 3	46 3*	46 3*
Glynn's Lydenburgs	9 0*	—	7 0*	7 0*	7 0*	8 0†
Govt. Areas	80 0	79 6*	79 0*	79 3*	79 6	79 6
Knight Centrals	—	1 9*	—	4 9*	4 8*	4 9
Lace Props.	6 3*	6 0*	—	5 0*	—	—
Leeuwpoot Tins	7 3	7 0*	7 0*	7 1*	7 3*	7 6
Luipaardsvlei Est.	—	—	—	—	4 0†	4 0†
Meyer and Charltons	80 0†	80 0†	79 0†	72 6*	72 6*	72 6*
Middelvllei Est.	1 0*	—	1 0*	1 0*	1 0*	—
Modder B.'s	26 9*	26 6*	27 3	27 0*	27 0*	27 0*
Modder Deeps	43 6	43 6	44 0	43 0*	43 6	43 0*
Modder Easts	7 9*	7 7½	7 6*	7 6*	7 6	7 6*
Natal Navig. Colls.	30 0†	—	27 0*	—	—	—
National Banks	217 0*	217 0*	—	217 0*	—	217 0*
New Eland Diamonds	21 0*	22 6*	—	22 6	22 0*	—
New Era Cons.	7 0*	7 0*	7 0*	7 0*	7 0*	7 0
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*

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FURTHER RECOLLECTIONS BY W. P. TAYLOR.

We put up a small canvas home. It was all canvas tacked on to wood. There were many of them: some were shops, other diamond offices. Ours was our home. The floor was gravel. At night we unrolled our blankets and caught fleas. Fleas! At first we searched for them, afterwards they were welcome. They invaded us with the determination of aliens. We could not put the law against them, and they became our bed-fellows. The boarding-houses were mostly great military marquee tents. Their owners came from Kingwilliamstown, and they all claimed to be 1820 settlers. We had tried the "Pig and Whistle" and "Blue Posts," but both were expensive and distant, and so we settled down to the Tidmarsh tent. Pa Tidmarsh was really a cobbler on the loose. There were about six Tidmarshes, from Miss Tidmarsh to Baby Tidmarsh, and the *deus ex machina*, who worked the whole thing and whom you hardly ever saw—poor Ma Tidmarsh. I saw you slaying; the sight shocked my poor little system. It was not enough that you should have borne and brought up that horde of Tidmarshes, but how you survived some thirty boarders on top of them and grubbed 17 hours daily in that fearful improvisation of loose sheets of iron called a kitchen, I never could understand; but nobly, and without complaint, you did it. Miss Tidmarsh and the two smaller sisters waited. Pa Tidmarsh, with all the importance of his class, was owner, and sometimes waited. Miss Tidmarsh spoke of society and balls, and Pa Tidmarsh of "larst night at the club." Sometimes his appearance confirmed his statement. I think it was the second appearance of Ma Tidmarsh that decided us to leave. Poor Ma Tidmarsh, you were the most willing slave I ever saw. In heat and dust, and cold and wet, you kept those Tidmarshes clothed and respectable, and you fed your boarders. It was a one-sided bargain, and it struck my young heart as unfair. It wasn't cricket. Afterwards, seeing Pa Tidmarsh holding up a verandah post and imploring Heaven with black eye and loose neck gear, I sighed, for my heart beat hard for Ma Tidmarsh. Biddy came from King. Her husband had carried the stripes. Her home was in Tipperary, and, as the sodger boys sing, it was a long way off. Biddy's tent was full of sunshine, for sure, wasn't Biddy in it, and didn't she carry the sunshine everywhere? We were happy with Biddy. She nicknamed us: she called the dour, dark man St. Paul, and there were the Apostles, and then there was Johnny Cope, the butcher. It was a good thing Johnny Cope came, for Biddy never could have boarded those great eating miners and made her tent pay. Then she nursed the sick. The second son of a lord, who had the best of manners, burnt his tissues with Martell's brandy. Biddy made mending broths for his destroyed digestion, and when he died she sighed for the poor boy and found flowers to strew on his heavenly path. Johnny Cope came to the rescue and married Biddy.

Then there was the Bisset family. Maggie and George were sweethearts; they both came from dear old King. Maggie was a lovely Scotch lassie, and George a braw lad. Perhaps I should give as clear a picture of the Bisset *menage* as possible. Their boarding-house and bar was directly opposite our little canvas crib. Maggie was a perfect specimen of a Scotch lassie at her best. She had dark brown hair and lovely dark Scotch eyes; a litiesome figure, and came out in bright coloured print. She was just the vivid relief that all eyes sought in that gruesome sand and heat, and it was one of the first pictures of human romance and tragedy my little eyes fell upon. Any man would have been justified in singing "Annie Laurie" or "Tales of Araby" to Maggie, for she was a dear little embodiment of home brightness. George Benning, her lover, served at the same bar; he had a partnership in it. Fenwick, the young remittance man, would show Maggie his meerschaum pipe and get her to polish it with the soft side of a glove. Old Iving Watson would come and recite Bret Harte, and Nicholson

would sometimes drop in; then they would make him sing "Polly Perkins" or "The Girl that Served Behind the Railway Bar." The storekeeper of Knox's store sat opposite in the sunshine, smoked his briar and pulled up his great belt with a sigh, as he watched Maggie cleaning her glasses. Dan Hurley and Randall loitered over their whisky, and Mephistopheles, with red whiskers and fixed eyeglass, focussed Julius Pam, as he showed Maggie his parcel of rare white glassy stones. At first it was quite a clear, bright atmosphere, and as calm a picture on the surface as one of Maeterlinck's rural scenes painted on the banks of a river's placidity, with a background of oaks and elms and high-reaching poplars, the centre of the scene filled with hay-tossing lads and lassies, and flitting swallows skimming in God's heavens. Only Mephistopheles was here, and then there was that damned eyeglass. Richardson, the novelist, lets go at whiskers and waistcoats. I don't like the eyeglass; seen in the young it is flat and possible to peer through, but with age it becomes aggressive, and it positively looks through you. I don't like it in men, and less in women, and it upset Maggie and George. Maggie grew skittish, wore a brooch (not George's), a ring (not George's), and when it came to a bracelet, there was thunder. The intruder had a black eye as well as a glass one, and George went back to King. Maggie drooped. The stranger left, and we moved from Bisset's. Its later history was saddened by Maggie's death. Years afterwards I saw George Benning; he owned an hotel at Umata. When I asked him if he still remembered Maggie Bisset, he moved like a shot stag.

Ah, Peggy! There was a mess, as we called it in our later civilised moments. James Beningfield was the chairman, and sat at the head of the table. It was run on wonderful lines. We never saw the hostess. Peggy always brought notes and spoke to the chairman. You are curious to know about Peggy. Those wonderful old English prints of Morland's show you the old hostel and the maid. In any English country town she is still there, but time has robbed her, as it has everyone else, of old world characteristics; but the homeliness of the old country is allied with its domesticity, and the maid stands out first in our anticipations of reception. Alas, our Peggy was not as these; our Peggy was black—a smiling Zulu boy—and had a wooden leg, and we named him Peggy because he pegged along. Peggy was a find. Alone, he waited on twelve of us. No orders were given; Peggy knew everything. In all our days there was no complaint. Yes, there was, when Peggy got drunk. Peggy took off his leg and tried to brain a Kafir. Then his leg was taken from him and he became helpless.

There was Mrs. Barker's and then there was Playford. "Drawn on you for thirty pounds; coming up by transport wagon."—Louis. As I opened and read the telegram, my mind travelled over the names of all the girls I knew. It was serious; it was real; directed to me and signed by Louis. I was open about it. I showed the telegram to friends, and I got chaffed unmercifully, and so I waited developments. The draft arrived signed by Louis Playford. A year previously, in a billiard room at his father's house at Malden, I had playfully consented to look after him if his father died. Herbert Playford died, and Louis worked his way out on a tramp loaded with dynamite. He holds his two fingers up to-day and swears she was struck twice by lightning before she reached East London. There he deserted. George Farrar found him, and when he heard his name was Playford, George thought he had something at last to knock Charlie Cronin out of the sculls, but after Louis had smashed one or two outriggers he was booted, and came up country with my thirty pounds. An amusing thing occurred en route. The lad had promised his mother to make a Christmas pudding wherever he was, and think of her as he eat it. In his pocket book were all the instructions. He got suet

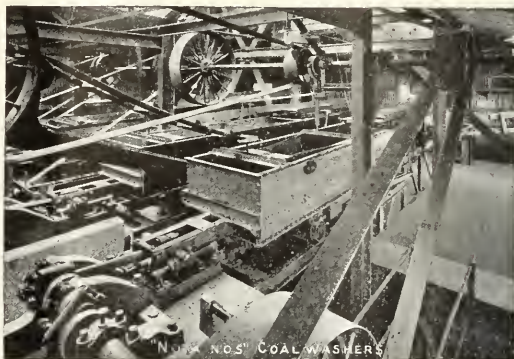
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and raisins; no flour, so he took mealie meal; milk, orange rind, and lastly, six eggs. The pudding was mixed, the cloth to boil it in in readiness, and then he had to put in the eggs. He broke one. It went off like a motor back-fire, and he had to shift his seat up wind. He broke a second, and shifted his seat again. A third, another move, and then he prayed. Good youth, he had promised his mother. The last three eggs went into that pudding with closed eyes. To this day he does not know whether they were good or bad, and he eat his pudding. He was a simple soul and fond of rest. He would lie abed until within a few minutes of his time; then rush through his ablutions, throw on clothes, run to his breakfast, bolt his food, scamper to office, walking in just on time. We cured him of this by simply altering the clock once or twice. Our warnings about sleeping with open doors he scorned. One morning he was minus his one and only suit. At first he thought it great fun, but when he realised he really was without a rag, he begged for clothes. We took pity on him and lent him some black Sunday clothes. He looked perfect in his sorrow.

Verdite Mines.

Many of our readers will be interested to learn that a new gold-bearing lode has been discovered on this mine, and that a trial crushing during this month gave the most gratifying results. We understand that a syndicate in England has proposed to take over the sole right of selling and manufacturing this company's tale in Europe, and that the export of this mineral may shortly be resumed on a much larger scale than hitherto.

Mozambique Mineral Concessions.

The statutory meeting of the Mozambique Oil and Mineral Concessions, Ltd., was held on January 20 last, and, in April, the managing director, Capt. Lionel Cohen, D.S.O., M.C., left for the company's territory in Mozambique, Portuguese East Africa. Since his arrival he has been engaged on the company's business, and in organising various prospecting expeditions. He cabled news regarding six of these, describing the prospects as favourable and the country as very mineralised. A large deposit of bauxite was struck near Angoche, and also a lode of graphite—the latter 40 ft. wide and 1 mile long. There is rich tin at Pequerra, blanket reef at Guernea, and indications of oil at Larde. The prospects in regard to tin are exceptionally good. Some 74 miles north of Angoche, a tin lode is reported that "exceeds all previous discoveries in Africa." There is some uncertainty as to the concessions for oil, but this is not likely to interfere with the company's programme. The vendors have secured a most important oil concession in Angola, and contemplate forming a company with a capital of £1,000,000, £450,000 being reserved as working capital, and 150,000 fully-paid £1 shares will be transferred to Mozambique Oil and Mineral Concessions, Ltd. The most powerful international oil group in the world endeavoured to obtain this property when offered by tender, but, owing to the energy and the efforts of the vendors and the Portuguese director (Dr. Populin), that submitted by the English group carried the day. The directors speak enthusiastically of this property, to which it is evident that they attach the greatest importance. The board has been strengthened by the adhesion to it of Mr. Ernest Mansfield and Mr. Noel B. Davis.

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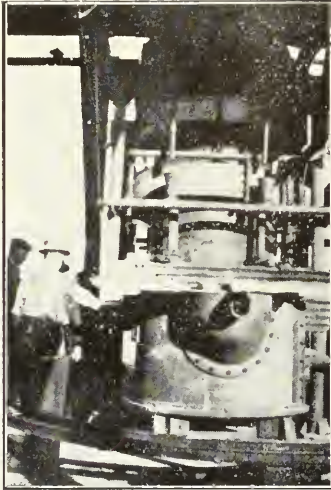
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Transvaal Silver.

Recent developments on the Dwarsfontein property of the Transvaal Silvers have been distinctly more favourable. In the third level east of No. 1 shaft the lode has been struck seven feet wide, giving good values. In the second level west of No. 1 shaft a good looking lode has been encountered with payable bands. In No. 2 shaft, where recent quarterly reports have shown disappointing results



The Blast Furnace at the Transvaal Silver Mines.

the third level west has got into a lode from 8 to 10 feet, also showing good values. It is, of course, most encouraging to find these good developments in depth, and also that the ore body at the third level is opening out into a wide, well-defined lode carrying good values. The desulphurising plant and first unit of the smelting plant are running smoothly and the concentration plant is rapidly nearing completion.

Letters to the Editor.

GENESIS OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I regret your correspondent "Mystified" is unable to accept the photo published in your issue of the 13th inst. as evidence of the actual crystallisation of the diamond unless he can obtain accessory facts or "inside knowledge" acquired by me through prolonged investigation. He will realise how difficult it is to convey impression to the sceptical mind. Mayhap the photograph would lie to any who are unacquainted with its significance. The one reference I made to Kimberlite in my article was a quotation from the late Sir William Crookes: "Does not this fact point to the conclusion that the blue ground is not their true matrix?" I expressed no personal opinion. That the true matrix of the mine stone will be recognised I have no doubt. My considerations are confined to the discovery of the genesis of the diamond as pertaining to the alluvial gem. The string of questions "Mystified" has submitted are quite irrelevant to the point at issue. To prejudice interests preparatory to laboratory investigation is foreign to my purpose. There the facts will be sifted. I have sufficient confidence in the evidence I have collected to be sanguine of satisfactory results.—Yours, etc.,

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Johannesburg Consolidated Investment Company, Limited

(Incorporated in the Transvaal).

CAPITAL AUTHORISED — £4,500,000
CAPITAL ISSUED — — £3,950,900

REPORT OF THE DIRECTORS AND STATEMENT OF ACCOUNTS

FOR YEAR ENDED 30th JUNE, 1921.

REPORT OF THE DIRECTORS,

Submitted to the Shareholders at a Meeting held in the Board Room, Johannesburg Consolidated Investment Company, Ltd., Consolidated Building, Fox Street, Johannesburg, on Wednesday, the 23rd day of November, at 11 o'clock in the forenoon.

ACCOUNTS.

1. The Company's Balance Sheet and Profit and Loss Accounts for the financial year ended 30th June, 1921, are submitted herewith.

PROFITS.

2. After providing for depreciation, English and Colonial Income Tax, and other charges, the profit for the year, including £191,453 8s. 4d. brought forward, amounts to £579,411 13s. 8d.

DIVIDEND.

3. On the 23rd June the Directors declared a Dividend of 10 per cent., free of income tax, payable to Shareholders registered as at 30th June, 1921. This distribution (excluding provision for income tax) absorbs £395,000, leaving a balance of £184,411 13s. 8d. to be carried forward to next account.

VALUE OF SHAREHOLDINGS.

4. The Company's shareholdings have (where necessary) been written down to their market value as at 30th June.

FINANCIAL POSITION.

5. The financial position of the Company continues to be very satisfactory, and as opportunity occurs the Company's interests are being extended and developed.

MINING INTERESTS.

6. The usual reports issued by the various gold mines under the Company's control afford all necessary detail as to their position. The following general information may, however, be of interest to this Company's Shareholders:—

Government Gold Mining Areas (Modderfontein) Consolidated, Ltd.—This property continues to make excellent returns. The tonnage milled for 1920 amounted to 1,515,000 tons, which was an increase of 154,000 tons, and the number of fine ounces of gold recovered was 603,239, an increase of 33,857 fine ounces when compared with the previous year. In view of the Company's large ore reserves, amounting to over ten million tons, the policy of the Company is to maintain the ore reserves at this figure.

Van Ryn Deep, Limited.—The ore reserves are over three million tons of an average value of 9.7 dwts. over 72 inches, both tonnage and grade showing an improvement as compared with the previous year. The development of the Western section of the mine shows improvement.

Randfontein Central Gold Mining Company, Ltd.—The scheme for the reorganisation of this mine is now nearing completion, but progress has been retarded by strikes and other obstacles beyond the control of the management. It should be borne in mind that the work which required to be undertaken has been practically equivalent to the opening up of a new deep-level proposition at the bottom of the former workings. There is every reason to anticipate that substantial

benefits will shortly accrue from the reorganisation of this property.

The taking over of the Randfontein Deep, Ltd., property, referred to in last year's report, has been completed, and mining operations in this area have been carried on for the last twelve months. It is anticipated that ore from the Randfontein Deep section will be sent to the mill at an early date.

Randfontein Estates Gold Mining Company (Witwatersrand), Ltd.—In the Company's previous report reference was made to an action successfully brought by the Randfontein Estates Company against Sir Joseph B. Robinson, which resulted in the Randfontein Estates Company being awarded £215,000, plus interest at 6 per cent. as from February, 1907. In respect of this judgment a payment of £391,155 11s. 6d. on account has been made to the Randfontein Estates Company. The latter's solicitors have since been served with a notification that Sir Joseph B. Robinson has applied for permission to appeal to the Privy Council against this judgment.

New State Areas, Ltd.—The work of sinking the two shafts on this property is now completed, the South Shaft having been sunk to a final depth of 4,071 feet and the North Shaft to a final depth of 3,768 feet. The reef intersected by the South Shaft gave the extremely high average value of 89.8 dwts. over 18.9 inches. The reef intersected by the North Shaft was found to be faulted and disturbed by numerous quartz intrusions, and therefore no reliable assay value has yet been possible. Development is rapidly proceeding, and there is every reason to anticipate that the New State Areas will prove a most valuable property.

WORKING COSTS.

7. It has for some time been obvious that existing circumstances no longer justified a continuance of the high scale of wages paid to the miners in South Africa. It is therefore satisfactory to report that an amicable arrangement has been concluded between the Transvaal Chamber of Mines and the Trade Unions concerned resulting in an immediate reduction of wages, with the probability of further reductions in the near future.

GOLD PRODUCTION.

8. The value of the gold produced by the Company's group of mines during the year under review amounted to £9,926,943, the average price obtained being approximately £5 11s. per fine ounce.

COAL INTERESTS.

9. As mentioned by the Chairman on the occasion of the Company's last Annual Meeting, the Company has acquired considerable coal interests in South Africa. The equipment of the mines is nearing completion, and they will be capable of producing a large quantity of coal. Your Directors are hopeful that the Company will eventually derive material benefit from this new enterprise, more particularly when the necessary railway facilities have been obtained.

Johannesburg Consolidated Investment Company, Ltd.—Continued.

DIAMOND MINES.

10. Regarding your Company's interests in the leading Diamond Mines in South Africa, it may be mentioned that during the period under review the falling off in the demand for stones has been met by a drastic curtailment of production. This is no new feature in the history of the diamond industry, and it is confidently anticipated by those who control the policy of the diamond mines that an improvement in the position may be expected in the near future, and of such improvement indications are already apparent.

ESTATES AND TOWN PROPERTY.

11. Sales of building sites on the Company's residential estates continue to be effected.

VISIT OF THE PERMANENT CHAIRMAN TO SOUTH AFRICA.

12. Early in the year Mr. S. B. Joel, the Permanent Chairman, went out to South Africa on the Company's business. His visit was very valuable, as it

enabled him, in consultation with the Directors, to deal with many matters of considerable importance and urgency.

DIRECTORS.

13. In terms of the Articles of Association, four of the Directors, viz., Sir John S. Purcell, K.C.B., J. Emrys Evans, C.M.G., J. Friedlander and Isaac Lewis, retire by rotation, and offer themselves for re-election.

ELECTION OF AUDITORS.

14. Messrs. W. Fergusson and S. Thomson, the Auditors of the Company in Johannesburg, and Messrs. Kemp, Chatteris, Nichols, Sendell & Co., the Auditors in London, retire from Office and offer themselves for re-election.

By Order of the Board,

W. H. MARDALL,
THOMAS HONEY, Secretaries.

28th September, 1921.

Dr.	Balance Sheet, 30th June, 1921.				Cr.		
CAPITAL AND LIABILITIES.				ASSETS.			
	£	s.	d.	£	s.	d.	
Authorised Capital— (Under Resolution of 23rd Nov., 1905)	4,500,000	0	0	Stocks and Shares	3,915,649	7	4
of which £1,345,000 is Registered Capital				Mining Properties and Advances to Mining Companies	277,311	17	7
Capital Issued	3,950,000	0	0	Real Estate and Buildings	421,030	17	4
Reserve Fund	250,000	0	0	Office Furniture, etc.	8,093	11	1
Sundry Creditors	1,449,104	11	4	Loans on Mortgage and Real Estate	161,026	0	4
Dividend (No. 24) of 10 per cent., free of Income Tax, declared 23rd June	395,000	0	0	Pre-War Loans against Securities, subject to the Treasury and Stock Exchange regulations	856	15	9
Profit Appropriation Account— Balance	184,411	13	8	Loans at Short Call on Market and other Securities	£455,878	18	10
Contingent Liabilities— Uncalled Capital on Investments, etc.	£349,635	0	0	Sundry Debtors and Dividends Accrued	798,323	4	5
				Cash at Bankers and in hand	190,345	12	4
					1,444,547	15	7
					£6,228,516	5	0
THOMAS HONEY, W. H. MARDALL, Secretaries				S. B. JOEL, Chairman, A. R. STEPHENSON, Directors.			

Profit and Loss Account for the Year ended 30th June, 1921.

£	s.	d.	£	s.	d.		
To Directors' Fees, Salaries and other Expenses, less Amounts received from other Companies	34,340	5	5	By Profit realised on Stocks and Shares, Dividends, and Sundry Receipts, less provision for Income Tax and Amounts written off	422,298	10	9
To Balance being realised profit for the year carried to Appropriation Ac- count	387,958	5	4				
	£422,298	10	9		£422,298	10	9

Profits Appropriation Account.

£	s.	d.	£	s.	d.		
To Dividend No. 24 of 10 per cent., free of Income Tax, declared 23rd June, 1921	395,000	0	0	By Balance of Profit and Loss Account at 30th June, 1920	191,453	8	4
To Balance carried to Balance Sheet	184,411	13	8	By Balance of Profit and Loss Account at 30th June, 1921	387,958	5	4
	£579,411	13	8		£579,411	13	8

We report to the Shareholders that we have audited the accounts of the Johannesburg Office of the Johannesburg Consolidated Investment Company, Limited, dated 30th June, 1921, and have obtained all the information and explanations we have required. The Balance Sheet of the Johannesburg Office of the Company is, in our opinion, properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs in Johannesburg according to the best of our information and the explanations given to us, and as shown by the books of the Company in Johannesburg. We have also verified the securities in South Africa.

SAML. THOMPSON,
Chartered Accountant,
W. FERGUSSON,
Registered Public Accountant,
Auditors.

Johannesburg, 6th July, 1921.

We report to the Shareholders that we have audited the Accounts of the London Office of the Johannesburg Consolidated Investment Company, Limited, dated the 30th June, 1921, and have obtained all the information and explanations we have required. The Audited Accounts of the Johannesburg Office have been properly incorporated in the above Balance Sheet and Profit and Loss Account, and in our opinion, the Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us and as shown by the books of the Company. We have also verified the securities in London.

KEMP, CHATTERIS, NICHOLS, SENDELL & CO.,
Chartered Accountants, Auditors.

London, 5th August, 1921.

Enemy Shareholdings.

SETTLEMENT IN SIGHT.

AGREEMENTS BETWEEN UNION CUSTODIAN AND BRITISH PUBLIC TRUSTEE.

Negotiations to be Completed by end of January.

The question of disposal of South African enemy shareholdings is a matter which has engaged the attention of the Government, the public, and the mining houses on both sides of the water for a considerable time past. On various occasions it has been announced that an agreement has been arrived at, and on just as many occasions hopes of a settlement of the difficulty have been disappointed. It is now, however, reported from London, apparently from an official source, that complete agreement has been reached on all points between the Public Trustee and Sir Hamilton Fowle, Union Custodian of Enemy Property, in connection with the allocation of enemy shares in companies working in South Africa, and on all other outstanding matters of procedure.

A scheme has also been agreed upon regarding the disposal of enemy shares in mining companies, under which all enemy shares in any company will be offered in one block, and first to group companies. Negotiations regarding such sales in connection with companies incorporated in England will be conducted by the Public Trustee and in connection with companies incorporated in South Africa by the Union Custodian. The Public Trustee's Department is preparing certain statistics which are expected to be ready for despatch to South Africa at the end of December.

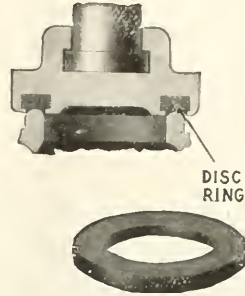
Negotiations for the disposal of the whole of the enemy holdings will be commenced immediately the statistics arrive. It is hoped that the negotiations will be satisfactorily completed by the end of January. Sir Hamilton Fowle sailed by the "Arundel Castle" last week.

The principal blocks of "enemy" shares held in South Africa are as under:—

Company.	No. of Shares.
New Modder	437,864
Modder B	150,896
Brakpan Mines	49,486
Springs Mines	53,588
Johannesburg Cons. Invest. ...	58,111
Meyer and Charlton	29,865
General Mining	482,733
West Rand Cons.	692,947
City Deep	21,832
East Rand Proprietary	53,562
Cons. Main Reef	22,495
Village Deep	34,117
Modder East	21,482
Knight Central	21,755
Van Dyk	185,369
Van Ryn Estate	22,497
Wolluter	53,676
Wit. Deep	32,575
Bantjes	59,844
Cinderella Cons.	58,952
Glynn's Lydenburg	19,342
New Klooffontein	45,727
Nourse Mines	16,326
Rose Deep	11,581
Robinson	51,100
Rand Collieries	110,240
Randfontein Estate	32,402
Randfontein Central	31,356

FAIRBANKS

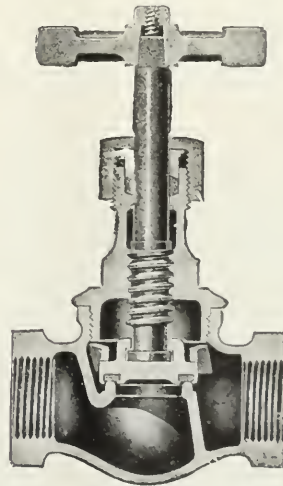
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AND AT KIMBERLEY AND DURBAN.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET. BUT MERCHANTS ANTICIPATE EARLY RECOVERY—IRON AND STEEL—AGRICULTURAL IMPLEMENTS—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—GERMAN TRADE ACTIVITIES—PROPOSED NAVAL DISARMAMENT EFFECTS ON STEEL WORKS—OIL NOTES—UNION'S COMMISSIONER FOR COMMERCE—METAL MARKET.

General Review.

Business has been quiet this week, but the undercurrent is of an encouraging character. Trading on the Commercial Exchange has been fairly good, with, however, little volume. The consensus of opinion in mining circles is that stocks are becoming depleted more and more; indeed, in some lines shortages are already apparent, showing that the weak holders are gradually being weeded out. It is generally expected that the next few months will see an all-round improvement in business. At the moment, of course, labour troubles are the disturbing factor and are preventing the industry from departing from its enervated hand-to-mouth policy of obtaining supplies. The commercial community is beginning to think that it is time to have a clean up, to get to bedrock and know more or less the general economic position. Provided the present unsettling labour conditions are improved and the cost of production materially decreased, there appears little in the way of a slow but gradual recovery in business conditions. The gold premium has again declined somewhat and with it a corresponding appreciation in the sterling exchange with America. For the first time in six months, the rate has advanced to over four dollars, which, however satisfactory it may be in respect of the European economic position generally, warns us with no uncertain voice that it is imperatively necessary for the Rand gold mining industry to lose no time in effecting drastic reductions in working costs if the bulk of our mines are to continue operations in the near—some authorities consider in the very near—future. As regards building operations, big inquiries are about for material for new works, if not for just now, at any rate for a time to be reckoned in weeks, as people are now seriously thinking of tackling propositions which have been too long delayed in the hope of lower costs. This hope, however, appears to be fallacious, at any rate as regards building materials, which are now without doubt on the upward grade; timber has advanced overseas considerably of late, with every indication of a still further rise shortly, and other building materials are in somewhat like case. The rates of wages will, and must, come down, but the negotiations to that end will, in their very nature, be bound to be of a protracted nature; hence the general inclination to put a period to the present stagnation and catch up the arrears of building work so long needed. The flow of money from the Government Departments, which it is expected we shall soon see, will automatically give an impetus to business generally. Prices of mining and building materials locally show on the whole little change from last week, but remain firm with an upward tendency. Inquiries in commercial circles have elicited the fact that, notwithstanding the Premier's recent statement, the banks are still keeping a firm hold of the reins in regard to financial facilities, and that until the labour difficulties shall have been satisfactorily settled little help may be expected from those quarters. But, given a satisfactory solution of those difficulties, the opinion is generally optimistic that we shall see improving business conditions early in the New Year.

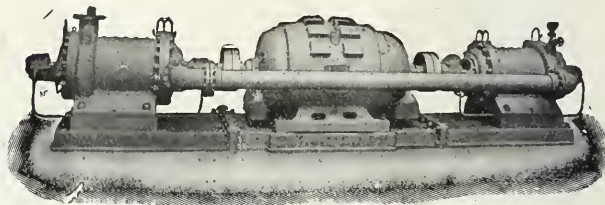
Iron and Steel.

Business, as is usual at this time of the month when the mines' requirements have been satisfied, has slackened off. Trade conditions are again exceedingly quiet, and although

there are some extensive inquiries floating, the general experience unfortunately is that very few of these mature. However, there appear to be prospects of revival, which, though all too gradual and slow, should develop during the ensuing months, so that by the middle of next year a more sanguine report should not be out of place. There are mooted a number of projects of considerable magnitude in extensive pipe lines and Municipal power schemes, including large quantities of steel poles. The National Trading Co., who are the agents for the Mannesmann Tube Works, report a measure of activity not only in the above lines but also in another of their specialities, viz., sirius oxy-acetylene metal welding and cutting plants, for which a number of orders have recently been received from the country, where the autogenous process of welding metals is finding increasing favour and is being gradually recognised as the most useful help, particularly when large engineering shops can only be situated at a considerable distance. Owing to the financial stringency and labour troubles, consumers, both

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For Mine Drainage, Waterworks, Etc.



Pumping Set suitable for lift of 2,500 ft.

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mines and engineering firms, are at present only buying from hand to mouth. Many tenders that have been asked for construction and other purposes have not yet been given out, for obvious reasons. The S.A.R. are asking for tenders for the enormous quantity of 714 long tons of reinforced bars to be used in connection with the new elevators. The Railway are also asking for tenders for the supply of copper tubes for the ensuing year. Merchants are pleased at this, because many orders for the larger sizes go direct to the High Commissioner in London, leaving them without an opportunity of quoting for them. The new Railway buyer, Mr Lyddon, who has been appointed as from February next, will, it is hoped, see to this and allow local merchants to quote for everything that is required by his Administration. This matter, in the view of a leading importing merchant, should by reason of its great importance be taken up by our Chamber of Commerce.

Latest quotations.—Dunswart iron 22s. 6d. per 100lb. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 35s. to 42s. 6d.; larger sizes, 32s. 6d. to 40s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 32s. 6d. to 34s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 33s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 32s.; steel, 35s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 32s.; channels and joists, 37s. 6d.; shafting, $\frac{3}{8}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 45s. to 50s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{2}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; 1 $\frac{1}{2}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per

doz.; 12 lb., 25s. per doz.; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening 3s. to 9s. 6d. per sq. yard; cyanide for outside mines, 1s. 6d.; zinc shavings, 1s. per lb.

Newcastle Iron and Steel Co., Ltd.

The directors held their quarterly meeting at Newcastle recently, at the same time inspecting the progress of the assembling of the plant, and found that a great deal had been done since their last visit. The completion of the plant is now in sight; ore and coke are now being brought to the property, and it is hoped that it will not be long now before production of pig iron in South Africa for commercial purposes will be an established fact. The foundry, which has been established for the company's own castings and also the brick-making plant have proved invaluable; many tons of castings have been and are being made for the company's own use, and that, together with the bricks made by the company, has saved them much time and many thousands of pounds in money.

Second-hand Machinery.

There is not much to report this week, and curtailed orders are anticipated for the next few weeks; the mines are not disposed to take over large stocks, and consequently orders are on the quiet side. With regard to rails, these have come down considerably on account of the German invasion of Mannesmann. As an instance, there was a big order in the market the other day for a very large tonnage of rails for Delagoa Bay and district. A price was quoted for about 400 tons delivered Delagoa at about £11 10s. per ton, but the order was snapped up by a German firm at £9 2s. 6d. landed in Delagoa Bay. A 10 h.p. electric motor was sold during the War at about £110 second-hand, and before the War for about £60. These are being offered by the German makers landed Johannesburg at £55. Piping also has been largely purchased from Germany, hence the drop in the second-hand product. A contract was given out for piping by the Rand Water Board, and the difference between the English and German tenders was £180,000. But it is felt that this cutting of prices by German firms is not to last long, as is evidenced by the announcement in the press of a strike in one of the German steel works, where the men are demanding 100 per cent. increase of wages, and prices should come to what they should be. Quietness is expected to rule in the second-hand machinery market next month and indeed well into the New Year.

Welsh Tinplate Industry.

According to latest*oversea advices, the position of the Welsh tinplate industry is regarded as more satisfactory in consequence of large European and Asiatic orders and also a very large contract for British Columbian packers, obtained in the face of severe American competition.

AFRICAN IRON & STEEL PRODUCTS, LTD.

PATENTEES AND MANUFACTURERS OF THE

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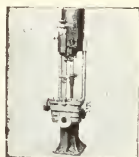
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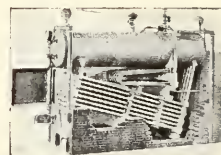
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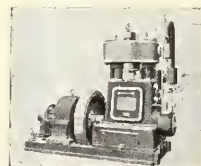
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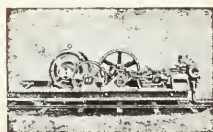
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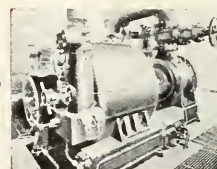


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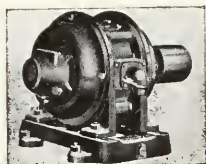


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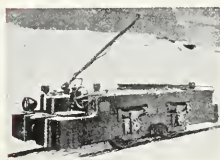


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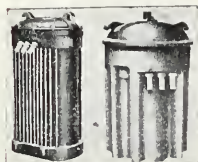
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German Steel Works Closed.

A strike has occurred in the iron and steel works in Westphalia, owing to the operatives claiming an increase of 100 per cent. in wages, which was refused by the masters.

Suspension of Large Tinplate Firm.

A firm trading largely in the East in tinplates, galvanised sheets, etc., has, it is announced from London, suspended payment, with liabilities amounting to £900,000. A scheme is being arranged to re-organise the company.

Agricultural Implements.

There is very little doing in these at the moment, the farmers, owing to the low prices ruling for their produce, being unable to buy what they need, and need rather badly. There has recently been a sharp fall in prices of farming implements in Canada, whence a large portion of our agricultural implements come, which averages 15 per cent. to 20 per cent. This decline will, however, not affect next season's local prices, as large stocks have been imported for such demand, and these must be worked off before the farming community can avail itself of the lower prices. Farmers are, it is well known, well to the fore in purchasing up-to-date machinery when the result of their farming operations allows them to spend money, but recently there has been no such opportunity when, instead of profits, farmers have been making losses. Consequently they have to do the best they can with their old machinery, and importers are saddled with huge stocks which they cannot at present dispose of. The Canadian fall will undoubtedly have the effect of reducing prices of local stocks in the near future, as merchants cannot hold stocks indefinitely and will eventually have to turn them over at a sacrifice. As a matter of fact, in some cases farming implements are now being sold under cost.

Timber and Building Materials.

Prices have been firmer in Scandinavia and Finland for timber during the past three months with an upward tendency, and a considerable advance has taken place in the f.o.b. prices quoted by Swedish mills. Large shipments of timber recently received from the Baltic were bought before the recent advances, but at present selling quotations leave importers with little or no profit. The tendency in the near future will therefore undoubtedly be for timber to rise in price.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver board, 4½d.; floorings, 6½d. to 7d.; ceilings, 4½d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Furniture timber: Burmah teak, 18s. 6d. per cube here for first quality, 14s. 9d. for second, at the coast; American oak and Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at the mills; Honduras

mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks are unchanged at 70s. for blue stock; 60s. mixed; £1 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s. 6d., 46s. 6d., 55s. for 1 to 3-ply.

There is nothing new in the building trade, things quietening down in view of the approaching holidays. There is still a little building going on, which is keeping hands fairly well employed. As previously stated, a spurt is anticipated about February next.

Second-hand Iron and Timber.

Things are at present not too bright in the second-hand iron and timber yards, and it is generally expected that they will get worse before they are better. Inquiries are good, but orders, in the absence of financial backing, are very scarce. Prices are as last reported and appear to be stabilised, viz., 6d. to 7d. for iron, and 9d. to 10d. for timber.

Electrical Goods.

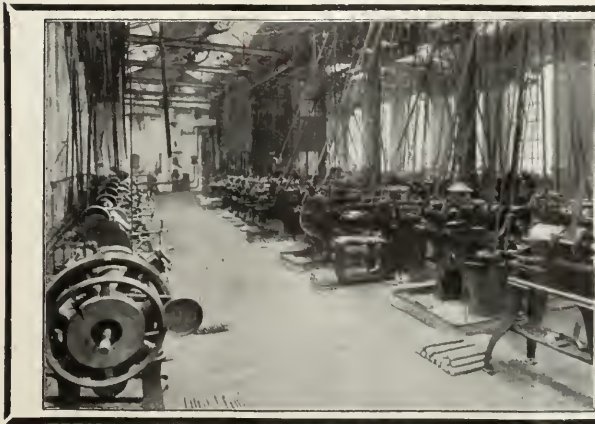
Business continues quite fair in town and country, and has been so far the last fortnight; country orders are coming in at a satisfactory rate and for quite a large quantity of wares. There are no alterations to report in prices, and dealers generally do not expect any declines for some time to come. Germany, it seems, cannot reduce her prices lower, and England and America find it impossible to do so in view of the wages question. Stocks in all lines are now abundant. Building operations are going ahead a little better, said a prominent dealer, but of course nothing like they ought to be and what the present scarcity of accommodation warrants, but leeway is expected to be made up next year. The banks, he said, are rather easier now than previously, but still careful; he thought that financial facilities would later on become still easier and be a great help to building operations. The power station are adding a few extra connections, but they are afraid to overload the plant at present awaiting auxiliary plant early next year.

Electrical Conversion.

The preliminary work in connection with the Krugersdorp electrical conversion scheme is now in hand. Prof. Buchanan and the engineers of the Victoria Falls Power Co. have arranged the route and the points of delivery of power.

German Competition in Mining Requisites.

Germany is now delivering cyanide at from 10 to 15 per cent. below the price at which British manufacturers can quote. In shoes and dies she is under-quoting local industrialists, who had been turning out the mine requirements



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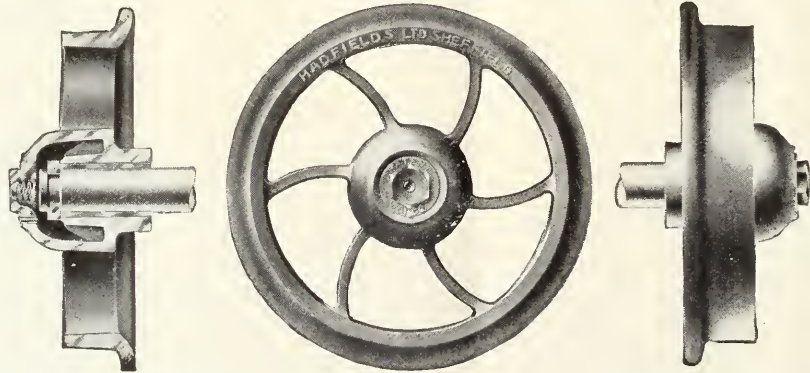
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satisfactorily both as regards quality and price, the latter just below the British, thus ensuring the retention of the trade in the country. Now Germany is offering at £30 per ton against £40 per ton quoted by Britain. The trade in these articles amounts to over £200,000 per annum. As regards rails, Germany is now offering these at £18 per ton, compared with £24, the price ruling here for some time past. There is only one solution to this, and that is a drastic cut in wages, without which our markets will be lost to us irrevocably.

Use of White Lead.

A cable from Geneva states that on the resumption of the discussion of the report of the White Lead Committee at the Labour Conference, Mr. Gemmill, the Joint Secretary and Actuary of the Transvaal Chamber of Mines, protested against the prohibition of white lead, and pointed out the effect it would have on our gold mines if such were carried out. He was, however, overruled by 76 votes to 3, and the use of white lead (with certain exceptions) was prohibited in interior and exterior painting under regulations protecting workers using pigments.

Washington Naval Disarmament Proposals and Effect on Steel Works.

Disarmament, if carried out, will undoubtedly very seriously affect the shipbuilding and iron and steel industries. It is reported that already owing to the progress of negotiations at the Conference some contracts regarding capital ships in the Clyde shipbuilding yards have been suspended, which is necessarily affecting some Glasgow steel works. At least three years' work, with wages totalling £15,000,000 sterling, is being held up. An announcement has been made that the Parkhead forge has been closed. Naturally, until further progress has been made in the negotiations, nothing definite can be done, but it is understood that instructions have been issued from the Admiralty to those firms engaged in naval construction to hold their hands pending further advices. Sheffield and Birkenhead are also suffering from the temporary cancellation of subsidiary orders. The President of the American Iron and Steel Institute, Mr. Schwab, declares that disarmament might involve loss to armament makers, but if permanent peace were possible he would gladly see the war-making plants of his companies sunk to the bottom of the ocean.

Oil News: Oil Fuel Growing in Favour.

A cable from New York announces that shareholders in the Delaware Union Oil Co. have ratified an amalgamation with the Royal Dutch Shell Transport Company. The new company will be capitalised at ten million shares without par value, the Dutch Company receiving 72 per cent. and nominating 15 directors, the Union Company taking the remainder of the shares and nominating four directors.

African Oil Corporation.

The work of testing the property during the past few months under the supervision of an engineer of the Royal Dutch Company, is progressing very satisfactorily. The width of shale for mining purposes exceeds, it is stated, the original estimates formed by the company's own engineer, and the results published as to values have been exceeded by recent assays. A boring contract has been entered into by the Royal Dutch Company with the McNamara Shot Drill Co., Ltd., and boring operations are to commence forthwith, results of which are being eagerly looked forward to.

German Reparation.

Sir Henry Strakosch, in an article in *The Times* on the subject of the German indemnity and its ruinous incidence on Allied countries in the way of unequal competition, suggests that goods delivered as part reparations should be devoted to purposes of a capital character, such as the erection of plant and equipment, central electric power stations in the neighbourhood of coalfields, and for the improvement of the harbours of Britain, which would, he thinks, be very advantageous. He says that such goods would not compete with current market commodities, and that the erection of the plant would provide employment in Allied countries. Further, that cheaper means of production in future would yield increased revenue for the liquidation of national debts. Sir Henry Strakosch suggests that the scheme should embrace the whole British Empire, and should be run by private enterprise, those receiving such goods guaranteeing payment plus a percentage of profits or small rates of interest to the Government.

Disposal of South African Products to Germany.

Colonel Mentz, together with Mr. Canham, the Union Trade Commissioner, and Mr. Boshof, have visited Berlin for the purpose of finding means of disposing of South African products—wool, maize, hides and skins—and have had several conferences with the German foreign office and others. Colonel Mentz is convinced of the great demand for these products, and is satisfied with the progress already made in this connection.

S.A. Reserve Bank.

The weekly statement, dated November 19, shows the ratio of cash reserve to liabilities to public as 73.2 per cent.

Union's Commissioner for Commerce.

It is announced that the Government has selected Mr. Karl A. Spilhaus, of Capetown, as the Commissioner for Commerce, who will assume duties on January 1 next. His province will embrace most of the Western and Northern European countries, such as Holland, Belgium, France, the Scandinavian States, Germany, etc. Mr. Spilhaus has extensive knowledge both of the products of the Union and Continental requirements. His headquarters will be at Rotterdam. The necessity for this appointment has been keenly felt in the Union, and the selection meets with general approval.

SOUTH AFRICAN REPRESENTATIVE:
E. FRASER JONES.
BOX 7067.
JOHANNESBURG.
OFFICES:
Oceana Buildings,
Simmonds Street.
PHONES:
2596 and 2597.
TELEGRAMS:
"BRITFLOTT."

Transvaal Coal & Oil Shale Corporation, Limited.

(Incorporated in the Orange Free State and registered in the Transvaal in the Union of South Africa).

Capital, £275,000, divided into 150,000 10 per cent. Cumulative Preference Shares of £1 each and 125,000 Ordinary Shares of £1 each, as follows:—

Preference Shares for provision of Cash Capital	£65,000	
Preference Shares issued in payment of properties and Grenfel Colliery Co., Ltd., Shares representing over £40,000 cash on plant & development	85,000	£150,000
Ordinary Shares issued in payment of properties		125,000
		£275,000

Directorate.—W. E. BLELOCH (Chairman) (alternate, J. G. JARVIS), J. W. LIVSEY, R. BLELOCH (alternate, J. H. RAINER), W. CARLIS, H. FREELAND, C. A. GRIFFITHS.

London Committee.—R. BLELOCH (Chairman), C. F. KENYON, L. W. LIVSEY.

Secretary: J. S. Richardson. Head Office: 150-153, New Stock Exchange Buildings, Johannesburg. London Secretaries: South African and Colonial Agency, Ltd. London Offices: 3, London Wall Buildings, London, E.C. 2. Bankers: The Standard Bank of South Africa, Ltd., Johannesburg and London. Solicitors: Messrs. Saner & Nathan, Aegis Buildings, Johannesburg; Messrs. Romer & Skan, London.

Capital fully Guaranteed.—The whole of the cash capital of the Company has been guaranteed by the South African Nitrate and Potash Corporation, Ltd.

ASSETS, PROSPECTIVE PRODUCTION AND PROFITS.

Freehold and Mineral Rights over	8,960 acres.
Mineral Rights	2,432 "
Grenfel Colliery, Five-sixths Interest	5,692 "
Contracts of Option over	9,697 "
	23,645 acres.
Working Capital, Development and Plant	£105,000.
Rich Torbanite on Mooifontein—Estimated Tonnage	2,000,000 tons.
Estimated Profit—Value of Torbanite on Treatment by Ironside Process	£3 per ton.
Ordinary Oil Shale—Estimated Tonnage	20,000,000 tons.
Estimated Profit on Ordinary Oil Shale on Treatment by Ironside Process	£1 per ton.
Coal—Estimated Tonnage	168,000,000 tons.
Estimated Profit on Coal	2s. 6d. per ton.

In actual working tests made by the Ironside process, described below, the yield from the Mooifontein Torbanite averages 60 gallon of crude oil per ton. The crude oil is of fine quality. This result indicates a minimum profit of 60s. as above. From this Torbanite material alone, therefore, the Corporation should earn a profit estimated at £6,000,000.

Ironside Oil and By-products Distillation Process for Oil Shales and Bituminous Coals, invented by Mr. T. G. Ironside, M.A., B.Sc. (Edin.) constitutes a completely new method of extracting the oils and other valuable by-products from oil shales and bituminous coals. By this method the oils are extracted with extraordinary rapidity. Within half a minute after the shale or coal is placed in the distilling chamber the oil begins to run out through the condenser pipe. The capital cost for a distillation plant on this method will be only a small fraction—probably not more than one-eighth or one-tenth of the cost for a plant on the old retorting method. An estimate for a plant built on the old method to treat 50 tons per day comes to £28,000. The cost for a distillation plant to treat 50 tons a day by the Ironside method will probably not be more than £3,000 to £3,500. Moreover, the extraction of the oils is more complete and satisfactory. A larger yield of the higher grade oils is assured, owing to the even and comparatively low temperature which can be easily maintained throughout the operation.

The Ironside process bids fair to make it possible to produce crude oil from such shale and bituminous coals at costs which will allow competition on level terms with oil from wells. In that invention, therefore, it may be said that South Africa has "struck oil." The Transvaal Coal and Oil Corporation holds in the Grenfel area, and the great areas adjoining on Mooifontein and Bloemfontein, practically inexhaustible supplies, not only of highly bituminous coals and of ordinary oil shales carrying 20 to 30 gallons of oil per ton, but also an estimated tonnage of at least 2,000,000 tons of the rich Torbanite mineral described in the Prospectus, yielding up to 70 gallons of Crude Oil (specific gravity 0.880 at 20° Centigrade) per ton—unique almost in the world.

The Company is about now to erect the first Ironside Retort at Grenfel, and it is expected to be producing crude oil by about March next. It will therefore be the first producer of oil on a commercial scale in South Africa, and the pioneer in an industry which before long may rival the gold industry in magnitude and value.

PRIMARY REFINING PLANT.

It is estimated that a primary refining plant costing approximately £5,000 would treat the crude oil products from an Ironside Retort with a capacity of 50 tons per day. From Mooifontein Torbanite yielding 60 gallons per ton the output would be 3,000 gallons of crude oil per day. It is estimated that the primary refining plant would produce the following products from each 60 gallon of crude oil, i.e., from each ton of 60-gallon Torbanite treated:—

(1) Benzol or Petrol	12 gallons at 2s. 3d.	£1 7 0
(2) Light Burning Oil for Paraffin Lamps	12 gallons at 1s. 9d.	1 1 0
(3) Crude Creosote for Sheep Dips, etc.	18 gallons at 2s. 0d.	1 16 0
(4) Tar	9 gallons at 1s. 6d.	0 13 6
(5) Pitch	9 gallons at 0s. 6d.	0 4 6
		£5 2 0

Equal to a value of £5 2s. per ton of Torbanite, calculated at prices for these primary products far below these ruling at present. For all these primary products there is a constant and large demand in South Africa. The total mining and producing costs by means of the Ironside process is not likely to exceed £1 per ton of Torbanite leaving a margin of £4 2s. per ton profit instead of the £3 estimated.

"The Industry at the Cross Roads."

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

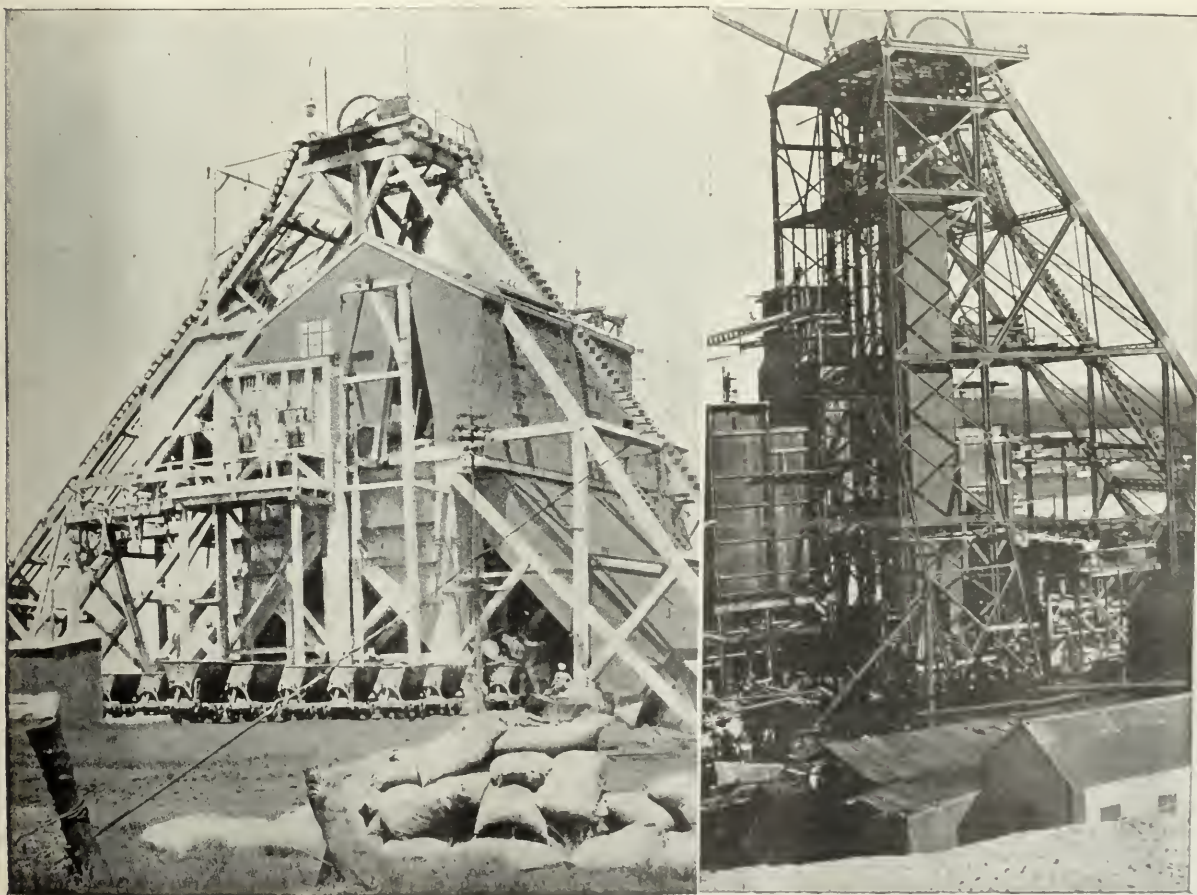
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, DECEMBER 3, 1921

No. 1575

Scenes at the Crown Mines where the Calamitous Strike started.



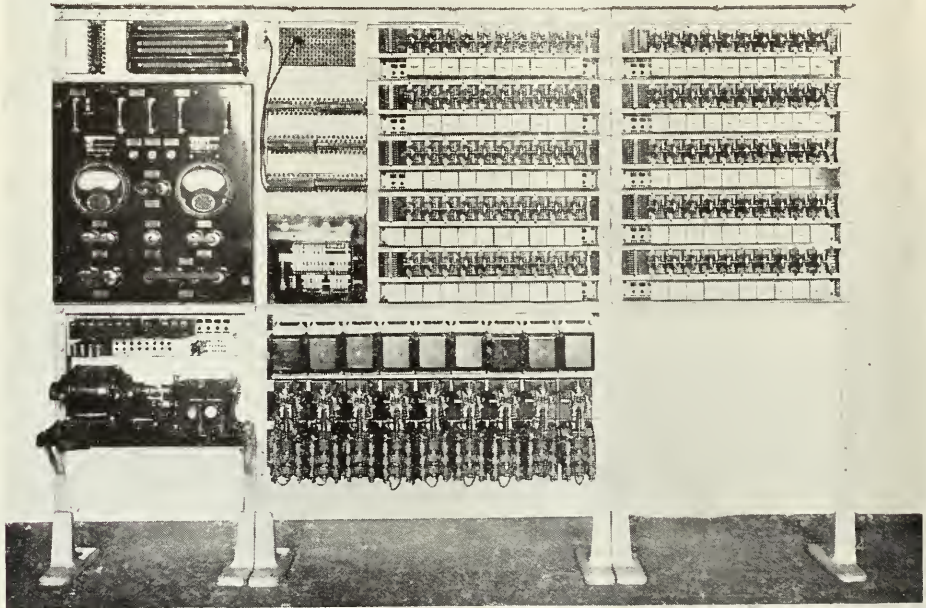
At the moment of writing the prospect of a settlement of the Crown Mines industrial dispute appears to be encouraging. Left-hand photo depicts the old Crown Reef headgear; right-hand photo No. 5 Shaft, where the trouble started.

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AT THE CROSS ROADS OF INDUSTRY.

HOW THE RAND HAS REACHED THE CRUCIAL POINT OF ITS EXISTENCE—WHICH PATH WILL IT TAKE?—SIGNIFICANCE OF THE CROWN MINES STRIKE—SOME TELLING FACTS AND FIGURES.

The gold mining industry of the Witwatersrand has now reached the cross-roads of its existence. Either it must regain the high road of the prosperity which it formerly enjoyed or else it will languish and decline until a row of tumble-down headgears and smokeless stacks denote the existence of a once flourishing mining field.

One Road or the Other.

It must either take one path or the other; it cannot continue indefinitely to halt at the parting of the ways and to survey timorously and with indecision the two roads which are open to it. It may well be that when we look back upon the past from the vantage point of the future, the historians will see in this Crown Mines strike and its larger developments the turning point in the career of the Rand, and will note the ebb in the tide of concessions, abnormally high working costs, and little labouring value given in return for such expenditure, as the crucial point in the life of the gold mines. We sincerely trust that this will indeed prove the turning point. If not, then the present will denote an unhesitating tread along the road to ruin, with its consequent dire effects for Johannesburg, the Reef, and the whole of the country.

The Golden Harvest which Feeds us All.

These of us who do not actually and directly derive our livelihood from the mines are very apt to think of the gold

which to establish an industry if the purchasing power of the gold mines was seriously impaired.

Johannesburg without its Mines.

We are thus forced back to the irrefutable conclusion that it is the gold industry, and the gold industry alone, which keeps Johannesburg and the Reef going. Each smiling villa in Parktown and on the Houghton Estate, each block of flats, each shop and each warehouse in town, each row of miners' cottages and each store along the Reef, each motor car that dashes up Twist Street, and each trolley that toils along the Reef, are in the first degree dependent on the business of making conglomerates, yielding only a few dwts. per ton, pay. And if we cannot make them pay, Johannesburg will contract as Cœlgardie has contracted, and will be brought face to face with abject poverty just as other mining towns—Kimberley in the Cape Colony and Redruth in Cornwall—are facing poverty to-day. Moreover, the baneful influences of a curtailment of mining operations on the Rand would react over the whole country, bringing in their train diminished revenue, an increasing burden of taxation, and economic disaster to all other industries.

The Low-grade Mines and their Disbursements.

We have written these things many times before. Generally speaking, such counsel falls upon deaf ears. The gold mines are supposed to be vastly profitable concerns



The New Modder, the Rand's Show Mine. Unfortunately we possess few New Modders, and the accompanying article makes it clear that our future is bound up in the low-grade ventures.

industry as something apart from our privy purses and individual lives. There are those who profess to believe in a Johannesburg existing without the golden harvest of the mines. It is hard to visualise this glorified mining camp of ours, which we call the Golden City, existing as a prosperous community without the weekly pay slip and the monthly cheque of the mines. The Rand of which Johannesburg is the centre is paying out money at the rate of over two and a half millions per month in respect of wages and stores. The mines in the immediate vicinity of this town are spending over three-quarters of a million a month; of this the Crown Mines alone disburses a quarter of a million.

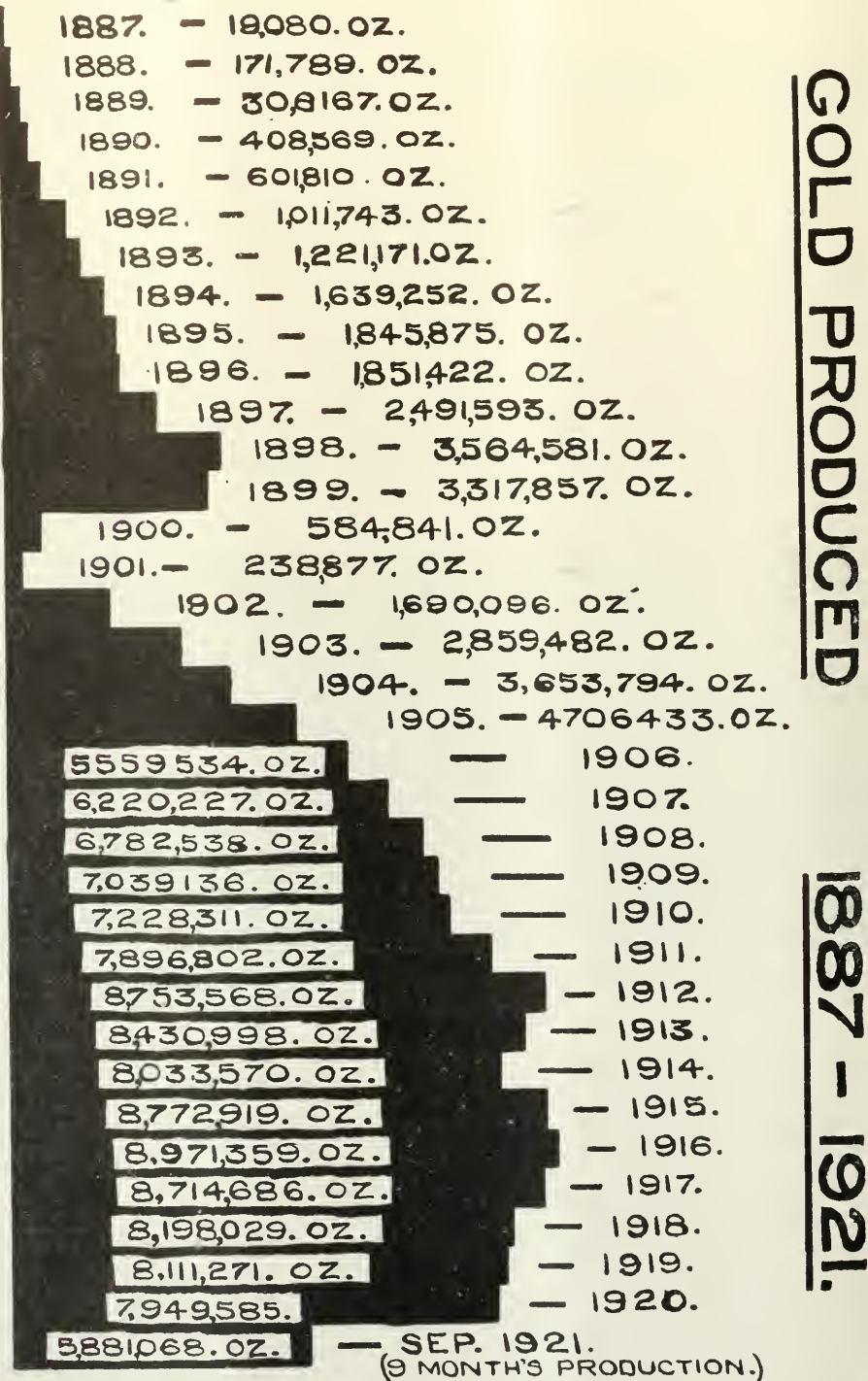
The Fable of Industries.

If this spending power was taken away from the community, even if it was largely curtailed, Johannesburg could not exist except on a very much diminished basis of population and prosperity. Our local industries are all dependent on the mines, and if the Rand fell from its high estate as the leading gold field of the world, who would dream of establishing an industry here? We are without raw materials, we have no cheap transport such as would be provided by a river system, we are far from a seaboard, and we employ the most highly-paid and inefficient white "labourers" in the world. A merchant prince seeking new avenues for the employment of his wealth would, we should imagine, regard Johannesburg as the last place on earth in

enriching a select coterie at the expense of the community. This is not true. It is true that there are half a dozen mines on the Reef which take rank amongst the richest and most profitable ventures on earth. But these rich mines, although they yield the bulk of the dividends, expend only a small proportion of the working costs upon which the people of the Rand, and in a material degree the inhabitants of South Africa, live.

A few facts and figures in this connection are worthy of emphasis. In the first half of the current year the total dividends paid by all the mines of the Witwatersrand amounted to £3,201,277. Of this amount £2,168,068 were distributed by the following half-dozen companies:—City Deep, Government Areas, Modder B, Modder Deep, New Modder, Van Ryn Deep. The remaining 33 companies, with an aggregate capital in issue of thirty-five and three-quarter millions, paid only £1,033,209 in dividends for the first six months of the present year, or an average yield of 5.8 per cent. per annum on the issued capital. One can obtain a higher rate than this from Government Bonds. On the other hand, the high-grade mines enumerated above only distribute 23 per cent. of the Rand's monthly outlay on wages and stores. In September the Rand's working costs amounted to £2,510,062. Of this, the half-dozen rich mines paid out £571,264, and the poor mines £1,935,798. The company circulating the largest amount of money amongst

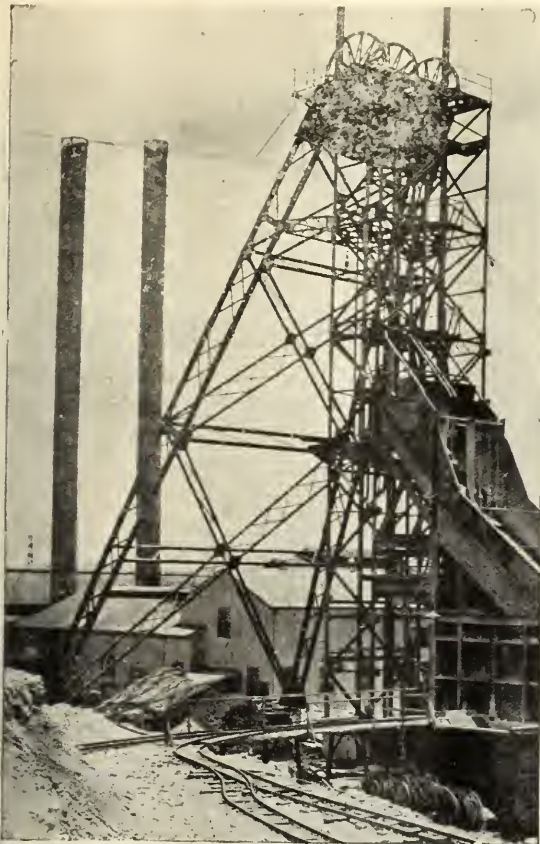
How the Rand Gold Mining Industry has expanded and how it is contracting.



Graphs showing Gold Production of the Rand, 1887 to September, 1921.

Note.—The values of 1921 are estimated assuming that the output up to September, 1920, represents three-quarters of the total output for 1921.

the community in September was the Crown Mines, now in the throes of an absurd strike. This mine, until the other day, was distributing money at the rate of over three millions per annum. It is one of our town mines immediately adjoining Johannesburg on the west, and we of the Golden City can



Another Rich Mine on the East Rand.

ill afford to dispense with such a monthly cheque or to see our livelihood dissipated by a few agitators. Next to the Crown Mines on the list of money spenders come the E.R.P.M. and Randfontein, which between them expend more than four millions sterling and distribute nothing in dividends. It is clearly our business to reduce working costs to such a level that the mining of low-grade ores on these fields can again be made remunerative and attractive. Only by this means can there be any real prospect of salvation for the mines. There can be no permanence of outlook for an industry which is dependent on the incidence of such an ephemeral and abnormal factor as the gold premium.

The Rand's Great Need.

The first essentials for the attainment of such an ideal are lower working costs, larger output, and freedom from irksome and unnecessary Trades Union restrictions. The mines should—nay, must—be allowed to work out their own destinies without interference from professional agitators, who preach dissent in order to justify their own existences. If consulting engineers, managers, and other technical men were freed from the burdens imposed on them by a surfeit of trades union demands, there would be more time and disposition to attend to technique and to better existing practice.

Big Technical Improvements Possible.

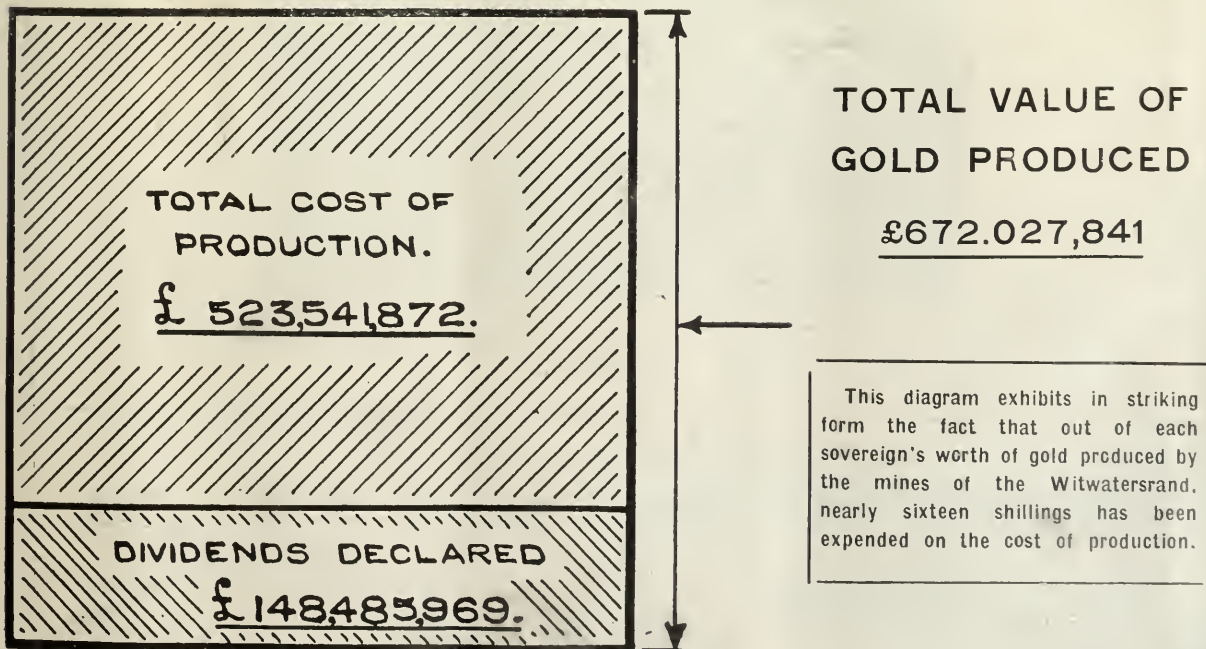
For it is fairly certain that the last words have not yet by any means been said either in regard to above or below ground practices. There is still plenty of scope for improvement, and if the industry were not constantly harrassed by labour troubles, these technical men would be more encouraged to experiment in new directions and to apply the results of their researches to the mines.

A Waning Industry and What It Has Done.

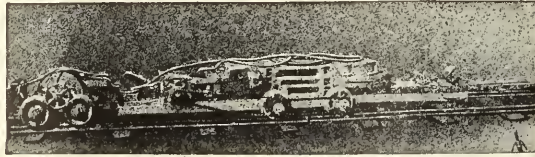
As it is to-day, the great gold mining industry of the Rand is waning. Since 1887 these mines have produced £672,027,841 of gold, and of this colossal total £523,541,872 has been spent on stores, wages and taxation. Continuation of the industry on a large scale depends in the main on the ability of the mines to work low-grade ores at a profit without the fictitious relief of the gold premium.

Fateful Decisions.

The industry stands indeed at the cross-roads. The decision as to which path it is going to take in the future depends in large degree upon the workers, the policy which will in future be pursued by the Chamber of Mines, and by the voice and decision of the public of the Union at large.

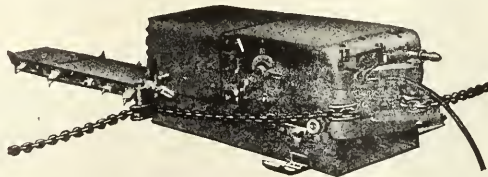


**THIS IS A SULLIVAN C.E.9 LOW VEIN COAL CUTTER AND
POWER CAR WITH TRAILER-TYPE REEL.**



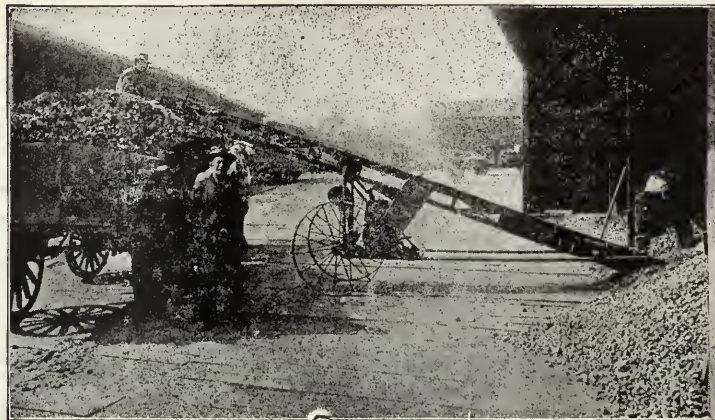
— AND —

THIS IS THE C.E.7 IRONCLAD SHORTWALL COAL CUTTER



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THE UNION'S COAL TRADE.

REDUCTION OF SIXPENCE PER TON IN RAILWAY RATES—HOW THE POSITION OF OUR COLLIERIES IS CONDITIONED BY TRADE GENERALLY.

It is announced that a reduction of sixpence per 2,000 lbs. will be made in the railway rates for export cargo coal and for coal utilised in bunkering ships carrying full cargoes of export coal shipped by vessels sailing on or after December 1, 1921. This measure of relief is sadly needed by the collieries, for official figures make it abundantly clear that in the past three months there has been a very material falling off in the coal trade of the country. In August the collieries of the Union reached their high-water mark of sales. They disposed of 1,035,494 tons for a value at pit's mouth of £448,048. The quantity sold in that month was over two thousand tons more than the previous best sales output in December of last year, when the value was £441,979. The highest selling value recorded was in respect of January of this year, when 979,990 tons were sold for £465,764.

Question of General Trade.

Whilst this reduction in rates will be helpful, it must be fairly clear that there can be no real revival in the coal export and bunkering trades of the Union until there is a general commercial revival. South African coal is produced

Province.	No. of Collieries Producing.	Total Coal Sold. Tons.	Tons Value realised at Pits		Value per Ton at Pits	
			Mouth.	£	s.	d.
Transvaal	36	555,745	175,860	6	3.95	
Cape	5	412	323	15	8.16	
Orange Free State	3	69,936	20,840	5	11.52	
Natal	30	276,493	187,254	13	6.54	

Union of South Africa 74 902,586 384,277 —

Progressive Figures.

Period.	TRANSVAAL.		Value per Ton. s. d.
	Tons sold.	Value at Pit's mouth. £	
Year, 1917	6,641,229	1,586,062	4 9.32
Year, 1918	6,438,961	1,632,361	5 0.84
Year, 1919	6,622,313	1,694,131	5 1.40
Year, 1920	7,180,124	2,187,681	6 1.12
1921—January	604,286	211,781	7 0.11
February	535,003	183,167	6 10.17



Exporting Coal. The Bluff, Durban.

very cheaply at pit head, and it is of good quality. But it is not, generally speaking, of first class grade, and by the time it has travelled the long haul to the coast, its cost at the port hardly makes it a cheap coal by comparison with other coals at to-day's competitive prices.

In other words, South African coal does not provide such excellent value that ships will go far out of their way to secure it, and it is therefore clear that a lively coal trade infers a favourable condition of trade generally with ships calling at our ports to land imports or take away exports.

Recent Tonnages and Sales Values.

The outstanding statistics of our coal trade during recent months are exhibited in the accompanying statistics:—

OCTOBER, 1921.

Province.	No. of Collieries Producing.	Total Coal Sold. Tons.	Total Value realised at Pits		Value per Ton at Pits	
			Mouth. £	s.	d.	
Springs-Brakpan Area (Transvaal)	4	60,666	16,773	5	6.36	
Middelburg Area (T'vaal)	18	405,155	131,278	6	5.76	
Other Areas (Transvaal)	14	89,924	27,809	6	2.22	

March	588,623	200,893	6 9.91
April	544,247	184,535	6 9.38
May	588,031	191,747	6 6.26
June	554,453	181,615	6 6.61
July	575,940	185,764	6 5.41
August	629,743	204,402	6 5.90
September	609,815	193,455	6 4.14
October	553,745	175,860	6 3.95

KOMATI POORT COAL FIELDS.

The owners of a large area adjoining the Government Reserve, railway passing through same, are prepared to negotiate with a view to further development and sale; an option given. 4 feet seam discovered at about 70 feet.

For full particulars apply to

DILLEY & SECCULL,

100, Fox Street, Johannesburg.

NATAL.

Period.	Tons sold.	Value at Pit's mouth. £	Value per Ton. s. d.
Year, 1917	2,890,296	1,466,304	10 1.76
Year, 1918	2,607,133	1,358,934	10 5.10
Year, 1919	2,801,004	1,487,031	10 7.41
Year, 1920	3,321,606	2,040,070	12 3.40
1921—January	294,303	228,115	15 6.02
February	283,378	319,542	15 5.94
March	297,346	217,028	14 7.17
April	258,678	177,215	13 8.42
May	319,599	222,363	13 10.98
June	327,628	226,711	13 10.07
July	306,813	210,662	13 8.79
August	328,942	220,155	13 4.63
September	305,353	204,098	13 4.42
October	276,493	187,254	13 6.54

UNION OF SOUTH AFRICA.

Period.	Tons sold.	Value at Pit's mouth. £
Year, 1917	10,382,920	3,275,608
Year, 1918	9,877,325	3,224,597
Year, 1919	10,266,135	3,416,244
Year, 1920	11,473,464	4,519,665
1921—January	979,990	465,764
February	894,230	426,961
March	962,147	439,604
April	882,278	386,247
May	988,190	438,678
June	966,739	434,087
July	962,333	420,830
August	1,035,494	448,048
September	990,315	420,469
October	902,586	384,277

REZENDE MINES, LTD.

Report for the quarter ended 30th September, 1921:—The circular shaft was sunk 16 ft. to a total depth of 888 ft.; the development footage for the quarter amounted to 1,124 ft.; tonnage mined, 18,962; waste sorted, 8.5 per cent.; tonnage milled, 17,350; total yield (fine ounces), 7,837.89; total yield per ton (dwts.), 9.03. Working revenue (including premium on gold, £9,500), £43,362 0s. 9d.; 49/11.818 per ton milled. Working costs, £24,435 19s. 4d.; 28/2.018 per ton milled. Working profit, £18,926 1s. 5d.; 21/9.800 per ton milled. Sundry revenue, £559 2s. Total profit, £19,485 3s. 5d. The capital expenditure during the quarter amounted to £3,831.

General Remarks.—Native labour for the quarter was all voluntary, and since the middle of August, when we experienced an epidemic of influenza, has been scarce. Development results have been satisfactory.



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"FLOWER" BRAND.



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Agents for South Africa: **FRASER & CHALMERS, Ltd.,** Johannesburg, Bulawayo and Salisbury

The subjoined statement for the month of September, 1921, shows the tonnage and percentage of tonnage of commercial sea-borne traffic from the different ports to stations within the competitive zone, *i.e.*, Vereenigin-Pretoria Springs-Klerksdorp inclusive, and including the South Rand and Vereeniging-Canada Junction lines:—

Group 1—

Tonnage.

	Port Capetown.	East Elizabeth.	Port London.	Port Natal.	Lourenco Marques.
Group 1:					
Rate 1, 2, 3	468	1,543	607	4,925	4,918
Group 2:					
Rate 4, 5, 6, 7, 8	207	172	638	1,736	6,543
Totals	675	1,715	1,245	6,661	11,461

Percentage.

	Port Capetown.	East Elizabeth.	Port London.	Port Natal.	Lourenco Marques.
Group 1:					
Rate 1, 2, 3	3.75	13.38	4.87	39.53	39.47
Group 2:					
Rate 4, 5, 6, 7, 8	2.23	1.85	6.86	18.67	70.39
Totals	3.10	7.88	5.72	30.62	52.68

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YEARS AND OVER**

THE JOHANNESBURG BOARD OF EXECUTORS AND TRUST COMPANY, LIMITED, has had under its care many and varied forms of Trusts—as Executor, Trustee, Administrator, etc.

Its wide experience, the well-known ability of the officials who are responsible for its management, and high regard in which its patrons hold it, are attributes which commend this Company to you.

WILLS appointing the Company Executor can be held in safe custody free of charge.

In addition to handling of Estates, the Company acts as Agent for Absentees, and undertakes:—

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- Purchase and Sale of Landed Property,
- Collection of Rentals,
- Investing of Capital,

and generally every Trust and Agency, including Insurance in all branches.

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COMPANY'S OFFICES:
97a, COMMISSIONER STREET,
JOHANNESBURG.

P.O. Box 271. Telephone 87.
Tel. Ad.: "EXECUTORS."

The Rand Refinery.

BRIEF DESCRIPTION OF THE BUILDINGS AND OPERATIONS OF THE REFINERY.

The Rand Refinery, which is now nearing completion, may be described as the most important gold refinery in the world. It is situated near India Junction, Germiston. The reasons for the selection of this site were its proximity to Germiston on account of it being an important railway junction, and to an electric power supply from the Victoria Falls and Transvaal Power Co., Limited, good environment, facility for drainage, comparative freedom from dust and vibration, ample room for quarters, facilities for railway siding, and easy delivery by road. A private railway siding was erected near the South Rose Halt on the Rand Mineral Line, and work was begun on the site towards the end of June, 1920, when the erection of the first buildings, viz., the Stores and Coke Bins, was taken in hand. The buildings comprised under the general term "Refinery" were started in August, 1920, and consist of:—Refinery Office, Assay Office, Rough Gold Melting House, Silver Reduction and Gold Refining Branch, Power House and Workshops, Chlorine Generator House,

Balance Room.

The ingots from the Rough Gold Melting House are accurately weighed (weight after melting) and samples taken for the Assay Office. In the case of deposits the assay of which is satisfactory, the bullion is sent to the Gold Refinery at convenient times. When the assay is unsatisfactory, *i.e.*, when the bullion contains base metals which render the assay results unreliable, the bullion is returned to the Rough Gold Melting House for a preliminary refining (toughening) with air, chlorine, nitre, etc., to remove base metals which produce unevenness in samples. After this treatment the bullion is again weighed in the balance room and another set of samples is taken for the Assay Office.

Gold Refining Branch.

After the weight and assay have been determined, the bullion is forwarded to the Gold Refinery. Here it is made up into lots of about 700 ounces each. Each lot is melted in a 4-pint clay crucible, which stands in a plumbago guard crucible, using borax as a flux. When the bullion is melted a clay pipe stem is introduced into the molten metal and



The Rand Refinery at Germiston.

Store Rooms, Coke Bins, Coal Bunkers, Switch and Transformer House, Garage and Police Guard Rooms, all of which are enclosed by a boundary wall covering an extent over 5 acres of ground.

Refinery Office.

The bullion received is weighed in the presence of the depositor, the numbers and marks on the ingots are noted, a refinery number is given to the deposit, a receipt showing weight and refinery number is handed to the depositor, and a ticket showing weight and refinery number is placed with the gold, which is sent to the Rough Gold Melting House.

Rough Gold Melting House.

The bullion is check weighed, marks and description of ingots in each lot noted. Each lot of bullion is melted in a plumbago crucible with suitable fluxes; after melting bullion is cast into "slipper" ingots, deposit number stamped on each ingot, ingots freed from slag, etc. The crucible used in melting scraped, flux and scrapings crushed and panned off. The scrap gold so obtained is called the "end," and its weight is included in the "weight after melting" of the deposit.

chlorine and air passed through the molten mass. The chlorine converts the silver and base metals into chlorides, part of the base metal chlorides volatilise, the remainder with the silver chloride rise to the surface of the gold and are bailed off by means of a small clay crucible and poured into a mould placed on the furnace top. The passage of the chlorine is continued until a colour test of the issuing fumes with a cold pipe stem shows that no more chlorides are being formed. A light brown or yellow colour is obtained. The bulk of the chlorides is then removed by bailing, and the balance is removed by absorption with bone ash. The fine gold is stirred, remelted in large tilting furnaces, sampled and cast into bars of about 400 ounces each for export. The fine gold ingots are forwarded to the balance room for final weighing. When the assays are made the fine gold ingots are forwarded to the Refinery Office for export.

The chlorides of silver and base metals removed by bailing contain small quantities of gold; to remove the gold the chloride is made up into lots of 300 ounces each, melted in plumbago crucibles with bi-carbonate of soda and borax. This operation reduces a portion of the silver chloride, which produces silver, and this falling to the bottom of the crucible carries the gold with it. The crucible with contents is then removed from the furnace and allowed to cool till the metal

at the bottom of the crucible has solidified. The chlorides, being still liquid, are poured off, cast into chloride cakes about 1 in. thick, and are gold free. The metallic button so obtained is again refined with chlorine.

The chlorine gas used is generated from manganese dioxide, common salt and sulphuric acid in an Edward's generator.

All pots, ashes, pipe stems, etc., used in the Refinery go to the grinding room. They are ground in ball mills to pass through a 60 or 80 mesh. Large metallics remain in the ball mill and are removed. All metallics recovered are returned to the Refinery for treatment with chlorine. The tailings are treated in lead and cupellation furnaces for further extraction of precious metals, and the residues from this operation are exported from the Refinery.

Silver Refining Branch.

The chloride cakes produced in the Refinery are crushed in a rock crusher to about 1 in. cubes. Five to six cwts. of this crushed chloride are placed in a barrel, capacity about 60 gallons, and treated with a hot saturated salt solution. This treatment removes the base metal chlorides by solution in the brine. When these are removed, the solid silver chloride is taken out of the barrels, placed in a reducing vat between iron plates, covered with a dilute solution of sulphuric acid and heated with steam. This operation transfers the chlorine from the silver to the iron and produces sponge metallic silver. This sponge silver is returned to the barrels, washed with hot dilute sulphuric acid and water to remove soluble iron chloride. The sponge silver is dried, melted and cast into ingots of about 1,000 ounces, or it may be necessary to melt and stir potassium nitrate into it to remove impurities, before casting into 1,000 ounce ingots for the market. Gold free silver is thus obtained. All solutions produced in the wet reduction of the silver chloride are passed over scrap iron to precipitate the silver and copper contents. This residue is dried, sampled and sent to a smelter.

Assay Office.

Both dip and clip samples of rough gold bullion are assayed to ascertain the gold and silver content of the deposits. Dip samples for fine gold and silver bullion are used. All assays are made in duplicate on different samples by different assayers using different furnaces, apparatus, etc., and making weighings by different systems of weights, etc.

Residential Quarters.

These consist of 23 houses situated near the Refinery.

ANSWERS TO CORRESPONDENTS.

W. Johns.—We suggest that you get in touch with the colliery in question.

ASBESTOS

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Mining Men and Matters.

Mr. B. I. Campbell, of Nigeria, is on a visit to the Rand.

The thirteenth annual meeting of the S.A. National Union will be held at the Carlton Hotel, on Friday next, the 9th instant, at 3.30 p.m.

Mr. J. Kennedy Tullis, Director of Messrs. John Tullis & Son, Ltd., belting specialists, of Glasgow, has arrived on a visit to the Rand.

The following certificates have been issued by the Mines Department for the period ended November 26, 1921:—
Mine Overseers.—Metalliferous Mines: G. Burrows, C. A. Cowen, J. Swingewood. Collieries: A. Shirlaw. Non-fiery Collieries: T. L. Campbell. Mechanical Engineers.—Mines: W. Dunn, J. W. Ellwood, J. T. McCauley, H. S. Northey, W. J. Petersen (Honours), J. W. Ramsden, P. J. Rosevear. Works only: A. Banks, F. C. Bleackley, J. F. Brown, J. G. Davison, W. G. Edward, G. Hall, J. T. McCauley, G. E. Phillips, F. J. Redman. Electrical Engineers.—Mines: A. H. T. Ablett, B. F. Hewitt. Works only: C. W. Curry, E. O. Jones, E. F. Rendell.

The E.R.P.M. Enquiry.

The Minister of Mines has ordered an enquiry into "the reasons for the reduction in the number of white persons employed upon the E.R.P. Mines." The chairman is Major U. P. Swinburne (C.I. Mines), and the members are Messrs. E. E. J. Meyer (Manager, E.R.P.M.) and W. Price (representative South African Industrial Federation).

West End Diamonds, Limited

(Registered in the Orange Free State.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the SECOND ORDINARY GENERAL MEETING OF SHAREHOLDERS in the above-named Company will be held in the Board Room, The Jeppe Arcade, Commissioner Street, Johannesburg, on THURSDAY, the 15th DAY OF DECEMBER, 1921, at 10.45 a.m., for the transaction of the following business, viz.:

1. To receive and consider the Directors' and Auditors' Reports and Balance Sheet and Statement of Accounts for the year ended 30th June, 1921.
2. To elect two Directors in the places of Messrs. E. M. Hind and H. de V. Steyler, who retire in accordance with the Company's Articles of Association, but are eligible and offer themselves for re-election.
3. To appoint Auditors for the ensuing year and to fix the remuneration of the retiring Auditors, Messrs. C. L. Andersson & Co.
4. To transact all such other business as may under the Articles of Association be transacted at an Ordinary General Meeting.

The Share Register of the Company will be closed from the 9th day of December to the 15th day of December, 1921, both days inclusive.

By Order of the Board of Directors,

A. WOODROW.

(For the South African Townships, Mining and Finance Corporation, Limited, Secretaries).

Head Office: The Jeppe Arcade,
Johannesburg, 11th November, 1921.

84409

Johannesburg Board of Executors.

A REMARKABLY SOUND POSITION—GROWTH OF THE COMPANY'S BUSINESS—PUBLIC CONFIDENCE EXHIBITED IN TELLING FIGURES.

The 32nd annual ordinary general meeting of shareholders of the Johannesburg Board of Executors and Trust Company, Limited, was held in the board room of the company, 97a, Commissioner Street, Johannesburg, last week.

Mr. C. H. Barclay, who presided, referred with regret to the unavoidable absence of Mr. Llewellyn Edwards, the vice-chairman, who invariably occupied the chair.

There were also present, either personally or by proxy, Messrs. S. J. Wilks, D. F. Gilfillan, R. Niven, C. A. Wentzel, A. R. Lowick, A. P. Lloyd, H. Curtis, G. A. Jones, W. H. Thorne, T. Beeforth, J. T. Goldsbury (manager), A. Howat (assistant manager), and A. H. Robertson (secretary), 8,438 shares being represented out of a total issued capital of 25,000.

The auditors' report having been read, the chairman said: Before moving the adoption of the directors' report, balance-sheet and profit and loss account for the year ended September 30, 1921, which are now before you, I will, with your permission, make the usual reference to the salient features disclosed in the accounts.

Steady Growth.

One most gratifying feature is the confidence of the public in our company, which is demonstrated by the steady growth of funds placed in our hands for investment on behalf of clients. The figures for the last seven years are as follows:—

Year	1915	...	...	...	...	£215,250
"	1916	...	...	...	...	229,000
"	1917	...	...	...	...	240,000
"	1918	...	...	...	...	245,000
"	1919	...	...	...	...	288,500
"	1920	...	...	...	...	369,000
"	1921	...	...	...	...	430,000

This steady growth of public confidence, pleasing as it is, is not undeserved. There are not many public companies who can say as we can, that any client of ours can obtain his securities and cash at any time he thinks fit to ask for them. From our balance-sheet it will be seen that the amount due by us to clients is £31,275, against which we have cash at our bankers £35,072, so that in the remote contingency of all our clients desiring to be paid at once, we could meet them without any difficulty, a position we always intend to maintain.

The branch of our business dealing with the administration of estates is also steadily increasing, the advantages of appointing our institution as executors, trustees or administrators, being more and more appreciated. This is a point I should like to emphasise. Of necessity no individual, with his own affairs to attend to, can possibly give the same attention to executorial and trustee duties such as a well organised company can give, and there is, in addition, the all-important factor of security.

Stability in Bad Times.

So much for our clients and the public generally. We will now glance at the profit and loss accounts, which interest you as shareholders. As the directors' report informs you, the net profit for the year under review is £6,568—this is £2,136 less than the corresponding figures for the previous year, but as was pointed out to you on the last occasion on which we met, those figures included a special item of £1,708 profit on the sale of Victoria Mansions. Eliminating that item, you will see that our earnings on the ordinary business of the company have been maintained almost at high water mark, which, considering the difficult times through which this community has been passing, is an achievement with which you will no doubt be well satisfied.

The capital of the company is unchanged, viz., £25,000 issued and £5,000 in reserve. Against the £25,000 you have landed property £6,845—this is book value only; the realisable value is very considerably in excess of that. Further, you have the company's investments under bonds and other headings, totalling over £40,000, and due provision has been made for any possible loss that may be sustained in this connection.

Remarkable Position.

It is evident that your company is in an extraordinarily strong and stable position. For all practical purposes it has no liabilities at all, its realisable assets are more than double its issued capital, and you possess the goodwill of an old-established business which is constantly and steadily increasing.

The suggested allocation of the profits is detailed in the directors' report. We propose to pay the usual dividend of 10 per cent., plus a bonus of 1s. 6d. per share, which will make a distribution for the year of 17½ per cent. We shall add £1,000 to the reserve fund, and carry forward to next year's accounts the remaining £2,207, which, added to our ordinary and special reserves, will make our total reserves £20,754.

In the present condition of world turmoil, it is of no avail to prognosticate. We are content to know that we have the confidence of the public, and our position and methods are such that we need have no misgivings as to the future. Our special thanks are due to the manager (Mr. Goldsbury), the assistant manager (Mr. Howat), the secretary (Mr. Robertson), and all the staff, who have worked in your interests loyally and effectively. I now beg to propose the adoption of the directors' report, balance-sheet, and profit and loss accounts.

Business Done.

The motion was seconded by Mr. D. F. Gilfillan, and unanimously adopted.

The directors' proposal to pay a dividend to the shareholders at the rate of 10 per cent., plus 1s. 6d. per share bonus, equal in all to 17½ per cent., was adopted.

The chairman stated that Mr. S. J. Wilks was the retiring director in terms of the articles of association, but was eligible and offered himself for re-election. There was no other nomination, and Mr. Wilks was declared duly elected.

It was proposed by Mr. C. H. Barclay, and seconded by Mr. R. Niven, that the retiring auditors, Mr. H. F. Watson and Messrs. Alex. Aiken and Carter, be reappointed for the ensuing year. This was carried, and the remuneration for the past audit was fixed at £150 each.

Mr. A. R. Lowick recommended that the matter of awarding a bonus to the staff receive the consideration of the directors.

Mr. Gilfillan said that he would like to urge upon all shareholders the desirability of bringing to the notice of their friends the advantages of appointing such an institution as this executors and trustees in the administration of estates. The financial position of the company was unique, clients had undoubted security, and a well-trained staff ensured economy and efficiency. Mr. Gilfillan further stated that as far as he was concerned, both in his professional and private capacities, he invariably recommended his clients and friends to nominate the company executors under their wills.

With a vote of thanks to the chairman, the proceedings terminated.

Wages on the Mines.

COMING READJUSTMENTS. Reductions on Gold and Coal Properties.

In terms of the arrangements agreed on between the Chamber of Mines and the South African Industrial Federation four months ago, rates of pay on the mines will be amended as from the beginning of the New Year.

The wages of mechanics, improvers and apprentices on the mines will be reduced as from January 1, 1922, in accordance with the automatic scale for the adjustment of wages agreed upon between the Chamber of Mines and the South African Industrial Federation in August. Prior to that it was agreed that the wages of mechanics should not be reduced before the end of the present year. Formal notice has now been given to the unions concerned, through the Federation, of the coming reduction.

In September last the Chamber of Mines agreed that the wages of winding engine drivers should be stabilised to the same extent as the wages of mechanics. Formal notice has now been given through the Federation to the South African Amalgamated Engine Drivers and Firemen's Association that the wages of winding engine drivers will be reduced as from January 1, 1922, in accordance with the automatic scale above referred to.

The Automatic Scale.

The recommendations agreed to at the conference early in August between the Chamber and the Federation regarding the adjustment of wages on the mines were as follows:—

Future adjustments of wages to be based on the rise or fall in the cost of living, on a scale approximately corresponding to that rise or fall, i.e., in lieu of the £2 8s. increase there shall be substituted in the case of workmen earning, without those increases, 15s. per shift or over, an increase of 3s. 6d. per shift in respect of the first 21 per cent. increase in the cost of living, and an additional increase of 6d. per shift in respect of each 4 per cent. increase, or portion thereof, above 21 per cent., until (at 57 per cent.) an increase of 8s. per shift is reached. This scale to operate only between increases of 3s. 6d. and 8s. Variations beyond these limits not to be subject to fluctuation with the cost of living, but to be considered if and when the necessity arises.

In applying this sliding scale, wages to be adjusted quarterly, and to be based on the average increased cost of living figures of the last but one preceding quarter. Thus, as the average increased cost of living during the quarter January-March last was 43.6 per cent., the addition to wages during the quarter July-September would have been 6s. 6d. per shift, i.e., a reduction of 1s. 6d. per shift on the previous rates.

In order to adjust to this scale the wages of those who (without the increases) are earning less than 15s. a shift they will receive an addition bearing the same proportion to the addition received by the others as their wage, without any addition, bore to 15s.

Overtime, leave pay, etc., to be as at present, but based upon whatever rate is in force at the time.

The above scales may require some small modifications to adapt them to the case of apprentices.

The percentages above referred to are those shown in the periodical publications of the Director of Census with regard to the cost of food, fuel, light and rent.

Adjustments to take effect quarterly, on the first day of October, January, April, July and so on.

The scale not to apply to mechanics until after December 31, 1921.

The conference definitely recognised that circumstances over which neither the unions nor the Chamber can exercise any control may at any time necessitate a reconsideration of the whole position.

The decrease which the wages of mechanics and a certain section of the members of the Engine Drivers and Firemen's Association will undergo from the beginning of next year will, it is estimated, probably be 4s. 6d.

Colliery Wages.

The reductions of wages on the collieries will come into force on January 1, 1922. The effect of the reduction will be that a man who has been receiving 30s. will receive 25s., and a man whose pay has been 24s. 6d. will receive 21s. 7d., the reductions being 5s. and 2s. 11d. respectively.

The rent charged for married quarters on the coal mines is £3 2s. 9d. per month, and for single rooms 10s. 8d. per month. These rentals include fuel, sanitary service, water and, where available, light.

Rents on the collieries have not been raised since the end of 1914.



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Government Mining Leases Inspector's Report.

OFFICIAL REVIEW OF POSITION AT FAR EAST RAND MINES.

From the reports of the Government Inspector of Mining Leases for the quarter ended September 30 we take the following:—

Springs Mines, Ltd.

The ore reserves as at the 30th June, 1921, were estimated during the quarter, the pay limit adopted being 5 dwts. over a stoping width of 55 inches. The figures show the satisfactory increase of 276,803 tons in the payable reserves during the six months' period, the corresponding total average width being approximately one inch less, while the value remains the same. The present reserves include one small block of ore with an average width of 51 inches. The increase in the payable reserves by development is equivalent to a replacement of 2.28 tons for every ton mined from the reserves during the six months' period. The further opening up of the payable zone towards the eastern end of the east haulage has contributed about one-third of the total increase in the reserves, the balance being more or less distributed over the remaining portion of the mine. Certain connections of development ends in the above-mentioned zone made during the six months' period have been the means of transferring a considerable tonnage from the formerly unavailable to the present available reserves. The average working costs for the six months January to June were 30s. 4.7d. per ton. To meet these costs and making the necessary allowances for sorting and residues, and taking gold at its normal pre-war value, the lowest reserve block limit required is approximately 6½ dwts. In order to make 5-dwt. rock payable to mine with the above working costs gold must realise £5 14s. 6d. per ounce. About 23 per cent. of the total reserve tonnage has a value below 6½ dwts. There was a reduction of approximately 2½ inches in the actual stoping width and external waste width mined in the payable ore reserves during the six months compared with the widths estimated.

No. 3 Shaft.—During the quarter 203 feet have been accomplished in connection with station headings, together with 1,126 feet of development, which latter footage is included under that head. The erection of the permanent steel headgear, which has recently been delivered on the property, will be proceeded with shortly.

No. 4 Shaft.—The erection of the steel headgear is completed. The plant and surface equipment necessary for the resumption of sinking operations is now complete.

Of the total footage developed, 1,126 feet were driven from the No. 3 shaft. The greater portion of this footage was off reef, and of the footage sampled, amounting to 280 feet, 14.3 per cent. was payable, the average value and width being 42.8 dwts. over 10 inches. Compared with the previous quarter, there has been an increase of 624 feet in the footage developed and 10 feet in the footage sampled. The payable percentage of the footage sampled has decreased from 54 per cent. to 43.1 per cent., but the average value has increased from 516 inch-dwts. to 653 inch-dwts.

The headings north and south forming the north-west haulage have been connected up. This opens up a direct airway on the western side of the mine between the No. 1 upcast shaft and the Nos. 2 and 3 downcast shafts, and should materially improve conditions in the workings of that portion of the mine.

The rock broken in the mine according to survey measurements amounted to 148,403 tons. In addition, 37,391

tons were dumped as waste. The rock came from the following sources—

	Tons.	Percentage.	Dwts.	Sample value.
Payable ore reserves	109,269	73.6	9.93	
Other than payable ore reserves	12,049	8.1	5.79	
Development	27,085	18.3	4.27	
Total	148,403	100.0	8.56	

Average stope width, 58 inches; average reef channel width, 27 inches; average stope width in payable reserves, 58 inches.

Compared with the previous quarter there has been a decrease of 1,895 tons in the tonnage mined. A breakdown of the hoisting plant at the No. 2 shaft in September adversely affected operations.

The average value and width of the ore mined from the payable reserves, according to data adopted in the estimation of reserves as at the 30th June, 1921, were 8.70 dwts. over 61.43 inches, whilst the payable reserves as a whole at that date averaged 8.76 dwts. over 62.53. The face sampling value of the ore mined from the payable reserves after allowing for the difference in stoping width was about 7 dwt. higher than the corresponding block estimate. It is satisfactory to record that a further reduction of the average stoping width has taken place, thus minimising the percentage of waste rock reaching the mill. In the payable ore reserves the external waste estimated to be carried has been reduced by over 10 per cent. As the mine can keep the mill fully supplied, every ton of waste that can be kept out of the mill helps to improve the milling grade of the rock. Compared with the previous quarter, the tonnage milled shows a decrease of 9,650 tons, a breakdown in the hoisting plant during September interfering with the rock supply. The gold obtained shows a decrease of 1,207 ounces.

State Mines.

A summary of the development work is as follows—Drives, 2,476 feet; winzes and raises, 2,440 feet; haulage-ways, 1,215 feet; crosscuts, etc., 5,301; total, 11,432 feet. Footage on reef, 4,446 feet; footage sampled, 4,170 feet; footage payable, 2,970 feet (equal 66.1 per cent.). Average reef channel width payable footage, 52 inches; average reef channel value payable footage, 15.2 dwts. The development sampled at each of the shafts was—North-west shaft: Total feet, 1,180; percentage, 26.4; payable, 650 feet; percentage payable, 55.1; channel width payable, 59 inches; channel value payable, 13.5 dwts. North-east shaft: Total feet, 1,010; percentage, 23.3; payable, 520 feet; percentage payable, 50.0; channel width payable, 45 inches; channel value payable, 9.1 dwts. South-west shaft: Total feet, 1,100; percentage, 24.6; payable, 1,010 feet; percentage payable, 91.8; channel width payable, 46 inches; channel value payable, 18.5 dwts. South-east shaft: Total feet, 1,150; percentage, 25.7; payable, 790 feet; percentage payable, 68.7; channel width payable, 57 inches; channel value payable, 16.3 dwts. Totals and averages: Total feet, 1,170; percentage, 100.0; payable, 2,970 feet; percentage payable, 66.1; channel width payable, 52 inches; channel value payable, 15.2 dwts. Compared with the previous quarter there has been an increase in the total footage developed of 2,372 feet, and in the footage sampled of 610 feet. The payable percentage of the footage sampled has increased from 53.6 per cent. to 66.4 per cent., and the average value from 723 to 791 inch-dwts. The sampled footage is fairly evenly distributed over the four shafts. The ratio of crosscuts, etc., to the total development footage is higher than for previous

quarters owing to the system of carrying a larger percentage of the primary development in footwall in order to facilitate the eventual handling of the stoped rock. This entails an increased amount of crosscutting to tap the reef. The average value and width of ore mined from the payable ore reserves, according to data adopted in the estimation of reserves as at 31st December, 1920, were 8.13 dwts. over 78 inches, whilst the payable reserves as a whole at that date averaged 8.19 dwts. over 76.5 inches. The face sampling value of the ore mined during the quarter from the payable ore reserves was 85 inch-dwts. higher than the corresponding estimated block value. This increase is most marked in the south-west shaft section of the mine, where the sampling value was 189 inch-dwts. in excess of the estimated value. This is equivalent to practically 2½ dwts. over the stoping width.

Of the total revenue from gold, the sum of £223,458 0s. 5d. represents the estimated premium, being at the rate of 26s. 4d. per ounce, and equivalent to 10.516s. per ton milled. The estimated premium for the previous quarter was equivalent to 8.054s. per ton milled. Compared with the previous quarter, the working profit shows an increase of 2.932s. per ton milled, but excluding the gold premium and exchange, the working profit shows an increase of 0.621s. per ton milled.

New Slate Areas.

A summary of the development work is as follows:—Drives, 1,537 feet; raises, 943 feet; winzes, 574 feet; crosscuts, etc., 1,573 feet; total, 4,657 feet. Of the above total, 1,929 feet and 2,728 feet were accomplished at the north and south shafts respectively. Footage on reef, 1,624 feet; footage sampled, 1,610 feet; footage payable, 870 feet (equal 54 per cent.). Average reef channel width payable footage, 26 inches; average reef channel value payable footage, 30.5 dwts. The development sampled at each of the shafts was:—North shaft, Total feet, 1,060; percentage, 65.8; payable, 320 feet; percentage payable, 30.2; channel width payable, 30 inches; channel value payable, 12.0 dwts. South shaft: Total feet, 550; percentage, 34.2; payable, 550 feet; percentage payable, 100.0; channel width payable, 24 inches; channel value payable, 43.9 dwts. Totals and averages: Total feet, 1,610; percentage, 100.0; payable, 870 feet; percentage payable, 54.0; channel width payable, 26 inches; channel value payable, 30.5 dwts. Of the total footage developed, 606 feet were in connection with the shaft stations and off reef. Compared with the previous quarter the total footage developed shows an increase of 1,014 feet. The values met with in the reef exposures in the north shaft are encouraging, as 30 per cent. of the development on reef averaged in value 360 inch-dwts. It will be remembered that this shaft intersected the reef in a very poor zone, the value being about 5 inch-dwts. Faulting in the south shaft has caused a certain amount of displacement of the reef, but wherever exposed the reef has proved payable, the average value for the quarter being 1,054 inch-dwts.

The capital expenditure amounted to £95,661, made up as follows:—Shafts and equipment, £13,277; development, £44,580; equipment mine, £7,224; compressor plant, £13,726; additions to compounds, £6,283; other surface works, buildings, etc., £10,571; total, £95,661.

West Springs.

No. 1 Shaft.—Work has made satisfactory progress at this shaft. The main station approaches and return ways are practically completed. A transformer chamber has been cut and its equipment is in progress, and four main development headings have been commenced.

No. 2 Shaft.—The borehole from the bottom of this shaft was sunk a further 732 feet during the quarter to a total depth of 1,068 feet, making the bottom of the hole 4,004 feet below the shaft collar, at which depth drilling was stopped. The amygdaloidal diabase was entered at a depth of 3,958 feet. In the No. 1 shaft the footwall of the reef was intersected at a vertical depth of 840 feet below

the top of the amygdaloidal diabase, and assuming a similar vertical thickness of strata between these two points at the No. 2 shaft, then the reef should be encountered at a depth of about 4,800 feet. When sinking ceased the bottom of the shaft had reached a total depth of 2,940 feet. The development sampled from No. 1 shaft, West Springs, and from the Springs Mines property is as follows:—West Springs shaft: Total feet, 260; percentage, 63.4; payable, 35 feet; percentage payable, 13.5; channel width payable, 35 inches; channel value payable, 8.56 dwts. Springs Mines shaft: Total feet, 150; percentage, 36.6; payable, 105 feet; percentage payable, 70.0; channel width payable, 13 inches; channel value payable, 47.59 dwts. Totals and averages: Total feet, 410; percentage, 100.0; payable, 140 feet; percentage payable, 34.1; channel width payable, 19 inches; channel value payable, 29.17 inches. Compared with the previous quarter, there has been an increase of 1,314 feet in the total footage developed. The payable percentage of the footage sampled increased from 21 per cent. to 34 per cent., but the average value decreased from 576 to 541 inch-dwts.

Ventilation is receiving careful attention, and all the main headings are divided throughout their length by a 9in. brick wall forming an intake and return airway. The foul air and fumes from blasting are exhausted from the faces by means of electrically-driven fans installed at the shaft station, and ascend the shaft through the three northern compartments, which are bratticed off to form the upcast. The working conditions are good and the mine is working double shift.

Brakpan Mines.

The ore reserves as at the 30th June, 1921, were estimated during the quarter, the pay limit adopted being 5 dwts. over a stoping width of 50 inches. The following table gives the particulars of the reserves as at the 30th June last and the 31st December, 1920, when the previous estimation was made for purposes of comparison:—Payable reserves: Available, 30th June, 1921, 2,184,338 tons; stope width, 69.70 inches; value, 8.87 dwts; available, 31st December, 1920, 2,182,926 tons; stope width, 70.13 inches; value, 9.01 dwts. Unavailable, 30th June, 1921, 170,174 tons; stope width, 67.45 inches; value, 7.36 dwts.; unavailable, 31st December, 1920, 156,241 tons; stope width, 65.61 inches; value, 7.06 dwts. Pillars, 30th June, 1921, 195,113 tons; stope width, 72.85 inches; value, 8.83 dwts.; pillars, 31st December, 1920, 187,350 tons; stope width, 73.60 inches; value, 8.84 dwts. Totals and averages: Tons, 30th June, 1921, 2,549,625; stope width, 69.78 inches; value, 8.77 dwts.; 31st Dec., 1920, 2,526,517 tons; stope width, 70.08 inches; value, 8.88 dwts. The above figures show an increase of 23,108 tons in the payable reserves during the six months period; the average stoping width and value both show a slight decrease. The ore brought into the reserves during the six months is practically all situated in the south-western portion of the mine. The development in the south-western area was either off reef or in low-grade rock, and very little additional tonnage has been opened up in this district.

The average working costs for the six months January to June, 1921, were 27s. 11.4d. per ton milled. After making the necessary allowances for sorting and residues, and taking gold at its normal pre-war value, the lowest reserve block limit required to meet these costs is approximately 5.9 dwts. In order to make 5-dwt. ore payable to mine with the above working costs gold must realise £5 1s. 8d. per ounce. About 22 per cent. of the total reserve tonnage has a value below 5.9 dwts. The actual stoping width and external waste width mined in the payable ore reserves during the six months closely approximated the widths estimated.

Compared with the previous quarter, there has been an increase of 863 feet in the total footage developed, and an increase of 70 feet in the footage sampled. The payable percentage of the footage sampled has increased from 38 per cent. to 40 per cent., but the average value has decreased

from 555 to 578 inch-dwts. Of the total footage developed, 191 feet in haulage ways were accomplished at No. 1 shaft, but no payable reef was disclosed.

Of the total revenue from gold, the sum of £87,476 7s. 6d. represents the estimated gold premium, being at the rate of 26s. 3d. per ounce, and equivalent to 10s. 0.59d. per ton milled. The estimated premium for the previous quarter was equivalent to 8s. 0.92d. per ton milled. Exchange for the quarter amounted to £1,057. compared with £2,204 17s. 6d. for the previous quarter. Compared with the previous quarter, the working costs show a decrease of 1s. 10.181d., and the working profit an increase of 1s. 8.364d. per ton milled. The working profit, excluding the gold premium and exchange, shows a decrease of 0.952d. per ton milled. To the working profit of £138,855 8s. 7d. may be added the sum of £1,070 11s. 3d., representing the difference between the estimated premium and the actual premium on gold for the three months 31st August, 1921.

Modderfontein East.

Compared with the previous quarter, there has been a decrease of 1,009 in the total footage developed. The payable percentage of the footage sampled increased from 46.2 per cent. to 52.4 per cent., but the average value decreased from 354 inch-dwts. to 326 inch-dwts. The percentage of payability in the No. 2 shaft has improved considerably; in the No. 1 shaft it has fallen, whilst in the No. 3 shaft it has remained about the same. The rock broken in the mine, according to survey measurements, amounted to 77,300 tons. The rock broken came from the following sources:—Payable ore reserves, 56,785 tons; percentage, 73.5; sampled value, 10.63 dwts.; other than payable ore reserves, 6,519 tons; percentage, 8.4; sampled value, 4.36 dwts.; development, 13,996 tons; percentage, 18.1; sampled value, 2.99 dwts. Totals: 77,300 tons; percentage, 100.0; sampled value, 8.72 dwts. Average stope width, 56 inches; average reef channel width, 36 inches; average stope width in payable reserve, 57 inches. Compared with the previous quarter there has been a decrease of 3,230 tons in the tonnage mined and an increase in the average value of 0.66 dwts. The rock broken in the payable reserves during the quarter increased from 62.6 per cent. to 73.5 per cent., and the average value decreased 0.66 dwt. The rock taken from development decreased from 37 per cent. to 18.1 per cent., and the value increased 0.4 dwt. Only 300 tons, or 0.4 per cent., of rock was broken in other than payable ore reserves during the previous quarter. The average face sampling value of the ore stoped in the payable reserves is about $\frac{1}{2}$ dwt. below the estimated value of the corresponding blocks. This is the first quarter since milling operations commenced that the face sampling value has fallen below the block estimate, but, as pointed out in my March quarterly report, this falling off was not unanticipated. The average value and width of ore mined from the payable reserves, according to data adopted in the estimation of reserves, as at the 30th June, 1921, was 11.14 dwts. over 57.71 inches, whilst the payable reserves as a whole at that date averaged 7.7 dwts. over 56.7 inches. Overmining has, therefore, taken place to the extent of 206 inch-dwts., or approximately $3\frac{1}{2}$ dwts. over the stoping width. The average stoping width was practically the same as for the previous quarter, but the external waste mined was reduced in width by over an inch. Compared with the previous quar-

ter there was an increase of 4,850 tons in the tonnage milled, and an increase of 2,018 ounces in the gold obtained; the value of the ore before milling was slightly higher. The percentage of waste sorted decreased from 20.6 per cent. to 17.9 per cent., as there was less tonnage drawn from surface dumps and less waste mined.

The total cost of development was £37,429 8s. 10d. The fixed charge was 5s. per ton from stopes for July and 6s. per ton for stopes from August and September. The expenditure under surface transport includes the sum of £8,239 15s., equivalent to 2s. 1.58d. per ton mined, for transport of ore between the mine and the Apex plant. Compared with the previous quarter, the mining costs, excluding development, show an increase of 2s. 6.79d. per ton mined. This increase is more apparent than actual, due to the unit of cost adopted being "per ton mined." During the quarter under report 81.9 per cent. of the rock mined came from stoping, whereas only 63 per cent. was derived from that source during the previous quarter. Development in both quarters accounted for the balance of the rock, amounting to 18.1 per cent. and 37 per cent. respectively. As the costs of shovelling and tramping, winding, pumping, and other charges are distributed in proportion to the tonnages derived from mining and development, it will be seen that the former carries a considerably greater proportion of these charges this quarter than for the previous quarter. The higher price of explosives is also a factor bearing on the increased cost.

Of the total revenue from gold, the sum of £42,133 18s. 7d. represents the estimated premium, being at the rate of 26s. 1.27d. per ounce, and equivalent to 10s. 8.57d. per ton milled; therefore the premium more than accounts for the working profit. Compared with the previous quarter, the total working expenses show an increase of 2s. 2.208d. per ton milled. This increase is due chiefly to the higher cost of mining and development, these heads having increased respectively 10.95d. and 1s. 7.29d. per ton milled. General expenses, mine and reduction costs both show a decrease. There is a decrease of 3.48d. per ton milled in the working profit, but if the gold premium is excluded the decrease becomes 2s. 5.68d. per ton milled compared with the previous quarter.

The capital expenditure amounted to £26,569, made up as follows:—Mine equipment, £7,939; development, £16,677; surface works, buildings, etc., £7,365; total, £31,981; less credit, £5,412—£26,569.

The average number of coloured labourers at work during the quarter was 2,027, compared with 2,319 for the previous quarter.

The ground to the north of the present workings has recently been tested by means of drilling. Three boreholes have been put down to the reef, with, unfortunately, disappointing results as regards values.

Of the issue of £400,000 registered 8 per cent. debentures for the purpose of redeeming the outstanding $6\frac{1}{2}$ per cent. debentures falling due on the 31st July last, £65,000 were taken up by shareholders and the holders of the $6\frac{1}{2}$ per cent. debentures. Practically all these $6\frac{1}{2}$ per cent. debentures outstanding have been presented for redemption.

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EDITORIAL.

LESSONS OF THE STRIKE.

The Crown Mines strike should provide an object lesson for the whole of South Africa. We do not propose to reiterate the history of the events which have led up to this deplorable industrial catastrophe, nor do we intend to recapitulate the various arguments and suggested compromises brought forward at the various conferences, which unfortunately broke down on Monday night. The company is very rightly fighting for a principle which, if surrendered, would be fatal to discipline on the mines and would further embarrass an industry already languishing under the heavy burdens imposed on it by Trades Union restrictions,

inordinately high costs and poor labouring efficiency. We rejoice in the fact that the Chamber of Mines has taken up a firm stand in this matter. But we are extremely sorry that the men have not listened to reason and have assumed an attitude which has compelled the management virtually to close down the proposition. The Crown Mines distributes over three millions per annum in wages and stores. It is the largest of our town mines, and prolonged inactivity at the property will most seriously and adversely affect Johannesburg and indeed the whole of the country.

It is little short of amazing that in the face of an alarming increase in the numbers of the unemployed consequent on retrenchment resulting from the present depression, the workers on the Crown Mines should throw away their comfortable livelihoods over a dispute in which they are wrong, and manifestly wrong. These men, and perhaps the public generally, do not adequately realise that the Rand mining industry is in large degree carrying the whole country on its back, and that if the gold mines are tampered with, the Union generally will speedily feel the dire result. There is a disposition in some quarters to believe that the mining enterprises of the country other than those of the Witwatersrand are able to absorb large numbers of mine workers. Nothing is further from the truth. The Labour returns issued by the Mines Department show that nearly 5,000 less white men were employed by mines, alluvial diggings and metallurgical works in October of this year than in October of 1920. The coal mines slightly increased their complement, but there were substantial reductions in the numbers of European employed by copper and tin mines as between these two dates. The diamond mines, on account of the collapse in the gem market, had to well nigh halve their white labour force whilst the numbers of Europeans on alluvial diggings and prospecting concerns declined in the same period from 7,100 to 4,200. The gold mines, on the other hand, employed just as many Europeans in October, 1921, as they did twelve months previously. And of the 30,887 whites employed by all the mines of the Union, over 21,000 were at work on the Rand. The actual number of white persons in the service of the Witwatersrand gold mines on the last full working day of the month was 20,958, and the total amount disbursed to white persons in the service of Witwatersrand gold mines during the month was £847,253, including £40,342 as leave pay and £5,746 as bonus.

In other words, the mines of the Rand are paying out in wages alone over ten millions sterling per annum. These figures conclusively show that without the Witwatersrand the mining industry, and in fact the whole of the Union, would be in a most parlous plight to-day. The statistics quoted above should, too, make it abundantly clear that ill-timed and senseless strikes, like that now in progress at the Crown Mines, are bound to jeopardise the finances of the State and to embarrass every inhabitant of the country.

THE FUTURE OF THE GOLD PREMIUM.

There is still a perplexing difference of opinion among the authorities in regard to the future of the gold premium. In their prophecies regarding the fluctuations of the premium, most of the experts have shown themselves singularly at sea, and it may be that the premium will continue to move contrary to their anticipations. The premium, we all know, is bound up with the course of the dollar exchange, and the latter is in turn conditioned by the state of trade between England and America, and the international war debts. Asked why the price of gold continued to decline, one authority stated recently: "Because the trade position of England with regard to America continues to improve daily. In other words, the English pound note will buy more of the world's goods—America's included—than it would a month ago." "This," he proceeded, "is partly due to a fall in prices in England, created by wage-cutting, which, in turn, has come about through international competition for the world's markets. The balance of trade as between England and America is gradually being restored. This tends to bring the pound back towards the pre-war exchange rate compared with the dollar, and consequently fewer shillings

are required to-day to purchase an ounce of gold than was the case last month, when the pound sterling was worth less."

Against this we have a reported revival in American trade which may result in a corresponding rise in the dollar, with a consequent increase in the gold premium. The whole question, it will be seen, is much too complicated to tempt one to prophesy. The Rand, which is so vitally interested in the fluctuations of the premium—over which apparently it has no control—can only "wait and see" what the future may bring forth.

Notes & News.

Transvaal Silvers.

We understand that development operations on the Transvaal Silver and Base Metals continue to disclose satisfactory values over a good thickness of ore.

* * *

Position of the Lace Proprietary.

At the annual meeting of the Lace Proprietary Mines held in Johannesburg during the week, Professor Lawn, who presided, stated that the company is in a strong financial position. The cash on hand amounts to £135,233 and the only policy which the company can pursue is to conserve the finances of the company and await developments. The board is, however, keenly alive to boring and development results in adjacent propositions, and in his speech Professor Lawn made an interesting reference to data recently secured in neighbouring propositions. The full speech appears elsewhere in this issue.

* * *

Mr. Jagger and the Nurahs.

The discussion between the Minister of Railways and the National Union of Railway and Harbour Servants on the question of wages, privileges, and hours, which has been going on for some time, took an interesting turn this week. The "Nurahs" have had a general congress at Bloemfontein; and as a result a deputation of their representatives waited on the Minister, Mr. Jagger, on Monday with a set of categorical questions relative to the attitude of the Administration. The Minister, very properly we think, refused to answer these point-blank questions verbally, but promised to do so in writing at his convenience. The deputation thereupon unceremoniously withdrew. On Tuesday the Minister replied in detail and in writing to the deputation, reaffirming the attitude of the Administration on the questions at issue. General opinion is in entire agreement with the Minister, who, it is recognised, very rightly refuses to be bullied or browbeaten in regard to the railway economies rendered absolutely necessary by the present general conditions of the country.

* * *

Johannesburg Board of Executors.

A statement that must be very gratifying to the shareholders was presented at the annual meeting of the Johannesburg Board of Executors last week. A full report of the meeting will be found elsewhere in this issue, from which it will be seen that the company is in an extraordinarily strong and stable position. As Mr. C. H. Barclay, who presided, pointed out, it has, for practical purposes, no liabilities at all, its realisable assets are more than double its issued capital, and it possesses the goodwill of an old-established business which is constantly and steadily increasing. The company thoroughly deserves the confidence of the public which it has won in such a large measure, and the figures show that the funds placed in its hands for investment on behalf of clients have doubled in the past seven years. An important branch of the business

carried on is the administration of estates, and the public are learning to appreciate the advantages of appointing so long-established and sound an institution as trustees and administrators. A perusal of the chairman's speech in this issue may be recommended as an antidote for pessimism.

* * *

Another Shaft-sinking Record.

Particulars are to hand of another shaft-sinking record. At the Chief Consolidated Mine, in the Tintic district, Utah, the Water Lily vertical shaft was sunk 427½ ft. during the 31 days from July 15 to August 15. The first 367 ft. passed through a porphyry formation, and the last 60 ft. through a moderately hard close-grained limestone. The shaft has three compartments, each measuring 4 ft. 4 in. by 4 ft. 6 in. The surface equipment consists of two small hoists and two air-compressors operated electrically. Hoisting was done through two compartments. Timbering was done as the work proceeded by means of a suspended steel bulkhead hung from each last set, so that drilling and hoisting could be done continuously. The average number of holes drilled each round was 23.9. The particulars supplied do not include the depths below surface of the start and finish of this trial.

* * *

The Year with Witbank Colliery.

For the year ended August 31 last Witbank Colliery earned a profit of £155,952. In the course of his annual report, the Consulting Engineer, Mr. Stuart Martin, writes:—The despatches for the year are the highest so far recorded, and show an increase of 122,091 tons over the preceding year. The number of shifts worked decreased 17 at Witbank and increased 145 at Uitspan. It is noteworthy that practically the whole of the increased output consisted of round coal. The sales of Duff diminished and a considerable quantity was dumped on the surface. Development in both sections of the colliery has been fully maintained, and coal of typical thickness and calorific value continues to be opened up. The shortage of rolling stock on the railways continues to limit the company's ability to produce the maximum output. Capital expenditure for the year totalled £21,800. There are no important liabilities on capital account for the current year. Fair progress can be recorded from the by-products plant, as the products are becoming known to consumers. The underground workings, machinery and plant are all in first-class condition and order. The management and staff are to be congratulated on their successful year's work.

* * *

Medical Research on the Rand.

Everybody knows that the South African Institute for Medical Research has rendered, and is rendering, magnificent service to the country. In its bacteriological research department Sir Spencer Lister's work in connection with pneumonia has been of tremendous value, and particularly so to the mining industry, and in respect of industrial hygiene it is known that Dr. Mavrogordato has been conducting research work in regard to silicosis of the very highest importance for the last two years. Having regard to all this, one is sometimes tempted to wonder whether the fullest and best use is being made of the data secured, and whether sufficient publicity is given to the results of the investigations. We observe, for instance, in an editorial appearing in a recent issue of *The Lancet* on the subject of silicosis that reference is made to data secured in South Africa so long ago as 1915. It is not asserted in *The Lancet's* article that such data represent the last words on the subject. But the article suggests to us the possibility of much more up-to-date light being thrown on this highly important aspect of industrial hygiene by the Johannesburg Institute, which should at any rate lead the world, not only in its investigations, but in its publications as well, in regard to an industrial disease which has been more prevalent on the Rand than in any other mining field.

CROWN MINES STRIKE.

BRIGHTER PROSPECTS—THE CHAMBER'S TERMS—TIME LIMIT EXTENDED TILL TO-DAY.

The situation regarding the Crown Mines strike took a distinctly better turn on Thursday, when, as the result of the Joint Executives' meeting the previous day, the S.A. Industrial Federation wrote to the Chamber of Mines on the "five shifts for one" proposition, and received, in reply, a clear statement of the terms the Chamber was prepared to offer.

The terms are those proposed by the Minister of Mines and Industries, and are as follows:—

The Terms.

That the strike be called off immediately on the following conditions:—

1. That it be accepted by both sides that officials shall not be represented by workmen's unions in any dispute, whether the official be a member of such union or not.
2. That a conference be held to settle the application of this principle as it may affect some borderline cases.
3. No victimisation on either side, and the men to be re-employed as rapidly as work can be provided.
4. Strikers not to be required to sign on as new hands, but leave privileges will be continued subject to the provisions of the existing regulations, the word "five" being substituted for "ten" (for this occasion only) in Regulation No. 10.
5. After work has been resumed, Mr. Walthew should be given an opportunity to interview the management of the Crown Mines in the presence of a Government official nominated by the Minister. This interview to take place within two days of the men returning to work.

Federation Re-opens Correspondence.

The Federation's first letter to the Chamber on Thursday morning was as follows:—

J. Boyd, Esq.,

Assistant Secretary, Department of Labour,
Chamber of Mines, Johannesburg.

Dear Sir,—At the Joint Executives meeting, held yesterday, of the unions concerned in the mining industry, there appears to be some misunderstanding as to whether the Chamber of Mines actually agreed at the conference with the Minister of Mines, to the compromise of the holiday leave regulations of a 5 to 1 instead of 10 to 1 as laid down in the regulations.

The following resolution was passed, which I was directed to submit to you, and I should be glad if you would let me have a reply as early as possible:—

"That steps be taken at once to ascertain whether the Chamber of Mines is agreeable to substitute five shifts to one for ten shifts to one in relation to the penalties under the leave privileges."—Faithfully yours,

(Signed) J. GEDDES, Acting General Secretary.

The Chamber's Reply.

This brought an immediate reply, the Chamber writing:—
The Acting General Secretary,
South African Industrial Federation,
Johannesburg.

Dear Sir,—With reference to your letter of even date, at Monday's meeting the Chamber's representatives intimated to the Minister that, if the union accepted the compromise proposed by him on the matter of leave, the Chamber would not stand out. Since, however, the union's representatives, after consultation in private, definitely rejected the proposal, this undertaking, of course, lapsed.

Nevertheless, the Chamber will be prepared, not to alter its holiday leave regulations, but to agree, in this particular case only, to the Minister's proposal, provided that the strike is at once called off and the men return to work to-morrow morning (Friday, the 2nd instant).

In order that there may be no misapprehension, I attach a copy of the settlement the Chamber will accept.—Yours faithfully,

(Signed) J. BOYD, Asst. Secretary, Dept. of Labour.

Extension of Time Asked.

The Executive of the Federation sat on Thursday, but as it was almost impossible to call the necessary meeting for the consideration of this offer on Thursday afternoon, Mr. Geddes wrote, asking the Chamber if they would extend the time for the men returning to work until Saturday morning. On this point the Chamber answered:—

"In reply to your second letter of this date on the above subject, the Chamber is prepared to extend the time for the men returning to work until Saturday morning, the 3rd instant. I would, however, point out to you that this will mean that the majority of the men will not be required until Monday, as on Saturday it will not be convenient to provide occupation for any except certain timbermen, skipmen and trammers, and possibly some others.—Yours faithfully,

(Signed) J. BOYD, Asst. Secretary, Dept. of Labour.

Whether the Chamber's offer, as now reaffirmed, will be accepted or not, remains to be seen, but it is certain that yesterday's steps offer a greater possibility to settlement than any taken during the whole course of the dispute.

A further batch of boys left the Crown Mines on Thursday

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SPECIAL ENGINEERING FEATURES. ..

¶ This section of the Journal is being much^{er} extended in scope and usefulness.

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ENGINEERING SECTION.

The British General Electric Co., Ltd.

THE COMPANY'S NEW BUILDING "AN ENGINEERING ACROPOLIS"—HOW THE BUSINESS HAS GROWN—A RECORD OF CONTINUOUS PROGRESS—OLD AND NEW JOHANNESBURG—EVERYTHING FROM A TURBO-GENERATOR TO A BELL PUSH.

It is with pleasure we record another forward step in the commercial activities of South Africa. We refer to the immense strides made by that well-known South African firm, the British General Electric Company, Limited. In the early days of Johannesburg, to be exact, 1896, with a very small store and office in Commissioner Street, this firm started; 1904 saw them occupying a wood and iron building on the present site—a building typical of that period in Johannesburg. This building soon proved inadequate for the growing business, and a large brick structure was erected in 1910. 1920 witnessed yet another building. To-day we have "Magnet House" at the corner of Leveday and Anderson Streets, a truly palatial and fitting home for such a firm as the "B.G.E.C." as they are familiarly styled.

Having heard a good deal about Magnet House, and with a view to securing information, a representative of this journal recently paid the B.G.E.C. a call, and under the guidance of their genial Managing Director, Mr. W. B. Phelps, and his obliging staff, was able to gain a fairly comprehensive understanding of one of South Africa's large business organisations.

A new building symbolical of engineering progress in South Africa has just been completed in Johannesburg. It is a striking edifice of magnificent proportions, as the accompanying photograph shows. It is styled Magnet House, and it is the new headquarters of the British General Electric Co., Ltd. The British General Electric Co. are the direct representatives in South Africa of the world-famous General Electric Co., Ltd., of England, the largest electrical manufacturing concern in the United Kingdom, with large works in Birmingham, Manchester, Coventry, Newcastle, Southampton and London, which give employment to nearly 20,000 people. They are also the proprietors of Fraser and Chalmers' Engineering Works at Erith. These factories embrace the whole range of electrical plant and supplies of every description, from the steam turbo generator to the humble bell push.

How the Business has Grown.

The head offices and stores of the British General Electric Company are situated at the corner of Leveday and Anderson Streets, Johannesburg, and the sub-branches and stores are at 89, Castle Street, Cape Town, and 56, Field Street, Durban, respectively. The company's activities go, however, much further than this. The B.G.E.C. service

extends in fact throughout the sub-continent, and they have agents at Port Elizabeth, East London, Pietermaritzburg, Bulawayo, Delagoa Bay, Mozambique, Dar-es-Salaam, Zanzibar, Beira, Mombasa and Nairobi.

The company first started operations in Johannesburg in 1896, with a small store and office in Commissioner Street. With the growth of business the Cape Town branch

PHOTOS THAT TELL AN ELOQUENT TALE OF PROGRESS.



The B.G.E.C., Johannesburg, in 1904.



The B.G.E. Co.'s Johannesburg Headquarters in 1910.

was started in 1903, and the Durban branch was opened at the beginning of 1921.

The Johannesburg store and office were removed to the present site in 1904, on which then stood a wood and iron building, typical of old Johannesburg. These premises,

however, soon proved inadequate, and they were pulled down and a larger brick structure was erected in 1910.

Subsequently, owing to the wonderful increase of the company's business, plans were got out for the further extension of the building in 1914, but, owing to the war breaking out, the extensions were held up.

The new building was begun towards the end of 1920, and has just been completed. It is indeed a structure of which any city might be proud, and it constitutes a remarkable testimony to the growth of the B.G.E.C.'s business in the Golden City and throughout the country. The building is constructed throughout of reinforced concrete, and has four floors, *i.e.*, ground floor, and three floors above. These floors are served by an automatic push-button electric lift, manufactured by the Express Lift Co., of London, one of the subsidiary companies of the parent concern.

In the Show Rooms.

In the engineering showroom are displayed the various types of dynamos and motors, starting gear, switchboards, high tension oil switch cubicles, high and low tension switchgear, measuring and testing instruments, lightning arrester gear, portable electric tools, lift controller gear, electric fans, etc., etc. There is also an interesting display of semi-automatic electric house lighting plants and small oil engines for farm use.

The electro-medical showroom, which is undoubtedly the finest of its kind in South Africa, displays to advantage all the latest inventions in electro-medical apparatus as manufactured by Messrs. Watson and Sons (Electro-Medical), Ltd., London, for whom the company are the sole agents in South Africa. A complete installation of X-ray ap-



Magnet House, the magnificent New Premises of the British General Electric Co., in Johannesburg.

A Wonderful Display

The ground floor provides accommodation for the heavy engineering stocks, such as dynamos, motors, switchgear, and also the packing and despatch departments. On this floor is the very latest type of overhead travelling crane for handling the heavy machinery, and by this means every portion of the floor can be reached with a minimum of labour.

The first floor is devoted entirely to the offices and show-rooms. These latter consist of a suite of three spacious apartments for fittings and glassware, electrical plant and supplies, and electro-medical apparatus respectively.

The fittings showroom is elaborately fitted up, and displays to great advantage the very latest designs of electric light fittings and glassware, as well as electric cooking apparatus, and the latest inventions for electric heating.

paratus, consisting of 10 k.w. transformer, switch control table, couch and tube stand is fitted, and practical demonstrations are given daily to the medical profession.

The second and third floors are devoted to stock rooms for various departments of the company's organisation, and everything in connection with care and control of stock is arranged in a most systematic manner.

A Wide Field of Operations.

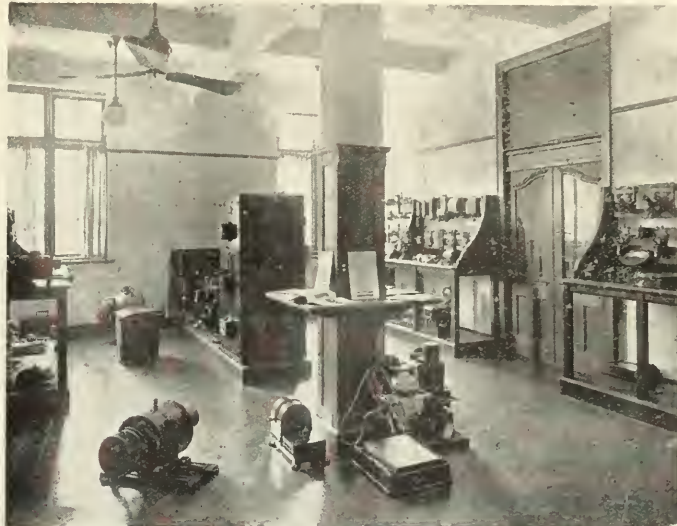
The company's operations in South Africa cover the whole field of electrical engineering and supplies, including steam turbines, Turbo compressors, Turbo blowers, dynamos, motors, transformers, switchgear and switchboards, portable electric tools, electric lifts, electric fans, electric lighting supplies, cable and wires, measuring instruments, telephone and telegraphic apparatus, mining bells and signalling apparatus, insulators, heating and cooking apparatus, electro-medical apparatus, magnetos, etc., etc.

Large stocks are held at the company's stores at Johannesburg, Capetown and Durban, and the mining industry is specially catered for.

Large Contracts on Hand.

The firm specialises in the complete equipment of power and lighting installations for mines, municipalities, factories, etc., under the supervision of its engineering experts. Many large contracts have been carried out in South Africa. Among contracts at present on hand may be mentioned

From the foregoing our readers will readily realise the British General Electric Company, Limited, of South Africa is an organisation of no mean proportions. Representing these immense manufacturing activities, they are naturally in the unique position of having first-hand information and trading knowledge embracing the whole range of electrical plant and supplies, and in conclusion we would suggest that any of our readers specially interested should pay a visit to Magnet House, where not only an interesting but a profitable hour can be spent.



A View in the Engineering Show Room.

three 3,000 k.w. Turbo alternators and high tension transformers and switchgear for the Pretoria Municipality, and a steam-driven Turbo compressor 30,000 cubic feet capacity for the Randfontein Estate G.M. Co.

Times at present may be bad; they are bad. But we are not incorrigible pessimists. We believe that the clouds which hang over our heads in sunny South Africa will soon be dispelled. The country will come into its own again, The growing scope and usefulness of electricity will help again to galvanise life into languorous industries, and in the epoch of activity that is coming the British General Electric Company is destined to play a great part. But whether times be good or bad, the B.G.E. Co. is here to stay. The magnificent building just completed—it is a veritable electrical engineering aeropolis—is an earnest of this, and the wide range of stocks which the company carries provide tangible evidence of the B.G.E. Co.'s belief in the country and in their ability to play a large and increasing usefulness in the country's engineering progress.

TENDERS CALLED FOR.

Tenders are invited by the Natal Navigation Collieries and Estate Co., Ltd., for the supply and erection of plant under the following contracts:—

Specification No. 1—Contracts Nos. 1 and 2: Supply and erection of generating plant and switchgear.

Specification No. 2—Contracts Nos. 3 to 9: Supply only of haulages, motors, cables, transformers, pumps, overhead equipment and pipe line. Copies of general conditions and specifications may be obtained from the company at 28, Natal Bank Chambers, Natal, or from Messrs. G. M. Clark and Partner, 10-12, Meischke's Buildings, Johannesburg, on deposit of two guineas for each specification, which will be refunded on receipt of a bona fide tender.

MINES DEPT. EXAMS.

CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 3 failures this year (1921)

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Denver Engineering Works.

CONSTRUCTIONAL ENGINEERS. IRON AND BRASS FOUNDERS. LOCOMOTIVE AND ROLLING STOCK REPAIRS. SMITHS. BOILER MAKERS. CRUCIBLE AND CAST STEEL FOUNDERS.

The Denver Engineering Works (Chisholm Stevenson and Company, Limited), situated on the Main Reef Road, Denver, have been in existence since 1916. Shortly after the Boer War their present premises were owned by Hubert Davies and Spain, who conducted engineering work there for a few years. Subsequently they closed down, and after nine years of inactivity the present owners took over the works and founded the Denver Engineering Works. The works cover 6½ acres of ground; and all the buildings are of steel and galvanised iron construction. The works are very conveniently situated in the proximity of Denver station, and are connected to the main railway line. Railway lines run through the property and workshops, and provide admirable transport facilities not enjoyed in less favourably placed localities.

spans. The materials for these bridges will come from oversea and the construction of the parts will also take place there. From this it does not follow that the work could not have been constructed here, in fact the management asserts that the construction of these bridges is within their capacity, but that they lack the necessary materials required for the work. This again clearly bears out the fact that it is a matter of vital importance to the engineering works of this country that all the necessary raw materials should be produced locally, and that efforts in that direction should not be spared by our producers of iron and steel.

Power.

All power necessary at the works is obtained from the V.E.P. Current at 20,000 volts is transformed down to 525



General View of the Works.

Special attention has been paid in these works to locomotive repairs and construction. Work in this connection is undertaken for the railways, mining and private companies, as well as contractors. In all about 90 locomotives have passed through these works, and of these 40 to 50 have been completely rebuilt. The works are also capable of designing, constructing and erecting complete mining plants; and general engineering work of any description comes within the range of their possibilities. Recently a contract with the Public Works Department has been undertaken for the erection of 12 road bridges with 150 to 200 feet

volts in a 750 kilo Watt transformer, and represents 1,000 horse power in all. A 100 h.p. compressor supplies compressed air for the pneumatic tools as well as light and heavy hammers in the smith shop.

Designing.

The company does all its own designing work when necessary. A special department has been set aside for this important branch of the works. The mining industry is



Tender Tanks for South African Railways, built by the Denver Engineering Works.

specially catered for in this department, and plans and specifications for complete mining plants can be drawn up. By designing is meant the planning, calculating, and drawing of any plant, structure, machine, or part of a machine. It is the work of a technically trained engineer and draughtsman, and its importance cannot be overestimated.

Pattern-making constituted the next step in the manufacturing of machine parts which have to be made in cast iron or other metal. The pattern is usually a model of the finished cast article.



14 ft. Headgear Sheave for Brakpan Mines.

Foundry.

Castings weighing up to 9 tons have been executed in these works, and while they were in the hands of Hubert Davis and Spain, a 15 ton casting was made. Local pig iron as well as scrap is used in making castings, and the No. 1 pig produced by the Pretoria Iron Works has given every satisfaction. Castings in brass and other alloys are also made. A special feature of these works is the fact that work in crucible cast steel can also be executed. Special furnaces working under draught from a 120 foot stack have been constructed. These furnaces are fired with hard Natal coke, and although this coke is satisfactory in every other respect, high sulphur content is one of its disadvantages. This seems to point to the fact that coke producers should exercise greater care in the washing of the coal they use for coke production in order to eliminate as far as possible this objectionable constituent. The steel foundry is provided with two annealing furnaces which are used for subjecting castings in steel to the necessary heat treatment in order to make them ductile.

Machine Shop.

The machine shop is very well equipped with all the latest types of machine tools. It contains 22 lathes, of which the largest has a 15 ft. 6 in. diameter. The largest planing machine in this country is to be seen in these works; it has a 21 foot travel, and is capable of taking work measuring 6 ft. x 6 ft. x 21 ft. There are 7 shaping machines, 2 milling machines, slotting machines, 5 radial drills, other drilling machines, a 30 in. and 7 ft. boring mill, and grinding machines. The machine shop and locomotive boiler shop are served by 4 overhead 10 ton cranes.

Boiler Shop.

There are two boiler shops at the works equipped with a full supply of the latest machines used in that department. One of these shops is used exclusively for locomotive boiler work, while the other is used for general plate and constructional work. At the time of visiting a cupola casing was in the process of making, and several locomotive tenders were nearing completion in the general shop. In the locomotive shop a fire box for a locomotive was being completely rebuilt, and other boiler work in course of construction. The machines in the general shop consist of the following: A Buffalo plate splitting machine capable of cutting and punching up to 1 in. plates; 3 large double ended punches and shears; 3 sets single-ended punches and shears; 2 sets plate bending rolls; 1 set plate straightening rolls; angle iron cutters, and metal saws. Complete oxy-acetylene and electric welding plants are also to be found in the boiler shop.

The works are at present feeling the prevailing depression. Under normal conditions of working the European staff numbers about 140 people, but at present there is sufficient work to justify the employment of about 100 Europeans only.

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New Rolling Stock for S.A.R. Electrification.

ALTERNATIVE TYPES AND METHODS CONSIDERED—DESIGN RECOMMENDED FOR PROPOSED GOODS AND PASSENGER LOCOMOTIVES.

Now that the S.A.R. Administration has definitely decided upon electrification, the interesting question arises regarding design of rolling stock and locomotives to be adopted. In this, as in other questions relating to electrification, Messrs. Merz and McLellan's expert advice will doubtless be followed. In the course of their recommendations on the subject they write:—

For the working of trains on an electrified railway there are in general two methods of dealing with the rolling stock, one by substituting electric for steam locomotives, the other by equipping a certain number of coaches in each train with motors, the necessary accessories including control apparatus, and electrically driven compressors or vacuum pumps for the operation of the brakes. The former is for obvious reasons the only method applicable to main line traffic, whether goods or passenger, but for suburban passenger traffic for which special coaches are set apart, both methods are available, and it is necessary to consider the relative advantages of each before deciding which should be adopted. The second method is generally referred to as the "multiple unit" system, and is described in detail below.

Characteristics of Locomotives.

For dealing with main line traffic, whether goods or passenger, on any electrical system, one or more types of electric locomotive are required, and in deciding upon the characteristics of each type, a number of important considerations must be taken into account.

The two principal considerations which go to determine the characteristics of any locomotive are:—

- The draw-bar pull that must be exerted, and
- The maximum and average speeds of travel.

Both of these factors are to a certain extent under the control of the designer, but economic considerations have an important bearing on the matter. For any given power of locomotive it is possible to take a light load at a comparatively high speed, or a heavy load at a comparatively slow speed. In practice, owing to the presence of gradients, it is the general rule where goods traffic is concerned, to take as heavy a load as the locomotive is able to haul up the maximum or ruling gradient, provided the brake equipment of the train as a whole is capable of controlling the speed down the steepest gradient. In South Africa, where all vehicles are fitted with air brakes, the controlling factor is the draw-bar pull required to haul the train up the ruling gradient. With steam locomotives the load has to be limited to such a value that the draw-bar pull required is not beyond the maximum capacity of the locomotive as determined by the weight on the driving wheels available for adhesion. In the case of electric locomotives, however, which are not limited in the same way as steam engines as regards power or total weight available for adhesion, the limiting factor is to be found not in any characteristic of the locomotives themselves, but in the strength of the standard draw-gear of the rolling stock.

We have discussed this matter with the Chief Mechanical Engineer, and we understand that with the heavy type of draw-gear already in use on some of the goods wagons, and with which it is proposed ultimately to equip all the rolling stock, the strength of the draw-bar is sufficient to enable a train of 1,800 short tons to be hauled up a gradient of one per cent. This corresponds to a pull of about 48,000 lbs. The heaviest locomotives at present in use on the South African Railways are able to exert continuously a tractive effort of 53,750 lbs. These engines, however, which are of the Mallet articulated type, cannot in practice travel at more than a very moderate speed, and for this reason their utility is somewhat limited.

Tractive Effort of Proposed Goods & Passenger Locomotives.

We have carefully considered the question as to what draw-bar pull the standard electric goods locomotive should be designed for, and on the basis of the strength of the draw-gear mentioned above, and bearing in mind that with an

electric locomotive there is less danger of couplings being broken due to snatching, we recommend that the weight available for adhesion should be about 120 long tons, and that the driving equipment should be designed to give a tractive effort (*i.e.*, draw-bar pull plus tractive force required to propel the locomotive itself) of 48,000 lbs. for the usual test period of one hour, and of 64,000 lbs. for short periods such as during the start of a train. The latter figure in relation to the weight on the driving wheels, *viz.*, about 120 tons, corresponds to an adhesion coefficient of 1 to 4.2 which is well within the limits of practice with electric locomotives. This recommendation has already been put before the Chief Mechanical Engineer, and we understand that it meets with his approval.

In working out our estimates of working costs of haulage in the different divisions with electric operation we have, therefore, assumed that loaded trains would be made up to such weights as can be dealt with on the various ruling gradients by standard locomotives of the capacity mentioned in the foregoing paragraph.

So far we have dealt only with goods locomotives. In the case of passenger locomotives it is usually only necessary to exert a draw-bar pull which is well within the capacity of the draw-gear. Considerations of platform and station accommodation generally limit the number of coaches per train to a maximum of 15 or 16 and, assuming an average weight per coach of 40 short tons, the maximum load of a passenger train may be taken at about 600 tons. Now the maximum gradient on any of the sections under consideration on which a special passenger locomotive would be used is

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1 in 40. The draw-bar pull required to haul a passenger train of 600 tons up a gradient of 1 in 40 would be about 40,000 lbs., which is within the strength of the draw-gear mentioned above. Even so, however, it would be uneconomical to design the standard passenger locomotive for this pull; it would be better to use a banking engine in addition to the train engine for taking the heaviest train up the maximum gradient as the sections containing gradients such as 1 in 40 are comparatively short and few. It is therefore a matter of judgment what draw-bar pull the passenger locomotive should be designed for. We have carefully considered all the conditions, and we recommend that the weight on the driving wheels should be about 72 long tons, and that the driving equipment should be designed to exert a tractive effort of about 30,000 lbs. for the usual one hour test period, and a maximum corresponding to an adhesion coefficient 1 to 4.2, of 38,400 lbs. With this capacity a single locomotive would be able, without assistance, to haul a 600 ton load up a gradient of 1 in 60 compensated, and this should be amply sufficient for all probable requirements.

In the matter of speed, there can be no question that with electric working the most economical condition is obtained when the train travels at the highest permissible speed. The Engineer-in-Chief has advised us that the speed of goods trains should not be allowed to exceed 40 miles an hour under any circumstances. On the other hand, we have ascertained from actual tests that this speed is reached in practice with trains of 1,200 tons and over, though with trains of 1,600 tons we understand that lower speeds are more usual.

Speed Characteristics of Proposed Goods and Passenger Locomotives.

We therefore consider it desirable that the standard electric goods engine should be capable of hauling a 1,200 ton train composed of loaded wagons at a speed of about 40 miles per hour on the level, or a train of 1,800 tons at not less than 30 miles per hour. Further, we recommend that full advantage should be taken of the special characteristics of electrical operation by providing for a speed of about 20 to 23 miles per hour up the ruling gradients. This obviously implies a very substantial increase in the general speed of goods trains, and requires powerful locomotives. The actual horse power of the proposed standard goods locomotive under these conditions works out at about 2,800 (on a usual one-hour test basis). This may be compared with the capacity of the present steam locomotives, which is in the neighbourhood of 1,000 to 1,400 h.p.

For passenger trains, we are advised that apart from restrictions due to local conditions, the speed should not be allowed to exceed 60 miles per hour. We consider it

advisable, therefore, that provision should be made in the design of the express passenger locomotive for a normal speed on the level with a train of fifteen main line coaches of not less than 55 miles per hour. With this condition the motors would exert their full power of climbing gradients at a speed of about 28 to 29 miles per hour, and we are of opinion that this would tend to the most economical working, taking all considerations into account.

An Automatic Railway Coupling.

The above invention by Mr. A. Heale, of Piet Retief, has recently been patented, and represents a device which is claimed to be unfailingly automatic in action. The following gives a description of the coupling:

According to this invention a buffer has, in its interior, an inclined surface sloping towards front to rear, and of substantially semi-circular cross section. At the top of this inclined surface is a slot in which the member uniting two buffers can lie and beyond the slot there is a cavity which is so formed as to accommodate the end of the aforesaid member, said end being of such a shape as to prevent the member slipping through the slot, the rear face of the inclined surface taking the pull.

Means are provided whereby the end of the uniting member can be lifted up so as to pass over the slot when it is desired to uncouple the vehicle.

In one form of this invention the uniting member consists of a rod with a spherical portion at each end, the top of the incline being slotted to receive the rod, the cavity beyond the slot receiving the spherical portion. In the bottom of this cavity is an ejector which can be caused to rise, thus raising the spherical portion from its position and allowing it to be pulled over the slot in the act of uncoupling.

One method of ejection is by connecting the ejector to a lid-like fitting on the top of the buffer whereby the assistance is given in keeping the spherical portion in its position normally, but when the lid is raised by any appropriate means such as a lever fitted on the end of the vehicle, the ejector is also raised and the spherical portion allowed to pass over the slot as above described.

African Platinum Mines, Limited.

The second ordinary general meeting of shareholders of the African Platinum Mines, Limited, will be held at the Board Room of the Johannesburg Stock Exchange, Holland Street, Johannesburg, on Thursday, 15th December, 1921, at 3.30 o'clock in the afternoon.

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Problems in Railway Electrification.

PRACTICE IN SWEDEN.

A MATTER OF INTEREST TO SOUTH AFRICA.

By a Special Correspondent.

In this time of saving money by the electrification of the railways and by production and distribution of the power therefrom from a central steam-power station, it may be interesting to know if a portion of this saving "the coal" cannot be operated on the steam engine locomotive itself.

In Sweden, where, owing to the high price of the imported coal, the system of electrification of the railways by single-phase current and from water-power stations, is the most advanced in Europe (two-thirds of the farms of the whole country being in the same time already electrified) it has been thought that the capital required for the total railway electrification is so great that a large saving of the fuel on the steam locomotive must first be tried.

This has now been in a practical way solved by the Ljungstrom steam turbine condenser locomotive, on which the ordinary compound piston steam engine is replaced by a Ljungstrom or so-called "stal" steam turbine, and the condenser is placed on the tender.

This condenser consists of radiation tubes in which the condensation is obtained by the surrounding cool air, and the hot water is used again in the boiler.

The first locomotive of this type constructed has, without any preliminary experiments, drawn an express train of 12 cars with a maximum velocity of 56 miles per hour and with a saving of fuel over the ordinary engine of 50 per cent.

From Stockholm to Malmö, 350 miles, the ordinary engines take coal and water four times. This new machine takes its provision once for the whole journey. The journey is achieved in perfect silence, no steam being blown out by chocks through the chimney from which the smoke alone is escaping in a continuous stream without sparks and thus without any danger to the surrounding forests.

This first giant locomotive is said to be almost perfect, as shown from the first trials, although some details need perfection.

There is no doubt that it means a revolution in steam locomotive construction all over the world.

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East Rand Gold, Coal and Estate Co.

Mr. J. H. L. Manisty presided at the annual general meeting of shareholders of the East Rand Gold, Coal and Estate Co., Ltd., on Thursday, in Johannesburg.

The Chairman, in proposing the adoption of the reports and accounts for the financial year ended June 30, 1921, stated that the net profit on coal-winning account for the year under review amounted to £3,711, as compared with a profit of £313 for the previous year on 91,082 tons sold. The total quantity of coal sold this year was 100,301 tons of rounds and nuts.

A great feature of this increase, the Chairman proceeded, is that the whole of the saleable output consisted entirely of rounds and nuts, whereas during the previous year a large quantity of duff was sold. This duff, consisting of about 30,000 tons, was sent to the waste heap.

This profit, though satisfactory, would have been much better had it not been for shortage of orders throughout the whole year, the continuance of high cost of materials, high wages and shorter working hours. Deducting the loss on farming, there remains the sum of £1,920 to be carried to appropriation account. This amount, together with the amount unappropriated at June 30, 1920, and before providing for depreciation, makes a total of £8,777.

The cash and cash assets total £25,585 against liabilities amounting to £7,977, leaving a balance of £17,608; the reserve shows a balance of £3,730.

Since the annual reports were taken in hand, an accident has occurred in the shaft, necessitating the closing down of operations to enable the manager to effect the necessary repairs. This will mean that we shall lose our output for about a month, and the expenditure is estimated at £1,500.

When this work is completed I think we may regard our position as a very sound one, and, provided we can procure orders for about 9,000 tons or upwards and effect a gradual decline in the cost of stores and wages, we may certainly look forward to good profits in the forthcoming year.

I referred at the last annual meeting to the great future for South African coal, the demand at that time for export purposes being very great, and it appeared likely to continue for some considerable time to come.

BUSY MAN'S PAGE.

We regret that on account of the non-arrival of the European mail up to the time of going to press we are unable to give our usual digest of technical literature in this issue.

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Mechanical Advantages of Electric Locomotives compared with Steam.

By Sir Vincent Raven, K.B.E., M.Inst.C.E.

The following note was included in an address given by Sir Vincent Raven, at the 1921 Engineering Conference held at the Institution of Civil Engineers. The address, by its conciseness and lucidity, seems to us a valuable contribution to a subject of great present importance.

In a comparison between steam and electric locomotives there are a number of prominent features in both types that are perhaps best expressed by the terms "for and against" or "advantages and disadvantages."

Admittedly the practical experience of locomotive engineers in this country has been almost exclusively confined to the steam locomotive, and for that reason it would probably be well to enumerate in the first instance the mechanical limitations and disadvantages which, every engineer will agree, exist in the steam locomotive and which, it may be argued, are overcome to a very considerable extent by the adoption of the modern and more up-to-date system of electric traction.

The mechanical disadvantages of the steam locomotive may be briefly summarised as follows:—

The locomotive being a complete independent unit, its power cannot be greater than the capacity of its boiler.

To increase the boiler capacity obviously implies increased dimensions and weight, both of which offer grave difficulties in regard to clearances and strengthening of bridge structures.

It is known that on many railways in Britain the limit of weight has been reached, and further development of power is only possible at enormous expense.

The boiler, cylinders, valve-gear, crank-shafts and all reciprocating parts are costly to maintain.

Turntables, fuelling plant and water supply appliances must be provided.

The cab is small and open to the weather, involving discomfort to the locomotive crew.

The locomotive radiates heat and uses coal all the time steam is up, that is, during many hours when it is doing no work, and either standing by or coasting.

The wear and tear of the locomotive on the track is considerably increased by the impossibility of accurately balancing the reciprocating parts.

The case for the electric locomotive may be set out by the brief statement that it is not hampered by any of the above-mentioned objections. In addition, one might point out that it possesses other important qualifications, such as:—

Simplicity of mechanical construction and operation.

Increased power of acceleration.

Higher scheduled speed due to the possibility of heavy short period overloads, resulting in more frequent service and increased use of existing tracks.

Uniform turning effort resulting in better factor of adhesion at starting and on gradients.

Absence of all reciprocating movements and accurate balance of all rotating parts.

Facilities for driving from either end of a locomotive.

Accessibility of mechanical and electrical parts.

Better accommodation for locomotive crew by reason of increased cab area and by closing in and heating the cab.

Possibility of coupling two or more locomotives together under the control of a single driver.

Owing to the limitations of this note, probably sufficient is here put forward to invite a full and exhaustive discussion, but two special points may be referred to, namely, the fuel economy made possible by the use of electric locomotives, and the cost of maintenance.

Fuel Economy.

The production of energy in a power station rather than on the locomotive leads to a very substantial economy of fuel. On a steam locomotive fitted with all modern improvements, it is not practicable to work at less than about 2½ lbs. of best quality coal per B.H.P. hour, and very few engines are capable of doing this for any length of time. Taking into account additional fuel required for lighting up, standby losses, periods of uneconomical working and other factors continually met with in practical working, the average consumption is more like 3½ lbs. per B.H.P. hour for passenger engines, and 5 lbs. for goods engines.

On the other hand, with electric locomotives, whether passenger or goods, and with up-to-date power station and sub-station plant, it is possible to reduce the consumption of fuel to 1¼ lbs. per hour, or even less, of low quality coal per B.H.P. produced on the locomotives. In other words, electrification enables the fuel consumption to be reduced to one-half or one-third, the fuel employed being of a quality unsuitable for steam locomotives.

Cost of Maintenance.

Our own experience with regard to the cost of repairs of electric locomotives working between Shildon and Newport shows that this cost is approximately one-third that of maintaining the steam locomotives which worked this traffic previous to 1915.

The difference in America, however, is much greater, as Mr. Armstrong, chairman of the Electrification Committee of the General Electric Company, gives figures showing the cost of repairs per mile of three American railways varying from 6.3 cents to 14.6 cents, as compared with a cost of 60 cents per mile for a 2-8-8-2 Mallet steam engine, which is the class of engine that would have to be used to haul a similar train to that taken by the electric locomotive, the cost of repairs of which is 14.6 cents, or one-fourth that of the steam engine.

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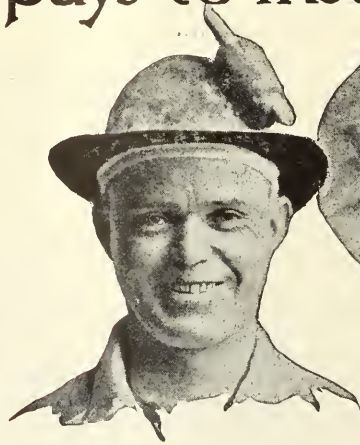
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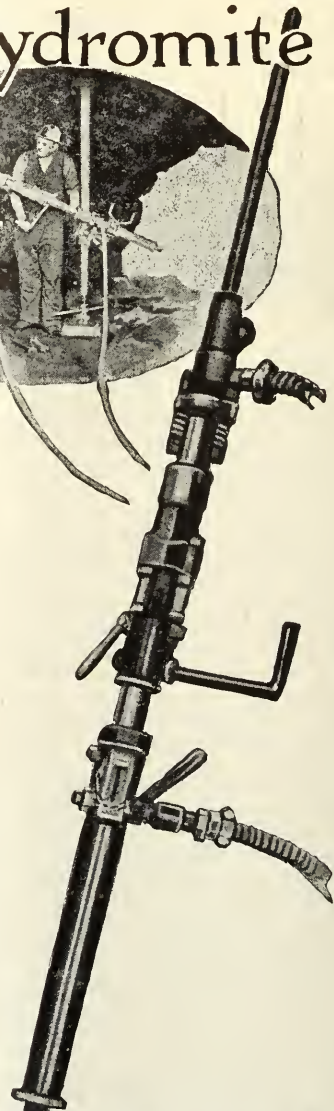


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The Week in the Sharemarket.

STEADY AND QUIET—AWAITING A SOLUTION OF THE LABOUR TROUBLE AND EX-ENEMY SHARE QUESTION—TRANSVAAL SILVERS FIRM.

The market during the week may be described as steady but quiet, awaiting a solution of the Crown Mines trouble and of the ex-enemy share question. At the time of writing the strike position at the Crown Mines appears as far from solution as ever, but hope of a settlement is much brighter, and there is every reason for expecting the men to return to work, and we can only hope that the good sense of the majority of the men may yet prevail and the situation saved from becoming worse. The ex-enemy share question is another factor affecting the market, and the London financial papers, indeed, seem to regard it as the chief restraining influence at the present moment. It is to be hoped that the question of price of the shares concerned will soon be settled and the matter brought to an early conclusion. The economic position of Germany and the Irish crisis do not make for market activity, but these troubles will doubtless right themselves in time. The local market has, for all these reasons, remained stagnant, and as far as gold stocks are concerned there is practically nothing to report. Diamonds continue to ease off, and Tins are little dealt in. Transvaal Silvers were the only bright feature of the week, and kept firm despite the prevailing lack of business. The few changes of interest in the list of quotations for the week were as follows:—

	Fri. 25th.	Sat. 26th.	Mon. 28th.	Tues. 29th.	Wed. 30th.	Thur. 1st.
Princess Estates . . .	0 11*	0 11*	0 11*	0 10*	0 11*	—
Rand Nucleus . . .	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Randfn. Centrals . . .	—	9 0*	—	—	—	9 0a
Randfn. Estates . . .	14 0	13 9*	13 9*	14 0*	13 9*	14 0
Roberts Victors . . .	—	—	7 0*	7 0*	7 6*	7 0*
Rooibergs . . .	3 0*	3 0*	3 0*	3 0*	3 0*	3 0*
Simmer and Jacks . . .	—	2 6*	2 6*	—	2 6*	—
S.A. Lands . . .	4 16	4 1*	4 2*	4 2*	4 2*	4 2*
Springs Mines . . .	37 3	36 9	36 6*	37 0*	37 0*	37 3
Sub-Nigels . . .	10 9	10 6*	10 6*	10 6*	10 11½	10 6
Swaziland Tins . . .	—	7 0†	7 0†	7 0†	7 0†	7 0†
Trans. G.M. Est. . .	9 0†	8 9*	8 6b	9 0*	—	9 0*
Van Ryn Deeps . . .	69 3*	69 6	69 3	69 6	69 6*	—
Village Deeps . . .	8 0*	7 6*	7 9*	7 6*	7 6*	—
Western Rand Est. . .	3 0†	3 0†	—	3 3†	—	—
Witbank Colls. . . .	—	—	35 0*	35 0*	35 0*	—
Witwatersrands . . .	12 0*	12 0*	12 0*	12 0*	12 0*	—
Wit. Deeps . . .	7 6*	7 6*	8 0*	—	7 3*	—
Woluhuters . . .	3 1*	3 1*	3 1*	3 0*	3 1*	—
Zaaiplaats Tins . . .	2 9*	2 9*	3 0	2 9*	2 9*	—
Union 5 per cent. . .	£99*	£99*	£99*	£99*	£99*	—
New Estate Areas . . .	19 6	19 3	19 6	19 9	19 6*	19 9*
Rouxville Diamonds . . .	1 1*	1 1*	1 0*	1 0*	1 0*	1 2*
S.A. Townships . . .	—	—	9 9†	—	—	—
S.A. Alkali . . .	12 3*	12 6*	13 0†	13 6*	13 3	13 0*
Transvaal Silvers . . .	21 0*	20 0*	20 6*	20 3*	21 0	22 3
West Springs	8 9*	8 9*	8 9*	8 9*	8 6*	—

* Buyers. † Sellers. a. Odd lots. b. Ex London.

	Fri. 25th.	Sat. 26th.	Mon. 28th.	Tues. 29th.	Wed. 30th.	Thur. 1st.
Anglo-Am. Corp. . . .	18 9*	18 9	18 9*	19 0*	19 0	19 0
Apex Mines	6 3*	6 0*	6 3*	6 3*	6 3	6 3*
Bantjes Con. . . .	6 7*	6 6*	6 6	6 6*	6 3*	6 3*
Brakpan Mines . . .	—	48 0*	48 0*	50 0*	50 0	48 6*
Bushveld Tins . . .	0 7*	0 7*	0 6*	0 7*	0 7*	0 7*
City Deeps	—	46 0*	—	46 0*	—	46 6
Clydesdale Colls. . .	23 6*	23 6*	23 0*	23 0*	—	—
Con. Diamonds . . .	12 3	12 4*	12 6*	12 6	12 6	12 6*
Con. Investments . . .	20 0*	—	—	—	13 6†	—
Con. Langlaagte . . .	14 0†	—	12 6*	12 6*	—	13 0*
Con. Main Reefs . . .	9 3*	9 3*	9 4*	9 3*	9 6*	9 9*
Coronation Colls. . .	—	38 0†	—	38 0†	—	40 0†
Do. Freeholds . . .	0 7*	0 7*	0 8*	0 7*	0 8*	0 8*
Do. Syndicates . . .	5 0*	5 0*	5 1*	5 3*	5 0*	5 6*
Crown Diamonds . . .	2 9	2 9*	2 6*	2 9	2 9	2 8*
Crown Mines	36 3	—	—	—	35 0*	—
Daggafonteins . . .	2 9*	2 9*	2 9*	2 9*	2 9	2 9*
East Rand Coals . . .	1 9*	1 9*	1 9*	1 9*	1 9*	1 6*
East Rand Props. . .	4 9*	5 3†	4 9*	4 9*	4 9*	4 9*
East Rand Debs. . .	£85*	£85*	£85*	£85*	£85*	£85*
Eastern Golds . . .	0 9†	—	—	—	—	0 9†
Ferreira Deeps . . .	10 0†	—	—	—	—	—
Frank Smith Dmds. . .	2 9	2 10*	2 10*	2 9*	3 0	3 0*
Geduld Props. . . .	46 3*	45 9*	45 6*	46 0*	46 9a	46 3*
Glynn's Lydenburgs. . .	7 0*	8 0†	—	—	7 0*	—
Govt. Areas	79 0	79 3	78 6	79 0	80 0	79 3
Hume Pipes	—	14 0*	14 0*	15 0†	—	—
Knight Centrals . . .	4 9*	4 7*	4 8*	4 9	4 8*	4 6a
Lace Props. . . .	—	6 0*	5 6*	5 0*	5 9*	5 6*
Leeuwpoot Tins . . .	7 3*	7 9*	7 6*	7 6*	7 6*	7 6*
Luijpaardsvlei Est. . .	—	3 6	3 6	—	3 6	—
Lydenburg Farms . . .	4 6*	4 6*	4 6*	4 6*	4 6*	4 6*
Meyer & Charltons. . .	72 6*	72 6*	72 6*	—	72 6*	72 6*
Middelvlei Est. . . .	—	1 0*	1 0*	1 0*	1 0*	1 0*
Modder B.'s	26 9*	26 6	26 6*	27 0*	27 0	27 0
Modder Deeps	43 9	42 9*	43 0	43 9	43 6	43 0a
Modder Easts	7 2*	7 3*	7 1	7 1½	7 0*	7 0*
National Banks . . .	217 0*	217 0*	217 6	217 0*	217 6*	—
New Eland Dmds. . .	—	18 0*	—	—	—	—
New Era Cons. . . .	7 1*	7 0*	7 0*	7 0*	7 0*	7 0*
New Geduld Deeps . . .	—	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins . . .	5 9†	5 0*	5 3	5 3	5 3*	5 0a
New Modders	73 9	72 3*	72 0*	73 6†	73 6†	73 0
New Primrose	5 0*	—	—	—	—	5 0*
New Unifeds	—	3 6*	3 6*	—	3 6*	—
Nigels	4 3*	4 9*	4 9*	—	4 9*	4 3*
Nourse Mines	8 0*	8 0*	8 3*	8 3*	8 6*	8 6*
Pretoria Cements . . .	40 6	39 6*	39 0*	39 0*	38 6*	38 6

The Base Metal Outlook.

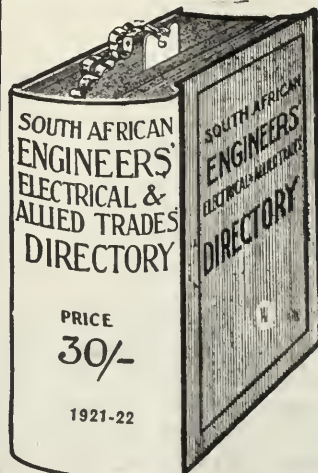
The outlook for base metals continues obscure, and is well described by Messrs. H. Bath & Sons, Ltd., in the following paragraph from their latest report:—"What the future holds for trade in general and for metals in particular is still obscured by big political and international affairs which must first be settled before a revival in trade can be expected. Meantime it is satisfactory to note the withdrawal of the American railway strike notices and the acceptance by the home engineers of a lower scale of wages. Certainly there is more trade doing now than was the case a few months ago, but there is naturally a great absence of enterprise under present conditions."

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Letters to the Editor.

THE UNION AND ITS COLOURED LABOUR.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir.—Recently General Smuts has pointed out the impossibility of the Union being directed by any particular part of its community. It's a funny thing, but that's just what has been the trouble all along. As far as the mines are concerned, some 24 per cent. of the world's gold comes out of the 40 per cent. low-grade mines of the Rand, and ten thousand, or less, labour autoerats have caused the directors of these mines to work out their gold to the absolute loss of their legitimate owners, the shareholders, and to the direct gain of labour, trade and Government. There are moments in the world's history when great sacrifices are made to attain an ideal. During the early part of the last century great reformers unceasingly pleaded for the release of the black man from slavery, and much blood was spilt to achieve his freedom. In this country the early Dutch never forgave England for depriving them of their slaves. It was held that here, at least, the black man was well treated and contented. The echo of strife generations later still registered a protest that had not yet died, and yet again there is the aspect of the Prime Minister appearing on the scene to release the black man from new slavery. The pinning down of a man because of his colour to all that is rough, hard and degarding, whilst his captor manœuvres the situation and draws unearned pay, is but a repetition of what the world had to claim release from in the past.

The marketing of one hundred thousand blacks by a neighbouring State is also a repetition of that old control of white over black.

The domination of traffic through the sale of labour is but another phase of slavery in a new and subtle form. The foreigner in his laws exploits the native, the miner exploits him, and the world looks on.

The moment calls for a strong man. There are opportunities—many of them. The Union wants release from the enslavement of black men, whether they be its subjects or its neighbour's subjects. It requires release from bargains that place embargoes on its ports. The Prime Minister has stated he can procure labour within the State. Let there be no more traffic in black skins; let us get our own labour, and free the country from foreign dictation.

The constant reports of new ports on the eastern coast gives encouragement to the hope that future traffic will find its way through them and thereby definitely relieve the Union for all time from the necessity of having to buy its way under foreign conditions.

It is release from any special part of the community, and their dictates, that is required. There is the hand of autoeracy denying individual efforts; there is the delay in pushing the development of gold discoveries; there is the leaning towards capital as the only means of carrying on—and whether the power be a foreign dealer in black skins or a

labour task-master, whether it be Government inaction or the dictates of capital, they are all questions of supremacy, and it will be interesting to see whether there is strength enough to give the country its much-wanted relief, or whether weak settlements will throw us back into the old slough of despond.—Yours, etc.,

EMOYENI.

ORIGIN OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—As the genesis of the diamond appears to interest certain of your readers, kindly allow me space for a word or two on this very interesting subject, as I abhor lengthy epistles. Some years back in conversation with myself, Mr. Frank Watkins, a gentleman of high chemical attainments, suggested carbonic acid gas under pressure, as in a diamond pipe with its lid on. That is to say a pipe which had not burst through the earth's surface, and whose kimberlite, as it is termed, had slowly cooled down below. When denudation had taken place, in course of ages, then for a certainty that pipe would be found to contain diamonds in payable quantity. In the case of blind pipes, the gas had escaped, and although they contain exactly the same matrix—"ikona" diamonds. Good idea, thought I; he's struck it! Later on, looking through Dana's "Manual of Mineralogy and Lithology," 1879, page 109, I came across the following note: "Carbonic acid, under pressure, becomes a liquid, and with pressure and cold, a white snow-like solid." Our diamonds, thought I! From that time on I have been inquiring of my mechanical engineering friends for a suitable compressor, etc., to manufacture them by the ton; but none appear to be sufficiently inventive. Hence, using my old motto, I write that "To know the truth is a great thing for thyself, but to tell the truth to others is a great thing for the world"—so let the world concern itself if it chooses. I have also a gaseous idea as to how Nature makes gold, but, as filthy paper is taking its place for the moment, perhaps it may be as well to leave this little matter in abeyance.—Yours, etc.,

SCOTT ALEXANDER,

"Rand Stratigraphist."

Johannesburg,
November 29th, 1921.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET—FUTURE PROSPECTS CHEERFUL—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—PREMIER ON POSITION—REDUCTION IN COAL RATES—BRITISH TRADE—UNION'S RAILWAY ELECTRIFICATION.

General Review.

The feature this week, dominating all else, has, of course, been the Crown Mines dispute, which still remains unsettled. With the exception of a few essential services, work on the mine has ceased, and the natives are being dismissed. The latter point is a most important one and has only been resorted to as the last resource, but it is impossible to keep thousands of natives in idleness at an expense of over £2,000 per day. The penalisation question is now being fought out, and it is hoped that sane councils will prevail.

Familiarity, we are told, breeds contempt, but the feeling in commercial circles at these recurrent disputes is arousing both contempt and disgust. As a leading merchant said, and with justice, how can we expect financiers to invest in our propositions when every month sees something approaching South American conditions of a few decades ago. That these epidemic troubles are most unsettling for business goes without saying, and merchants are nervously awaiting the upshot of the present disturbing factor in commercial life. They think, and rightly, that the vanishing premium on gold is—or, at any rate, should be—a sufficient pointer to the miners that the present moment is, to say the least, not a happy one for the ventilation of minor differences. The day is bound to come, perhaps before we have time to prepare for its full effect, when the disappearance of the present premium on gold will have a paralysing effect on our gold mining industry. The present premium of about 17s. per ounce above normal, which is enabling many of our mines to give employment to hundreds of workers and to distribute large amounts of money in the shape of wages, etc., without in many cases giving a profit to shareholders, will undoubtedly be looked upon in time to come (leaving the previous higher level quite out of the question) as a godsend to our history. Is it asking too much that our workers should realise the present and future position, which is only too apparent to keen and well-wishing observers? Prices are much the same as before, but the tone is undoubtedly better. Though materialisation is slow, and, under the circumstances, expected, inquiries are much better now than they have been for some considerable time, and merchants are unanimous that we shall see a decided betterment in business generally early next year, provided always that the labour question can be once and for all satisfactorily settled. The cheaper level of prices at Home in the heavy lines is beginning to make itself felt locally, especially in iron and steel goods, and merchants are adjusting prices accordingly. A well-known authority in the commercial world said his impression was that we had gone through recently a very depressing time, but that the horizon was undoubtedly clearing, and, failing any unforeseen difficulties, we were heading to improving business conditions. Nobody, he said, in this stock-taking and holiday month expected big things, but after the turn of the year we should, he thought, make very satisfactory progress. The Commercial Exchange during the past week has been stimulated by the usual monthly requirements of the mines, but on the whole business has been quiet and about the average of recent months.

Iron and Steel.

The requirements of the mines at this time of the month have caused the usual spurt in business, but the Commercial Exchange reports that apart from this usual and expected fillip, nothing of consequence has transpired.

Latest quotations.—Dunswart iron 22s. 6d. per 100lb. basis price; Union Steel Corp., Ltd., 30s.; imported iron and steel flats, small, 35s. to 42s. 6d.; larger sizes, 32s. 6d. to 40s.: $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 39s. 6d.; $\frac{3}{8}$ in. iron, 32s. 6d. to 34s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 33s.; steel, 39s.; $\frac{3}{4}$ in. round iron, 32s.; steel, 35s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 32s.; channels and joists, 37s. 6d.; shafting, $\frac{3}{8}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. per lb.; 1 in., 8½d.; 1¼ in. to 2 in., 7d.; larger sizes, 6½d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 24s. to 25s.; 3-16 in. and upwards, 24s.; spring steel, 7½d. to 8½d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 47s. 6d.; to 52s. 6d. per 100 lbs.; $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 45s. to 50s.; hexagon

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nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{3}{4}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{4}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 50s., and strong signs offering; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per doz.; 12 lb., 25s. per doz.; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening, 3s. to 9s. 6d. per sq. yard; cyanide for outside mines, 1s. 6d.; zinc shavings, 1s. per lb.

Second-hand Mining Material.

There have been several large orders placed, both by the mines and country clients, for second-hand piping. During the War period the mines would buy piping and fix it up themselves, nowadays they only accept second-hand piping that has been properly done up, such as having proper flanges put on, sockets to be in good condition, etc. There is a parcel knocking about of 20 lb. rails; the quantity is

stated as 600 tons. As there have been several large mine enquiries lately for this size rail, no doubt the holder will soon be able to place his parcel. A judgment of great importance to merchants and the general public has just been given in the local courts, the plaintiffs being a firm of auctioneers and defendants local mining material merchants. Plaintiffs advertised for sale a quantity of new Jackerie Dies. Defendants purchased these dies at the sale. A day after the sale they found out that these dies had been through a fire and were therefore second-hand, and consequently refused to accept delivery of the dies. The plaintiffs then advertised a resale of the dies, holding defendant responsible for the difference in price between the first purchase and the resale. On the second occasion the goods only realised one-seventh of their original purchase price. The defendants proved clearly in evidence that the goods, which were sold as new, had gone through the fire of Orenstein Arthur Koppel during the anti-German riots. The magistrate gave judgment in defendants' favour, holding that the goods had been misrepresented at the sale, because having been in a fire they were not new. A person selling a new article must deliver in the same condition as it left the manufacturers.

Iron and steel in the United States and Canada show an improvement, and negotiations are in progress for an extensive tonnage in steel rails. Owing to lower prices, agricultural products are progressing rapidly. Crude oil prices have advanced sharply.

Timber and Building Materials.

Prices are practically unchanged. Business has slackened off a little and, in the opinion of experts, will continue quiet until after the New Year. Stocks of timber are fair, but 3 x 9 long lengths are presently very scarce. The indications are, taking the Baltic position into account, that prices of timber will advance.

Prices: 3 x 9 deals, 1s. 1d. to 1s. 1 $\frac{1}{2}$ d.; scantlings, 11d.; beaver board, 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{3}{4}$ d. to 7d.; ceilings, 4 $\frac{3}{4}$ d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9 $\frac{3}{4}$ d. to 10 $\frac{1}{4}$ d. Furniture timber, Burnah teak, 18s. to 18s. 3d. per cube here for first quality, 14s. 6d. for second, at the coast; American oak and Japanese oak, 1s. 2d. at the coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 3d. per cube at coast; Rhodesian mahogany, 8s. 6d. per cubic ft. at mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 8d. to 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. per ft. Bricks remain the same at 70s. for blue stock; 60s. mixed; £4 10s. to £5 for wire cuts. £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Business is much the same as it has been for some weeks past, quiet and little doing, and indeed no improvement is expected before next year. Prices are unchanged at 6d. to 7d. for iron and 9d. to 11d. for timber, but owing to increasing scarcity of stocks these prices are inclined to harden. A merchant in a large way of business said inquiries are quite good, but orders are slow. Stocks are gradually being depleted.

Lower Building Wages in Capetown.

Certain sections of the building trade in the Peninsula have agreed to accept a reduction to 3s. 2d. per hour, except coloured bricklayers, who will be dealt with pro rata. Painters' wages are to remain the same as before. This reduction in wages is expected to give a fillip to local building operations.

Electrical Goods.

Business, in the opinion of a leading importer, remains good, with, if anything, an improving tendency; people, he said, seem to have gained heart of grace and recognised that prices have about reached bottom—for a time, at all

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events. Clients are now, he said, paying their old outstanding accounts. Prices are unaltered, but in view of advices from oversea an upward trend seems inevitable. A prominent dealer in electrical wares, with large connections with Britain and the Continent, gave it as his opinion that Germany was at the end of her tether as regards lower prices. She cannot, he thought, do more than she has done, and gave as an instance the fact that several German manufacturers' agents here had been cutting prices against each other so much that eventually some of them had acknowledged to him that they could go no lower in their quotations. This authority said the reading of the international barometer showed undoubtedly at the moment that bottom in respect of prices had been reached, and he did not expect any alteration, except in an upward direction, for some time to come. Prices had, he thought, about reached bottom and cannot get cheaper without a radical reduction in wages; in fact he thought the possible trend in the immediate future was towards a higher level. There is nothing big going at the moment in the shape of contracts, but a steady line of small jobs is giving fair employment at the moment and encouragement to future operations. As an illustration of the better tendency in the electric and building business my informant said nothing could be more telling than the fact that last week he had received payment for a fairly large amount which had been owing for over two years.

Premier on the Position.

At the Congress of the Free State South African Party last week, General Smuts referred, *inter alia*, to the difficulty in which the Government found itself in regard to present problems. In regard to the wool farmers' troubles the Government had taken measures to meet the difficulties, and General Smuts said that Colonel Mentz had in Germany done his utmost to bring about a satisfactory solution. The Premier affirmed the appointment of Mr. Carl Spilhaus as Trade Commissioner, whose appointment, owing to his outstanding ability, would be of real service to the country. On the labour position General Smuts was very pronounced. If, he said, the present unreasonable attitude were persisted in the mines could not possibly carry on. The position with regard to the short working hours could not be tolerated. Native affairs had to be placed on a sound and practical basis, and it was hoped that the aims of recent conferences to that effect would be achieved.

British Trade.

Mr. Stanley Baldwin (President of the Board of Trade) stated at Liverpool there were more indications of a trade revival than the reverse. It was generally thought that the corner had been turned in the United States, while the bottom had been reached in India, and there were signs of revival in Japan.

Fall in British Living Costs.

On October 1, owing to a substantial decline in the cost of foodstuffs, which are now 103 per cent. above pre-War prices, there has been a decline of seven points compared with September 1, and of 73 points compared with November last year, which was the highest reached.

Railway Electrification—Union's Start.

It is announced that the Railway Board has decided to electrify the Natal section of the South African Railways between Glencoe Junction and Maritzburg, which covers a distance of 171 miles. It is hoped to have the first section in operation within two years' time and the whole scheme within four years. Electrification will undoubtedly eventually tend towards lower railway rates. The total cost of the transmission will, it is reported, be well over £3,000,000.

German War Debt Scheme.

The special committee of the Federation of British Industries and German Reparations suggests the transference of the obligation between Governments into obligation between individuals, by the creation of mortgages on German railways, shipping and other industries. The committee also suggests the utilisation of German energies under allied experts in the restriction of the railways in Central

Europe and Russia, and the construction of public works in undeveloped regions of Africa, South America, and Asia.

Potash.

America, it may be noted, is at the moment very interested in potash, and is rather proud of the fact that she can show a proposition giving 9 per cent., but it is stated that there has been a discovery in the Transvaal showing from 10 per cent. to 11 per cent. in large bodies. We shall have more to say about this discovery later.

Ockiep Copper Mine.

Operations on this mine have now, it is reported, been definitely abandoned.

Persian Oilfields.

A 50 years' concession has been granted to the Standard Oil Co. to exploit oilfields in the northern provinces of Persia. This measure is expected to revive business in re-opening trade north to foreign enterprise.

International Conference to Deal with Unemployment Problem.

The Labour Conference at Geneva, following upon a cable from Mr. Gompers, President of the American Federation, has passed a resolution in favour of the convocation of an international conference to examine and discuss remedies for world-wide unemployment.

Natal Navigation Collieries and Estate Co., Ltd.

Tenders are called for the electrification of Nos. 4 and 5 shafts as per specifications given.

Wireless.

A wireless service between England and Australia has been arranged. Branch stations are to be established in the Commonwealth and in England and Canada. The charges for such service will range from 3d. to 2s. a word. A capital of £1,000,000 has been provided.

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JOHANNESBURG.

Union Loan.

A new issue has been floated of the Union of South Africa £6,000,000 consolidated 6 per cent. stock at 96½. The new loan is mainly for the purpose of redeeming Treasury bills to the amount of £3,000,000 due on December 1, 1921, and £2,000,000 of Treasury bills due on February 8, 1922. This loan has been mentioned in City financial circles.

Wage Reduction in Collieries.

The Chamber of Mines have notified a reduction in wages of colliery employees to take effect from January 1, in respect of which the Federation Department of Mining is taking a ballot.

Metal Market.

Latest London quotations: Standard copper, £67 10s. cash, £68 10s. forward; electrolytic copper, £75 10s. cash, £77 forward; standard tin, £163 12s. 6d. cash, £165 7s. 6d. forward; quick silver, £10 7s. 6d.; bar silver, 37½d; bar gold, 103s. per oz. Metals show a rise during the week on the conviction that present prices will respond to any favourable circumstances.

Union's Mineral Industry

The following are the principal items to be noted in connection with the statistics for the month of October, 1921, issued by the Mines Department of the Union:—

Labour.

	Whites. No. in Service.	Coloured. No. in Service.
Diamond Mining	2,425	5,108
Diamond Alluvial, Diggers and Prospecting Concerns	4,207	14,006
Coal Mining	2,100	37,547
Copper Mining	108	937
Tin Mining	69	1,262
Other Base Mineral Mining	235	2,802
Grand Totals	30,887	245,787

Output.

	Fine ounces.	Value.
Gold—Witwatersrand (Transvaal)	696,384.117	£2,958,052
Other Districts	18,702.930	£479,445
Other Provinces	6.000	£25
Total	715,093.047	£3,037,522
Silver	74,882.861	£11,233

	Carats.	Value.
Diamonds	49,692.91	£177,776
Tons.		
Coal (Sales)	902,586.000	£384,277
Copper Ore and Concentrates (Sales and Shipments)	—	—
Tin Concentrates and Metallic (Sales and Shipments)	84.000	£6,981
Other Base Minerals (Sales and Shipments)	—	£7,882
Total Value		£3,625,671

Totals for Ten Months from January, 1921.

	Fine ounces.	Value.
Gold—Witwatersrand (Transvaal)	6,582,093.947	£27,958,959
Other Districts	162,576.436	£690,580
Other Provinces	6.000	£25
Total	6,744,676.383	£28,649,564

Silver	676,893.124	£104,518
Carats.		
Diamonds	717,687.88	£2,799,208
Tons.		
Coal (Sales)	9,564,302.000	£4,264,965
Copper Ore and Concentrates (Sales and Shipments)	158.270	£6,524
Tin Concentrates and Metallic (Sales and Shipments)	1,257.094	£120,850
Other Base Minerals (Sales and Shipments)	—	£115,509
Total		£36,061,138

Totals, if gold taken at estimated increased value, £35,926,800. Total value, £43,338,374.

†Value calculated at the standard rate of £4.24773 per fine ounce. The Transvaal Chamber of Mines estimates the value of the October gold output at £5.150 per fine ounce, which would represent an increase of £645,207 in the total value of the month's output.

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Rhodesia's Mineral Output.

DETAILS FOR OCTOBER—INCREASE OF A THOUSAND OUNCES—BASE MINERAL PRODUCTION £12,721 HIGHER.

We have received for publication from the office of the Rhodesia Chamber of Mines the following detailed statement of the mineral output for the month of October, 1921, with comparisons and values:—

Gcld.

MATABELELAND.

	No. of stamps Treated.	Tons	Yield Ozs.	Value £
Bulawayo District:				
Abercorn (Abercorn G.M. Co., Ltd.)	5	762	657-36	2,761
Do. (sands)		366	92-92	390
Aerial (Carson Mines, Ltd.)	5	610	64-10	269
Do. (sands)		450	36-49	153
Antelope (H. Harrington)	5 3 P	910	334-86	1,406
Anterior (W. J. Lane)	5	75	11-60	49
Do. (sands)		90	18-25	76
Athi (Berry & Black)	5	151	30-51	128
Do. (sands)		115	19-46	82
Big Ben (W. E. Hunt), Sep. (sands)		240	42-82	180
Bill's Luck (Bill's Luck Synd.)	5	370	80-21	337
Blighly (H. Ashburner) (sands)		270	38-44	161
Camp (Carson Mines, Ltd.), Sept.	5 1 P	760	78-60	330
Do. (sands)		480	36-54	154
Druid (R. G. Thomas)	2	100	16-47	69
Fanora (A. Granger)	5	270	45-87	193
Fred & Fred (Trans. & Rho. Est.)	10 4 P	1,730	777-25	3,293
Do. (sands)		1,730	422-22	1,788
Freda (Coghlan & Black)	3	374	40-34	169
Golden Oriole (Golden Oriole Syn.) (August)	3	45	5-33	22
Do. (sands)		132	11-12	47
Helen (Koodoo Syn. No. 2), Sept. (October)	5	360	111-62	469
Do. (October)		350	95-67	402
Henriette (T. Berwitz)	2	80	33-30	140
Horn (Horn Reef Synd.)	10	785	118-73	499
Huntsman (Rhodesia G.M. and Investment Co., Ltd.)	5	310	191-80	819
Do. (slimes)		460	122-05	525
Ibis (A. J. Ledingham)	3	335	17-55	74
Jessie (Jessie Tributors)	15 4 P	1,950	374-76	1,574
Do. (sands)		2,280	231-39	972
Kestrel (E. Warren)	5	300	61-80	260
Killarney (F. D. Roscoe)	10	783	296-05	1,243
Do. (sands)		450	34-99	147
Legion (W. H. Robinson)	5	360	105-76	444
Lonely Reef G.M. Co., Ltd. (October)	20 3 T	5,100	1,863-26	7,892
Do. (slimes)		5,100	2,726-09	11,595
Lucky Star (McKenzie & Harris)	2	50	19-83	83
New Eclipse (J. R. Stewart)	5 1 T	1,059	421-58	1,771
Do. (sands)		478	77-51	326
New Mystery (W. Souter) (adjustments)	F			4
New Start (W. A. Foster)	5	350	43-22	181
Old Nic (Old Nic Slimes, Ltd.) (slimes)		2,100	149-60	628
Port (M.D. Synd.)	2	131	73-17	307
Queen's (Bembesi District G.M. Co., Ltd.)	10	522	120-52	506
Do. (sands)		480	34-30	144
Queen's (E. W. Lamin)	5	575	181-16	761
Reco (R. Corbett)	3	180	183-84	772
Red Boy (Red Boy Synd.)	5	540	244-09	1,025
Red Rose (Kewin Byo D. Synd.)	10	510	756-05	1,075
Rhodesian King (R. Aserman)	5	87	36-30	152
Sable (R. J. Maidwell) (Sept.)	3	150	39-21	165
Do. (October)		150	39-21	165
Scottie (J. F. Smith)	3	90	34-18	114
Seoveni (W. H. & D. A. Burrows)	3	160	33-69	142
Silver King (J. C. Reed), pannings			1-80	7
Pannings (H. C. Manning)			1-58	6
Premium—May-July, 1921				17,327
Bulawayo District Total			11,225-31	£64,756

Gwelo District:

Babs No. 1 (Beach & Boby)	5	411	76-79	323
Do. (sands)		190	71-10	299
B.F. (B. Berthold)	5	700	192-07	807
Black Prince (S. Levin)	5	500	175-73	738
Do. (sands)		400	30-29	127
Do. (balance, September)			73-73	310
Commonage (H. W. Gray)	T	268	31-63	133
Connemara (Connemara Synd.)	5 R P	400		
Do. (sands)		1,939	581-90	2,444
Cosmopolitan (Beach & Boby) (sands)		240	29-60	124
Danga (Cribb & Seear)	5 1 P	573	192-36	808
Do. (Sands)		230	13-96	59

	No. of stamps	Tons Treated.	Yield Ozs.	Value £
Easter Egg (Easter Egg Synd.)	5	140	36-05	151
Eva (H. Stocks)	5	165	31-36	132
Falcon Mines, Ltd.	28 N 2 T	15,890	2,924-98	12,285
Do. (copper £16,521, silver £512.)				
Fed Up (A. Malcolm)	F		51-60	217
Gaika G.M. Co., Ltd.	51 C 1 T	4,181	893-11	3,808
Do. (sands)		4,181	502-02	2,129
Glen Hume (Glen Hume Synd.)	5	700	110-08	462
Globe & Phoenix G.M. Co., Ltd.	40 12 P	6,241	3,591-45	15,084
Do. (sands)		9,949	1,954-09	8,207
Do. (slimes)		2,530	515-75	2,166
Gondan (J. M. Stopforth)	2	51	14-99	63
Do. (balance, August)			15-50	65
Just Right (F. M. Linscott) (Sept.)	5	60	13-88	58
Knights (Knight & Smith)	5	228	244-35	1,026
Lucerne (J. Wyser)	2	180	37-61	155
Makokoshla (R. Sharkey)	5	200	124-70	524
Mary Fraser (J. Thornett) (Sept.)	11	200	13-61	57
Montagu (Woodger & Murray)	5	70		
Do. (sands)		60	13-08	55
Moss (James & Worthington)	5	814	314-35	1,320
Do. (sands)		1,400	75-33	316
Primrose (J. M. Harris)	5	620	94-63	397
Do. (sands)		508	51-25	215
Riverlea (G. C. Hooper) (sands)		667	61-89	260
Royalist (J. Austen) (sands)		779	38-74	162
Smith's Pocket (C. A. Abbott)	5	408	25-93	109
Strike (J. M. Markham)	11	650	89-18	375
Tabekwe (J. Cruikshank) Mill Site	F		18-62	78
Ubique (Woodger & Murray)	(5)	200		
Do. (sands)		90	38-37	161
Veracity (L. R. Evans)	5	650	152-70	641
Do. (sands)		750	56-92	239
Woodend (Woodend G.M.)	5	131	26-61	112
Premiums—May-July, 1921				76,802
Gwelo District Total			13,606-92	134,006

MASHONALAND.

Hartley District:

Ambassador (J. G. Volk)	5	300	86-62	364
Do. (sands)		300	33-57	141
Aurora (Aurora Synd.)	5	382	47-36	199
Big Boulder (Pope & Baker)	5	460	177-43	745
Bull Dog (J. Thornett)	5	581	94-25	396
Do. (sands)		387	40-61	171
Cam & Motor G.M. Co., Ltd. (concentrates)	13,000	1,655-08	7,019	
Do. adjustments (slags) (October, 1920)	F	1,391	3,167-95	13,435
Chadshunt (C. H. Wheildon) (September and October)	10	988	719-06	3,020
Do. (sands)		445	85-58	359
Cissy (J. E. F. Poulton)	2	118	24-46	103
Colne (H. F. Wilson)	5	70	7-52	32
Do. (sands)		32	4-50	19
Cricket (F. C. Luvat)	11	400	106-59	448
Do. (sands)		360	45-13	190
Do. (concentrates)	F		20-72	87
Dresden (R. A. Smith)	10	1,500	115-38	485
Do. (sands)		650	12-94	54
Eiffel Blue (Blyth & Moore) (slimes)		1,200	75-58	317
Do. (slags)	F		21-24	89
Eileen Alannah Mining Co., Ltd. (sands)	6 N	830	230-65	969
Do. adjustments (slags), November, 1920	F		113-22	475
Glendarra W. Ext. (C. S. Marks)	2	50	7-67	32
Golden Valley (J. Mack & Co.)	10 1 P	1,132	411-74	1,729
Do. (sands)		594		
Do. (slimes)		550	257-90	1,083
Do. adjustments (slags), December, 1920	F			9
Grandeur (Grandeur G.M. Co.)	5	647	94-57	397
Hepworth No. 2 (J. W. Bauner)	5	300	103-22	434
Do. (sands)		160	16-94	71
Hollis (McLean & Fouche)	5	255	91-82	386
Hope (Hope Syndicate)	5	576	107-39	451
Do. (sands)		420	21-88	92
Inez (Mrs. Sarah Smith)	2	29	12-58	53
Invincible (I. J. Minaar)	(5)	307	80-30	337
Do. (sands)		240	31-51	132
Kanyemba (J. W. Banner)	10	640	219-85	923
Do. (sands)		480	41-61	175
Mali (J. Thornett) (sands)		900	25-38	107
Mint (F. Curlois)	(5)	15	10-72	45
New Invincible (I. J. Minaar) (slimes)		600	83-57	351

	No. of stamps.	Tons Treated.	Yield Ozs.	Value £
New Topaz, adjustments (concentrates) ...	F	—	—	138
One Step (W. Miller) ...	2	280	52.42	220
Do. (sands) ...	—	300	21.71	91
Owl (A. Rolfe) ...	10	693	182.45	766
Do. (sands) ...	—	634	89.08	374
Do. (slimes) ...	—	126	—	30
Do. adjustments (slags) ...	F	—	—	30
Oxo (Trixie, Ltd.) ...	(5)	174	63.13	265
Revie (Ambrose & Aitken) (Sep.) ...	5	620	92.70	389
Do. (October) ...	—	600	60.90	256
Do. (sands) ...	—	450	68.76	289
Rouge (C. G. Bennett), adjustments (slags) ...	F	—	—	21
Royal Bucks (R. J. Bray) (Sept.) ...	H	60	2.79	12
Do. (October) ...	—	280	14.46	61
Samos (Samos Syndicate) ...	3	80	46.10	178
Shepherds (Begbie & Jackson) ...	10 1 T	900	112.09	471
Do. (sands) ...	—	700	108.52	456
Do. (slimes) ...	—	70	—	167
Sid (W. How) ...	3	300	39.87	167
Tannie (J. Davidson) ...	3	11	5.97	25
Tsessebe 2 E. Ex. (Ullyett, Cribb & Seear) ...	10	1,400	370.72	1,557
Do. (sands) ...	—	1,625	127.40	535
Do. adjustments (concentrates) ...	F	—	—	74
Turkois (J. Mack & Co.) ...	10 2 P	1,332	434.86	1,826
Do. (sands) ...	—	1,332	—	105
Vumba (P. A. Scott) ...	3	90	25.02	102
Washington (I. J. Minaar) ...	5	153	40.14	168
Do. (sands) ...	—	120	15.75	66
Do. adjustments (slags) ...	F	—	—	6
What Cheer (H. Moser) ...	10	533	137.52	578
Premiums—May-July, 1921 ...	—	—	—	24,512
Hartley District Total ...	—	—	10,616.45	£69,660
Lomagundi District:				
Anglian (F. L. Standen) ...	5	479	352.36	1,480
Eldorado (Austen & Eaton) ...	5 1 T	700	386.52	1,623
Eureka (F. K. Brown) ...	5	346	24.61	103
Jolly Boys 18W (Jolly Boys Synd.)	5	600	71.62	301
Do. (sands) ...	—	600	34.17	144
Maggiemac (J. McMurdon) ...	10	810	207.24	871
Do. (sands) ...	—	561	53.33	224
Noxid (C. K. Dixon) ...	1	40	15.23	64
Ventura (Ventura Syndicate) ...	5	200	22.91	96
Premiums—May-July, 1921 ...	—	—	—	2,431
Lomagundi District Total ...	—	—	1,167.99	£7,337
Mazoe District:				
Dip (F. G. Richmond) (final clean up) ...	2	20	5.82	24
Kit (J. M. Laing) ...	5	165	35.58	150
Promoter 1 (F. C. Croxford) ...	C	2,300	86.37	363
Do. (sands) ...	—	1,800	70.56	296
Slam (Slam Syndicate) ...	10	510	50.01	210
Premiums—May-July, 1921 ...	—	—	—	961
Mazoe District Total ...	—	—	248.34	£2,004
Salisbury District:				
Alliance No. 2 (Alliance Tribute Syndicate) ...	5	414	134.86	566
Arcturus-Slate (Goldfields Rhodesia Develop. Co., Ltd.) ...	20 2 C	6,010	1,216.40	5,158
Do. (sands) ...	—	6,010	1,311.94	5,565
Bridge (D. H. Curry) (Sept. sands) ...	—	260	—	407
Do. (October) ...	—	—	97.01	407
Downton (J. A. Moore) ...	5	508	56.51	237
Fiona (Jensen & Townsend) ...	—	—	42.51	179
Joking (W. C. Harrison) ...	8	467	482.35	2,026
Joyce (B. Ellsmoor) (sands) ...	—	480	52.66	221
Juno (Santa Claus Syndicate) ...	5	406	90.65	381
Do. (sands) ...	—	325	151.90	638
New Full Back (W. B. Maris) (plate scrapings) ...	—	—	4.47	19
New Umbrella (J. A. Moore) ...	5	623	134.59	565
Old Home (E. H. Walsh) ...	2	98	37.21	156
Right Bower (G. Hawkins) ...	5 3 dolly	5	4.92	21
Shamva Mines, Ltd. ...	64 N 12 T	56,600	2,220.84	9,430
Do. (sands) ...	—	30,925	6,043.35	25,624
Do. (slimes) ...	—	25,374	—	321
Do. adjustments (September) ...	F	—	—	321
Tip Top (Jumbo G.M. Co., Ltd.)	10	1,650	448.88	1,885
Do (sands) ...	—	550	56.08	236
Top (Harrison & Rooke) ...	5	305	151.17	635
Trio (Trio Syndicate) ...	5	390	219.87	923
Do (sands) ...	—	296	39.43	166
Premiums—May-July, 1921 ...	—	—	—	9,074
Salisbury District Total ...	—	—	12,997.60	£64,433

Umtali District:

	No. of stamps.	Tons Treated.	Yield Ozs.	Value £
Howat's Luck (A. W. Rose) final clean up (September) ...	—	—	—	9.96
Kent (R.M.S. Syndicate) ...	10	700	221.08	928
Do. (sands) ...	—	700	92.40	388
Liverpool (H. and H. D. Norris) ...	5	580	121.05	508
Do. (sands) ...	—	300	56.20	236
Lucknow D.B. 1 E (Toronto Synd., September) ...	2 N	300	25.88	109
Do. (sands) ...	—	200	25.02	105
Rezende Mines, Ltd. ...	50	5,800	1,834.98	7,786
Do. (sands) ...	—	3,314	294.20	1,248
Do. (slimes) ...	—	2,189	232.13	985
Do. (concentrates) ...	—	207	399.40	1,695
Premiums—May-July, 1921 ...	—	—	—	5,367
Umtali District Total ...	—	—	3,312.30	£19,397

Victoria District:

	No. of stamps.	Tons Treated.	Yield Ozs.	Value £
Empress (D. & J. Laing) ...	C	1,800	132.10	555
Do. (sands) ...	—	900	117.38	493
Premiums—May-July, 1921 ...	—	—	—	733
Victoria District Total ...	—	—	249.48	£1,781

(P) Grinding Pan. (BM) Ball Mill. (T) Tube Mill. (H) Huntington Mill. (GR) Gates Rolls. (Fn) Pneumatic Stamp. (N) Nissen Stamp. (C) Chilian Mill. (RP) Roasting Plant. (F) Treated at Falcon Mine. (WM) Waterfall Mill. (LM) Lane Hill. (EP) Experimental Plant.

SUMMARY OF MINERAL PRODUCTION. OCTOBER, 1921.

	Yield	Value.
Gold (fine ozs.) ...	53,424.39	*£363,373
Silver (fine ozs.) ...	13,342.56	1,713
Coal (raised, 49,306 tons)—sales ...	—	14,963
Coal (used for coke) ...	—	5,402
Copper (Blister) (tons) ...	270.88	16,521
Chrome Ore (tons) ...	101.81	378
Asbestos (tons) ...	628.95	14,458
Arsenic (tons) ...	112.35	2,582
Mica ... 20 tons	1,306 lbs.	5,163
Tungsten (Scheelite) tons fine contents	17.25	800
Total ...	—	£425,353

* Includes £137,207 gold premium.

ASBESTOS—OCTOBER, 1921.

Bulawayo District:	Tons.	£	s.	d.
Biltong (Ben Wilson) ...	10.25	461	5	0
Nil Desperandum (African Asbestos Mining Co., Ltd.) ...	146.95	3,673	15	0
Panganj (J. S. Hancock) ...	14.87	327	1	3
Shabanie (Rhod. & Gen. Asbestos Corp., Ltd.) ...	256.19	6,404	17	6
Clip C. (Slip Syndicate) ...	57.00	1,220	0	0
Lomagundi District:				
Ethel (Union and R. Trust, Ltd.)	30.00	375	0	0
Victoria District:				
Gath's (Rhod. and Gen. Asbestos Corp., Ltd.) ...	25.12	628	0	0
King (R. King Asb. Co., Ltd.) ...	88.57	1,367	9	7
Total ...	628.95	£14,457	8	4

COMPARISONS.—OCTOBER, 1921.

Gold—		
October, 1921 (fine ozs.) ...	53,424.39	
September, 1921 (fine ozs.) ...	52,435.96	
Increase ...	988.43	
Base Mineral Production—		
October, 1921 ...	£60,267	
September, 1921 ...	47,546	
Increase ...	£12,721	
Total Mineral Production—		
October, 1921 ...	£425,353a	
September, 1921 ...	320,618b	
Increase ...	£104,735	

a—Includes £137,207 gold premiums.
b—Includes £41,024 gold premiums.

Quarterly Reports.

S.A. TOWNSHIPS GROUP.

Operations of Subsidiaries for the Quarter ended Sept. 30.
S.A. Coal Estates (Witbank), Ltd.

Output, 168,488½ tons; estimated profits, £15,000. Cassel Section—Landau: Conditions underground continue good. Navigation Section—Bailey Shaft: Development still being pushed ahead and coal opening out well. Machinery and plant working satisfactorily. Navigation Shaft: Conditions underground very good; development still proceeding from air-shaft; erection of screening plant is well forward.

Leeuwpoort (African Farms) Tin Mines, Ltd.

During the quarter 4,561 tons of ore were milled and 3,496 tons of tailings treated, resulting in the recovery of 93 tons of concentrates of an average grade of 50.43 per cent. A total of 1,186 feet was developed and the expenditure on development, machinery plant, etc., amounted to £7,196 11s. 3d.

McCreeley Tins (Swaziland), Ltd.

Owing to the continued low price ruling for tin, the Board considered it judicious to temporarily suspend sluicing operations on the property.

West End Diamonds, Ltd.

During the quarter satisfactory progress has been made with erection of permanent plant, which is approaching completion.

Theron Diamonds, Ltd.

Mining, hauling and flooring of blue mixed and yellow ground has been continued during the quarter—a total of 30,080 loads having been floored during the period under review—making to date a total of 52,845 loads floored.

A Note on Drill Steel.

In a contribution to the discussion in Mr. E. A. Wright's paper on the standardisation of mining materials, before the Institution of Mining and Metallurgy recently, Mr. G. H. Gilman said: "Mr. Wright's paper bespeaks a great deal of painstaking research applied to a subject in which I am particularly interested. It was my privilege to contribute a paper on the Heat Treatment of Rock-drill Steel at the New York meeting of the American Institution of Mining and Metallurgical Engineers in February last. Mr. Wright's reference to the American suggestion for chemical composition of drill steel, prompts me in advancing the information that, prior to the War, a very large percentage of the hollow drill steel employed in America was imported from Sweden, and marketed in that country by A. Milne and Co., of New York City, under the trade symbol of F.J.A.B. Steel. This material was procurable in two tempers—No. 7 and No. 10. The former contained a carbon content of from 0.70 to 0.80, and the latter from 0.95 to 1.10. Comparative tests of these steels conducted under widely varying conditions have shown the No. 10 temper to possess shock and wear-resisting qualities that were superior to those of the No. 7 temper, but on account of the higher carbon content, considerably greater care was found to be necessary in its working, and especially as applied to its heat treatment, whereas the No. 7 temper would withstand more abuse by the drill steel smith. Conditions resulting from the entry of America into the War practically eliminated the Swedish product from our market, and American producers were forced to rely upon their own resources, with the result that two prominent steel companies adopted the specifications referred to by Mr. Wright, which I believe are representative of our best practice at the present time, although the F.J.A.B. Steel in the higher carbon content is now available."

FRICITION—
*the unseen enemy of Production
in your plant.*

"Power-Loss Insurance"

MODERN INSURANCE covers every hazard of industry except, perhaps, one
We suggest—

**A lubricating policy
for your entire plant.**

If you have correct lubrication for your cylinders, but not for your shaftings, you are only "half insured" against preventable friction—and expensive power loss.

If your turbines are correctly lubricated and other bearings incorrectly lubricated, you are suffering a serious "partial loss" of productive power—and production.

Only by correct lubrication throughout your plant can you insure yourself against—

—**loss of Fuel** : correctly-lubricated machinery requires less fuel.

—**loss of Power** : preventable friction slows down machinery and invites costly repairs.

—**loss of Production** : the machine that slows down, slows down your output.

—**loss of Profit** : after all, this is the important net loss.

The premium you pay for correct lubrication may be a few pence more per gallon of oil. This few pence a gallon represents not added expense but a marked saving in expense. It protects your machinery, while it speeds your output. Generally it reduces actual oil consumption.

If you are interested in insuring your plant against needless power losses, production losses, and profit losses, we suggest that you get in touch with our nearest branch.

Our lubricating recommendations are based upon—

- 1.—Experience gained through more than 50 years in manufacturing lubricating oils of highest quality.
- 2.—Our engineers' close contact with the efficient operation of all types of running equipment throughout the world.

Stocks are carried in principal cities throughout the country.



Lubricants

A grade for each type of service

Vacuum Oil Company of South Africa
LIMITED.

Cape Town.	Johannesburg.	Pretoria.	Durban
East London.	Port Elizabeth.	Mossel Bay.	Bloemfontein.
	Kimberley.	Lourenco Marques.	

The Week's Meetings.

FRANK SMITHS.

PROPOSED SALE OF LAND.

Slack Demand for Diamonds.

Professor J. G. Lawn, C.B.E., presided at the ordinary general meeting of shareholders in the Frank Smith Diamond Estates and Exploration Co., Ltd., held in the board room, Consolidated Building, Johannesburg. Others present included Messrs. J. Munro, J. H. Crosby, P. Dreyfus, L. J. Woolf, R. J. Gill, A. J. Beaton, J. A. Cohen, H. Adler, A. D. Viney, Alex. Leal (representing the secretaries), and E. H. Francis (representing the transfer secretaries).

In submitting for approval and adoption the directors' report and balance sheet for the year ended June 30, 1921, which had been circulated to shareholders, together with a report by the manager, the chairman said:—

At the time of the last annual meeting of the company we met together in a hopeful frame of mind, as the plant had just been completed, and washing had commenced on November 8, 1920.

There was one small cloud above the horizon, and that was that the demand for diamonds at the time was somewhat slack. It was, however, thought that this was only a temporary depression, and that the market would soon right itself again. Unfortunately the market did not improve, and the cloud of depression became larger. As a result, De Beers and Jagersfontein Mines closed down, and your directors felt that there was no chance of keeping your mine running, especially as the company was in debt, and so it was closed at the end of February last.

A Disappointing Yield.

During the four months that work was carried on 164,000 loads of blue ground were washed and 4,002 carats of diamonds recovered. This was a disappointing yield, as it only amounted to 2.44 carats per 100 loads, whereas the average yield during the last seven months that the mine was worked in 1914 was 3.77 carats, and for the six months previous to that was 3.57 carats.

In diamond mines there are usually richer and poorer zones, and they generally run vertically. As the blue ground was taken from the same level as in 1914, it was evident that a poorer zone of the mine had been reached. It would only have been possible to work the same zone as in the previous working by getting down to a lower level. This would have been done if it had been possible to keep the mine working, and I have no doubt that a similar yield to that previously obtained would have been secured. Even the yield of 2.44 carats would have paid for working, when the mine got properly going, had the diamond market held.

In September last there were sales of diamonds on a moderate scale, and hopes were entertained that a turn in the tide had come. Since then, however, the improvement has not been maintained, and the market is again dull. Under these circumstances there is nothing to be done but to pursue a waiting policy, and hope for better times.

The company has a large area of land bordering on the Harts River, and it is the policy of the directors to sell this if possible and so reduce the debt; but, as you know, farming is also in a state of depression at the present time, and land is difficult to sell.

Mr. Woolf asked to whom the diamonds were sold—£20,000 being mentioned.

The chairman: To Mr. Joel, when he was out here.

Replying to another question on the same point, Professor Lawn said the directors went into the matter, and felt that it was a good offer, and as events had proved it had been so.

Mr. Adler: They would not fetch the price to-day.

The chairman: No; to-day I don't think we would get any offer at all for them.

The report and accounts were adopted. The appointment of Mr. Paul Dreyfus as a director of the company was confirmed, Messrs. G. Inroth and G. Sonn, retiring directors, were re-elected. Mr. W. Fergusson was re-appointed auditor of the company.

Extending Options.

An extraordinary general meeting of shareholders in the company was then held, the same members being present.

The chairman said it had been called at the request of a large body of outside shareholders. He submitted the following resolution:—"That, having regard to the fact that the mine of the company closed down on March 1, 1921, and is still closed down, it is desirable to extend the option to subscribe for new shares in the company during a period of three years expiring on February 28, 1923, in terms of the option certificates issued by the company, dated March 1, 1920, and accordingly that the rights granted under the said option certificates be and the same are hereby extended from February 28, 1923, either by a period of two years or by a period equal to the time the mine remains closed down, whichever of such two periods may be the less. In the event of the latter period being applicable, notice of re-startment of the mine shall be given by the Board by advertisement in newspapers in Johannesburg and London."

Mr. Adler said he thought it was fair that shareholders should have an opportunity of recouping themselves. The mine was closed down at an inopportune time. Was it contemplated selling some of the company's land?

The chairman: We did.

Mr. Adler said he thought the proposition was an excellent one.

Replying to another shareholder, the chairman mentioned that the company had 40,000 acres of land altogether. About 5,000 acres would be reserved for the working of the mine, the water supply, and so on, and there would probably be about 35,000 acres available for disposal.

The resolution was adopted.

WITRAND COLLIERY.

SOUND HOPES FOR THE FUTURE.

The second ordinary meeting of shareholders in the Witrand Colliery Company, Limited, held in the Consolidated Building, Johannesburg, was presided over by Professor J. G. Lawn, C.B.E., who moved adoption of the directors' report and accounts for the year ended September 30, 1921.

"This company has had an exceedingly difficult year," said the chairman. "In the first place the equipment cost more than had been anticipated, largely owing to difficulties with the Railway Administration, who insisted on costly alterations

to the siding. Then there was great difficulty in placing the coal owing to the arrangements which had been made not proving satisfactory. Towards the end of August a contract was entered into with the Transvaal Coal Owners' Association. The allotment received is very small, but we are hoping that we shall be able to keep the colliery running at a small profit until such time as the larger output can be obtained. There is no doubt that the colliery will prove a profitable proposition on any reasonable output."

The report and accounts were adopted. Those present at the meeting included Messrs. J. Munro, J. H. Crosby, J. A. Cohen, W. M. Munro, Frank Hall (representing the secretaries), and E. H. Francis (representing the transfer secretaries).

A PROFIT BEING EARNED.

THE NEW SPRINGS COLLIERY.

Submitting the directors' report and accounts for the year ended September 30, 1921, to the second ordinary meeting of shareholders, New Springs Colliery, Limited, in the Consolidated Building, Johannesburg. Professor Lawn C.B.E. (chairman), said the profit made in coal mining during the past year was small. This was due, in the first place, to the fact that the railway siding was only completed in January last. In the second place the output was small. Towards the end of August a contract was entered into with the Transvaal Coal Owners' Association, and although the allotment of tonnage was small, a profit was now being earned. The colliery had opened up an excellent seam of coal. The equipment, although not elaborate, was sufficient, and when the output could be somewhat increased, satisfactory profits would be earned.

The report and accounts were approved.

THE BURNSIDE COLLIERY.

SHAREHOLDERS' MEETING.

Presiding at the first ordinary general meeting of shareholders in the Burnside Central Colliery, Ltd., held in the boardroom, Consolidated Building, Johannesburg. Professor J. G. Lawn, C.B.E., moved the adoption of the directors' report and accounts for the year ended September 30, 1921.

He said: Two circulars were issued to shareholders during the year, one on June 27 and the second on September 20. These, together with the report of the consulting engineer, circulated with the directors' report and accounts, explain the position fully. It is doubtful whether even in prosperous times the area owned by your company would make a profitable colliery, and in times such as we are facing to-day it would certainly be unwise to incur expenditure in developing and equipping the property.

Wise to Mark Time.

Under these circumstances it was felt that the wisest policy was to mark time for the present and to conserve the cash resources of the company. The directors of the company have agreed to forego their fees and expenses have been cut down to a minimum. The cash on hand at the end of the financial year was £20,870, and, as pointed out in the directors' report, £20,000 of this amount has been placed on fixed deposit. It

has been suggested by one shareholder that the interest on the cash should be paid out as a dividend, but naturally such a dividend would be very small, and I would suggest that this matter be left to the discretion of the directors.

The directors' report and balance-sheet were adopted.

The appointment of Messrs. J. G. Lawn, C.B.E., John Munro and Jack Andrew Cohen, as directors in place of Lieut.-Colonel G. A. Morris, C.M.G., D.S.O., and Messrs. W. J. Shaw and A. P. Smith (resigned), was confirmed. The appointment of Messrs. Jas. Anderson (since resigned) and James H. Crosby as directors was confirmed. The retiring directors, Messrs. J. G. Lawn, C.B.E., and J. Munro, were re-elected, and the company's auditors reappointed for the current year.

Those present at the meeting in addition to the chairman were Messrs. J. Munro, J. A. Cohen, J. H. Crosby, W. M. Munro, F. E. Irving, Frank Hall (representing the secretaries) and E. H. Francis (representing the transfer secretaries).

CONSOLIDATED COLLIERIES LIMITED.

75,000 TONS A MONTH OUTPUT.

A shareholders' meeting of the Consolidated Collieries, Ltd., was held last week, when Mr. J. G. Lawn, C.B.E., presided. There were also present: Messrs. John Munro, W. M. Munro, J. H. Crosby, J. A. Cohen, H. Williams; Mr. Frank Hall (representing the secretaries), and Mr. E. H. Francis (representing the transfer secretaries).

The Chairman said: I have pleasure in submitting for your adoption the directors' report and audited accounts for the year ended September 30, 1921. Your company was formed to take over two collieries, the Cape Colliery and the Carlechu Colliery. The Cape Colliery was fairly well equipped, but underground little development had been done. The Carlechu Colliery had only a very imperfect screening plant, but was much more extensively developed underground than the Cape. A new screening plant has been erected at the Carlechu Colliery, and other equipment has been added to both collieries, in particular an electric power plant at the Cape sufficient to serve both collieries. The collieries are now capable of an output of 75,000 tons per month. The profit on coal mining

during the period under review was small, principally owing to the breakdown in the arrangements which had been made for selling the coal. Towards the end of August a contract was made with the Transvaal Coal Owners' Association, and, although the allotment received by this colliery was very small, a profit is now being earned. There is no doubt that this is a very fine proposition, and when an adequate output can be attained substantial profits will be earned. I now beg to propose that the directors' report and accounts for the year ended September 30, 1921, be adopted.—Carried.

The retiring auditors, Messrs. Alex. Aiken and Carter, were reappointed.

LACE PROPRIETARY MINES

SHAREHOLDERS' MEETING.

Vlakfontein Intersection of the Reef.

At the 15th ordinary general meeting of shareholders of the Lace Proprietary Mines, Ltd., held in the board room, Consolidated Buildings, Johannesburg, on Tuesday, November 29, Professor J. G. Lawn, C.B.E., presided. There were also present Messrs. J. Munro, W. M. Munro, J. H. Crosby, E. M. Hind, J. Jeppe, A. Barker, J. S. Brown, D. R. Christie, R. Hedding, A. B. E. Johnston, E. Molyneux, D. O'Regan, and G. B. Pascoe, together with Mr. Alex. Leal, representing the secretaries, and taries.

In moving the adoption of the reports Mr. E. H. Francis the transfer secretary and accounts the Chairman said:—I have pleasure in submitting for your adoption the directors' report and audited balance sheet for the year ended August 31, 1921. No mining work or prospecting has been done on either of your two farms during the year under review, but there have been some developments in the neighbourhood of Vlakfontein which are of interest. Immediately to the north of Vlakfontein lie the properties of West Springs, Limited, and of Springs Mines, Limited. At Springs Mines No. 3 shaft, which is at present the southernmost shaft of that mine, the reef was intersected at a depth of only 3,466 feet, thus giving rise to the hope that the reef on Vlakfontein possibly occurred at a shallower depth than had been indicated by the borehole put down on the farm. More recently a borehole was put down by the New Consolidated Gold Fields near the north-eastern boundary of Grootfontein, a

farm adjoining Vlakfontein on the east; this borehole struck the reef at a depth of 3,340 feet. The evidence of this borehole tended in the same direction as that of No. 3 shaft Springs Mines. On the other hand the south shaft of West Springs, Limited, did not strike the Kimberley shale at the depth at which it was expected, and consequently the shaft was stopped and a borehole was put down at the bottom of it. This borehole indicated that the reef would only be struck at an approximate depth of 4,800 feet, whereas it had been previously anticipated it would be struck at a depth of about 4,000. So that it seems clear that between the north and south shafts of West Springs, Limited, there is either a fault or a sudden steepening of the reef. The direction of this disturbance probably runs to the east of south, but almost certainly it affects the depth of the reef on Vlakfontein. Developments in this district are being carefully followed, but there is no doubt that the wisest course at the present time is to refrain from doing any actual work until the position becomes clearer.

Repurchase of Spaarwater.

Since the close of the financial year the Spaarwater Gold Mines, Limited, has been placed in liquidation, and your directors agreed to repurchase the mineral rights of the Spaarwater Farm from the Spaarwater Company, the purchase price being the discharge of your company's right to participate in the liquidation distribution of the Spaarwater Company. This practically amounted to your company taking back the mineral rights of Spaarwater for the same consideration as it received when it sold them to the Spaarwater Company. As no work has been done on the property by the Spaarwater Company, the transaction was a fair and equitable one.

It will be seen that the cash position of the company is a strong one, and that there is £135,233 in hand. The only policy to pursue at present is to await developments and conserve the funds of the company.

The motion for the adoption of the reports and accounts was seconded by Mr. J. Munro, and on being put to the meeting was carried unanimously.

There being no other nomination, the retiring directors, Messrs. J. G. Lawn, C.B.E., and J. Munro, were re-elected.

There being no other nomination, the retiring auditor, the firm of Messrs. Page and Fry, was reappointed, and the fixing of the remuneration for the past audit was left in the hands of the directors.

This concluded the business of the meeting.

DIRECTORY OF SOUTH AFRICAN MANUFACTURERS.

Fifth Edition, 1921.

A copy of the above very useful publication has just come to hand. It is issued by the South African National Union, and is obtainable from bookstalls at a popular price. The purpose of the book is to inform people in the Union and elsewhere of the variety of articles now being made and from whom they can be obtained. The demand for such information is clearly evident from the number of inquiries received for a list of firms able to turn out goods in commercial quantities. There is an increasing desire for such

information by traders and agents. The publication will be of great assistance to manufacturers in placing their products in a larger number of markets than at present. The consumers will be likewise assisted, as they are enabled to place precisely where any article is obtainable, and thus save much time in unnecessary searching. To the producer of raw materials it provides very useful information concerning the factories which are likely to utilise such raw materials. In a young country like South Africa, where very many industries are in the primary stages, the importance of such information can hardly be overestimated. It is only by making known to the public what the country is capable of producing that a firm industrial footing can be gained

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Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, DECEMBER 10, 1921.

No. 1576.

Two Remarkable Diamond Mining Views.



(1) A Blast at the Premier Mine. (2) What it Brought Down.

The top photo is a unique picture of the actual moment of blasting at this great mine, now, unfortunately, worked on a curtailed programme. The bottom view shows the great mass of rock brought down by the blast.

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More Facts about the Rand Refinery.

GENESIS OF THE UNDERTAKING—"FINEST REFINERY IN THE WORLD"—WHAT IT MAY SAVE THE INDUSTRY—EXAMPLES FROM OTHER COUNTRIES—HOW WAR CONDITIONS EMPHASISED ADVANTAGES—NECESSITY OF A MINT—MOMENTOUS STEP IN HISTORY OF THE INDUSTRY.

In our last issue we gave a brief technical description of the Rand Refinery, now nearing completion at Germiston, to deal on a co-operative basis with the output of the Rand. In the following article we give some particulars of the history of the undertaking and the reasons why the industry decided to embark on the expense of its establishment.

A brief description of the Rand Refinery at Germiston, which appeared in our last issue, has aroused considerable public interest and evoked many inquiries regarding the origin and history of the undertaking. During the week, moreover, the proprietary company known as the Rand Refinery, Ltd., held its first annual meeting under the presidency of Mr. H. O. Buckle, who made no bones about describing the new Germiston institution as "the finest refinery in the world." Mr Buckle explained that the idea of establishing a refinery here had been mooted at intervals for a long time, but it was not until 1917 that it was taken up seriously. On a request being then received from the Union Government for comments on the proposal to establish a mint and refinery, Dr. W. A. Caldecott, who had for many years taken an interest in the subject, wrote an extremely interesting memorandum, indicating that the matter was well worth further investigation. Mr. Samuel Evans then took the matter in hand, and after going into it thoroughly, produced an exhaustive report, in which the subject was considered from every point of view. As a result of Dr. Caldecott's and Mr. Evans' researches, and in view of the Union Government's decision, in 1919, to establish a branch of the Royal Mint in South Africa, the Chamber of Mines made arrangements to erect and equip a gold refinery on the Witwatersrand, where the gold from the mines would be collected and refined and in due course despatched to Pretoria, where, absurdly enough, said Mr. Buckle, the mint was to be situated. Mr. Buckle did not mention the fact that expert advice sixteen years ago was strongly against the idea of a local refinery, but conditions have, of course, materially changed in the meanwhile, and to-day no impartial observer of all the facts can fail to perceive the wisdom of establishing a refinery with its essential adjunct, a mint.

Lessons from Elsewhere.

Mr. Samuel Evans, it may be remembered, in his historic memorandum on the subject—to which Mr. Buckle referred—advocated that the producers of gold in South Africa should be put in the same favourable position as the producers of gold in Australia and Canada; that is, that the industry should be allowed to make its bullion immediately marketable instead of having to incur the expense involved in sending it to England, Canada or Bombay to be refined and coined. A glance at some of the facts brought forward

in support of that plea may be of interest at this juncture, when the refinery is on the eve of entering the stage of actual production.

Some Questions.

The first question to be asked is:

Is it really necessary to send Witwatersrand bullion to England, Canada or India to be refined and minted?

Cannot the gold produced on the Witwatersrand be refined and minted locally at a lower cost than the 1s. to 1s. 10d. per fine oz. which in actual practice it has been costing?

The second question is: With a refinery in Johannesburg and a mint at Pretoria, what would be the charges which the gold mining companies of South Africa would have to pay in order to convert their gold bullion into sovereigns? To answer these questions it is necessary to examine what is being done elsewhere and at what cost.

It appears to have been the practice in the U.S.A. to have refineries and mints in every State which produced gold in any quantity. In Australia gold refineries and mints were established as branches of the Royal Mint at Sydney in 1855, at Melbourne in 1872, and at Perth in 1898. A mint and refinery were established at Ottawa in 1907. This establishment was considerably enlarged during the War in order to treat South African gold. A gold refinery and mint have just been established at Bombay. The following table shows the overwhelming importance of South Africa as a gold-producing country compared with other British Dominions where gold refineries and mints have been established:—

	1917.	
	Value of Gold Output.	Percentage of World's Output
	£	(£88,693,860).
Transvaal	38,306,381	
Cape and Natal	1,294	
Total for Union	38,307,675	43.2
Rhodesia	3,495,353	3.9
Total British S. Africa	41,803,028	47.1

	1917.	
	Value of Gold Output.	Percentage of World's Output
	£	(£88,693,860).
Australia	6,168,710	7.0
Canada	3,172,050	3.6
India	2,214,160	2.5

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MANAGERS' EXAM., September, 1921

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	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

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More Regular Work.

It must be remembered that a refinery in Johannesburg would have more work, and more regular work, than any other gold refinery in the world. Consequently, the costs ought to be lower than they are elsewhere. As far as one is able to ascertain, the work in most gold refineries and mints is extremely irregular, and, as a result, unduly costly. For instance, the issue of gold coins from the Royal Mint in London in the ten years ended December, 1915, varied between a minimum of £12,165,000 and a maximum of £33,350,000 per annum. Only £1,554,000 of gold coins were minted by the Royal Mint, London, in 1916. The U.S.A. mints converted 10,000,000 ozs. of gold into coin in 1904 and only 59,503 in 1917. In 1901 they converted into coin 26,727,000 ozs. of silver and only 2,312,000 ozs. in 1911. The Australian refineries and mints, and more particularly the Perth establishment, are the only refineries and mints working under conditions approximately similar to those which would be applicable to a refinery in Johannesburg. Even in the case of the Perth refinery and mint there are considerations which make for higher costs than would be likely to obtain here. At Perth a large number of small deposits of bullion have to be handled, and the total quantity of bullion treated is small compared with what would be the case in a Johannesburg refinery.

The authorities publish no figures as to the capacity of the Perth refinery, but it is reported to be equal to treating the total output of Western Australia, the value of which in 1903 was £8,770,719. It is claimed for the Sydney and Melbourne mints that they have a capacity equal to dealing with the total gold output of Australasia, which in 1903 totalled £18,333,000 in value. In June, 1900, the Secretary of State for India estimated the cost of building a new mint for gold at Bombay at £12,933.

Points about a Refinery.

As regards the cost of building and equipping a refinery only, one authority wrote from America:—

"I understand that at all the Australian mints the chlorine process is being used. At Ottawa the original installations were the Moebius and Wohlwill electrolytic processes, but in 1914, owing to the increased quantities of bullion to be handled, the more rapid chlorine process (Miller's) was introduced. At the U.S. Assay Office in New York the Moebius and Wohlwill electrolytic processes are employed. The capital cost for either process is comparatively small. Metallurgist W. C. Smith (already referred to) estimates the cost of a Wohlwill plant only, with building, to refine 10,000,000 ounces per annum at about £15,000, New York. The cost of the temporary building and chlorine plant put up at Ottawa to treat South African bullion, with capacity of similar quantity per annum, was about £9,000, and it is worth mentioning here that this addition was entirely completed in eight weeks. Had the arrangements been of a permanent nature more money would doubtless have been spent, especially on a better system for washing fumes. . . . The cost of the plant only at the U.S. Assay Office, New York, for both Moebius and Wohlwill processes was £15,000—also with capacity of 10,000,000 ounces per annum. The building cost I have not been able to ascertain, but, if we use Metallurgist W. C. Smith's figure of £10,000 for building, the total cost of the Assay Office, New York, would be £25,000."

To sum up.

It would be a conservative estimate to place the total realisation charges, including the payment to the Bank of England, at 1s. 2½d. per oz. of fine gold under pre-war conditions, which, on the output of South Africa for 1917, namely, 11,250,000 of bullion would mean, under pre-war conditions, over half a million sterling. Put in another way: That the actual cost of refining and minting in Western Australia is 1'422d. per oz. of bullion.

	Pre-War Conditions.
The total realisation charges per annum for British South Africa have been	£555,236
The cost of refining and minting if done in Johannesburg should not exceed	100,000
Difference	£455,236

which is approximately what the gold producers of British South Africa would stand to gain yearly were a mint and a refinery established in Johannesburg. In other words, every month's delay in providing a local refinery and mint involves a loss to the gold producers of British South Africa of about £67,000 under war conditions and about £38,000 under pre-war conditions.

An Argument Refuted.

The argument usually advanced against refining and coining in South Africa is that our currency requirements constitute only a small fraction of the gold output of the country, and that we have to send the bulk of our output to England, even if we did refine and coin it here. A little consideration will demonstrate the fallacious character of this argument. Let us examine what happens when gold bullion is sent from South Africa to England. In the fifty years ended 1913 the average value of the gold bullion and specie imported into and exported from the United Kingdom per annum was:—

Imports	£25,238,760
Exports	21,183,915
	£4,054,845

and of the latter a considerable portion was eventually exported in the form of jewellery, goldware, etc. It has been estimated that less than 5 per cent. of the Rand gold sent to England constitutes a permanent addition to the currency of the United Kingdom. Roughly, what took place before the War was this: Rand bullion was sent to England to be refined and partly coined, and then the bulk of it was distributed all over the world, to the Continent, to the U.S.A., to Egypt, to India, Japan, South America, etc. What happened during the War was: South African bullion was sent to Canada and India to be refined and partly coined. The refinery and mint at Ottawa were purposely enlarged in order to treat South African bullion, and a new gold mint was established at Bombay, apparently also in order to treat South African gold. When refined and coined at Ottawa or Bombay South African gold was re-shipped to Spain, U.S.A., Egypt, Japan, South America and China, which adopted the gold standard. It is obvious that when the gold is refined and, if necessary, minted here, it can be distributed direct to the countries requiring it, effecting a very large saving. "The fact is," as one authority put it, "it would be difficult to conceive a more unbusinesslike and extravagant arrangement than the one which has hitherto prevailed as regards the disposal of South African gold."

A Mint Essential.

An important point is that there must be a mint as well as a refinery established, and that the former be a branch of the Royal Mint in London in order to completely eliminate the Bank of England charge of 1½d. per standard oz. and obtain the benefit of the provision appearing in Proclamations creating branches of the Royal Mint, which says that "gold coins coined under such Proclamation shall be deemed to have been issued from the Royal Mint." It does not follow that all the bullion refined will be coined into sovereigns and half-sovereigns. Portion, no doubt, will be formed into ten ounce bars of standard fineness for export to India, China, and other countries which have to import gold for their mints.

The foregoing are some of the main reasons why the Rand Refinery, "the finest in the world," is now on the eve of becoming an accomplished fact.

roads traversing the State and with the aid of King Petrol providing a tremendously important adjunct to the railways.

The Indian Example.

Take, for instance, India. There they have a main trunk road running from Peshawur to Calcutta right across India, from the Khyber Pass on the west to Assam on the east. It is a road magnificently maintained by the Government of India and it provides a main artery right through the country, an artery running parallel with the great snow-capped mountains to the north from which India draws her economic life-blood through the medium of her magnificent rivers.

Other Countries.

In North America and in Europe there are similar main thoroughfares. France, for instance, has a wonderful system of roads and an excellent method of maintaining them in good order—a method which we propose to comment on in a further article.

Yet we in South Africa are little ahead of Central American republics in the matter of roads.

Wanted, a Main Road.

There should be a main trunk road traversing the Union from end to end—certainly from Capetown to Pretoria. Such a thoroughfare might well be extended northwards into the territory of our northern neighbours. From this main trunk branch roads should be extended to the various industrial centres of the country and to the coast ports. These branch lines would in turn be linked up with less important feeder lines and the whole network of communications would thereby galvanise life and activity into a country of immeasurable resources which is being starved through lack of leaders possessed of any imagination or constructive policies. The Railway Administration is to-day virtually without funds. Unemployment is rife and is extending. The railways are unable to construct the branch lines which are so urgently needed to open up rich and undeveloped districts.

Roads and the Out of Works.

The unemployed want work. It is no use squandering the Union's slender financial resources on doles and on useless relief work. But employment for the growing army of the out-of-works upon a main trunk road system traversing the whole country from Table Bay to the Limpopo would be the commencement of a step which would ultimately give to the Union an asset of vast value. Such an undertaking would with its feeder lines acting in consort with the railways give a tremendous fillip to commerce. It would also stimulate the motor trade of the country, and it would perhaps induce many overseas visitors to spend time and money on long motoring excursions in South Africa, a country blessed with good climate and scenery and with many other advantages which conspire to make the Union one of the most attractive motoring countries in the world—if only we had the roads.

How the Scheme would Benefit the Collieries.

Construction and maintenance of this main trunk road would provide our collieries with an immense market for the inexhaustible quantities of tar which they could produce from low-grade and waste coals. We have frequently observed in the course of visits to the coal fields of the Union that a vast amount of low-grade and fine coal is being dumped as waste. According to the managements of these collieries, there is no sale for this coal. Frequently we have been told that the collieries would be only too glad if some one would take the waste coal away. They could have it for nothing.

A Big Market for Tar.

When it is pointed out that this coal contains valuable by-products, and particularly tar, the invariable reply is: 'And who is going to buy the tar?' The market for tar in South Africa is exceedingly small. If we put up a tar plant we could not sell what we produced. The point is that an

enterprising road policy such as has been briefly outlined in this article would provide an ample market for innumerable tar plants. The main trunk road and its branches must be well metalled and a good surface maintained. Here, then, is an undertaking which would not only give useful employment to the out-of-works of the Union, but would also provide a profitable market for many thousands of tons of coal which are to-day going to waste. And of the advantages of such a road system to the country at large there can be no question whatsoever.

Strategical Value of the Road.

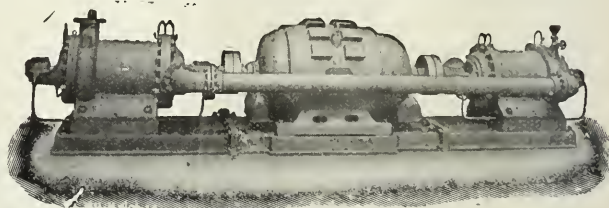
In addition to the points mentioned above, it would have a great strategic value, and in the case of a railway strike it might well prove the salvation of the Union. In England the great railway strike of 1919 was broken by the employment of mechanical transport on the excellent roads of the Island Kingdom. How much more important is it to the inland centres of the Union, situated at great distances from the coasts that there should be a good road route right through the country—a road which would be a valued coadjutor of the railways in normal times and which could if need be take the place of the railways during any possible period of industrial unrest.

Measuring One Thousandth of a Second.

Part of the work of observatory depends upon a means of measuring extremely short periods of time. For example, in receiving any signal by wireless telegraph or otherwise, it is vitally important that the precise time of receipt as recorded by a clock should be known. In order to facilitate this highly accurate determination, a British observatory has developed an appliance based on the Oscillograph, itself a British invention. This apparatus can register clock times of any signal accurately within one thousandth part of a second.

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THE IRONSIDE PROCESS DESCRIBED.

The process is the original invention of a young Scottish chemist, Mr. T. G. Ironside, M.A., B.Sc., Edin. Mr. Ironside has left with Mr. W. R. Burch, M.L.A., for England in connection with the business and financial arrangements that are now being made for establishing the process in England, America, France, Germany and other countries where oil shales and bituminous coals occur.

The outstanding advantage of low temperature carbonisation lies in the production of a quantity of oils almost double that obtained at high temperatures, as in gas works. Further, a large percentage of these are light oils suitable for internal combustion engines; the remainder are suitable for Diesel engines. The main requirements of a low temperature carbonisation process are:

(1) That the distillation is carried out at the lowest possible temperature which will break up the bitumens.

(2) That sufficient heat be present to distil off the volatiles produced by the decomposition of the bitumens.

(3) That the vapours which are formed are removed as rapidly as possible and with the minimum of contact with highly heated surfaces.

In any externally heated retort none of these conditions can be even approximately realised, for it is obvious that the walls of the retort must be at a relatively high temperature in order to get heat to pass inside the retort at a rate sufficient to make the process practicable. There is therefore a gradation of temperature from the walls of the retort to the centre, and the newly-formed vapours have abundant opportunity of coming in contact with the highly heated walls and with heated lumps which are hotter than the vapours themselves. The extreme conditions here set out are generally modified by the injection of steam, which tends to make the temperature more uniform in any one region of the retort; but, if the injection of steam were anything more than a palliative, the Mond producer would be the last word in low temperature carbonisation, which admittedly it is not.

In order further to cut down the temperature of the walls of the retort, these retorts are made of a cylindrical shape, so as to get a bigger surface, which will pass in the required quantity of heat at a lower temperature. The ideal would be an infinite surface at just above the right temperature.

In regard to the size of the particles being retorted it is obvious that ideal conditions will be attained when, and only when, each and every smallest speck of substance is in immediate contact, at every point of its own surface, with the heated surface, *i.e.*, the shale or coal, or other retorted substance must be in powdered form.

In the Ironside process the powdered shale is preferably pre heated until it is just about to begin giving off vapours. In the retort it is mixed with hot sand introduced at another point of the retort. The sand and shale are mixed by mechanism inside the retort, by which means the shale is raised to the temperature necessary for complete carbonisation under low temperature conditions, while the sand is just a shade hotter, and there is still sufficient heat present to distil off the volatiles. The process therefore approximately realises the ideal conditions. The powdered shale, every speck of which is in contact with an infinite surface of heating medium, is subjected as nearly as possible to the ideal temperature for each stage of the process. The mixing mechanism also performs the function of guiding the residue to an outlet where it drops into a sealed receptacle.

So far the process has been tested with a makeshift retort whose only recommendation was that it had two holes in the top for introducing sand and shale respectively, and

one in the bottom by which the residue might be extracted. These tests made clear the following points:

(1) The process is speedy. A given quantity of sand and shale once introduced into the retort is exhausted in something like a minute.

(2) The process will reduce the cost of the retorting plant (owing to the large capacity of this retort) to about one-tenth.

(3) The process gives a high yield, *viz.*, so far, from Waaiboek Cannel coal, liquids equal to 20 per cent. of the weight of the coal, while from the Mooifontein torbanite a yield of crude oil up to 40 per cent. of the weight of the material has been obtained.



Mr. T. G. Ironside, M.A., B.Sc. (Edin.), inventor of the new process which promises to revolutionise the production of oil from bituminous materials. Mr. Ironside graduated with first-class honours in mathematics, and during part of the War was engaged at Nobel's Explosives Works in Ayrshire. He came to this country as chemist to the S.A. Nitrate and Potash Corporation in 1919.

(1) The reaction is complete.

(5) As there is never much in the retort at any moment, and the retort may be built completely of iron, the process may be interrupted or the plant closed down whenever necessary.

(6) The carbonised residue from the process forms an ideal medium to replace sand, so that the process produces its own heating medium.

(7) No steam is required to moderate excesses of temperature, *i.e.*, coal required to raise such steam is saved and much less condensing plant is required.

(8) All heat required can be applied in an efficient manner, as the method of transferring heat to the sand

is not limited by the presence of shale, as in ordinary retorts.

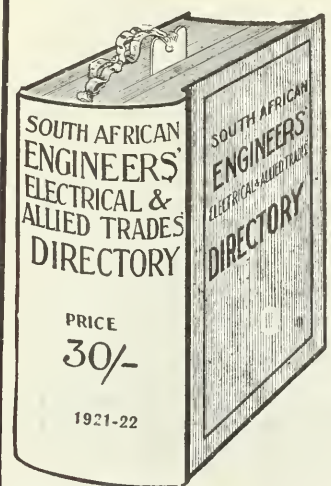
(9) The Waaihoek Cannel coal used on these tests has been reported on as not being suitable for Scottish retorts, owing to its clinkering tendencies. No sign of clinkering of the material was observed in these tests.

The tests referred to above were made in a small experimental retort of only 9 inches diameter. A new retort 3 feet in diameter has now been constructed. The height of the retort is about 2 ft. 6 in. This retort has been constructed by Messrs. Rowe and Monfries of this town. They have done their work excellently, both in regard to the castings and the interior mechanism. The detail mechanical drawings were executed by Mr. Kelly.

The completed retort has been despatched to the Grenfel Colliery, near Ermelo, where it will be erected and put into commission by the Transvaal Coal and Oil Shale Corporation, Ltd. The first material to be treated will be the rich torbanite from that company's property—the Carlis portion of Mooifontein. It seems certain that to the Transvaal Coal and Oil Shale Corporation will belong the honour of first producing oil on an industrial scale in South Africa.

Railway Electrification.

We understand that Messrs. Merz and McLelland, the consulting engineers, have advised all tendering firms to put in revised figures (in view of the fall in prices) within ten days, and the contract will be given out by the end of the month of December.



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WHERE QUALITY, NOT PRICE, TELLS.

When quality, not price, counts, British engineering is not yet beaten, as witness the following which we are privileged to extract from a letter from the head office of Messrs. Edgar Allen and Co., Ltd., of Sheffield:—

“Trade is improving and the troubles with workmen are fewer, but we are not working at our full capacity in the foundry and steel departments. The machinery and tramway departments are working full time. We have recently taken considerably over £20,000 worth of tramway work from Sweden, and more to follow, against German competition. *We got this on quality, not on price.* We have just completed the largest gyratory crusher ever made by a British firm. Its weight is 80 tons and the total height from foundation 17ft. 2 in., the diameter from the Hopper portion being 12 ft. 9 in. It was designed for breaking hard chalk for a cement company, and should break about 250 tons of chalk per hour, reducing lumps of about the size of a man to pieces 1 in. cube and under. The crusher surfaces are easily renewable, and made of our ‘Imperial’ Manganese steel.”

A RECORD ROPE.

What is believed to be the longest coil of moving steel wire rope, manufactured in one length without splice or joint, has just been completed at the Birmingham works of Messrs. J. and E. Wright, Ltd.

This rope is a new tramway cable for the Glasgow Subway Railway, and measures 36,300 feet long by 4½ in. circumference.

The Glasgow Corporation, with their reputation for always being abreast of the times, have decided on the most modern type of rope and have accepted a special flattened strand construction designed by Messrs. J. and E. Wright, Limited. The weight of the rope is approximately 65½ long tons.

The manufacturers, who believe that this is the very first fine ropes of flattened strand construction have been employed on tramway work, have also recently completed a large rope in the ordinary construction for the Melbourne tramways. This rope was 23,000 feet long, 4 inches in circumference and weighed approximately 30 tons.

The local agent for Messrs. T. and E. Wright, Ltd., is Mr. H. Aiers Hankey, of Standard Bank Chambers.

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The South African Institute for Medical Research.

HISTORY OF THE INSTITUTE—PHTHISIS RESEARCH—WORK OF THE MEDICAL BUREAU.

Members of the Chemical, Metallurgical and Mining Society of South Africa were the guests of the S.A. Institute for Medical Research on Saturday morning. The visitors were hospitably received by the Director of the Institute, Dr. W. Watkins-Pitchford, and the staff, and were conducted through the various departments and laboratories. Before commencing the tour of inspection the Director lucidly explained the origin and functions of the institution. The South African Institute for Medical Research was established in 1912 by agreement between the Government of the Union of South Africa and the Witwatersrand Native Labour Association (acting on behalf of the mining industry of the Transvaal), for the purpose of carrying out researches and investigations with a view to the prevention and treatment of human diseases. The Institute occupies a commanding site, in extent just over four acres, adjacent to the

work formerly carried on in the Government Bacteriological Laboratories of the Transvaal, which, by virtue of the agreement under which it was founded, the Institute is required to carry on.

The most prominent line of research which, up to now, has been pursued in the Research Division is that in respect of the prevention of pneumonia, a disease which, until recently, accounted for most of the sickness and mortality amongst the native labourers on the mines of South Africa, as well as recent researches in connection with miners' phthisis and the problem of mine ventilation.

Apart from the work of the Research Division, the Institute, in the "Routine" Division, carries out a large amount of diagnostic investigations for hospitals and the medical profession, in addition to the usual bacteriological services



The Institute—Looking from the East.

Johannesburg Hospital, and bounded by Hospital, de Korte and Joubert Streets, the main entrance (when the full scheme of the laying-out of the grounds has been completed) being designed to face Hospital Street. The site for the buildings, which overlooks the central area of Johannesburg, was donated by the Government, whilst the cost of the buildings and their equipment, amounting to about £45,000, was borne by the mining industry. The cost of maintenance of the Institute is borne by the Government and the mining industry in equal proportions up to a limit of £10,000 per annum, and, in addition, a substantial revenue is earned from the performance of bacteriological and pathological services—other than research work—for the Government, the mining industry, public bodies and the general public through the medium of the medical profession.

The work of the Institute is carried on in two main divisions—"Research" and "Routine," the latter including all the bacteriological, pathological and medico-legal

required for the Government, the mining industry and municipalities. Since the establishment of the Miners' Phthisis Medical Bureau in August, 1916, its work has been carried out in the Institute buildings, a portion of which has been allocated for the purpose. Under the Miners' Phthisis Act of 1916, every applicant for employment underground on the mines of the Witwatersrand is required to submit himself for medical examination at the Bureau, the object being to exclude from work underground any person who is infected with tuberculosis. In addition, all miners employed underground must be similarly examined at intervals of six months to ascertain whether or not they are suffering from either tuberculosis or silicosis, or both. The examination conducted at the Bureau is a very thorough one, and embraces both clinical and X-ray investigations.

The association of the work of the Bureau with that of the Institute has proved of mutual advantage; the numerous pathological investigations required by the Bureau are

carried out without any loss of time in the adjacent laboratories, and unique facilities for investigating miners' phthisis are thus provided.

A conception of the excellent work which has been achieved in the Bureau can be obtained from the following statements which were made by the Director during the course of his address to the visitors. "Up to the year 1916 the whole question of silicosis was in a most confused, chaotic state. It was known that large numbers of men who did not get silicosis at all had received large sums for compensation. It was also widely advertised that men who had silicosis had not received compensation.

Silicosis or miners' phthisis is the most important disease of South Africa, from the point of view of health and economy generally. Therefore, everything that could be known about the disease should be the care of this Institute.

The result has been, in the five years in which the Bureau has been associated with us, that we have now a clearer conception of silicosis than ever existed before. We know exactly what it is; it can be recognised. More important: this is the only place in the world, as far as I know, that it can be said with certainty whether a man has got silicosis or not. There is a rigid examination of all recruits for underground service. This has resulted in a very marked rise in the health of the underground workers.

"Since the Medical Bureau was started, 8,000 of these men have been passed. Of this number not one has developed silicosis. That fact alone would justify the association of a medical bureau with an institute for medical research."

Further testimony of the Bureau's work is furnished by the following extract from the report of the Miners' Phthisis Board for the eight months ended July, 1920. The total number of clinical examinations and investigations was 42,030, an average of 140 examinations and investigations for each working day. The annual totals of examinations and investigations for each year since the establishing of the Bureau in 1916 have been: 28,853; 35,579; 32,730; 42,030. For the twelve months now being reported upon, there has been an increase in the work of the Bureau of about 45 per cent. over that for the first year. During the year a total of 29,062 radiographic negatives (12 in. by 10 in.) have been prepared. The percentage of rejected negatives was 6.5. The Bureau accepts as evidence only those radiographs which reach a definite standard of technical quality.

The work of marking each radiograph with the serial number of the individual has been simplified and improved by the use of an appliance devised by Dr. W. Steuart, the medical radiographer, and the chairman. This appliance produces an indelible radiographic stencil of the serial number, the class of examination, and the date, upon the heart shadow of the examinee. Its use has been productive both of saving of time and greatly increased clearness and accuracy in the identification of the radiographs.

Recovering Lime from Waste Solutions.

The utilisation of solutions containing zinc on the gold mines is a problem which has been commented on by chemists and metallurgists on the Rand for some time past. A large amount of zinc goes to waste annually in these solutions, and a process which can economically utilise this zinc in some form or other should prove to be of some value to the mining industry. In the Kominsky process, a method for converting the zinc in solution into paint pigments is put forward, and briefly consists of the following: The zinc solution used is that which results from the acid treatment of gold zinc slime, and usually contains about 5 per cent. metallic zinc, a small quantity of ferrous iron salts, and excess acid. The iron salts have to be removed, otherwise they find their way into the zinc compounds precipitated subsequently, and cause discolouration. The removal of the iron has been made possible by the Kominsky process. The acidity of the solution is controlled by the

addition of lime. Iron is converted from the ferrous to the ferric state by means of sodium chromate. Sodium hydroxide is now added, and precipitates impure zinc hydroxide from a small quantity of the original solution. The zinc hydroxide is made into a paste and added in considerable excess to the original oxidised solution. Excess of sulphuric acid is neutralised by some of the zinc hydroxide, and the remainder precipitates ferric and chromium hydroxides from the neutralised solution. An equivalent portion of zinc hydroxide goes into solution. The whole solution is filtered in a filter press. The sludge containing some zinc hydroxide is reused for precipitation, while the clarified solution is now free from iron. The zinc is next precipitated from it by means of a solution of sodium chromate, producing a precipitate of zinc chromate which when filter pressed, washed, dried, and crushed produces the paint pigment zinc-yellow. By precipitating the zinc as carbonate and calcining this product zinc-white is produced.

* * *

October Gold Output.

The official figures issued by the Chamber of Mines show:—

WITWATERSRAND:

Tons crushed	2,041,581
Declared fine ozs.	690,348
Dwts. per ton	6,708
Working revenue	£3,511,275
Working costs	£2,529,678
Working profit	£981,597

The working profits for October were £169,530 lower than those for September. This drop was due to the fall in the gold premium from £5 10s. in September to £5 3s. in October. The tonnage crushed was 44,495 tons higher in October than in September, and working costs were 5d. per ton lower. Both the greater tonnage crushed and the lower working costs have to a certain extent counteracted the adverse effects of the fall in the premium, but much more has to be done in that direction in order to stabilise the position of the gold mining industry.

OUTSIDE DISTRICTS:

Tons crushed, 30,243; yield, 17,477 fine ozs.; working revenue, £66,205; working costs, £52,689; working profit, £13,516.

BARBERTON GOLD STATISTICS.

The following particulars of mining in the Barberton district for the month of October are supplied by Mr. L. G. Deglon, secretary to the Barberton District Mine Owners' and Managers' Association:—

No. of Mines producing	8
No. of Stamps working	100
Tube Mills	2
Tons of ore treated	5,742
Fine Gold (ozs.), recovered	2,351,344
Value at £1/24/73	£9,988
Small Mines and Miscellaneous, fine gold ozs., 219,270, value	£932
Total output, fine gold, ozs., 2,570,614, value	£10,920
Labour—Whites, 176; coloured, 2,123.	
Chamber of Mines estimated value per fine oz.	£5 15 0
Claims held for month ended 31/10/21:	
Prospecting Permits	50
Prospecting Claims	2,124
Diggers' Claims	249
Base Metal Claims	25,191
Total Claims	27,564
Days (24 hours) milling	—

The Resources of the Harrismith District.

(By a Correspondent).

The following brief account of the mineral and industrial possibilities of the Harrismith district directs attention to a promising and little known area of the Free State.

The south-eastern corner of the Free State Province is not so well known as perhaps it deserves to be. For a number of years on many different occasions sporadic attempts have been made by divers syndicates and companies to exploit the mineral resources of this area, but for various reasons most, if not all, of them have come to grief. One recalls memories of oil prospecting syndicates, the Clocolon, Ladysmith, and other concerns which operated over a considerable area and by means of shaft sinking, boreholes, etc., endeavoured, always unsuccessfully, to locate the oil reservoirs which the promoters fondly imagined to exist at moderate depths below the surface.

Outside the search for oil, diamonds have claimed the attention of other adventurers. Who has not heard of the fabulous wealth in diamonds of that, at present, *terra incognita*, Basutoland? Meanwhile, until this Naboth's vineyard is thrown open to the prospector he is content to confine his activities to the Free State border areas, and many a marvellous diamond find has been located—needless to say wholly in the imaginations of the promoters of bogus concerns—which have been successful in extracting money from the pockets of the public in order to develop the properties and thus to create new Kimberleys for coming generations of South Africans.

However, putting aside the chimeras of oil wells and diamond mines, the district of Harrismith is not wholly deficient in minerals of economic importance which, if judiciously developed and capitalised, ought to give the public "a fair run for their money."

Coal, oil shale, lime, certain mineral salts, clay for the manufacture of bricks, including a valuable deposit of fire-clay, used in making bricks for withstanding the great heat of smelting furnaces; good building stone is abundant, and the ingredients for the manufacture of cement are to be found in the locality.

In and around the town of Harrismith coal exists which is spread over a very considerable area. Until the railway was constructed no particular attention was paid to the possibilities of coal seams being worked. Latterly the desire has been manifested that the coal resources should be exploited in the interests of the town and district. There is at present considerable demand for coal for both domestic and industrial purposes which cannot yet be satisfied from local resources. Practically all the coal used comes from Natal, and the local price of fuel is consequently high owing to the high costs of mining in Natal and the freightage.

Several new industries are arising at the moment. one of these, a wool factory—for the building of which tenders have lately been asked for in the Johannesburg papers—is to be established on a somewhat ambitious scale. The capital is £300,000 all subscribed locally and practically altogether by the farmers, thus proving incidentally the shallowness of the plea of poverty put up by this class when any question of adequate taxation for them is raised in Parliament. There are also creameries and butter factories in actual operation, and a municipal power station with a possible output of 750 k.w. of energy is also in operation.

Flour and mealie plants are also in operation as well as several engineering plants. Altogether the local fuel demand is of sufficient importance to make the opening up of the coal measures a matter of urgency.

Should payable seams of oil shale be found in the neighbourhood, a big fillip would be given to industrial enterprises, as there is ample local capital available for this

purpose. The limestone found in this neighbourhood is of good average quality; owing to lack of railway facilities it is somewhat difficult to exploit successfully at the moment. but the matter of railway extension is shortly to be taken seriously in hand, when the lime—89 per cent. CaCO₃ by analysis—will be available for the market.

Since several good clay beds are known to exist in the district, the question of the establishment of local cement works is only a matter of time, as all the necessary ingredients are at hand and water power and water for manufacturing purposes is abundant. It is fairly certain that nitrates will be found in this district, samples of these have been submitted for analysis, and have shown a fairly high nitrogenous content; no serious attempts have yet been made to work the deposits.

Other mineral salts have also been located on certain farms; owing to the apathy and indifference of investors no attempt has been made to open them up. All the above-mentioned deposits have been brought to the notice of the writer, and it is very probable that systematic prospecting would disclose other mineral prospects of economic importance.

A word as to the available sources of water power in this neighbourhood may not be out of place. A number of high hills—mountains would perhaps be a better term—are found in this district. They are outliers of the Drakensberg range and are spread over an extensive tract of country. Streams of water issue from points either near to or on the summits of these mountains, and, falling in a series of cascades down their precipitous sides, finally exhaust themselves and form large water courses whose combined waters make up the bulk of the Wilge and other rivers. By the erection of suitable dams, and in other ways, enough power could be developed to provide a considerable supply for all purposes; one such stream seen by the writer would easily develop 2,000 horse power if properly harnessed, and there are several others equally valuable.

Tree planting has been markedly successful on a large scale in the district; millions of trees are now growing, chiefly under Government control. While in no sense a mineral deposit, timber is a very necessary aid to mining and may reasonably be brought into discussion as an adjunct to the mining possibilities of the area in question.

It may therefore be concluded that, while in no sense an Eldorado, the Harrismith district is one which fairly offers an opening for a moderate investment of capital for mining and industrial purposes, and with the possibility of further finds of useful minerals in the future. Having a railway connected with the large industrial areas in both directions, it is easily accessible for investigation purposes and for the forwarding of stores and equipment if required. It is hoped that more attention will be paid to it by persons with the necessary capital and energy to exploit its resources.

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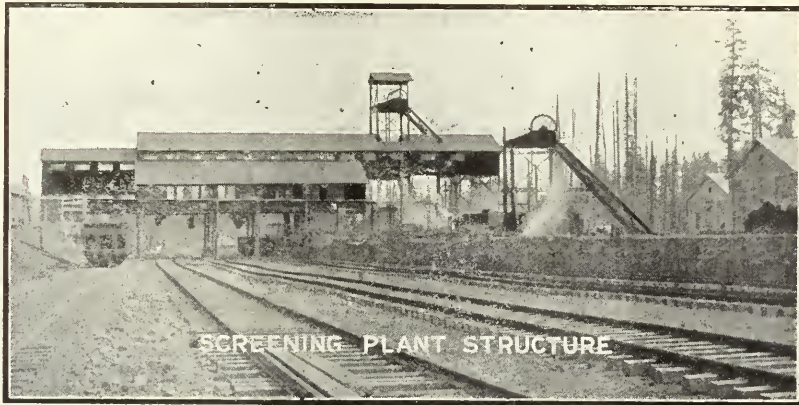
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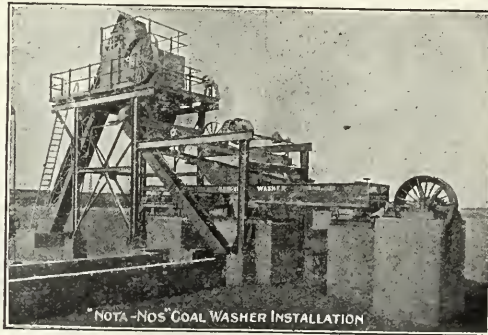
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November Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of November, 1921:—

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit	Estimated Working Costs per Ton.
City Deep	86,500	34,603	£174,315	£54,785	27/7
Cons. Mn. Reef ...	50,000	17,793	89,634	14,259	30/1
Crown Mines	171,000	55,758	280,880	70,388	24/7
Dir. Road. Dp. ...	27,000	8,784	44,249	1,066	31/14
E.R.P.M.	124,500	30,243	152,348	2,862	24/0
Ferreira Deep ...	33,100	10,431	52,544	10,360	25/5
Geldenhuis Dp. ...	48,777	12,941	65,014	*869	27/0
Knight Central... ..	30,000	6,707	33,447	1,528	21/3
Modder B.	59,000	30,095	151,604	75,223	25/10
Modder East	24,600	10,366	51,020	7,371	35/5
New Modder	108,000	50,391	253,400	140,786	20/10
Nourse Mines... ..	45,800	15,527	78,077	7,291	30/10
Robinson	39,500	8,112	40,863	1,443	19/11
Rose Deep... ..	55,000	13,879	69,918	9,975	21/9
Wolluter	31,200	7,673	38,655	1,670	23/8
Village Deep	51,100	16,216	81,686	7,950	28/10

Tls. & averages 985,077 329,519 1,657,654 406,088 25/4

* Loss.

Crown Mines, Ltd.—Owing to the strike which commenced at No. 5 shaft on the 9th of November and extended to all producing sections of the mine on the 25th of November, the results obtained for the month are abnormal. The actual working costs per ton milled show no appreciable increase because 41,300 tons of accumulated rock were removed from stopes during the strike period and the breaking charges on this rock had been incurred previously. Working revenue per ton milled was higher for the following reasons: The mine grade showed an improvement due to rich fines being swept from idle stopes. 190,400 tons of slimes and sands were treated in the cyanide works, thus producing cyanide gold for 19,400 more tons than were milled. Similarly the amount of gold recovered from steaming launders and tube mills was the same as would have been recovered in a full month's run."

Wolluter G.M., Ltd.—Milling operations were suspended for three days, due to breaking mill motor driving shaft.

General Note.—The valuation of gold has been taken at £5 0s. 9d. net per fine ounce, which is 1s. per ounce less than the previous month.

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of November, 1921:—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	120	57,000	26/10:323
Springs Mines	80	45,000	27/10:704

Totals and averages 200 102,000 27/3:786

	Value of Gold declared.	Yield per Ton.	Working Profit based on standard value of Gold.	Working Profit per Ton.
Brakpan Mines	£98,327	34/6:009	£21,775	7/7:686
Springs Mines	79,887	35/6:062	17,130	7/7:358

Totals & averages... £178,214 34/11:327 £38,905 7/7:541

Estimated Premium taking Gold at £5 3s. 0d. per fine oz. less exchange on remittance—

Brakpan Mines	£18,599	£40,374
Springs Mines	15,271	32,401

Totals and averages 33,870 £72,775

Note.—Brakpan placed to gold reserve 4,230 fine ounces; total reserve at date, 16,588 fine ounces.

WITWATERSRAND DEEP, LIMITED.

The estimate of results for the month of November, 1921, is as under:—Tons milled, 35,000; gold recovered, 10,035.724 ozs.; average of stamps running, 180; stamps running time, 20,904 days; tube mills, 5. The working expenditure, including head office charges, for the month is £44,025, or 25s. 2d. per ton. The estimated working revenue based on an estimate of £5 2s. per fine oz. (less 1s. 3d. realisation charges) is £50,555, or 28s. 11d. per ton. The estimated working profit is £6,530, or 3s. 9d. per ton, from which is to be deducted the capital expenditure for the month of £1,355, leaving a surplus of £5,175.

UNION CORPORATION GROUP.

Particulars of operations on the producing mines of this group for the month of November, 1921:—

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Revenue (Including Sundry Rev.) Total.	Per ton
Geduld Proprietary ...	100	46,000	17,363	£88,579	38/6
Modder Deep	70	43,300	23,728	120,077	55/6

Totals and averages 170 89,300 41,091 £208,656 46/9

Company.	Total.	Costs Per Ton.	Profit (Incl. Sundry Rev.) Total.	Per ton
Geduld Proprietary... ..	£50,703	22/0	£37,876	16/6
Modder Deep	45,651	21/1	74,426	34/5

Totals and averages.. £96,354 21/7 £112,302 25/2

The above results are arrived at by calculating the gold produced at £5 2s. per fine ounce. Realisation charges in excess of normal are debited direct to revenue.

CONSOLIDATED GOLD FIELDS.

The following are particulars in regard to the outputs for the month of November, 1921, of the undermentioned companies of the Consolidated Gold Fields Group:—

Company.	Stamps Running.	Tube Mills.	Tons Crushed.	Gold declared, Fine ozs.	Profit.
Simmer and Jack ...	320	7	60,000	14,632	£8,458
Robinson Deep... ..	150	9	60,500	20,040	22,703
Sub Nigel	30	2	10,400	5,994	6,000

Totals 500 18 130,900 40,666 £37,161

Total gold in reserve (fine ounces): Simmer and Jack, 1,200; Robinson Deep, 1,495; Sub Nigel, 2,108; total, 4,803.

The revenue derived from gold for the month of November is calculated at the rate of £5 2s. per fine oz., less estimated gold realisation and exchange charges of 1s. 6d., or a net figure of £5 0s. 6d. per fine oz.

GENERAL MINING & FINANCE GROUP.

The following information regarding the November operations of the producing mines of this group has been supplied:—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West ...	10,730	£13,398	24-97	£14,261	£863
Meyer & Charl.	14,600	18,148	24-86	43,250	25,102
New Goch ...	16,500	18,519	22-45	18,618	99
Rood. United ...	17,650	18,444	20-90	19,046	602
Van Ryn Est. ...	32,600	41,132	25-23	47,171	6,039
West Rand Con.	33,000	41,193	24-97	45,222	4,029
	125,080	£150,834	24-12	£187,568	£36,734

In calculating the revenue, gold has been taken at a value of £5 2s. per fine ounce, less estimated realisation charges.

BARNATO GROUP.

Operations for the month of November, 1921:—

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte ...	45,000	£66,692
Government G.M. Areas ...	140,000	319,963
Langlaagte Estate ...	45,000	69,160
New Primrose ...	22,500	24,621
New Unified ...	11,700	13,142
Randfontein Central ...	121,000	179,327
Van Ryn Deep ...	55,400	150,826
Witwatersrand ...	42,700	55,237
Totals and averages ...	483,300	£878,908

October totals ... 473,300 ... £868,060

Mine	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte...	£52,103	23-157	£15,025
Government G.M. Areas...	152,564	21-795	168,128
Langlaagte Estate ...	55,234	24-548	14,521
New Primrose ...	20,988	18-656	4,015
New Unified ...	11,207	19-157	2,041
Randfontein Central...	165,044	27-280	15,642
Van Ryn Deep ...	66,230	23-910	86,043
Witwatersrand ...	46,460	21-761	10,009

Totals and averages ... £569,830 ... 23-580 ... £315,424

October totals ... £567,728 ... 23-990 ... £306,797

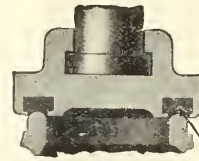
Note.—The above results are arrived at by calculating the gold at £5 2s. per fine ounce.

GLYNN'S LYDENBURG.

The following are the particulars of the output for the month of November, 1921, in respect of the above company: Tons crushed, 3,600, yielding 1,349 fine ozs.; estimated value of month's output, £6,752; estimated profit for month, £1,218. Note.—The above figures are exclusive of expenditure on shaft sinking, special development and capital expenditure amounting to £976. The month's results are based on value of gold of £5 0s. 3d. net per fine oz.

TRANSVAAL G.M. ESTATES

The following are the particulars of the output for the month of November, 1921, in respect of the above company: Central Mines: Tons crushed, 12,300, yielding 3,133 fine ozs. Elandsdrift Mine: Tons crushed, 1,500, yielding 936 fine ozs. Vaalhoek Mine: Tons crushed, 530, yielding 302 fine ozs. Estimated value of month's output, £21,906. Estimated loss for month, £776. Note.—Loss due to lower grade at Central Mines and closing down of Vaalhoek mill greater portion of month for repairs, cost of which is included in working expenses. The month's results are based on value of gold of £5 0s. 3d. net per fine oz.

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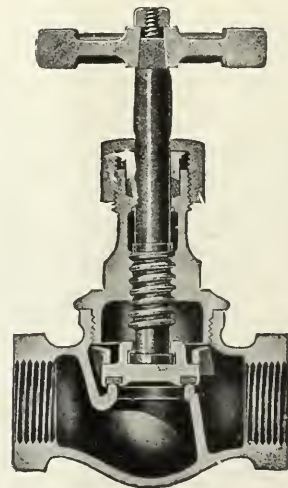
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AND AT KIMBERLEY AND DURBAN.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Electricity Supply at Sheffield.—The Electrical Review, November 4, p. 605.

The Rating of Machinery.—The Electrical Review, November 4, p. 617.

Aluminium Alloys.—The Engineer, November 4, p. 476 and 489.

A New System of Sewage Disposal.—The Engineer, November 4, p. 481.

The Treatment of Steam Turbine Lubricating Oil.—The Engineer, November 4, p. 490.

Power Transmission by Oil.—The Engineer, November 11, p. 500.

Developments in Power Station Design.—The Engineer, November 11, p. 502.

Mining and Metallurgy.

Modern Practice in Diamond Core Drilling.—The Colliery Guardian, November 4, p. 1273.

Indian Competition in Iron and Steel.—Iron and Coal Trades Review, November 4, p. 658.

Errors Latent in Mine Sampling.—Mining and Scientific Press, November 5, p. 633.

The Uranium and Radium of Katanga.—Mining and Scientific Press, November 5, p. 637.

The Mexican Mining Industry.—Mining and Scientific Press, November 5, p. 638.

Ventilation and Working Efficiency.—The Mining Magazine, November, p. 273.

Iron and Steel.

Iron and Steel Works Practice.—Iron and Coal Trades Review, November 11, p. 681.

Chromium Steels and Irons.—Iron and Coal Trades Review, November 11, p. 686.

Titanium.—Iron and Coal Trades Review, November 11, p. 695.

Stainless Steel and Its Properties.—The Engineer, November 11, p. 504.

Coal and Fuel.

Novel Headgear at a Cape Breton Colliery.—The Colliery Guardian, November 11, p. 1337.

Coal Dust Sampling.—The Colliery Guardian, November 11, p. 1339.

Economies in Coal Consumption at Collieries.—Iron and Coal Trades Review, November 4, p. 647.

Nelson Briquetting Co., Ltd.—Iron and Coal Trades Review, November 4, p. 653.

Low Temperature Carbonisation at Barnsley.—Iron and Coal Trades Review, November 11, p. 688.

Withdrawal of Safety Men from a Coal Mine and Its Consequences.—Iron and Coal Trades Review, November 11, p. 690.

METAL REPORT.

We are indebted to Messrs. Henry Bath & Son., Ltd., for the following report, dated November 16:

Copper.—There has been a steady improvement in standard copper, the closing quotations of which show an advance on the fortnight of 7s. 6d. to 10s. per ton. Good advices continue to come from America where large sales are taking place, the quantities disposed of during October being on a larger scale than for some considerable time. Domestic requirements have absorbed a fair quantity, while export orders are well maintained. Home consumption is

showing a slight improvement but there is still plenty of scrap material available. Some 8-9,000 tons of copper, rough and refined, forming the balance of stocks held by the Government were sold by tender on the 7th inst. and it is understood that most of this copper is destined for the United States. According to the Metal Exchange returns, the stocks of copper in warehouse on the 31st October were: 9,158 tons refined, 12,518 tons rough, and 183 tons unclassified, together 21,859 tons against a total of 19,485 tons on the 30th September.

OFFICIAL QUOTATIONS.

	16th November.	1st November.
Standard Copper (cash) ...	£66 ³ / ₄ —£66 ³ / ₄	£66 ¹ / ₄ —£66 ³ / ₄
Do. (3 months) ...	£66 ³ / ₄ —£67 ³ / ₄	£67 ¹ / ₄ —£67 ³ / ₄
Electrolytic ...	£75 —£77	£73 —£75
Wirebars ...	£76 —£77	£74 —£75
15th November.		
Best Select ...	£68 —£70	£66 ³ / ₄ —£68 ³ / ₄
Manufactured ...	£101	£103

Tin.—At the commencement of the fortnight the tendency was rather uncertain and on the 2nd inst. prices declined to £155 cash and £157 three months. During the next few days a much better tone developed and under good buying values advanced sharply until £159 cash and £161 10s. three months were touched by the 8th inst. Since then there has been a slight set-back, but the tone remains firm. Supplies are still plentiful, but there is an improving demand for the home trade, while America is also showing signs of buying. A fair demand is maintained from the Continent. Moderate sales are taking place in the East. The Metal Exchange statistics for tin are not yet available.

OFFICIAL QUOTATIONS.

	16th November.	1st November.
Standard Tin (cash) ...	£157 ³ / ₄ —£158	£155 ¹ / ₄ —£155 ³ / ₄
Do. (3 months) ...	£159 ³ / ₄ —£160	£157 ³ / ₄ —£158

Lead.—Prices in this market have maintained a steady advance under moderate trading, near positions especially being in demand. Arrivals continue on a small scale, but are being eked out by small shipments from America. Nevertheless the supplies of lead are hardly sufficient to meet current requirements, and the present meagre stocks may yet show a further reduction. Business with home consumers is quiet, but the Continent is still taking lead from this country. The Metal Exchange statistics show stocks on 31st October as 5,161 tons against 9,883 tons on the 30th September, a decrease for the month of 4,722 tons.

OFFICIAL QUOTATIONS.

	16th November.	1st November.
Soft Foreign Lead ...	£24 ³ / ₄ —£23 ¹ / ₄	£23 ¹ / ₄ —£23 ¹ / ₄
<i>Sulphate of Copper.</i> —£28 to £30 per ton spot and forward delivery.		

Tin.—English, £156 10s. to £157 per ton. Bolivian Bars, 95 per cent., £140 to £142; Ores, 65 per cent., £84 to £86 per ton.

Lead.—English, £25 5s. per ton.

Spelter.—English, quite nominal.

Pig Iron.—No quotations are available.

Antimony.—£35 to £38 per ton for English Regulus. Ore nominal.

Wolfram Ore.—12s. 6d. to 13s. per unit per ton for 65 per cent. tungsten acid e.i.f.

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EDITORIAL.

THE RAILWAYS REPORT.

The report issued by the General Manager of the South African Railways and Harbours for the year ended with March last is, as usual, much more than a statement of progress, expenditure and revenue on the railways and at the ports of the country. It is an extraordinarily informative blue book dealing with practically every phase of trade and industry in South Africa. No department of the Government has its finger more closely on the commercial pulse of the Union than the S.A.R. & H., and Sir William Hoy's report deals exhaustively both in fact and

figure with every branch of railway and harbour activity, traffic costs, accidents, engineering aspects, accounts and statistics. It contains plans of the principal harbours of the country, numerous diagrams, and many excellent photographs. In so far as the engineering features of the report are concerned we have drawn fairly extensively on those sections in the engineering pages of this week's issue and it here remains briefly to touch on the more general aspects of the report. At the outset Sir William shows that the total capital expenditure of the railways at 31st March last was just under one hundred millions sterling, whilst that in respect of harbours was over ten and a quarter millions. Yet this, the great State-owned asset of railways and harbours, increased its accumulated deficit from £1,549,000 to £2,599,000 during the year under review. In other words, the railways made a loss of £1,272,972 and the harbours a profit of £318,156.

"The year under review was a remarkable one in many respects," states the report. "It marked the turning point in the steady upward tendency of prices that had been going on since the early days of the War, and the arrest—only temporarily it is hoped—of the wave of commercial and industrial prosperity which South Africa has enjoyed for several years. The earlier part of the year was one of general prosperity and unprecedented traffic, and the latter part one of difficulty and trade depression."

The revenue for the year was the record figure of £23,618,457, an increase of 125.89 per cent. as compared with 1909, but, after allowing for interest on capital, cost of living allowance, has resulted in the above deficit. Working expenditure increased by £12,971,254, or 228.54 per cent., since 1909. During the year the S.A.R. carried 64,069,138 passengers and 16,434,541 tons of goods, minerals and coal. The returns for the first five months of the current financial year ended August 31, 1921, show a further deficit of £886,348. Higher wages and shorter working hours had nullified the repeated increases in rates and fares. The latter cannot be further increased, having reached in almost every case the utmost economic limit, and in some cases have had to be reduced to prevent loss of traffic. Under the circumstances, the General Manager says, there is no alternative means of balancing accounts than to reduce working expenditure. This has been done by the doing away with the cost of living allowance, which will disappear on December 31 this year, and which will effect a saving of £3,200,000. Non-essential work has been eliminated and greater efficiency and economy had been introduced. Owing to the financial position it was considered necessary to postpone many development works in progress or in contemplation, and to restrict the new programme of capital works to the narrowest possible limits. As against this picture of gloom the future is not without rays of hope. Some big schemes are ahead, of which the principal are the decision of the Government to proceed immediately with the electrification of the Glencoe-Maritzburg section of the Natal railways, and the erection of grain elevators, which will entail the expenditure of many millions, and a great deal of it in this country, in the shape of wages and material, thus easing the unemployment problem of the moment. Other large development projects also are said to be in contemplation.

Amongst many other instructive pages in the report are those devoted to a review of the mineral industries of the country, which give in summarised form the outstanding statistics of the mineral output of the Union. Labour questions enter very largely into the report. Sir William has a great deal which is very much to the point to say in regard to the eight-hours' day. The report quotes from an article which recently appeared in the *Railway Gazette* on the subject of the eight-hours' day, which seems succinctly to sum up the position. In the course of this quotation it is stated: "Apart from the decreased efficiency due to inexperience there is in many cases a serious degree of compulsory idleness. There can be cited on every system certain small stations where there is only one train in the morning and one in the evening, but where the number of employees has had to be doubled because the interval between the passage of the trains

exceeds the legal working day. This situation is not only prejudicial to the railways but is also most harmful to the workers in other industries. . . . The evil effects of the eight-hour law as applied to railway service are so numerous and so evident that the only practical solution is obvious—the conditions under which the law is applied to the railways must be revised. The railway service is a complex service which accommodates itself as badly as possible to a rigorous allocation of working hours."

The report constitutes an abundant justification for the policy recently adopted by the Administration in the direction of economy. The true facts of the position are that the railways are losing money. Rates have been raised to such a degree that it is economically impossible to increase them further, and it is therefore imperative in the interests of the whole country that measures should be taken to reduce expenditure. The trouble with the railways is that they, like the mines, are hampered by working expenses which are too high and by efficiency which is far too low. Abnormal wages, shorter hours and overstaffing have all conspired to bring about a financial result which requires the pruning knife, and the whole country should be grateful to Mr. Jagger for his determination to arrest the financial rot in a great State asset.

Sir William Hoy's report makes it quite clear that the Railways and Harbours Administration has been passing, and still is passing, through very difficult times, and having regard to all these circumstances we consider that Sir William and his subordinates are to be congratulated on the able manner in which they have administered the department. Our railways are often the butt of public condemnation and censure. The Administration has been blamed for all manner of things. It has been abused by colliery owners, farmers, passengers and employees; by a great percentage of the inhabitants of the Union in fact. But if these critics took the trouble to analyse the report now before us they would probably realise that the greater portions of their censures are absolutely unfounded. And if they travelled on, despatched goods by, or worked for certain other railway administrations which we could mention, they would find that S.A.R. does not mean "Slow And Rotten" after all. As an American visitor recently pointed out, Sir William Hoy manages more miles of railway line than any other man on earth, and we think that a careful perusal of his latest report will show that he and his staff have carried out their large responsibility during a very trying period with conspicuous ability.

GOLD AND EXCHANGE STABILISATION.

Mr. H. G. Wells, however much he may have fallen foul of our French Allies, has certainly deserved well of the world for reminding us of the failure of the Washington Conference to discuss the paramount question of currency and exchange stabilisation. As far as South Africa is concerned, it may not be generally known that an important conference on the subject was held at Pretoria on Wednesday, when the heads of the banks and several of our other leading financiers considered our monetary problems. No official statement is yet forthcoming regarding the result of these deliberations, but it is satisfactory at any rate to know that the Government is alive to the importance of the issues. Our own view, from which we have not wavered, despite a marked absence of interest and support in high places, is that the problem should be approached from the point of view of the Transvaal, as the world's largest gold producer, whose productive capacity is now threatened with restriction, and that our endeavour should be to secure in the welter of conflicting interests a fixed higher price for our product than the old pre-war one, to which it now seems inevitably sinking. A London contemporary to hand by this mail thus excellently puts the matter:—"Stabilisation of exchange is a possibility, restoration of a gold standard is a possibility, but what is impossible is the restoration of the former gold standard. This is a point of view which has not yet entered into the consciousness of the financial world, but it is a sound one. To-day no country has a practical gold standard. To-day the currency of every country has a

definite relation to gold for the day. To stabilise the exchanges of the world, all that is necessary is to have a conference to agree that the rate of exchange at the close of the bourses of the capitals of the world, on a certain day, shall be the relation of those currencies to gold. The price of gold on October 16th was £5 5s. 4d. per ounce in London, and in the capital of every country of the world it had a definite price in the currency of that country. To stabilise the exchanges, all that is necessary is to fix this relation to gold, and for each country associated in the agreement to have a small reserve of gold so as to be able to pay in gold, if desired by another country. . . . The gold reserve of the world must now be regarded as a flywheel of trade, and be apportioned to the various members of the Conference adopting a gold standard in proportion to their external trade. The quantity of gold that each of such countries must hold having been determined, the Conference would arrange the terms upon which countries holding more than their share of gold would part with it to those holding less than their share of gold." Without repeating what we have more than once written on this subject, we may state that the foregoing fits in with our own simple solution of the whole complex question—a solution which, moreover, for us has the paramount merit of meaning the salvation of our low-grade gold producers.

Notes & News.

Luipaardsvlei No. 10.

The borehole which is being sunk on this West Rand property by the Coronation Syndicate has encountered the Randfontein Leader at a depth of 834 feet. The value disclosed is 727.2 dwts. over 2 ins., equivalent to 30.3 over 48 ins. The drill is being continued to cut the West Reef, which it is expected to encounter at a depth of 1,150 ft.

Nylstroom and Railways.

Mr. J. W. Jagger, Minister of Railways, and Mr. J. Rissik, of the Railways Board, visited Nylstroom on Wednesday in connection with the proposed railway from Nylstroom to the Bushveld, via Zandrivers Poort. Mr. Jagger undertook to give the fullest consideration to the proposed railways from Nylstroom to the Bushveld.

The Consolidated Gold Fields Meeting.

The cabled summary of the Chairman's speech at the annual meeting of the Consolidated Goldfields fails, of course, to do justice to the long and detailed review of the company's affairs which it is wont to contain. We hope to print the speech in our columns in due course, and in the meanwhile may note one or two of the outstanding features. Lord Harris referred to "the terrible figure of depreciation" in the year's accounts, namely, £492,000, of which he said over one-third represented the writing down of Robinson Deep shares. The accounts showed a debit balance of £111,000, but the cash position of the company was good, the amount being £709,000. He defended the diminution of the company's holdings in South African mining interests, and showed that the retention of many of the Rand shareholdings would have led to a great decrease in the dividends from them as compared with 1913. Lord Harris dwelt on the position of the Robinson Deep, where he regarded the outlook as most hopeful. The Chairman's speech was followed by one of Mr. Aubrey Hyman's characteristic orations, the chief point in which seems to have been an appeal for "the infusion of fresh blood" into the administration of the company. As far as its interests in this country are concerned, however, there does not seem to be much force in Mr. Hyman's remarks, as the management's business seems to lie in the direction of conserving the company's assets rather than in assuming fresh responsibilities. Still, this is the age of free speech, and we are all in favour of shareholders being encouraged to "have their say." Much better and manlier that they should do so in this fashion than that they should vent their spleen on unoffending secretaries or, as so many do, anonymously through the Press.

Mozambique Portland Cement.

We understand that the Managing Director of this enterprise, who has been in Europe expediting shipment of the remaining portions of the necessary equipment, has been entirely successful in his endeavours, and is now on his way back. The outlook for the company has, therefore, greatly improved.

* * *

The Clydesdale Dispute.

With reference to the trouble on the Clydesdale Collieries, it is reported that at a meeting of the joint executives of the District Federation, held at Witbank on Tuesday afternoon, it was decided to invite the Chamber of Mines, Johannesburg, to a further conference before taking drastic action.

* * *

The Crown Mines Case.

As agreed in the terms of the strike settlement, ex-Shift Boss Walthew interviewed the general manager of the Crown Mines (Mr. A. J. Walton) on Wednesday in the presence of a Government official. The official chosen was Mr. R. H. Miller, Inspector of White Labour.

We understand that Walthew's attitude at the interview was that he could not have acted otherwise than he did, as, having been definitely instructed by the Miners' Union not to go to see Mr. Healy, he could not disobey that instruction.

Mr. Walton, in reply, could not see how an official who would take instructions from a union in direct conflict with the instructions of a superior could hold an official position. While satisfied that Walthew's explanation was correct from his (Walthew's) point of view, he did not see how he could possibly be reinstated as a shift boss—in addition to which there was no vacancy in that capacity at the moment.

Walthew declined to follow Mr. Miller's suggestion that he should apply for a job in another capacity, and so the interview terminated.

* * *

African Oils.

Dealings have been allowed on the London Stock Exchange in the shares of the African Oil Corporation, whose issue is 237,000 10s. fully paid-up shares. Testing of the properties of the Corporation in the Wakkerstroom district has been carried out during the past few months under the supervision of Mr. Van Tijn, an engineer of the Royal Dutch Company, which has an option to re-constitute the company. Operations have been confined so far to extending existing drives, making new drives and sampling the shale exposed in these workings. The results thereby disclosed have been exceedingly satisfactory. A boring contract has now been entered into by the Royal Dutch Company with the McNamara Shot Drill Co., Ltd. Arrangements have been made for a bulk test of the shale in Scotland, for which purpose about eighty tons will be sent.

* * *

East Rand Gold, Coal and Estate Co., Ltd.

In another part of this issue will be found the full report of the speech made by Mr. J. H. L. Manisty at the annual meeting of the East Rand Gold, Coal and Estate Co., Ltd. As its name implies, the company is one of many-sided activity, coal mining and farming being for the time being the most prominent. The Chairman's speech deals with these activities in detail, and may be commended to the notice of those interested in other estate companies in the country. As the Chairman well put it in his speech at the annual meeting last year, "With the important natural resources at our command we would be neglecting our opportunities did we not, particularly in times like these, turn them to productive account. The satisfactory results won show what can be done by a bold agricultural policy, and encouraged by that we hope and expect to do better in the coming year. By so doing we believe we are not only benefiting ourselves, but setting an example that may profitably be followed by other land companies in the Transvaal." These words are no less applicable to-day than when spoken a year ago, and the excellent example set by this company may well be commended to the attention of other and even larger land-owning enterprises in the Transvaal.

The Minister of Finance on the Outlook.

Mr. Burton, the Minister of Finance, reviewed the position of the Union revenue and expenditure at Ladysmith on Wednesday night, and had a very dismal picture to present. Despite the anticipated big deficit budgeted for on the current year and the ruthless application of the pruning knife in all departments, the position is worse than expected, and the end of the fiscal year promises to reveal a further heavy deficit. The revenue has not been coming in each month at even the reduced rate expected, and against this, the expenditure for the year is likely to be something like £1,000,000 in excess of the estimate, as more money will have to be provided to meet the railway and irrigation works programme. Mr. Burton urges the utmost economy—both public and private—to meet the critical times ahead, and certainly the figures he quotes will come as a shock to the country at large, and should provide a serious warning in regard to the future. There is a limit beyond which taxation cannot be increased if enterprise is not to be stifled; and that limit has, apparently, already been reached.

* * *

Witwatersrand Geology.

We have received from the Geological Survey Department of Mines and Industries of the Union of South Africa a brochure on the geology of the country surrounding Johannesburg and Sheet 52, which the brochure explains, by Dr. E. T. Mellor, with a chapter on underground water in the dolomite areas by Dr. Du Toit. In an introductory note, dated Pretoria, August 16th, Dr. Rogers, Director of the Geological Survey, writes:—"The area occupied by the Witwatersrand beds was mapped by Dr. Mellor, with the exception of the outcrops in the south-eastern corner of the map, the lines of which were taken from work done by myself. Dr. Du Toit, Geologist to the Irrigation Department, kindly furnished many important details in the areas occupied by the Transvaal system, and we owe to him the discussion (Chapter X) of the underground water in the dolomite; we are indebted to the Director of Irrigation for allowing Dr. Du Toit to contribute these valuable additions to the work. The late Mr. Kynaston and Dr. W. A. Humphrey surveyed most of the country occupied by the pre-Witwatersrand and Transvaal formations respectively. A larger scale (1: 60,000) map of the Witwatersrand Goldfields surveyed by Dr. Mellor was published in 1917, and it is hoped that a map of the Heidelberg area to the south of the limit of that map will be issued during this year." We propose to comment on this valuable geological sheet and brochure in our next issue.

* * *

The Coming Mining Conference.

It will be remembered that at the momentous conference between the Prime Minister, the Chamber of Mines representatives and the trade union leaders the other day Sir Evelyn Wallers declared that the industry could only continue undiminished if the white labour attitude on certain questions was profoundly modified. It is understood that a conference will be begun in the near future—it must necessarily be of a protracted nature—and the three main points for consideration will be: (1) Revision of the contract system; (2) abolition of the "status quo" agreement; (3) removal of trade union restrictions. The two last of these, it will be seen, reach down to the foundations of present labour conditions on the Rand, and nothing but the profound disturbance of the industry due to the falling gold premium could justify throwing them back again in the melting pot. The plight of the industry owing to the drop in the price of gold may, however, at any moment become desperate, and such situations require desperate remedies. Let us hope that in the end, after a full and frank discussion of the problem it will yield, as other no less serious problems have yielded, to the logic of hard facts and common sense.

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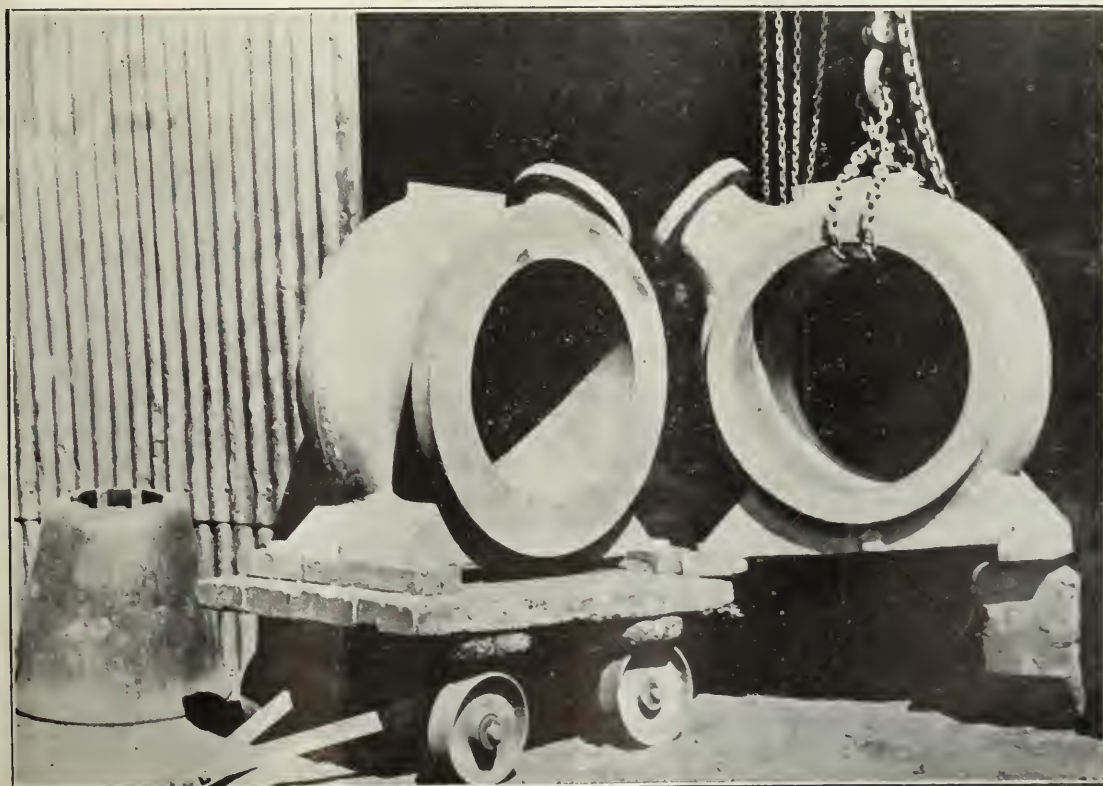
Rowe, Jewell and Company, Limited.

ENGINEERS, IRON, BRASS AND SEMI-STEEL FOUNDERS.

The engineering works known as Rowe, Jewell & Co., Ltd., are one of the oldest established concerns of this nature in Johannesburg. They are carrying on business at the present day on the site of the first foundry which worked on the Witwatersrand gold fields. They have grown up side by side with the gold mines and afford an excellent example of the dependence of one industry upon another. Immediately one industry springs up then another surely follows in order to supply the various needs of its forerunner. It is usually said that the development of a country follows the tracks laid down by railway expansion. In this case, however, the converse was true, and it was the lure of the gold fields, and the development of its allied industries which preceded railway construction. We find, then, that the original building and cupola, which were used at these works were brought from Kimberley by ox wagon by Mr. Kennedy, when Rand railways were still a thing of the future. This business was afterwards floated into a company, of which Mr. Sidney Farrar was managing director. The late Mr. J. J. Rowe and Mr. Jewell took over the works in 1893, and the former became sole proprietor shortly before the Boer War. He

formed the present private company in 1912, of which Mr. C. J. Clark is now managing director and Mr. J. A. Durie is the manager and also a director. Mr. C. M. Polmar is their well-known Reef traveller, and Mr. R. H. Smith is manager of the Brakpan Branch.

The Johannesburg works, known as the Old Rand Foundry, are situated at the corner of Main and West Streets. With the ever-increasing demand received by this company for mining, industrial, agricultural, and other items, it became necessary for the directors to consider the problem of expansion. The gold mining industry had expanded chiefly in the eastern direction, and the directors decided to open up branch works on the Far East Rand. The site was admirably chosen, and is within easy reach of the expanding mines of that district. Brakpan was chosen as the site for the branch works, which were opened in 1917. The company provided themselves with ample room for expansion, and owns in all five acres in the industrial portion of the township. At present the greater portion of the work turned out by this company is for the gold mines, but work for industrial and other companies has also been undertaken.



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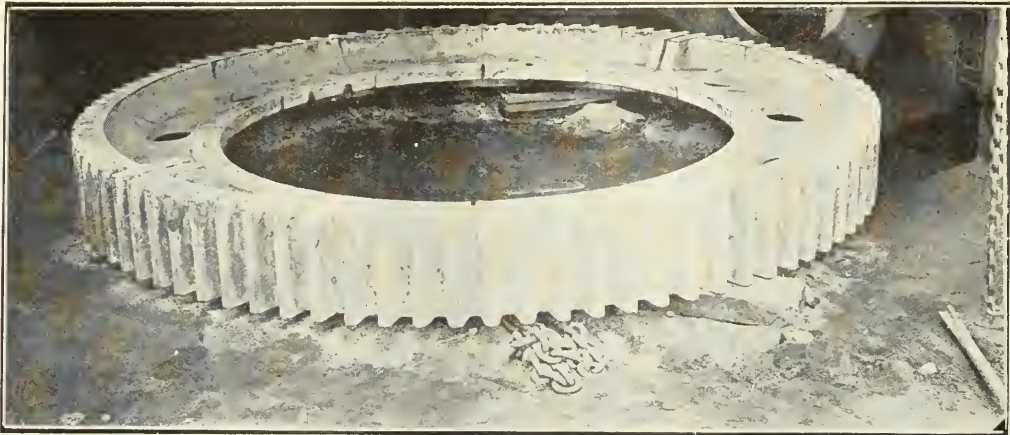
Raw Materials.

The development of the iron industry in this country should to a large extent influence the expansion of local engineering firms by producing a good quality and inexpensive pig iron. It is gratifying to note that the better qualities of pig iron produced in this country have proved satisfactory in every respect, and the No. 1 grade of the Pretoria Iron Works has given satisfaction in the foundries. The Pretoria plant was run on an experimental scale and managed to produce good pig iron. Local foundries are thus looking forward to the time that they will be able to obtain supplies of pig iron from South African blast furnaces, and judging by progress made at Newcastle, in Natal, that time will not be of the distant future.

The tonnage of coke consumed by local foundries must be large, and yet it is remarkable to see that complaints are still made with regard to high sulphur content. The allowable limit of sulphur content amounts to .75 per cent., and anything above that produces harmful effects in the iron melted with such coke. Coke producers should pay more attention to the washing of their coal, and reduce the sulphur content of their coke to the possible minimum.

Foundry.

The Johannesburg works of Rowe, Jewell & Co., Ltd., are equipped with three cupolas for foundry work, three brass furnaces for brass and aluminium castings, a fully-equipped turning and fitting shop, and blacksmith shop. The foundry is capable of turning out castings in iron, brass, aluminium and semi-steel. Casting up to nine tons in



Spur Wheel, 2½ tons, cast by Rowe, Jewell & Co., Ltd.

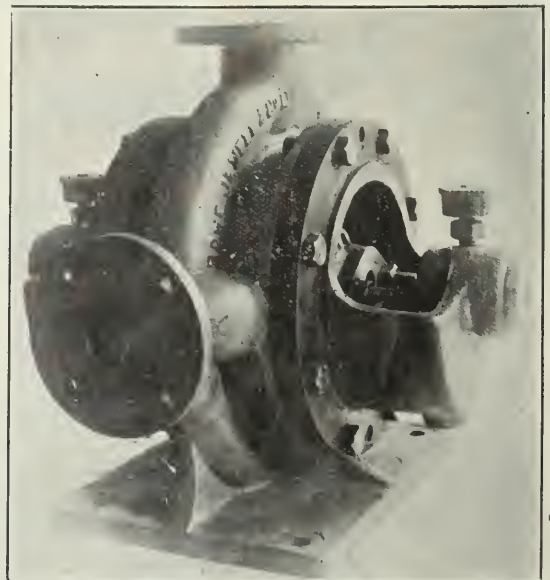


View in Machine Shop at Rowe, Jewell & Co., Ltd.



Pitman for Crusher, 2½ tons, and Roll for Steel Works, 2½ tons, cast by Rowe, Jewell & Co., Ltd.

weight have been executed, and larger articles can be turned out if required. During the War, in addition to much heavy and intricate work for the mines, over 400 tons of castings were supplied to the Rand Water Board at Vereeniging. Much of the plant required by Kynochs for the extension of their works at Umbogintwini, Natal, was cast and machined at these works. One of the specialities of this foundry is the making of castings for brick, tile, and pipe companies. At the time of our visit, in addition to a variety



Small Centrifugal Pump, moulded and finished complete by Rowe, Jewell & Co., Ltd.

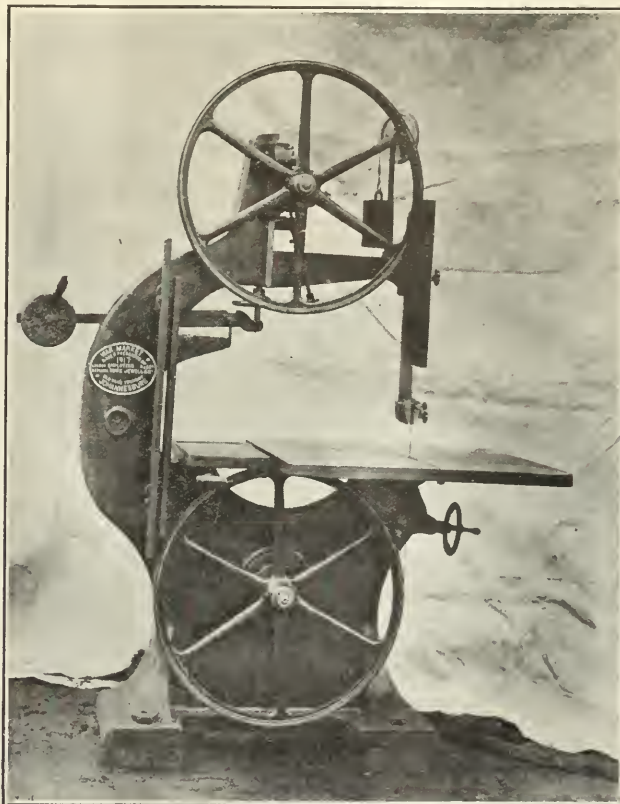
of small castings, the following articles had been cast and were in the process of being machined: A spur wheel for a tube mill weighing 2½ tons, a tube mill end weighing 3 tons, a pitman for a rock crusher weighing 2¼ tons, and a roll for the Union Steel Corporation weighing 2½ tons. Other achievements by this firm are: Castings in acid-resisting metal for Sulzer pumps, weighing as much as 3,500 lbs. each; centrifugal pumps, moulded and completely finished by them; and a wood-working band saw, completely manufactured here. The latter machine was presented by the firm to the War Market, and is an excellent example of local engineering skill.

The company has always been noted for the excellence of its castings. This is not to be wondered at when one

considers the record of the company and the fact that the works were established by men with long and varied experience in moulding and engineering gained in England, America and Australia.

In common with other long-established concerns, this company can be proud of its record in respect to the long service of its employees in both the foundry and machine shop. Many have service amounting to over 20 years. Altogether 70 Europeans are employed at these works. The foundry's scope is as diversified as its field is wide-spread. Amongst its customers are mines and railways, cement and lime concerns, irrigation works and milling companies, and its activities have extended far beyond the Union's borders into Rhodesia and the Congo.

THE PHOTOS DEPICTING SPUR WHEEL AND PITMAN AND ROLL WERE TAKEN AS THE CASTINGS LEFT THE FOUNDRY.



Wood Working Band Saw manufactured in Johannesburg and presented to the War Market and shown as an example of what can be made locally.



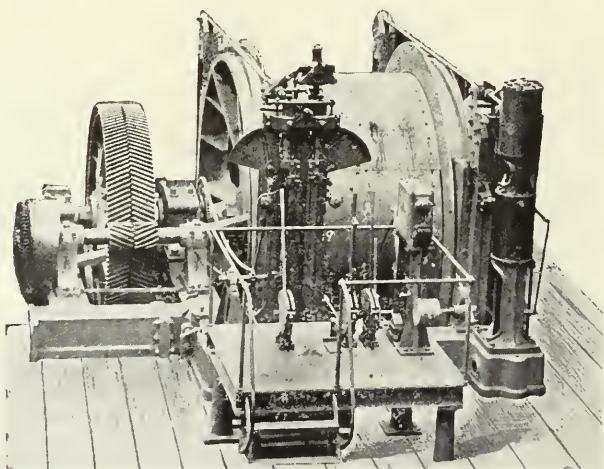
View of the Brakpan Works.

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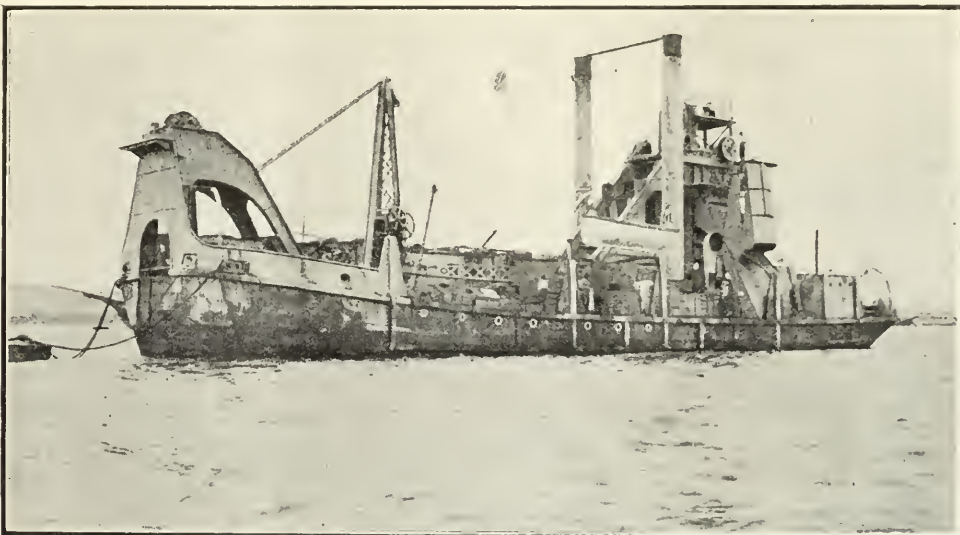
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The New Era in Durban Harbour Development.

BRIEF ACCOUNT OF NEW WHARFAGE, OIL SITES, DREDGERS, DOCKS AND GRAIN ELEVATOR.

In the course of his annual report Sir William Hoy writes regarding Durban harbour as follows:—83 vessels of a total tonnage of 217,591 were berthed at Congella. Two steamers of 5,061 and 6,551 tons were berthed at the cold storage sites at Congella to load meat for oversea. This marks a new era in development in this part of the harbour. The average working depth of the harbour entrance was 36 feet 3 inches L.W.O.S.T., an increase of 3 inches over the previous year. The berthage was increased by 505 feet during the year, 12,606 feet being now available, viz., 6,266 feet at Point, 2,365 feet at Bluff, and 3,975 feet at Congella, with depths varying from 23 feet to 38½ feet. The accommodation at the harbour was severely taxed during the months of July, August, September, and October. The

average number of steamers in port during the month of October was 54, and the largest number in port on any one day, 59. The floating dock was placed out of commission for overhaul on 23rd September, 1920, and was recommissioned on 23rd May, 1921. 675 vessels of an aggregate tonnage of 1,124,132 tons have been docked since the last overhaul in September, 1913. Originally the lifting capacity of the dock was 8,500 tons. This was reduced to 4,600 prior to overhaul, but has since been increased to 6,500 tons. 3,269,345 tons of spoil were dredged during the year, an increase of 387,397 tons. 1,659,500 tons were removed from the oil site channel. 101,102,536 tons of spoil have been dredged at Durban harbour since 1884. The new dredger "Walrus" arrived in Durban harbour on 27th March, 1921.



Bucket Dredger "Walrus," of the S.A.R. & H. Administration, which arrived at Durban in March, 1921.



View of New Oil Sites at Bluff, Durban.

Three large Oil Tanks of two million gallon capacity have now been completed and filled with crude oil for the fuelling of Oil-Burning Steamers.

The 180 feet extension eastwards and the greater portion of the reclamation have been completed, whilst the further extension of 600 feet is rapidly nearing completion, 99 per cent. of the work having been done. Berthage has been dredged to a depth of 35 feet. A commencement has been made with the 750 feet extension westwards. The preparation of oil sites was retarded through labour shortage. The total spoil deposited as reclamation in connection with the work amounts to 112,200 cubic yards. 9,000 tons of oil were pumped to the storage tanks on 7th June, and 7,000 tons on 25th June last. The 1,200 feet wharf extension at Congella is practically completed, providing a depth alongside of 32 feet 6 inches for 920 feet, and 25 feet L.W.O.S.T. for the remainder of the distance. Of the 800 feet wharf extension, 35 lineal feet were completed during the year. This, with the two jetties previously constructed, brings the total length of wharfage completed under this scheme to 1,150 feet. Good progress has been made with the foundations for the grain elevator, 17 per cent. of the work having been completed. The reclamations of 60 acres was commenced at Congella in January, 1914, and during the year 2½ acres were reclaimed, bringing the total up to 63¾ acres. The reclamation of a further area of 60 acres was commenced in September, 1917, and up to the end of July last 12 acres had been levelled and hardened. The progress of the work on the new graving dock was hampered by late delivery of plant from Europe, and, for a time, by shortage of labour. The total quantity of material excavated to 31st July last was 218,832 cubic yards, fully one-third of the total; 1,100 feet of trench for side walls has been excavated to a depth of 30 feet, and 200 feet to the full depth of 49 feet below L.W.O.S.T. Concrete foundations for 120 feet of side wall have been laid. Fifteen acres of valuable ground in the vicinity of the dock have been reclaimed with the excavated material. Six 4-ton electric cranes are on order for Durban harbour, two of which have arrived.

A Novel Box Spanner.

It is remarkable to observe how improvements continue to be made on engineering accessories which have been familiar since engineering was born. The box spanner, for example, is one of those simple tools which one is inclined to take for granted, but even it can be made better for many purposes by the exercise of a little ingenuity. A British firm has brought in a new type which can be used conveniently in a great variety of awkward positions. The box head is connected with the shank by a universal joint, which allows the shank to be tilted so as to clear the projections which might interfere with the use of the spanner.

A Remarkable Electric Run-about Crane.

British cranes of every type are well known all over the world, and it is not surprising to find a constant improvement being made in various directions. At a recent exhibition held in London a new type of run-about crane, propelled and operated by an electric battery, was shown. The crane itself lifts 15 hundredweight at the rate of 20 feet per minute, and is stable in any position without anchorage. The jib has a rising and falling motion only, slewing action being obtained by rotating the whole machine on the ground. The structure carrying the jib is placed on a chassis which is roughly circular and has driving wheels at each side driven by separate motors, as well as steering wheels fore and aft. These wheels are so arranged that the whole truck will rotate in a circle little over 6 feet in diameter. The battery, which acts as a counterpoise, is capable of propelling the loaded crane at 300 feet per minute. Nothing more convenient for dock and warehouse work could well be conceived.

Stainless Steel for Turbine Blades.

Stainless steel, which was discovered in the research laboratory of a British steel works, has been developed recently in quite a number of engineering directions. One of the most successful is in connection with the blades of steam turbines. Hitherto these blades have been made of 5 per cent. nickel steel, which was the best known substance for the purpose. Nickel steel, however, was found to corrode and wear away under the action of the steam, and it occurred to the inventors of stainless steel that it would be worth while trying whether the new material would stand up better than nickel steel. Accordingly several stainless steel blades, together with some new nickel steel blades, were inserted in a steam turbine more than a year ago. When the turbine was again opened recently the stainless steel blades were found as clean and smooth as on the day they had been inserted, while the nickel blades were deeply pitted and their edges badly worn away. A British electrical engineering firm made a similar experiment for a longer period with the like result. As the pitting of turbine blades reduces the efficiency of the machine and involves costly replacement, it is practically certain that stainless steel will supplant nickel steel for this purpose. Apart from engineering uses, the most popular new application for stainless steel appears to be in connection with golf clubs. For this purpose stainless steel is ideal. Other familiar uses include mirrors, fenders, fire-irons, knives, scissors, and surgical instruments.

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The Workshop Equipment of the S.A.R.

A BRIEF REVIEW OF THE CHIEF FEATURES—NEW WORKS AND EXTENSIONS CONTEMPLATED— THE QUESTION OF MATERIAL.

From the annual report of Mr. D. A. Hendrie, the Chief Mechanical Engineer of the S.A.R., we take the following account of the railway workshops:—

Salt River.

The new locomotive erecting shop has been completed and the foundations are well in hand for the additional extension to this shop recently authorised, and the steel structural material for same has been ordered from overseas. The new boiler shop has been completed and is being utilised to its full capacity, but as this shop was only completed towards the end of the year, the full advantages to be derived therefrom and the increased output will not be apparent to any appreciable extent until the coming year. The new steel underframe shop and boiler machine shop schemes are now nearing completion. The new pattern shop and pattern store have also been completed and are now in full working order with satisfactory results, particularly in providing adequate accommodation for the proper storage of valuable patterns, etc. The extension to the foundry and the extension to the smiths' shop are now well in hand. Additional machine tools have been installed in the various shops with beneficial results. The new points and crossings shop and equipment for same have now been authorised. An additional bay to machine shop for the accommodation of electroplaters and brassfinishers has been sanctioned. Schemes for the conversion of old boiler shop into tender shop, the conversion of old tender shop into coppersmiths', tinsmiths', and plumbers' shops and additional accommodation for millwrights have also been authorised. New offices for mechanical engineer's and railway storekeeper's staffs are required and should receive early and favourable consideration. A quantity of urgently required machine tools have been authorised and ordered.

Durban.

The extension to the locomotive machine shop has now been completed, and the second 50-ton overhead electric travelling crane for the recently completed extension to locomotive erecting shop has arrived and has been installed. The steel structural material for the new bays for wagon repair shop has arrived and is now in course of erection. The new oil and waste reclamation plant has been completed. A number of new machine tools have been installed with satisfactory results. An extension to the locomotive machine shop to provide wheel shop has been authorised. The existing boiler shop accommodation is inadequate for the present-day requirements of this depot, and serious consideration will have to be given at an early date to the installation of a new boiler shop to remedy this. The quantity of urgently required machine tools has been installed with good results.

Pretoria.

The work in connection with the removal of the old and re-erection of the new paint shop is now well in hand. The new boiler shop has been authorised and the necessary steel structural drawings are in hand for the building. The steel structural building for the new steel foundry has been delivered and is now in course of erection; almost all of the equipment for this shop has been delivered from overseas, and a commencement has been made with its installation, and it is anticipated that the new steel foundry will be completed and producing castings in about six months' time. The scheme for the removal and re-erection of carpenters' shop to a more convenient site has been sanctioned.

A number of new machine tools have been installed, and also a number of new machine tools have been sanctioned and ordered.

Uitenhage.

The extension to the foundry is well in hand. Several new machine tools have been installed and the new 7-ton crane for wagon yard has arrived and has been put into commission with satisfactory results. The hydraulic installation and hydraulic machinery referred to in my last report have now been completed and working satisfactorily. A new steel underframe shop has been authorised and the steel structural drawings for same are now in hand. Extensions to foundry and paint shop have also been authorised. The remarks in my previous reports in regard to additional locomotive erecting shop facilities still hold good.

Pietermaritzburg.

Tenders have been called for the steel structural work for the extension to locomotive erecting and machine shops, and it is anticipated the contract will be placed at an early date. A quantity of new machine tools have been installed and a further quantity authorised and indented for. An extension to provide accommodation for points and crossings shop and shop for retyring plant has been sanctioned, and an extension to provide accommodation for tinsmiths, millwrights, tool store, etc., has been sanctioned.

Bloemfontein.

The steel structural work for the main block of buildings for the new workshops scheme has arrived and is now in course of erection, and the machinery, etc., for the equipment of the new workshops is beginning to arrive from overseas. Tenders have been called for the steel structural work of the auxiliary buildings of the new workshops, and it is anticipated the order for same will be placed shortly. The scheme for the extension to the wagon yard has been completed with good results.

East London.

The electrification scheme is now in hand and the sub-station in connection with same is being erected, and the material and machinery on indent for the electrification scheme is coming forward from overseas. An extension to wagon repair shop has been sanctioned to provide additional accommodation for the erection and repair of carriages and wagons, etc.

Material.

During the year efforts have been directed to bettering the position with regard to material in arrears, with the main object of preventing delay in the output of both new and repaired stock. Supplies have come to hand more readily, but the placing into traffic of many vehicles has been held back owing to the non-arrival of necessary fittings, such as vacuum-brake cylinders and Gould's couplers. As a consequence, arrangements were made to tap a wider source of supply for some of the more specialised items, and beneficial results should accrue from the arrangement. The position with regard to buffers was serious for some time, and owing to the congested state in the railway workshops, sufficient help could not be given from this source to meet demands. Undue delay occurred in the delivery of certain sizes of tyres. The effects of this were accentuated owing to previous shortages in this direction. It cannot yet be said that the pre-war standard of quality of supplies in general has been regained, though, as the results of strong representations, coupled with the keener competition now prevailing, an improvement in respect of future orders is anticipated. A quantity of approximately 100 tons of pig-iron was obtained from local sources at Pretoria during the period under review, and this has been used in the production of castings with very satisfactory results.

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Engine Power on the S.A.R.

LOCOMOTIVE STOCK OF THE RAILWAYS—MR. HENDRIE'S REPORT.

The total locomotive stock of the S.A.R. Administration at end of March, 1921, consisted of one thousand seven hundred and eight 3-ft. 6-in. and fifty-four 2-ft. gauge engines, a total increase of sixty-two 3-ft. 6-in. gauge and a decrease of two 2-ft. gauge engines as compared with the number existing on 31st March, 1920. These figures are taken from the annual report of Mr. D. A. Hendrie, Chief Mechanical Engineer of the S.A.R. *Inter alia*, Mr. Hendrie also writes:—

Repairs to engines during the year have been of a very heavy nature; 1,019 engines passed through the workshops, as compared with 979 during the previous twelve months. The large number of class 14 C engines which had to be restayed and retubed was an unfortunate feature of these repairs. In addition, seventy new engines were erected at various depots. A fair amount of night-shift and overtime work has had to be resorted to in order to cope with the work. I should like to emphasise that the number of engines quoted above as repaired in the workshops does not truly reflect the quantity of work undertaken, as the average repairs necessary to an engine at the present time is very much in excess of pre-war requirements. This is an inevitable result of the shortage of material which has obtained during the war and post-war period. A large number of engines have simultaneously reached the stage where abnormal repairs are imperative, and the average cost is heavily inflated.

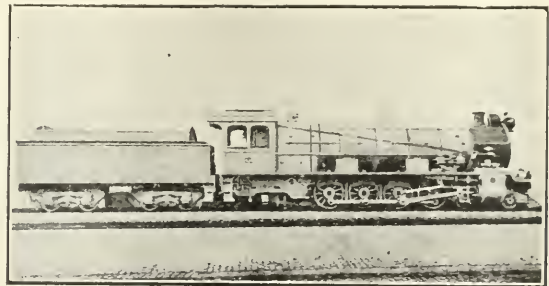
The Boiler Position.

In addition to the above, the boiler position is very acute. During the war period, with its shortage of copper-plate, fireboxes were repaired by putting in steel half-plates and generally everything was done to keep boilers fit to work. The general position to-day is graphically reflected by the following figures taken from the records of one depot alone:—

Year.	Material used in Repair of Boilers.	
	Copper Bar.	Copper Firebox Plates.
1918-19	42,410 lb	49
1919-20	83,240 lb	100
1920-21	110,040 lb	146

Not only do the above figures represent an approximate increase in material of 160 per cent. and 200 per cent. respectively over 1918-19 quantities, but they clearly indicate the additional labour required for manufacture and fitting of stays and firebox plates. As our capacity for repairing boilers is the controlling factor in the output of repaired engines, the heavy nature of our boiler repairs has an adverse effect on the general position. On consideration, it is therefore evident that although the number of repaired engines is only about 8 per cent. above the corresponding number of 1918-19, the actual work accomplished for the two periods bears an entirely different ratio, not reflected by the engine output. Attention is drawn to the destructive effects on copper firebox plates by inferior waters in the Transvaal and Cape Western and Midland Systems. A main line experimental engine, class "G.A." type, was placed in service on the lower section of Natal line at the beginning of February last, but as the mileage was only 1,504 to end of March, it is too early to pass any definite remarks on the working of this engine, but it shows indications of proving a success. The eight class M.J. engines (being balance of order for ten placed with Messrs. Maffei, Munich, prior to the war) were placed in service during the year, and have proved satisfactory. The other two engines of original order were received prior to outbreak of the war. Assistance has been obtained in the repairing of engines by private firms. The policy of installing more machine tools and plant in the larger steam-sheds to facilitate running repairs is beginning to show beneficial results by enabling engines to be retained in traffic for a longer period before

being sent into the various workshops. The comparatively small number of coaches completed in the workshops was due to non-arrival of essential material from overseas, coupled with the necessity of concentrating energies on repair work. The repairs to wagon stock have been exceedingly heavy, and a very large number of repairs have been undertaken which practically amount to rebuilds. There is a substantial increase in the number of repaired wagons, but, as in the case of engine repairs, the extra quantity does not truly reflect the increase in the work



New Main Line Engine: Type 12a. Weight of engine in working order, 148 tons; greatest axle weight, 17 tons 6 cwt.; tractive force, 40,744 lb.

done. A large number of wagons have received new floors and sides, and this fact is illustrated by the following figures taken from the returns of one depot:—

	Steel Plate Used.
1918-19	317,166 lb
1919-20	423,683 lb
1920-21	778,457 lb

Similar conditions prevail more or less at all depots. You will readily appreciate not only the extra cost of material and labour indicated by the above figures, but also the increase in number of repaired wagons which would have been effected if normal conditions had prevailed. The mechanical work at the harbours in connection with the appliances and floating craft was heavy during the year, and the provision of separate harbour workshops at Durban will be of great assistance. Considerable repairs have been carried out at the coastal workshops to ships belonging to the Administration, but in many cases it has been necessary to place contracts with private firms specialising in marine work so as to avoid detention of the ships.

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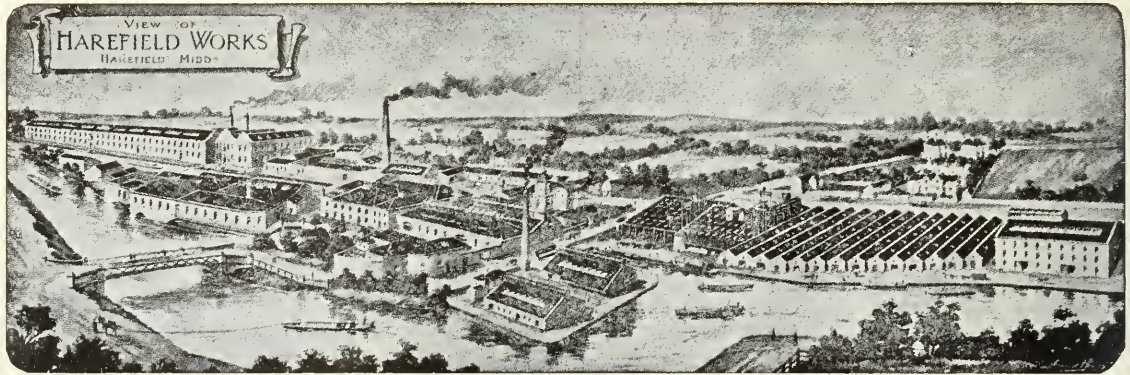
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The Week in the Sharemarket.

STEADY—BETTER OUTLOOK—DIVIDEND ANTICIPATIONS.

Notwithstanding the lugubrious speech by the Minister of Finance, the tone towards the week-end is distinctly better, though business remains quiet and restricted. Dividends will be declared next week, and will, it is anticipated, be fairly satisfactory. The news from Washington and the Irish settlement are, of course, bull points, though they may have the indirect effect of still further reducing the gold premium. The last, of course, remains the big factor in the local industrial situation, and if it goes on falling away the most drastic steps will be necessary if the poorer mines are to be saved. Further conferences are to be held, and the facts will have to be faced for the sake of all concerned. All the gilt-edged Far Eastern stocks were firmer during the week on dividend prospects, and though it is too much to hope for an active Christmas market, things may go better by the close of the year. In diamonds and fms the market remains stagnant, but Transvaal Silvers continue to prove the bright feature of the market. On Thursday they were 26s. buyers, and their recovery of 10s. within ten days affords tangible proof of life in this stock. Colliery shares remain quiet, and there is some talk of a strike at Witbank, which may or may not materialise. On the whole, quotations seem to have touched bedrock, and there is reason to hope that business all round will improve in the new year.

	Fri. 2nd.	Sat. 3rd.	Mon. 5th.	Tues. 6th.	Wed. 7th.	Thur. 8th.
Rooibergs	3 3*	3 6*	—	3 6*	3 6*	3 6*
Rouxville Diamonds	1 1	1 0*	1 0*	1 0*	1 0*	1 0*
S.A. Townships	9 6	—	—	9 6†	9 6	9 6*
S.A. Alkah	13 0	13 6†	12 9†	12 9*	13 0*	14 0†
Simmer and Jacks	2 6*	—	2 6*	2 6*	—	—
S.A. Lands	4 3	4 3*	4 3*	4 4	4 3	4 2*
Springs Mines	38 0	38 9	38 3*	38 3*	38 0*	38 0
Sub-Nigels	11 0	11 0*	11 3	11 0	11 6*	11 6*
Transvaal Silvers	22 6	24 3*	26 0	27 9	25 0*	25 0*
Union 5 per cent.	£99	—	—	£99	£98½*	£98½*
Van Ryn Deeps	70 6*	70 6*	70 0	69 9*	70 6*	70 0*
Village Deeps	8 0*	7 6*	—	7 6*	—	7 6*
Western Rand Est.	—	3 0*	3 0*	3 3*	3 3*	3 6†
West Springs	9 0	9 0*	8 6*	8 9*	8 9*	8 10†
Witbank Collieries	35 0*	—	—	—	—	33 9*
Witwatersrands	12 0*	12 0*	12 6*	13 0*	—	13 6*
Wit. Deeps	7 6	7 9	—	—	8 0*	—
Wolhulers	3 0*	3 1*	3 0*	3 1*	3 1*	3 1*
Zaaiplaats Tins	2 9*	3 0†	2 9*	2 6*	2 6*	2 9*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

	Fri. 2nd.	Sat. 3rd.	Mon. 5th.	Tues. 6th.	Wed. 7th.	Thur. 8th.
Anglo-Am. Corp.	19 3	19 9	19 3	19 0*	18 9*	19 0
Apex Mines	—	—	6 9*	—	7 0*	7 0*
Bantjes Cons.	6 3†	6 3	6 6†	6 3*	6 5*	5 9*
Brakpan Mines	49 0*	50 6*	50 0*	51 0*	48 0*	50 0*
Bushveld Tins	—	0 6*	0 6*	0 6*	—	—
City and Subs.	—	—	2 4*	2 4*	—	—
City Deeps	46 3*	47 3*	46 0*	47 0	47 0*	47 3b
Clydesdale Colls.	—	24 0†	—	—	—	20 0*
Con. Diamonds	12 6*	13 3	12 6*	13 0	12 9*	12 9*
Con. Langlaagtes	13 0*	13 0*	13 0*	13 6*	13 3*	13 0*
Con. Main Reefs	9 6*	10 0*	10 0*	10 3	10 0*	10 0*
Con. Main Reefs	9 6*	10 0*	10 0*	10 3*	10 0*	10 0*
Coronation Colls.	38 0†	—	38 0†	—	—	38 0†
Do. Freeholds	0 8*	—	0 8*	—	0 6*	0 6*
Do. Syndicates	6 0	6 9*	6 6	5 6	5 9*	5 9*
Daggfonteins	2 9	—	2 6*	2 6*	—	2 6*
Durban Road, Deeps	0 8*	—	—	—	—	—
E.R. Coals	1 9*	1 6*	—	—	1 9*	1 9*
E.R. Deeps	—	0 6*	0 6*	0 6*	0 8*	0 6*
E.R. Proprietary	4 9*	4 9*	4 8*	4 9*	4 9	4 6*
E.R. Debentures	£85*	£85*	£85*	£85*	£85*	£85*
Eastern Golds	—	0 9*	—	—	—	0 9*
Ferreira Deeps	10 0†	—	—	—	10 0†	—
Frank Smith Dmds.	3 0*	3 3*	3 2*	3 3*	3 3	3 3
Geduld Props.	46 6	47 0*	46 6*	46 3	46 3*	46 3*
Geldenhuis Deeps	—	4 6*	—	5 0*	—	—
Glynn's Lydenburgs	—	—	—	7 0*	7 0*	—
Govt. Areas	80 0*	80 0*	80 6	81 0*	81 6*	81 0*
Hume Pipes	—	14 0*	14 0*	—	15 0†	14 6†
Knight Centrals	4 7*	4 8*	4 8*	4 8*	5 0†	4 7*
Lace Props.	—	6 3*	6 0*	6 0*	6 0*	6 0*
Leeuwoort Tins	7 7†	7 9	7 9*	8 3	8 0*	8 3*
Luipardsvlei Est.	3 0†	2 6†	—	—	2 6†	—
Lydenburg Farms	4 9	4 6*	4 6*	4 6*	—	4 6*
Meyer & Charltons	—	—	70 0*	70 0*	—	—
Middelvlei Est.	1 0*	1 0*	—	1 0*	—	1 0*
Modder B.'s	27 6*	27 6*	27 6*	27 6	27 9*	27 6
Modder Deeps	43 9*	43 9	43 6*	43 6	43 3*	43 6
Modder Easts	7 0*	7 6	7 6	7 3†	7 3*	7 6
Natal Navig. Colls.	28 6*	28 6*	28 0*	28 6	28 6†	—
National Banks	217 6*	217 6	217 6*	217 6*	217 6*	217 6*
New Era Cons.	7 0*	7 0*	7 3*	7 3*	7 3*	7 3*
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	1 4	1 4*
New Kleinfonteins	5 3*	5 3	5 4*	5 3*	5 6*	5 6*
New Modders	73 9	73 0*	73 0	73 0	73 0*	73 6
New Primrose	5 0*	4 9*	—	—	—	—
New Unifeds	4 0*	4 0*	—	—	—	4 0*
New State Areas	20 0	23 3*	19 9*	19 6a	20 0*	20 3*
Nigels	4 3*	4 9*	—	4 3*	4 9*	—
Nourse Mines	8 9*	9 3*	9 3*	9 0*	9 0*	—
Pretoria Cements	39 6*	40 0*	40 0*	40 6*	40 9*	41 0*
Princess Estates	—	0 11*	0 11*	1 0*	1 0*	1 0*
Rand Nucleus	1 0*	1 0*	1 0*	—	1 0*	1 0*
Randftn. Centrals	—	10 0†	10 0†	10 0†	—	10 0†
Do. Estates	14 3	14 6*	14 6*	14 0*	14 0*	14 3
Roberts Victors	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*

Mining Men and Matters.

Mr. V. J. Ronketti, of the Union Corporation, has returned from England.

Mr. John Munro, joint managing-director of the "J.C.I.," has returned from his six months' trip to England.

Sir Robert Kotze, Government Mining Engineer, left for the coast on Thursday last on holiday, and will not return until the end of January. Major U. P. Swimburne will act during Sir Robert's absence.

Tunnelling Officers: Corps of Royal Engineers.—The third annual dinner will be held at the Carlton Hotel on Saturday, 17th December. Ex-officers who wish to attend are requested to communicate with the Secretary, Captain V. F. Brodigan, if they have not already done so.

LABOUR ADVISERS.

To the Editor, S.A. Mining and Engineering Journal.

A Kimberley correspondent writes:—

In your journal dated November 26, 1921, there appears a suggestion that each large mine should have a representative, who would be styled the labour adviser to the Chamber of Mines, and whose duty would be concerned with the keeping of industrial peace. The idea is a good one, and would be the means of checking a good deal of industrial trouble in the future.

Lord Orammore, at a meeting of the Delagoa Bay Development Company, gave an account of his recent visit to Lourenco Marques. He expressed confidence that a great and prosperous future lay before Lourenco Marques. A magnificent new hotel was in the course of erection, and it was hoped that when opened it would become a favourite winter resort for people from Johannesburg and Pretoria.

OTAVI MINES AND RAILWAY COMPANY.

The company has now resumed full activity at its mines and smelter in South-West Africa. For the six months ended September 30, 1921, shipments totalled 19,000 tons of ore, 830 tons copper matte, and 150 tons metallic lead. In the corresponding period of last year the figures were respectively 10,100 tons, nil, and nil.

Letters to the Editor.

THE VRYHEID COKE COMPANY, LTD.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In your article on the Denver Engineering Company, you say: "These furnaces are fired with hard Natal coke, and although this coke is satisfactory in every other respect high sulphur content is one of its disadvantages. This seems to point to the fact that coke producers should exercise greater care in the washing of the coal they use for coke production in order to eliminate, as far as possible, this objectionable constituent."

If you had confined your remarks to the particular coke which you are referring to I should not have written to you, but when you generalise, then in justice to the company I represent, I am obliged to take exception to both the statement and the advice.

There are, it is true, several coke producing companies in Natal whose coke assays well over 1 per cent. of sulphur, but in the case of my company's coke, our assays over 9 or 10 years never go above 0.70 per cent., and are usually between 0.50 per cent. and 0.60 per cent. Anything up to 1 per cent. is generally regarded as not being deleterious.

The cause of high sulphur contents in coke is not necessarily careless washing. Sulphur occurs in coal in Natal in at least two forms, viz.: It is inherent in the coal itself and it also occurs in the form of pyrites. In the latter case careful washing will remove a large percentage of the sulphur. In the former case it is extremely difficult, if not impossible, to get rid of it.

Yours faithfully,

CHAS. A. O. BAIN,

Managing Director, Johannesburg,

The Vryheid Coke Co., Ltd.

[We much regret that the paragraph in question should, in consequence of its generalisation, have in any way caused Mr. Bain annoyance. We know that the coke produced by the company represented by Mr. Bain is of exceptional quality and purity, and in case there may be any misunderstanding on this point we are pleased to give his letter publicity.]

ORIGIN OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In your issue of November 12 this subject was dealt with at some length, but, unfortunately, the writer camouflaged whatever knowledge he may have of the genesis of the diamond by a callous sacrifice of sense on the altar of verbosity. It was not to be wondered at that, in the following issue, your correspondent who aptly signed himself "Mystified," should ask for an elucidation of the cryptic contribution. Our old friend, Mr. Scott Alexander, in your last number, makes a very welcome appearance in a new rôle, and it is his letter that I wish to briefly deal with. Notwithstanding the dictum of the text books that "the diamond is the purest form of carbon," I have long been of the opinion that further investigations would prove the diamond to be an oxide of carbon, for the following reason, viz.: One of the salient features of the diamond is its high specific gravity—3.5 (as compared with carbon 2.2). May this not be accounted for by the suggested oxide hypothesis? Let us take another gem, the ruby or sapphire, the composition of which (Al_2O_3) is the very light metal aluminium (specific gravity 2.5) plus oxygen. It is not often that the oxide of a metal is more dense than the metal itself, but it is so with the ruby group; therefore, is it not permissible

to assume that the combination with oxygen has brought about the change from the low density carbon to the adamantine crystal with its high specific gravity? There are other weighty considerations which tend to the conclusion that the diamond is an oxide, the chief of which is that carbon, in either the solid or gaseous form, could not exist in an environment of the nature of "Kimberlite," which is one of the seats of origin of the diamond; "Kimberlite" is composed of the oxygen saturated compounds, the carbonates and oxides of various metals and earths, which would readily yield some oxygen to the carbon which has so great an affinity for it. Additional factors, the study of which should justify my contention, are the specific heat, atomic weight, and index of refraction of the carbon oxides as compared with the diamond, and I would urge the necessity of due consideration being given to these physical features by those who care to investigate this most fascinating subject. As to the genesis of the diamond, once the foregoing hypothesis is assented to, it becomes quite understandable; the molten mass in the crater, after the escape of the bulk of the gases from deep seated regions, becomes quiescent, solidification sets in at the surface, thus preventing the escape of the remaining gas contents, which perforce collect in groups varying in quantity, and as solidification proceeds downwards these gases, CO_2 or CO , or possibly other oxides, are crystallised under enormous pressure, not the pressure of mass or weight, but the pressure which results from the expansion which all minerals undergo in the transition from the fluid to the solid state, an expansion which, in the case of some minerals, is as much as eight per cent. Evidence of this almost incalculable stress is to be seen in the *in situ* condition of the different crystals, so many of which are crushed and fractured. I should much have liked to have treated the subject at greater length, but I fear to make too great a demand on your space. However, my purpose will have been served if this letter will but lead to further investigation—Yours, etc.,

LEWIS WATKINS.

ANOTHER VIEW OF THE GOLD PROBLEM.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I have recently seen it stated that the price of gold in pounds sterling is likely to rise on the payment early next year of, I think, £50,000,000 interest on the British indebtedness to the U.S.A. From the point of view of supply and demand this would seem feasible. On the other hand, apparently the price of gold in dollars has never varied, *i.e.*, it is merely the exchange rate which gives gold a higher value in pounds, the normal rate being 4s. 2d. to the dollar and at present it is about 5s., which accounts for the approximate 20 per cent. gold premium. This being so, then on payment of interest the rate of exchange is likely to move in favour of great Britain, hence the price of gold in pounds sterling will be less. I take the latter view, but it would be interesting to know what the experts think.—Yours, etc.,

A. J. C.

A CORRECTION.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—Please insert in your next issue the following correction: Frank Watkins should have read Lewis Watkins in my letter of last week.—Yours, etc.,

SCOTT ALEXANDER.

We regret that an inaccuracy appeared in our November 26th issue under the heading "New Mining Patents":—"George Desmond Richard MacCarty and Solin Butter—Improvements tube mill liner." This should read—"George Desmond Richard MacCarthy and Colin Butler—Improvements mortar box liner."

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET BUT HOPEFUL—IRON AND STEEL—AMERICAN NOTES—GENERAL OUTLOOK—TIMBER AND BUILDING MATERIALS—UNION RAILWAYS USE OF SOUTH AFRICAN TIMBER—GENERAL MANAGER OF RAILWAYS REPORT FOR YEAR—OIL NOTES—SHIPPING NOTES—UNION LOANS.

General Review.

Last week closed satisfactorily with the removal of the Crown Mines difficulty, which, though generally expected, was none the less received in commercial circles with relief. Such action on the part of the trades unions and miners augurs well for their acceptance of the Chamber of Mines proposals regarding wage reductions at the commencement of the New Year. This week has also not failed to furnish a pleasant and welcome surprise in the announcement from London that agreement had been reached between the Government and Sinn Fein, which, in view of the unfavourable state of negotiations right up to the last moment, was unexpected and came as a welcome surprise. Full particulars are now eagerly looked for. It will be very pleasant reading for, among others, General Smuts, to whose patriotic efforts in initiating the preliminary pourparlers no little measure of the success of the difficult and protracted negotiations may rightly be attributed. With regard to the Crown Mines settlement, people look upon it as a decided victory for the Chamber of Mines, and leaves them in no doubt as to the attitude the Chamber will adopt when the time arrives for tackling the economic position of the gold mining industry in a bold and fearless manner. In the meantime the premium on gold is steadily falling and calls for early and drastic measures on the part of the industry to adjust itself to the falling away of this adventitious aid to the value of our product. The great factor to-day, however, is the vital necessity of increased efficiency of the workers, and if this be introduced, together with radical reductions in wages and eventually lower costs of stores, little fear need be held that vast quantities of ore are going to be profitably exploited for many generations. Prices of mining materials are gradually going down, merchants here having to keep pace with the Home market. Timber, on the other hand, is somewhat firmer, and a slight upward movement is expected shortly. The constant depreciation of gold is having anything but a stimulating effect on the local position. Still we have no alternative but to wait for an improvement in trade conditions. Sooner or later the mines will have to come into the local market for their requirements. The market in turps is very bad at present, due to the absence of stocks here at the moment.

Iron and Steel.

The beginning of the month inquiries have not been so numerous as were witnessed during the past three months, owing probably to the recent labour trouble and to this stocktaking period, and there is no doubt that the holiday influence is already making itself felt. The feeling, however, is more hopeful, and undoubtedly several lines are getting scarce, which will tend to steady the market eventually. Owing to our labour troubles and the unsettled position of European affairs merchants have naturally refrained from indenting to any great extent, and consequently it is anticipated that a good many lines will soon become more and more scarce. An influential importer of mining material stated that he had this week heard from his correspondents that most of the Belgian works had closed down or were only partly working; wages, however, are coming down, and this may have the effect of many of the mills restarting shortly. German works are full up for a month ahead, so his agents reported, and are coolly repudiating contracts,

alleging that the depreciation of the mark has increased their cost of production, adding that thereby the German makers were losing their late reputation for straight dealing. "You may," they say, "probably have heard that the Germans are working like Trojans, but our recent trip to Germany did not confirm this. There are strikes everywhere, due to the increased cost of living through the fall of the mark. They are sticking tenaciously to the eight-hour day, but complaints are heard on all hands that the men are not working anything like so hard as in the old days."

Latest quotations.—Dumswart iron, 22s. per 100lb basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel flats, small, 33s. to 10s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{4}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{1}{2}$ in. and upwards, imported, round iron and steel, 30s.; channels and joists, 35s. 6d.; shafting, $\frac{3}{4}$ in., $\frac{1}{2}$ in., and $\frac{3}{4}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{2}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and

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Second-hand Mining Machinery.

There has been very little doing in the second-hand machinery business this month, and very few inquiries from outside, most orders being held back until the commencement of the New Year. Stocks have run down very low for second-hand goods, and second-hand steel plates of any consequence are very scarce, particularly 3-16ths and $\frac{1}{4}$.

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Engineering Shops.

These report a fair amount of business on hand, which, however, is by no means causing any strain on their resources, but by engineers are looking forward with others to improved conditions at the turn of the year.

The Union Steel Corporation (S.A.) Ltd.

The Union Steel Corporation (S.A.), Ltd., report that everything in connection with their industry is progressing very satisfactorily. Shoes are now being forged by them; many are already in use, are giving the greatest satisfaction, and are, it is stated, beating the imported article both as regards price and quality. There appears to be a tendency, more pronounced than ever before, the Corporation stated, of the Government's intention to support local industries, provided price and quality are equal to imported. This intention, if translated into deeds, will cause great satisfaction to local industrialists, who allege that in the past they have not been treated with that fairness which their establishment of costly concerns in the Union and the quality of their products deserved at the hands of the Government. The Corporation are making cast steel liners for the Sheeley process in the form of sectional plates for tube mill lining. Now that Mr. Isaac Lewis, the managing director, has returned to Johannesburg the Corporation are looking forward to increased activities. The next development, it is stated, will be the production by them of heavier rails, and within a few weeks 45 lb. rails will be produced. As will be noticed elsewhere, the Corporation has reduced their prices from 30s. to 22s. per 100 lbs. basis.

Continental Trade Activities.

During the greater part of this year there has been a marked advance in the competition of German goods, more particularly in electrical material, steel and wrought-iron piping and steel poles. In addition to the local firms which prior to the War represented German manufacturers, many representatives of Continental agencies have arrived here to deal directly with such business. It is noteworthy also that a Belgian company has now entered the field in respect of electrical machinery and train material. In many cases British connections have been alienated in consequence of the much lower prices tendered by the Continental makers.

Agricultural Implements.

Importers state that the present period is slackier than it has been for some considerable time. Weather conditions are favourable to the farmer, but unfortunately he has got no money, and the facilities for obtaining same are, in the face of the present prices for produce and the general restriction of monetary advances, of a rather gloomy nature.

American Notes.

In the course of a chat with a leading American importer he stated that prices in America were getting a little firmer, and that the output was approaching more and more to normal capacity, but that this had not yet been achieved; some of the United States steel mills had been down to 25-30 per cent. of their capacity, and none had yet got back to 75 per cent. Especially had an improvement been noted in barbed and plain wire, the price of which had advanced sharply recently. In regard to Johannesburg, he thought that the worst of the depression, as far as extremely low prices are concerned, was over, because merchants cannot go on for ever selling lines below cost of replacement. He said merchants were all doing this still, but not at the low prices previously obtaining, which was, in his opinion, a most encouraging feature in the position. Things generally, he said, were now in a sounder position than heretofore, not so much perhaps in regard to mining material as in other lines. Better prices could now be obtained, for example, in barbed and plain wire in particular, as well as in steel plates—not much better, but 5 to 10 per cent. higher, and the tendency generally he considered to be a little better. Steel plates were now 21s. to 27s. 6d. according to thickness and size; larger sizes as high as 29s. to 30s. for 12 x 6 of certain thicknesses.

American Trade with the Union.

Trade in October between the United States and the Union increased by 362,000 dollars, as compared with September. American exports were 1,500,000 dollars, compared with 900,000 dollars in September, while imports of South African products declined from 400,000 to 162,000 dollars in the same period. The striking features of American trade conditions, reports the American Trade Commissioner, Mr. P. J. Stevenson, are irregular prices, increasing production, and unemployment, which, however, is now decreasing. Foreign trade, both imports and exports, is stationary.

General Outlook.

In conversation with an influential merchant this week he said that, although things were undoubtedly quiet at the moment, everybody anticipated an improvement in business conditions after the turn of the year. December was, for obvious reasons, always a poor month, but the spring was bound to relax early in the New Year. He thought prices in some lines were tending to firm up a little. People generally are nervous about importing, because of the uncertainty existing as to future happenings on the Continent respecting the Exchange question. There was no doubt whatever that under the present depreciation of the mark German goods can knock British goods out all the time. Timber, he said, was beginning to firm up a little, which, in his opinion, was due to the completion to a great extent of the liquidation of surplus stocks. The settlement of the Crown Mines trouble had created a better feeling, and the general opinion was more optimistic; it now looks, he said, as if the trade unions are going to accept the reduction of wages at the end of the year, which has been announced by the Chamber of Mines, without much trouble, which should tend to clear the air a lot and help to a healthier outlook and better business conditions.

Timber and Building Materials.

Timber has a firming tendency, and indications point to a temporary slight upward movement, owing to the recent advance in the Baltic and the loss of a timber ship last week, which will cause inconvenience to merchants for a time. A lot of timber bought before the late rise is coming along, and the expected advance may only prove to be of a temporary nature, but eventually, of course, timber must reach higher levels, as present prices are, if not below, at any rate perilously near replacement costs.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver board, 4½d.; floorings, 6¾d. to 7d.; ceilings, 4¾d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9¾d. to 10½d. Furniture timber, Burmah teak, 18s. to 19s. 3d. per cubic here for first quality, 15s. 6d. for second, at the coast; American oak and Japanese oak, 1s. 2d. to 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cubic at coast; Rhodesian mahogany, 9s. per cubic ft. at mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. to 1s. 3d. per ft. Bricks are unchanged at 70s. for blue stock; 60s. mixed; £4 10s. to £5 for wire cuts, £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Business, owing to the approaching holidays, remains very quiet, with a fair number of inquiries, but few firm orders booked; no activity is anticipated until the New Year. Prices are unchanged at 6d. to 7d. for iron and 9d. to 11d. for timber.

Railways and Use of South African Woods.

The annual report of the General Manager of Railways disposes of the criticism recently levelled at the Administration for not availing itself more freely of South African timber. Sir William Hoy states that since 1917 a special committee has been instituted as a Timber Committee. In co-operation with the Mechanical Department no fewer than

149 different classes of wood had been used or examined for railway purposes. During the last two years 198,711 cubic feet, 7¾ tons, and 95 lengths of South African timber had been delivered at the several workshops, of which 62,171 cubic feet, 60½ tons, and 88 pieces had been used. In addition, 273,000 cubic feet of standing timber had recently been purchased at the Tokai plantation, and 25 tons of blue gum had been purchased at Hilton Road (Natal). About 30,000 lineal feet of *Pinus insignis* from Tokai had been cut into deals for 25 first-class coaches. South African timber is also being used exhaustively by the Engineering and Transportation Departments and at the harbours. The Administration had since Union purchased timber to the value of £66,616 for sleepers and other purposes, as compared with £2,950 in 1910. The General Manager states that the new seasoning kiln erected in Pretoria is now in operation, and various tests had been carried out in conjunction with the Forest Department in the seasoning of South African timber, with, so far, most encouraging results. If the treatment proves as successful as initial experiments indicate, it will give a great impetus to the use of South African timber. The above facts prove that the Railway Administration is keenly alive to the importance of the fullest possible use of South African woods.

Oil Notes.

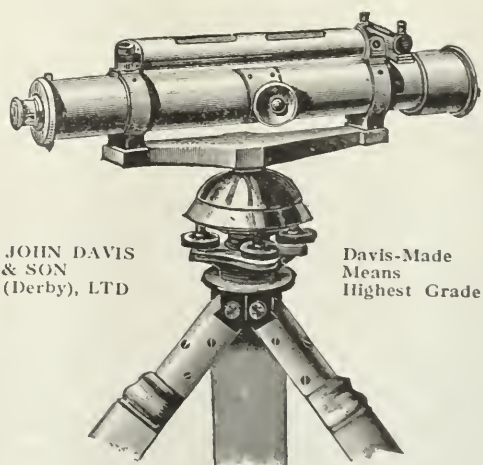
It is reported from America that a company with a capital of two thousand million dollars is being formed to absorb oil companies throughout the world. The Standard Oil interests will, it is stated, be merged in this huge trust, which will be called the World Commerce Company.

Difficulties have arisen in regard to the concessions taken over in the Northern Province of Persia by the Standard Oil Company. These rights were formerly held by the Anglo-Persian Company, but were repudiated by the new Persian Government. The two companies concerned are now invest-

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tigating the position, and a reasonable compromise is anticipated. The suggestion is scouted as absurd that there will be any clash of interests between America and Britain in these regions.

London reports that dealings have been allowed in the shares of the African Oil Corporation, which has issued 257,000 ten shillings fully paid up shares.

Petrol and Paraffin: New Maximum Prices.

A new order in the *Gazette* supersedes that of October 26 *re* the maximum selling prices of petrol and paraffin. The wholesale price of petrol at the ports is fixed at 27s. per case (all brands), Shell brand at 30s. 9d., and Pegasus and Zenith at 30s. 6d. The prices (wholesale) elsewhere are as above plus charges. The retail prices at the ports are 27s. per case plus 15 per cent., 4s. 3d. per imperial gallon, Shell 4s. 9d., and Pegasus and Zenith 3s. 9d. Prices elsewhere 27s. per case plus 15 per cent. plus charges; smaller quantities at the rate of 4s. 10d. per gallon, Shell brand 5s. 3d. per gallon tin, Pegasus and Zenith 4s. 2d. per tin. Prices of paraffin are: Wholesale at the ports, 16s. 9d. per case of two large tins. Elsewhere, price as above plus charges. Retail at the ports and all centres less than 400 miles from them, 19s. per case, or 9s. 6d. per tin, or 23s. 6d. per case of small tins, or 2s. 5d. per such tin. At places 400 miles or more from the ports, 19s. 3d. per case, 9s. 8d. per tin or 23s. 9d. per case of small tins, and 2s. 5d. per tin plus charges. 125 degree paraffin to be 3d. less a case. Bottle prices: At the ports, 6d.; elsewhere, 7d.

Electrical Goods.

Trading conditions, helped by the usual Christmas orders, are quite fair, and dealers have little to complain of in this respect. Contractors are fairly busy; there are a good many small contracts on just now, nothing big, of course, but people are now ordering materials suitable for Christmas presents—kettles, pots, plates, etc.—a little more than usually. A large importer of electrical appliances said that business just now could fairly be described as good all round. Prices for shades have declined about 10 per cent. during the week—glass shades, from 3s. 6d to 7s., to 3s. to 5s. 6d.; enamel iron shades have gone down 3d. to 1s. a dozen according to size; opal shades have receded 1s. to 2s. 6d. according to size, and are now selling at from 1s. 6d. to 2s. 6d. each. Most of these glass shades come from Czecho-Slovakia, of which Prague is the centre. The drop in price has been caused by the arrival of big consignments from Prague, Koblenz, etc. With these exceptions, prices remain stationary, and are expected to continue at their present level for a time, but eventually a reduction will be seen in them. Stocks are coming in all right from Britain and Germany, but those from the latter destination are tightening up in price and the tendency is for them to rise. American stuff is also coming along fairly freely, and in some respects is cheaper than the British article notwithstanding the Exchange.

Tenders for Railway Work.

At a dinner in London the other day Sir Edgar Walton warned his hearers regarding tenders for railway work, etc. He stated that foreign tenders were much lower than those of British firms, and though he, of course, wanted to see every penny spent in Britain, the difficulties in the way under the circumstances were very great.

Coal Notes.

A fall of 2s. per ton has been announced in the price of our coal.

Underselling of French Coal by British.

Considerable surprise has been caused in the French northern coalfields by the appearance there of British coal, which has actually been sold on rail at Calais at 95-50 francs per ton, as against the French product of corresponding quality on rail at Comines at 106 francs per ton. To combat the British invasion the French mineowners are trying to reduce wages, but this cannot be at once effected. The present coal wages in France are five times higher than they were in 1914. A possibility exists that the Belgian mineowners may also cut in and even undersell British merchants.

British Coal Wages.

Wages in the South Wales coalfield are gradually being adjusted and approaching the minimum of 20 per cent. on the average earnings in July, 1911. At present the percentage is 28.95 on the 1915 standard rates. The drop for November amounted to from 4s. to 5s. per day as compared with September. Miners' wages for November in Yorkshire, Notts, Derby, Leicester, Warwick, and Cannock Chase will be reduced 29.64 per cent. on basis rate compared with October. The November rate will, it is stated, be 110.53 per cent. on the basis.

Commonwealth's Steamers.

Lord Incheape, chairman of the P. and O. and other allied lines, has, it is stated, expressed his willingness to recommend the Shipping Conference to buy the Commonwealth Line. Mr. Hughes, although strongly in favour of the retention of the line, is seeking the House of Representatives' decision in the matter.

Sale of ex-Enemy Ships.

Lord Incheape's Committee, it is announced, disposed of 117 ex-enemy ships during the year for nearly £20,000,000 sterling, and is now offering 16 cargo boats of 4,000 tons upwards, which are still under repair in German yards preparatory to receiving the highest class of the German Lloyd's.

German Shipping.

The Nord-Deutscher Lloyd Company, whose capital has been doubled this year, announces a further increase of capital from 350 millions to 600 millions of marks, the directors stating as a reason for such increase that the depreciation of the mark has caused the compensation paid by the Government for vessels lost during the War to become inadequate to its original purpose.

African Steamship Company.

A meeting of this company authorised the directors to issue 500,000 6 per cent. cumulative preference £1 shares for the purpose of replacing ships lost during the War and for the provision of up-to-date passenger vessels for the West African trade.

Union Government's 6 per cent. Loan.

It is announced from Pretoria that up to date £7,660,000 has been invested in the Government 6 per cent. Loan, of which £1,650,000 is new money. Conversions have been made of the 5 per cent. 1921-36 stock to the extent of £5,710,000, and of Treasury Bills to the amount of £900,000. The loan will, it is believed, shortly be closed.

Union Loans.

The Union 6 per cent. Loan is quoted at £96 10s. and the New Union Loan at $\frac{3}{4}$ per cent. discount.

New Issue of British Treasury Bonds.

The new issue of Treasury Bonds, which is being issued at 99, compared with 98 for the last series, has been obtained at $5\frac{1}{2}$ per cent. The Bonds are redeemable in 1930.

S.A. Reserve Bank.

The weekly statement issued by the South African Reserve Bank on December 3 shows ratio of cash reserves to liabilities to the public of 74.9 per cent.

W. T. HALLIMOND, CONSULTING MINING ENGINEER.

Having left 43, Central House, messages for appointments may be left at

**No. 12, Norwich Union Buildings,
Fox Street,
Johannesburg.**

The Week's Meetings.

EAST RAND GOLD, COAL AND ESTATE CO., LTD.

Presiding at the annual general meeting of shareholders of the East Rand Gold, Coal and Estate Co., Ltd., on December 1, the chairman, Mr. J. H. L. Manisty, said:

The directors' report and audited balance sheet and profit and loss account for the year ended 30th June, 1921, are now submitted for your consideration and approval.

COLLIERY.

You will note that the net profit on coal winning account for the year under review amounted to £3,711, as compared with a profit of £313 for the previous year on 91,092 tons sold. The total quantity of coal sold this year was 100,301 tons of rounds and nuts; a great feature of this increase is that the whole of the saleable output consisted entirely of rounds and nuts, whereas during the previous year a large quantity of duff was sold. This duff, consisting of about 30,000 tons, was sent to the waste heap. Had there been a market for it, this would have represented a value of £2,600, a remarkable waste of value and revenue.

This profit, though satisfactory, would have been much better had it not been for shortage of orders throughout the whole year, the continuance of high cost of materials, high wages and shorter working hours. Deducting the loss on farming, there remains the sum of £1,920 to be carried to appropriation account; this amount, together with the amount unappropriated at June 30, 1920, and before providing for depreciation, makes a total of £8,777.

Your directors decided to write off an amount of £1,463 this year for depreciation, for which account has been taken as follows:—

Headgear, screening plant, etc.	£1,000
Farming machinery and implements	463
	1,463

added to this is the expenditure on boring operations, viz., £1,279, the result of which I shall refer to later, leaving a credit balance carried to appropriation account of £6,036.

The cash and cash assets total £25,585 against liabilities amounting to £7,977, leaving a balance of £17,608, the reserve amount shows a balance of £3,730. A shortage on last year's figures is accounted for principally by the heavy capital expenditure involved, which was forecasted by me in my remarks at the last annual meeting.

The capital expenditure covers the purchase of the coal cutter, hauling motor, a large number of mine trucks, in addition to a general reconditioning of buildings and erection of native hospital.

SHAFT TROUBLE.

I have to report that since the annual reports were taken in hand an accident has occurred in the shaft, some of the timber giving away, necessitating the closing down of operations to enable the manager to effect the necessary repairs. This will mean that we shall lose our output for about a month, and the expenditure is estimated at £1,500. When this work is completed I think we may regard our position as a very sound one, and, provided we can procure orders for about 9,000 tons or upwards per month, and effect a gradual decline in the cost of

stores and wages, we may certainly look forward to good profits in the forthcoming year.

It has been most unfortunate that the financial year has had to carry such an abnormally heavy burden, but this could not have been avoided if the colliery and plant are to be maintained in working condition. Practically no renewals and very little maintenance had been effected during the past few years, it having been the policy in the past to conserve our cash assets as much as possible, with the result that the breaking point was at last reached, and to put things right sums which should have been spread over a term of years all fell under the present financial year; as it is, the plant has for the most part been put in good working condition, and we are able to take advantage of any sudden increase of orders as they come.

THE COAL TRADE.

With the continuance of the export trade, in which we participated last year, we have continued to benefit by increased orders for our coal, which we are still able to execute and at a satisfactory rate of profit. In order to cope with any further demand, and at the same time endeavour to reduce costs as far as possible, and secure as great a portion as possible of the waste, it was decided to instal a coal cutter. This, as you will see from the manager's report, is now at work and is proving, I am pleased to say, an unqualified success. It has already been the means of reducing costs very materially and at the same time reducing the waste coal from 30 per cent. down to 12.6 per cent., and with the renewal of orders I feel confident we shall thereafter make good profits and soon be on a dividend-paying basis.

I referred at the last annual meeting to the great future for South African coal, the demand at that time for export purposes was very great, and it appeared likely to continue for some considerable time to come. Unfortunately, notwithstanding repeated representations, the Railway and Port Authorities failed to realise the importance of rising to the occasion, and instead of supporting the collieries, increased their rates, subsequently, however, reducing them, but too late to avoid a serious loss to the trade.

HIGH WORKING COSTS.

High working costs also prevailed, and it may be of interest to you if I give you a few actual figures of what that advance means in the working costs of our mine.

White and native wages are responsible for a total increase of £2,000 for the year; explosives, £2,100; stores, £2,000.

or an average of £500 a month, that is to say, under pre-war conditions the last year's working would have cost for the year's tonnage £6,100 less than under current conditions. These increases bring the cost to 57.76 over pre-war costs, at which increased figure it now stands. The increase in mine stores and explosives over pre-war rate vary between 40 per cent. and 300 per cent., according to the class of article. As against this, of course, the selling price of coal has advanced, but not in proportion to the increased cost of working.

BORING OPERATIONS.

I refer you to the manager's report on this subject. In my remarks last year I drew your attention to the board's

decision to undertake drilling operations with a view to ascertaining the thickness and value of our coal areas before deciding on sinking a new shaft. The primary object, of course, was to prove definitely the area and quality of workable coal lying to the south-west of the property, and to eliminate the long haulage with which we have to deal in the present mine. The results have been to prove conclusively that we have a large area of quite good coal, the thickness being 7ft. 9in, giving a calorific value of 10.52, the final results going to prove that we have a basin or field of about 600 acres in the south-west corner of the property, which, with an average thickness of 7ft., would give 6,300,000 tons or, including the pillars, a life of 21 years at 1,000 tons a day.

Your board, however, has decided not to carry out the idea of sinking a new shaft for the present, but to wait further developments as regards the future of the coal trade. The area dealt with represents, of course, only the south-west corner of the property, but I would like to point out that there still remains a large section of the property eastward and northward which undoubtedly has coal underlying same; it is only a question of quality and thickness, which must be proved by more extensive boring. It is, however, the intention to open up the old main east drive, which was abandoned some years ago, and driving a prospecting place from near the face of it into new ground, going northward and eastward. As it will be in a coal seam, we shall be able to procure sufficient coal to cover the cost of our prospecting, and should we be fortunate enough to turn out good quality coal, the distance from the shaft being less than our present haulage, will undoubtedly tend to cheapen the cost of working it and enormously enhance the life of the mine.

The idea of testing the ground for the Van Ryn series was postponed indefinitely; boreholes, however, in the coal area—the continuance of which would, we believe, intersect these series—have been carefully plugged so that at some future date we can proceed to put down another drill.

FARMING OPERATIONS.

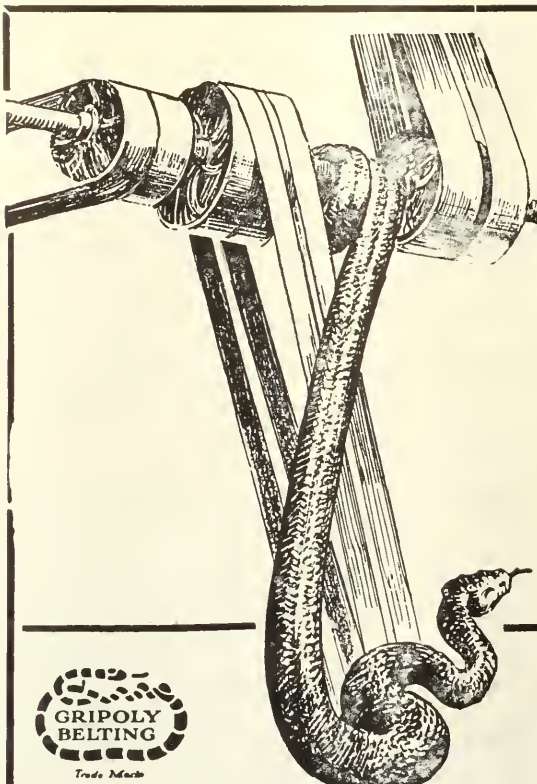
For details of farming operations I refer you to the manager's report. We show, unfortunately, a loss on this year's operations; I think, however, you are all fully aware that the season has been most disastrous for all farmers throughout the Union. Drought in the early part of the season, heavy rains and hail later when the grain was ripening, and the serious drop in the price of the produce, has all militated very much against our operations. Prospects this year, I may say, however, are more encouraging; more ground is being broken up, and I feel sure we shall see a decided improvement next year.

Our livestock generally is in first-rate condition and on the increase. The value of your herd's at to-day's prices (although appearing in the books at £1,600) can be taken at well over £3,000.

Your thanks are due to the mine manager, Mr. A. G. Maclatchy, and his staff; to Mr. A. Vernon, the farm manager; and also to the head office officials for their services during the past year.


I now beg to move the adoption of the reports and accounts as submitted.

The reports and accounts were passed unanimously and the meeting terminated.



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JOHANNESBURG, TRANSVAAL, SATURDAY, DECEMBER 17, 1921.

No. 1577

The Ferreira Deep Disaster.



(Top Photo) No. 1 shaft on fire, Ferreira Deep.
(Bottom Photo) An anxious group at No. 2 shaft on
Wednesday morning.

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The Ferreira Deep Disaster.

A WONDROUS STORY OF HEROISM AND ENDURANCE.

Never in all its history has the Rand been so saddened and thrilled as it has been during the past week by the calamitous events which have been happening 2,000 feet below the surface of the earth in the Ferreira Deep. The fire which started in this famous old mine last week and which has resulted in the virtual suspension of operations except those devoted to rescue work, has had as its sequel a chapter almost unparalleled in the story of mining perils, endurance and courage. Time after time hope of extricating the entombed men has been dissipated, only to be revived by some sudden change for the better in the underground conditions.

No more poignant story has ever reached our ears than the account of Mr. Selby's leave-taking with his entombed men on Wednesday. Then the smoke cleared and Mr. Stuart Martin and Mr. Ivor Rees led fresh rescue parties into the dangerous workings where Johnston and Lagan were pinned.

Mr. Martin, Mr. Paul Selby, Mr. Brett, and Dr. Donaldson, who was able to partially examine the injured men, Mr. Ivor Rees, Mr. Anderson of the Rand Mutual, Mine Captains Adams, Brinton and Fisher, Shift Bosses Old and Prebert, and the other members of the rescue gangs have done splendid and heroic work. The rescue parties have indeed lightened the tragedy of this terrible disaster by the grand and unselfish exhibition of courage which they have exhibited.

We are unable this week to give the full measure of praise to these heroic comrades of the brave men entombed, but we hope next week to publish a special illustrated article which will fully review the whole misfortune and which will also provide some little memento of a display of heroism and endurance which could well be blended into an epic.

At this juncture we would tender our heartfelt sympathies to the bereaved, and we would say that the Rand is this day proud of these miners of the Ferreira Deep as well as it is saddened by the story of the catastrophe.

One of the most tragic occurrences in the history of Rand mining occurred last Sunday night, when five miners were entombed by the collapse of No. 7 station at No. 1 shaft of the Ferreira Deep Mine. The collapse of the station is the result of the fire which was raging in a stope between the 7th and 8th levels. The fire was discovered about 10 o'clock on Wednesday night, the 7th.

The Fire Spreads.

At first the fire did not seem to be an alarming affair, and it was thought that it would soon be possible to get it under control and that the work of the mine would not be impeded so far as the lower levels were concerned. There seemed no reason to anticipate danger. So the European shift working on all levels below the first, except No. 9 level, went down as usual, the boys having been previously lowered. No. 1 shaft was not used, as this is the up-cast

shaft and smoke from the burning timber was finding its way up. It was about 9 o'clock or 9.30 that there was the first intimation of danger. It was seen that smoke was breaking across towards No. 2 shaft, and at the same time it was reported that certain individuals had been affected by fumes. The two mine captains, Messrs. Fisher and Adams, with assistant mine captain Brinton and others, at once went forward to investigate, and they saw some natives lying gassed in one of the roadways. As the rescue party proceeded, in a place which was comparatively clear of smoke, they themselves suffered three casualties from gassing in about ten seconds. It then became apparent that this portion of the mine was flooded with the deadly carbon monoxide gas from the fire, and under the instructions of the manager, Mr. Paul Selby, steps were immediately taken to get the whole of the white and native shifts out of the mine. About 12 o'clock every living soul was out of the mine, the manager—clad in muddy overalls and battered felt hat—being the last man up.

Down the Smoking Shaft.

Meanwhile No. 1 shaft, which is the up-cast shaft, had become like a chimney, up which rolled volumes of smoke



2,000 feet Underground in A Rand Mine.

with an evil, earthy smell. When a tally could be taken, it was suspected that there were about five natives who could not be accounted for, but it was not until some time afterwards that there was any reason to think there was any white man below. With the mine empty of the shift, the efforts to get at the actual scene of the fire were continued. At two o'clock Mr. Selby headed a party of three or four men, who made the descent of the smoking No. 1 shaft in an effort to reach No. 9 level. But this time, although the volumes of smoke rolling up the shaft were thicker than ever, the levels below the fire had become clearer—probably by reason of the draught caused by the hot fumes rising in the shaft. But it proved impossible to approach the scene of the fire. Any attempt to move in that direction was frustrated by the presence of carbon monoxide. It was impossible to locate the exact spot where the fire centred. All the members of the party were more or less affected by the fumes when they came up, but by this time it was no longer in doubt that an employee named Jardin was somewhere in the mine and it was not long before they made still another descent.

Fighting the Flames.

Equipped with smoke helmets the rescue party pushed through to the spot where the gassing of the first investigating party took place. Heroabouts on the 9th level and about 70 feet from the station, No. 2 shaft, they came upon the body of Jardin, who must have been dead some hours. It

was nearly 6.30 when his body was brought to the surface at No. 2 shaft. By seven o'clock the fire had not reached the shaft, and the shaft timbers were being kept wet to minimize the danger. The fire was located, attacked, and was

The disaster occurred while the five men were on the 7th level of No. 1 shaft fighting the fire. A fall of hanging took place, and, as more threatened, they took shelter under the main station, when the whole structure fell in. The five



Mr. Paul Selby (x) (Manager). Ferreira Deep, about to descend to investigate.

considered to be under control. It was possible by this time for the men engaged in these operations to work on No. 7 level, and as the fire is situated in stopes between No. 7 and No. 8, this gave them the advantage of being above the fire.

Sunday Night's Disaster.

At 10 p.m. on Sunday the circumstances accompanying the fire took a very tragic turn when the whole station at the 7th level of No. 1 shaft fell in and entombed five miners.

men were: George William Johnston, foreman timberman, married; Arthur Clark Logan, shaft timberman, married; Christoffel Jacobus van Tonder, reclamer, married; Leopold Dary Seeligsohn, sampler, single; Augustus Parau, single. A native came up by way of No. 2 shaft some while afterwards, stating that there had been a fall, and that he had found himself alone and in darkness. Amongst those who went down almost immediately were mine captains Adams and Brinton; but although they approached as near as practicable to the scene of the disaster, they found no signs of



The Safety Museum of the Rand Mutual. Exhibits with an added and poignant interest in view of the Ferreira Deep Disaster.

anyone being alive. Their calls and signals brought no response, and they returned to the surface. Rescue operations went on the whole of Monday, and the efforts of the men were in no sense diminished by reason of the fact that they expected to recover only bodies.

Another Dramatic Turn.

Later it was possible to ascertain by means of sounds that certain of the entombed men were still live. The speaker was apparently Johnston, and it was stated that Logan and Seeligsohn were with him and were alive. It was estimated that there was about 10 feet of rock between the entombed men and the rescuers. Rescue work was pushed on at all speed in spite of this fact. As time passed on the rescuers gradually got closer to the sufferers; any material removed had to be replaced by props or struts to obviate the occurrence of a collapse such as might bury finally both the sufferers and the rescue party. By 1.15 a.m. on Wednesday both Johnston and Logan had been given nourishment, which greatly improved their state, and it was hoped to complete the work of rescue by 2.30 a.m. Meanwhile in the early hours of the morning the fire, which it was hoped had been successfully brought under control, broke out again and smoke and fumes poured into the workings where the rescuers were working. This it was that seemed finally to seal the fate of the two poor fellows who had made such a gallant fight for life. The rescuers, reluctant as they were to withdraw, were compelled to leave the workings, for it would have been certain death for them to stay in the gradually growing cloud of smoke and gas. The news of the abandonment of rescue operations was cabled to the London office of the company.

Hope Not Abandoned.

After the rescue party had been driven from the scene of the disaster, the smoke filled shaft began to clear in the afternoon. Another rescue party, with Mr. Stuart Martin, the company's consulting engineer, and one of the best shaft sinkers on the Rand from the Crown Mines, Mr. Rees, went down, and it was reported that both Logan and Johnston were still alive. At 3.25 p.m. on Wednesday the following was officially issued: "Rescue parties have resumed operations, and fortunately find that the two men are still alive. There is still hope of rescue." The rescue operations, directed by Mr. Rees, the shaft sinker from Crown Mines, was progressing favourably. Johnston was keeping comparatively well, but Logan was gradually growing weaker.

Death of Logan.

The shift that came up at 1 a.m. on Thursday brought the sad news that Logan had died some hours earlier. Johnston was alive at 1 a.m. and comparatively well.

Johnston's Magnificent Fight.

All day on Thursday the rescue parties worked unceasingly to save the last survivor. But their splendid efforts were in vain. Mr. Johnston, we regret to say, died in the mine at about four o'clock on Thursday afternoon, after having been entombed for 90 hours.

Smokeless Fuel.

For many years a vast number of inventors in Great Britain and elsewhere have been trying to solve the problem of producing from coal a smokeless fuel which can be satisfactorily burnt in the ordinary open grate. The method adopted is to distill the coal at a lower temperature than is used in the ordinary gasworks. When this is done, gas is produced together with valuable oils and other by-products, leaving a material which is roughly midway between coal and ordinary coke in composition. Many difficulties were encountered in the attempt to make this process mechanically good and commercially sound. These difficulties seem to have been overcome in a large installation now at work in Great Britain, capable of treating about 36 tons of coal per day. The fuel produced is hard enough to withstand ordinary transport and it burns brightly in a grate, giving off a large mass of radiant heat, and showing no trace of smoke. The success of this installation depends mainly upon an ingenious arrangement of the retorts. When coal is distilled at the low temperature mentioned it expands, and this expansion in the retort is apt to make the resulting coke very friable. In the new installation, however, the retort is fitted with a double internal partition; and as the coke expands the two parts of the partition are brought together giving room for the expansion and enabling the coke to retain a firm structure.

* * *

Electric Railway Boom in Great Britain

Remarkable activity is being shown by British railways in connection with the conversion of lines, especially in the neighbourhood of London, from steam to electric traction. The Great Eastern Railway Company, which carries an enormous volume of traffic from the city to the east and north-east of London, has prepared a scheme of electrification and other improvements which will involve a capital of about £10,000,000. The London Brighton and South Coast Railway is bent upon electrifying practically the whole of its system between London and Brighton, and the "Underground" group in London has prepared a scheme for spending £6,000,000 on the development of its tube railways and allied transport services. The South Eastern and Chatham Railway has also made several plans for the conversion of its suburban system. One of the methods of propulsion laid before this country by a British engineering firm has some highly novel characteristics. It is proposed to propel the trains by means of internal combustion locomotives generating electricity, which in turn drives the motors on the locomotive or other parts of the train. The system is equipped with the usual overhead line or third rail which in this case, however, acts merely as a power interchange line. When a train is running down hill it returns current to the line; and when it is standing at a station the engine continues to run and to pump current into the interchange line. In this way additional power is afforded to trains which are ascending gradients or starting at stations. It is claimed for this system that it saves a large amount of capital expenditure and is very economical especially on systems where traffic is not dense enough to justify the construction of large power stations and transmission mains.

* * *

New British Air Service.

In spite of the difficulties which surround the development of a novel form of transport, the regular aeroplane service organised in Great Britain continues to expand. In the near future an additional service between London and Paris will be started. It is intended to arrange four regular services each way per day with British aeroplanes. These services will involve some portion of the journey being made in darkness. Improved lighting arrangements have been introduced at the aerodrome in order to enable night flying to be carried on in safety.

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HEAVY FALL IN THE GOLD PREMIUM.

THE OUTLOOK OVERSEAS IMPROVES AND AFFECTS THE RAND'S INDUSTRIAL POSITION—OUR MINES IN GRAVE PERIL—HEAVY LIQUIDATIONS ON THE SHAREMARKET—A MOMENTOUS CONFERENCE.

At the moment of writing the latest advice in regard to the premium is that gold has fallen to 98s. 9d. There has been heavy liquidation in big gold shares on the Stock Exchange, and at last it seems to be realised that the Rand is on the brink of a big catastrophe unless something can be done to retrieve the position.

Speaking only a little over a month ago, the Prime Minister said: "If the price of gold were to fall from 104s., where it is to-day (November 4), to 100s., the result would be that the following mines would have to work at a loss: The Geldenhuis Deep, the Robinson, the New Goch, the Aurora West, and the E.R.P.M."

The price of gold has now fallen to 98s. 9d., which is below the fateful figure mentioned by General Smuts. The Witwatersrand, therefore, at the present moment is faced with the fact that the mines mentioned have practically reached the border line of profit, and are in danger of closing.

The E.R.P.M.

How serious a matter it will be if the E.R.P.M. closes down can be indicated by repeating the words of General Smuts uttered on the occasion referred to. He said: "I found from the report of the Low Grade Mines Commission that if the E.R.P.M. closes down five other mines will have to follow suit. The report says that about three million gallons of water are pumped daily into the E.R.P.M. at an annual cost of about £100,000, and unless that water is pumped away the water will rise in those mines until afterwards it floods neighbouring mines, and there will be no stoppage of the mischief until you get right on to the Geldenhuis Deep. And the Low Grade Mines Commission reported that if the E.R.P.M. were to close down, and pumping were to stop on this mine, then the following mines would also go under, that is to say, the Witwatersrand Deep, the Witwatersrand, the Knights Deep, the Knight Central, and the Rose Deep. Practically a wash-out of the Witwatersrand from the Geldenhuis mine on to Benoni. Well, I need not tell you what that is going to mean. To cut out a section of the Witwatersrand like that, and to see these mines go under will be a serious state of affairs, and there will be very few who are sitting here who would be prepared to contemplate a situation like that."

As the Premium Goes.

Having indicated what would happen if the gold premium fell to 100s., the Prime Minister went on: "If there is another fall of 5s., that is, if the price of gold came down to 95s., the following mines will be working at a loss and running the risk of closing down: the West Rand Consolidated, the Nourse, the Durban Deep, the Knight Central and the Luipaardsvlei. If there is another fall of 5s., say to 90s., then the following mines will have to close down: the New Kleinfontein, the Wolluter, the New Unified, the Simmer and Jack, the Witwatersrand Deep, the Randfontein, and the Witwatersrand. And if the premium disappears entirely, that is, if the exchange falls again to 85s., the normal price per fine ounce, the following additional mines will go under: the Village Deep, the Rose Deep, the Consolidated Main Reef, the New Primrose, the Van Ryn Estate, and the Robinson Deep. Twenty-four out of the present 39 producing mines are in danger of going under when this premium disappears."

The West Rand.

Referring to the West Rand, General Smuts said: "You have a similar situation that will arise on the West Rand in case of the fall of the premium and the closing of the mines. You know that several mines have already closed down there. The Roodepoort United is in process, by slow degrees, of closing down. The Durban-Roodepoort is still going on, but really with curtailed operations. There you

have a case on the West Rand where a big area—all the Roodepoort area, with good gold in it, capable of being worked at a decent small profit for years and years to come—yet owing to the present situation all that area will probably close down if there is this fall in the gold premium, under present conditions."

The Conference.

In view of these unpalatable facts, the very greatest importance attaches itself to the further conference which was commenced on Thursday. The aims and objects of the conference have been very clearly set forth in the following letter which was recently despatched by the Chamber of Mines:

"With reference to the recent conference between the Prime Minister, the representatives of your Federation and this Chamber, at which the Prime Minister emphasised the grave position in which the gold mining industry finds itself, and at which certain suggestions for alleviating the position were put forward, you will recollect that the Prime Minister only dealt with the alterations to the mining regulations, and suggested that other proposals should be discussed by the Chamber and the Unions concerned in the mining industry.

"I am directed to request a meeting with your Federation at an early date, in order to discuss these important points.

Mines Making Losses.

"The Chamber would point out that, since the conferences with the Prime Minister early in November the price of gold has steadily fallen, with the result that mines which were then on the borderline of profit-making are now making losses; and should gold fall still further, more and more mines will cease to make profits. The present position is such that, should gold fall, as it seems likely to do, to its normal price of 85s. per fine ounce without a very material reduction in the cost of production, no less than 24 out of the 39 producing mines now remaining on the Witwatersrand would be making a loss which they are unable to bear. The result would be that over 10,000 Europeans would be thrown out of employment.

Three Means of Alleviation.

"The Chamber considers that there are three means whereby some alleviation of the position may be obtained which, although probably not saving all the mines, would certainly go a long way towards saving some of them. The means which the Chamber would propose are (1) an alteration in the system of underground contracts; (2) the modification of the status quo agreement; and (3) a rearrangement of underground work.

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"In regard to underground contracts, it is the Chamber's opinion that the prices paid for this work are out of all proportion to the value of the work done, and are so high as to cause discontent among other employees of the mines, and thus upset the discipline and good conduct which are so necessary to successful working. The Chamber proposes to introduce a 'no cost' form of contract, with a view to reducing the earnings of underground contractors to a figure more in keeping with the earnings of other employees on the mines.

Status Quo Agreement.

"In regard to the status quo agreement, the Chamber is of opinion that the time has arrived when this agreement should be limited to skilled occupations only, and that the mines should make greater use of experienced native labour in semi-skilled occupations. It is not the intention of the Chamber to suggest that natives should replace Europeans in skilled trades and occupations, such, for example, as those of mechanics, miners, etc., but that they should be employed instead of white men in those semi-skilled occupations which natives are well able to, and in some cases actually do, perform, such, for example, as those of pump attendants, cleaners, greasers, rough pipefitting, sanitary service, wastepacking, and so on.

"It is not the Chamber's desire or intention to affect in any way the employment of tradesmen and skilled Europeans on the mines, but rather to secure for such employees wider opportunity of employment, by ensuring that the mines will continue to work when the price of gold falls. I am desired to emphasise most strongly that it is only by some very drastic reduction in the cost of production that the mines can be kept going, and to urge on your Federation and the Unions the necessity of accepting the Chamber's suggestions, unless disaster is to overtake the Witwatersrand. The proposed modifications would (on the assumption that the existing mines continue) involve, over a period of months, if not years, a reduction, not necessarily all by retrenchment, of, at most, 2,000 in the number of unskilled and semi-skilled Europeans at present employed; and probably much fewer. On the other hand, if the present conditions are allowed to persist, the certain result will be the premature closing down of mines and loss of employment to over 10,000 Europeans, skilled and unskilled.

"Further, unless working costs can be reduced to a figure which will show a reasonable return on capital, even when gold has dropped to its normal price, the ordinary process by which exhausted mines are replaced by the opening of new ones will entirely cease."

Letters to the Editor.

UNITED STATES PATENTS.

To the Editor, *S.A. Mining and Engineering Journal*.

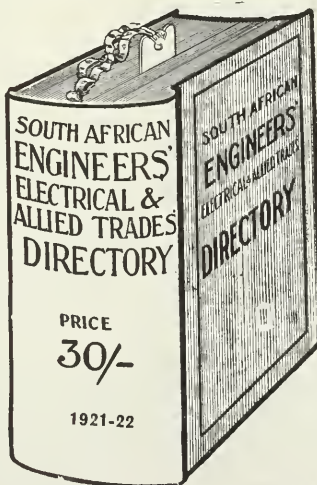
Sir,—Statements have recently appeared in the press that it "usually takes from two to five years" to secure the acceptance of specifications of patentable inventions in the United States and that it constitutes "a record" to have obtained a grant in the space of eleven months. There are in this town a great many people, interested in the subject of patents in the United States, by whom these statements will be read with considerable surprise, and if they are allowed to go forth unchallenged they will cause much needless alarm to others. May we, therefore, be permitted to say that in the course of an experience covering a period of more than thirty years, and a very large number of United States cases, we have no record of the allowance taking over four years to secure, and when the delay is considerable it is more often due to the applicant than to the United States Patent Office. The average time taken to secure allowance in the United States of America in the last fifty accepted cases handled by us, works out at a little more than a year, as the following table shows:—Under 6 months, 7; over 6 months and under 1 year, 13; over 1 year and under 18 months, 11; over 18 months and under 2 years, 9; over 2 years and under 3 years, 6; over 3 years and under 4 years, 4. In one instance the time occupied was under two months from date of filing, and we have just recently had a case accepted within three months.—Yours faithfully,

D. M. KISCH & CO.
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UNITED STATES TRADE WITH SOUTH AFRICA.

Trade in October between the United States and British South Africa increased 362,000 dollars over September, according to a cable from the Department of Commerce in Washington to the American Trade Commissioner, Mr. P. J. Stevenson. American exports were 1,500,000 dollars, as compared with 900,000 dollars in the preceding month, while imports of South African products declined from 400,000 dollars to 162,000 dollars in the same period.

The striking features of American trade conditions are irregular prices, increasing productions and unemployment, which is on a large, but decreasing scale. Foreign trade, both imports and exports, is stationary.



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AN EXPERIMENTAL MINE.

HOW TO GET DOWN TO BEDROCK FACTS—CLEARING UP CONTENTIONS.

(By a Special Correspondent).

Whilst all are agreed on the necessity for doing something to save the industry and of doing something speedily, there is no unanimity of opinion as between employers and employees in regard to the relative values of the various reforms suggested and as to the general economic effects of such reforms. Some people will tell you that there is no hope whatsoever for the low grade mines of the Central Rand, that they are worked out, and that working costs can never be reduced to a degree which will admit of them being again worked at a profit except in the remote contingency of the price of gold again reaching £6 per ounce. Those who are more optimistically inclined contend, however, that there is still a vast future for the Witwatersrand, and that, to use the exuberant declaration of a few years ago which was employed before the dire prospect of grass growing in our streets was envisioned, that mining will still be in progress on the Rand a century hence. One school of thought urges stabilisation of gold at, say, £5 10s. an ounce, and contends that herein lies our only salvation. But whether

The Obvious Remedy.

Having arrived at this point, there is disagreement on the ways and means by which low grade ores can be made to yield a profit, and on the general economic results of the most obvious method of achieving this, that is by reducing rates of wages, retrenching surplus men, abolishing or amending the contract system, and substituting black for white labour in some departments of mining. Any suggestions of this nature are, however, received in labour circles with profound suspicion. The conclusion is immediately come to that this is the thin end of the wedge in a conspiracy which aims at the complete breaking down of the colour bar and of the eventual economic and social ruin of South Africa. Such a view finds many champions outside the spheres of labour. There are, in fact, many people who are not directly connected with the industry who contend that Johannesburg, the Reef, and the country at large will not benefit by a low grade policy for the mines.



Construction work in progress on a big Rand Mine. A photo of the more prosperous times of a few years ago which we all should like to see return.

this is economically practicable no one seems to know. Our greatest financial pundits disagree over elementary questions of currency, and the world is sharply divided as between deflationists and inflationists, sane currency disciples and the champions of illimitable credit.

The Puzzle of the Premium.

None can foretell what is going to happen to the gold premium. Even our experts in the Chamber of Mines have made big mistakes in anticipation of its course. But, as we have often said, and as most clear-thinking critics and students of the kaleidoscopic Rand are agreed, the soundest policy is to leave such an ephemeral thing as the incidence of the American exchange out of the question altogether. We have got to get down to bed-rock facts and work out our salvation on the standard price of gold.

The Experimental Mine.

Having regard to all this conflicting welter of contentions, it seems to me that it would be an excellent idea to select one of the low grade mines which is in danger of having to close down and to test on a practical working scale the efficacy and economic effects of the various solutions which are being suggested as remedies for the ills from which the mines at present are suffering. I suggest that one mine of the Rand— I am not prepared to say which— but one mine which is now hovering on the border line of payability with gold at under £5 per ounce, and which will be forced into idleness if gold falls further in price and there is no concomitant reduction in expenses, be set aside as a property devoted to experiment.

Where Problems Might be Solved.

This could be done without impairing present operations. The output could be maintained and development continued.

Shareholders would have little or nothing to lose by such an experiment, for it is assumed that the mine selected would be one of those in danger of having to put its shutters up. The practical translation into actual practice of the various remedies suggested for the mining industry as a whole, the valuable data that would result from the actual testing of the various contentions in actual practice, might easily not only put this particular mine on a sound footing, but would render signal service to the whole Reef through the procuring of actual results. If only the experimental mine helped to establish the little appreciated truth of the axiom that it is better to do more work for less pay than to have no work and no pay it would achieve a great deal. But I think that a great deal of matter which is at present contentious and which gives rise to heated debates and harmful prejudices might be brought out of the present nebulae of debate into the clear light of proven knowledge by such an experimental mine. Some of our technical experts and leaders of industry declare, for instance, that given freedom from trade union restrictions and more latitude in regard to the employment of native labour on semi-skilled work costs in a typical mine can be reduced to well under a pound a ton without making any serious inroads into European wages. The experimental mine should be able to demonstrate the accuracy or the fallacy of this view. Exact data would be available as to what saving can be effected by the introduction of the reforms in question, and if it could be shown in actual practice that a mine which has to-day a cost bill of, say, £40,000 per month and is in danger of closing down can by reducing its bill to £25,000 per month be able to give continued employment to, say, 300 white men at an average wage of so much per month and distribute money expended on native labour and stores, in addition to earning a fair profit for the shareholders, it would indeed be a big step in the direction of putting our industrial house in order.

Management.

Such an experiment would have to be undertaken by all the parties concerned in a broad give-and-take spirit and with an unprejudiced determination to arrive at actual results. The mine in question might come under a committee of management elected by the Government Department of Mines, the Chamber of Mines, and the Labour organisations.

An Idea Meriting Consideration.

I am fully aware of the fact that the suggestion is open to criticism. It may very properly be pointed out that conditions vary in different mines, and that results secured in one proposition may not be capable of anything approaching exact reproduction in another property. All the same, I submit that the idea of an experimental mine merits consideration, especially so in view of the hard fact that it is not difficult to-day to select a proposition for a large experiment of this nature without adversely affecting

shareholders' interests, because there are several mines which, with gold at less than five pounds an ounce, are unprofitable on the present basis of working expenditure.

[We comment on this contribution in a leading article in this issue].

Mr. Karl Spilhaus.

Opinion is sharply divided on the wisdom of the Government's appointment of Mr. Karl Spilhaus to be the Union's Trade Commissioner on the Continent of Europe. In some commercial circles the appointment has roused a storm of protest. The Government, however, defends its action, and shows no intention of reconsidering the matter. We are told that this is no time for silly slobbering sentiment. The War is over, and Mr. Spilhaus, we believe, took out papers of naturalisation last year. Up to a certain point we quite agree with this view. But the thing can go too far, and this appointment has undoubtedly tended to estrange a vast amount of loyal public opinion previously staunch to the Government.

No one questions the good business brains of Mr. Spilhaus, but we do seriously question the ability of Mr. Karl Spilhaus to further the interests of Union trade in the countries of our former allies on the Continent, and particularly in that country of long memory, France. And surely there are men in the Union, British-born or Dutch-born, whose business abilities are not inferior to those of Mr. Spilhaus. There are many who contend that from a business point of view the Government has made a wise selection. But, on the other hand, a great number of South Africans, and particularly those who made vast sacrifices a few years ago, view the appointment with amazement, and consider that the Government has made a very big and astounding blunder.

MINES DEPT. EXAMS. CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

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Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we this week commence a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

Dividends Declared.

Natal Navigation, No. 38, 5 per cent., 1s., plus bonus 2½ per cent. (6d.).
 Brakpan, 15 per cent., 3s. per share.
 New Era, 10 per cent., 6d. per share.
 Rand Selection, 12½ per cent., 2s. 6d. per share.
 Springs Mines, 7½ per cent., 1s. 6d. per share.
 S.A. Coal Estates, 5 per cent., 1s. per share.
 Modder Deep, No. 14, 85 per cent. (4s. 3d. per share).
 Geduld Proprietary, No. 14, 10 per cent. (2s.).
 New Kleinfontein, No. 26, 5 per cent. (1s. per share).
 Apex Mines, No. 31, 5 per cent. (each per 10s. share).

* * *

Debenture Issues Interest.

Randfontein Estates, 6 per cent. first mortgage.
 Randfontein Central, 6 per cent. first mortgage.
 Crown Mines, 5 per cent. First Mortgage.
 E.R.P.M., 5 per cent. First Mortgage.
 Consolidated Diamond Mines of S.W. Africa: Warrants posted January 3.

* * *

Pretoria Silvers.

The annual meeting of Pretoria Silvers was held this week, Mr. Chas. A. O. Bain being in the chair. The company has been in existence since September of last year, during which period good progress has been made with the opening up of the property. Bad luck with the main or No. 1 shaft has caused some unforeseen delay and expense. The excess of liquid cash in hand over current liabilities at September 30 last was £9,473, the actual cash at bankers being £6,525. Plainly, the company will require some further financing before it can be brought to the producing stage. A noteworthy point is that it is not the intention to erect treatment plant, but to sell the ore as it is mined. Preliminary arrangements have been made with the neighbouring Transvaal Silver Co., who have a first-class plant, to sell to them the Pretoria Silver ore.

* * *

De Beers Finances.

In another part of this issue we deal with the main points of the speech made by Sir David Harris at the annual meeting of De Beers. The financial position of the great Kimberley undertaking merits separate treatment. The balance sheet shows a general reserve fund of £700,000. In addition, there is a special reserve fund for the stabilisation of the diamond trade amounting to £2,476,899. This fund is invested in the shares of other diamond mining companies and kindred interests, and is included in an amount of £2,926,899 shown on the assets side of the balance sheet. The company has paid during the year to preference shareholders the usual dividend of 20s. per share and to deferred shareholders 10s. per share. The actual profit for the year, after taking diamonds into stock at a merely nominal figure, amounted to £228,522. The state of the diamond market is such that the directors have decided not to declare any interim dividend to either preference or deferred shareholders for the half-year ending 31st December, 1921.

THE SOUTH AFRICAN IRON AND STEEL CORPORATION, LTD.

The balance sheet and directors' report of this company for the year ended June 30th, submitted to shareholders at the second ordinary general meeting held in the company's Board Room, Corner Estate Buildings, 203 Pretoria Street, Pretoria, on Wednesday, the 14th day of December, states, *inter alia*, that since the last report 350,000 shares of £1 each, fully paid, have been issued. The capital account now stands as under:—Issued: The Pretoria Iron Mines, Ltd., as consideration for certain assets, 200,000 shares; sundry subscribers, 150,000 shares; in reserve, 1,150,000 shares; total, 1,500,000 shares. The transfer to the company of the property and assets taken over from the Pretoria Iron Mines, Ltd., has been duly completed. In addition to these the company acquired during the year under review various properties specified in the report.

Under the heading of Operations, it is stated that the experimental blast furnace was blown in for the first time by the company on the 26th July, 1920, and was in operation continuously up to the 29th April, 1921. During this period 2,656 tons of pig iron were produced. Before blowing in, the whole of the plant was thoroughly overhauled, a new cooling system was installed and an additional heater built. The results of the running of this experimental plant have given valuable information technically and commercially. The foundry is now complete. The whole of the coal area has been prospected under expert supervision. Over 2,500 acres were drilled in detail by fourteen boreholes, roughly half a mile apart. The tonnage of good coking coal in this area can be safely reckoned 20,000,000 tons.

Accounts.—The following is a statement of the receipts and expenditure to 30th June, 1921:—Receipts: Working capital, 150,000 shares of £1 each, £150,000; less calls in arrear, £356 5s.—£149,643 15s. Expenditure: Buildings, machinery and plant, £10,754 5s. 6d.; property, claims and options, £101,651 10s. 7d.; prospecting and development, £11,295 16s. 1d.; technical reports, etc., new works, £7,359 15s. 4d.; general and administrative expenditure, £23,702 15s. 8d.; preliminary expenditure, £5,126 18s.—£159,891 1s. 2d.; investment, £1,590; stores and materials, etc., £18,884 16s.; furniture and fittings, £635 11s. 2d.; sundry debtors and payments in advance, £1,644 5s. 3d.—£22,754 12s. 5d.—£182,645 13s. 7d.; excess of expenditure over receipts, £33,001 18s. 7d.; made up as follows: Sundry creditors, £3,711 13s.; bank overdraft, £29,296 11s. 9d.; less cash on hand, £6 6s. 2d.

It is common knowledge that the company cannot proceed with its ambitious scheme unless large sums of capital are raised. The report shows that 1,150,000 shares are held in reserve. It was understood at the time of flotation that these shares were underwritten. Even if the £1,150,000 represented by these shares was forthcoming, the capital so available would not be sufficient for the company's ambitious schemes. As it is, the company had at the end of June a bank overdraft of £29,296 11s. 9d. and owed £3,711 13s. to sundry creditors, whilst the cash in hand amounted to the magnificent sum of six pounds six shillings and twopence.

* * *

Premier D.M. Co., Ltd.

The annual meeting will be held on February 24, 1922

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 H.O.Y.27, Central News Agency, Johannesburg.

De Beers' Annual Meeting.

SIR DAVID HARRIS REVIEWS THE POSITION OF THE INDUSTRY—REPLY TO THE CRITICS.

Sir David Harris presided at the annual meeting of De Beers last week, and delivered a long and interesting address. The keynote of his speech was given in the following passage:—"This Board is not infallible—we probably make mistakes, but these are the fault of the head, and not of the heart. Attacks on the Board, misrepresentation, unfair criticism, or abuse will neither mend matters nor assist the industry in the slightest degree. The only thing that will help is the sale of diamonds. For all concerned—directors, managers, staff, workpeople, shareholders, and all their families—I hope the day of revival is not far distant." Dealing with the actual position in the diamond market, Sir David said:—"The American trade is buying in the cheapest market. If this was the result of the discovery of a new mine in Russia we would be very much alarmed, but as this supply is only of a temporary character, and, we hope, will probably come to an end some time next year, we look forward with confidence to the renewal of trade with our best customers, the Americans. The returns from America show that, although there has been a great decrease in importations during the 14 months ended 30th June, 1921, there has not been an entire cessation of buying; on the contrary, diamonds have been imported regularly, as the following official figures will show:—For the 10 months 1st July, 1919, to 30th April, 1920, America imported diamonds valued at 80,714,000 dollars, in round figures an average of 8,000,000 dollars per month. During the 14 months ended 30th June, 1921, the total amounted to 36,790,000 dollars, roughly averaging 2,630,000 dollars per month. It will therefore be seen that for the 14 months I have mentioned the American purchases did not average one-third of those made during the preceding 10 months. You will realise how vitally the condition of affairs in America affects our industry. This is reflected in this company's returns for the year ended 31st December, 1920, in which our total receipts from the sale of diamonds amounted to £4,628,882, but from the 1st January, 1921, to 31st October, 1921, we have delivered only £618,936, while our expenditure for the same period was £2,019,249—a deficit of £1,400,313. Had it not been for the policy of control instituted by this company many years ago, and followed by all the big producers, during the present world-wide depression, the results to the diamond industry would have been disastrous. This policy will be maintained and adhered to. We do not despair of the recovery of the diamond industry, but, in the meantime, we are compelled, in the interests of all concerned—employees, shareholders, and Kimberley generally—to husband our largely decreased reserves. The necessity for retrenchment was forced upon us; we put off the evil day as long as possible, but owing to the long and continued depression in the diamond market the company, as mentioned in the directors' report, was reluctantly compelled to curtail its operations and to close down."

A Reply to the Critics.

Sir David directed a considerable portion of his speech to refuting certain critics of the company. In particular, he dealt with Sir Robert Kötze's recent statements in his annual report. By a process of what Sir David could only designate as "juggling with figures," Sir Robert Kötze arrived at the conclusion, and published it in a Government report, that at a time when De Beers' shares were standing at £10 the company were paying substantial dividends amounting to 14·3 per cent. on deferred shares, and it only

remained for Sir David Harris to point out that such a conclusion could only be drawn by eliminating the four years during which De Beers paid no dividends at all. The only fair method of basing the return to shareholders is on the average market price of the shares over the same period that the dividends were declared. Such a groundless attack was hardly less unjustifiable than the foolish one made by the "budding politician of Stellenbosch," who made free use of another Government publication to circulate statements which even the man-in-the-street would have no difficulty in proving to be utterly devoid of truth. So far from the products of the alluvial diggers being, through necessity, disposed of to the buyers of the big mines, and that De Beers' diamonds, for which this self-imposed critic says there is less demand, thus derive an unfair preference on the market, Sir David had only to state what is common knowledge, viz., that De Beers have never bought or had an interest in the purchase of alluvial diamonds.

Sir David concluded:—"The criticisms of Sir Robert Kötze, and the groundless attack of the Stellenbosch fabricator both bore the Government imprimatur in that the first was published in the annual report of the Government Mining Engineer, and the second in the *South African Journal of Industries*. I do not believe the Government saw these statements before publication, but as the public place great reliance on that which appears in official journals the Government should at least exercise some supervision to prevent statements appearing of an inaccurate and damaging character."

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Oil Shale Activities.

An INFORMATIVE CIRCULAR—AN AMERICAN VIEW OF SOUTH AFRICAN DEPOSITS.

We are in receipt of a very valuable circular of information issued by Mr. Victor C. Alderson, President of the Colorado School of Mines, on the subject of recent world-wide progress in oil shale development.

In the course of this Mr. Alderson reviews oil shale progress in various parts of the world and says, *inter alia*:—

A comprehensive and world wide view of the situation suggests a few striking facts.

1. The supply of well petroleum cannot be depended upon to supply indefinitely the needs of industry and advancing civilisation for oil and its derivatives.

2. The oil shale deposits throughout the world are virtually inexhaustible and supply a "second line of oil defence" as it were.

3. The main problems to be solved are:

(a) The perfection of a retort of large capacity, fool-proof in operation, and designed on correct scientific principles, that will produce the maximum amount of good oil.

(b) The refining of the crude shale oil, not into a long list of chemical curiosities, but into a few standard products for which there is a steady market, and

(c) The co-ordination of the various elements so that as a business project the whole will be an economic success.

4. There is a world-wide interest in oil shale—financial, economic, technical, chemical, and practical—that augurs well for its early development into an important factor in the economic advancement of the entire world.

The oil shale deposits of South Africa are recognised in four well defined areas, *viz.*, the Ermelo district of the Transvaal; the Wakkerstroom district of the Transvaal; the Utrecht district of Natal; and Impendible county of Natal. The oil shales of the Ermelo district occur in three veins; the lowest has a thickness of 20 to 24 feet; the middle one, 19 feet; and the top one from two to three feet, with some very thin streaks. Unfortunately, the lowest and middle veins produce little oil. The top vein yields 30 gallons of oil and 64 pounds of ammonium sulphate. Only a small amount of prospecting has been done, so that the actual value of the field is not known. The thinness of the top vein should not alone bar the district from consideration because the district is crossed by the Breyton-Ermelo railway and therefore has better transportation facilities than any of the other oil shale districts.

The main bed of the Utrecht district has a maximum of thickness of 22 feet, composed of a series of beds from two and a half to five feet in thickness. These beds are not uniform throughout the district, but, in places, thin out and enlarge. A test of the shale at the City Central Laboratory, London, gave 40.6 gallons of oil and 57 pounds of ammonium sulphate to the ton; and 1.71 per cent. sulphur. The distance of this deposit from a railroad is disadvantageous, but other advantages would probably justify a branch railroad from Wakkerstroom.

The oil shale deposits in Impendible county, Natal, occur in the Molteno beds and are best exposed on Crown lands in the Umkomas valley. E. H. Cunningham-Craig, of London, reports this shale to yield 27.10 gallons to the ton. Little development has been done, but what has been done indicates a valuable deposit worthy of further consideration.

In the Wakkerstroom district, the oil shales are found chiefly on four farms, *viz.*, Kromhoek No. 76; Virginia No.

371; Goedgeronden No. 77; and Ijzermeyn No. 280. The deposit has been opened for a distance of three miles by open cuts 200 yds. apart, sufficient to show the full section of the deposit with roof and floor. Until recently control has been held, and development made, by the African Oil Corp., Ltd. A test of the shale at the Pumpherstons Works in Scotland gave 31.75 gallons of oil and 37.18 lb. of ammonium sulphate to the ton. The test also showed that the Scotch retort was suitable for treating the shale. Recently the Royal Dutch Shell interests, after a favourable report of their engineer, have taken an option for six months on the property of the African Oil Corporation. The advent of this company into the oil shale industry is an epoch making event, as it assures development and financing on a worthy scale. Also it shows the appreciation by those interested in oil production from wells, that, in the future, they must depend upon oil shale as the source of oil.

These interests are also examining the Sakalava oil shale deposits in Madagascar.

In other parts of South Africa oil shale deposits are reported, e.g., in the beds of Basutoland; in the so-called Black shale group in Southern Rhodesia; and in the Matatiel Division of Griqualand East, Cape Province. A test of this shale, made in the Government Laboratory at Cape Town, yielded 25 gallons of oil to the ton.

The absence of a domestic supply of well petroleum, the consequent importation of oil and oil products and their high price, a large local demand, the presence of substantial deposits of oil shale, all followed by the active interest of such a colossus of financial strength as the Royal Dutch group combine to indicate an early development of the oil shale industry into a successful commercial basis in South Africa.

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Prospecting for Coal near Britstown.

OPERATIONS IN THE KARROO.

Prospecting operations have recently been in progress near Vogelgeraas, about 19 miles from Britstown, on the De Aar-Prieska line, for coal. A large acreage of ground has been taken up under option, and a shaft has been sunk to a depth of over 50 feet through shales to a band of carbonaceous shale. The obvious attraction of these properties from a mineral point of view is their potential value as producers of fuel. The discovery of coal of good quality in this district of the Union of South Africa would be of great importance and would have an influence on the whole industrial aspect of the Cape Province. The only coal fields at present being worked in the Cape Province are those around Stormberg, Indwe and Molteno, 150 miles to the east of De Aar. These Britstown farms lie at a mean altitude of about 3,500 feet, in a basin surrounded by low lying kopjes. Water of a slightly brackish or alkaline nature is encountered at a comparatively shallow depth in this locality.

General Considerations: The Cape Coal Fields.

Owing to the inferior quality of the coal, the Cape coal fields as at present exploited are considered to-day as being the least important of any of the coal fields in the Union of South Africa, and production has declined from 89,000 tons in 1911 to 5,700 tons in 1920. These coal fields have, in the past, when other coal was not available, served a useful purpose, but the extension of the railway system into other coal fields has enabled a supply of better coal to be obtained, with the result that the Cape coal mining industry has lately declined to vanishing point.

The coal seams vary considerably in thickness, and occur in shales in an irregular manner.

The most important coal deposits in the Cape Province occur in the neighbourhood of Molteno, Cyphergat and Indwe, where the shales carrying the coal seams outcrop in the Stormberg beds along the mountain sides. At Molteno one section of the seam is as follows: Top coal, nine inches; shale, five inches; and coal, one foot, two inches. At Indwe the top coal varies from two feet to three feet, then comes a band of shale several inches in thickness, followed by the bottom coal three feet to four feet thick. It will be evident that this interbedding of shale with coal is a condition not at all conducive to uniformity of thickness or easy and cheap mining conditions.

It is, however, a fact that the coal fields of South Africa belong to a collection of beds known as the Karroo system, so called on account of being characteristic of the Karroo district of the Cape, where they are also better developed than in any other Province of South Africa, for there they attain a probable thickness of at least 15,000 feet, and it has for long been held in certain quarters that extensive and systematic borings of the Karroo measures in the Cape Province would disclose the presence of extensive and valuable coal measures.

It is stated that several boreholes have been sunk to substantial depths on these Britstown properties by a former option holder or holders, and that on the data secured in and by these borings a large cash offer was made for the mineral rights of these farms.

Coronation Syndicate.

The annual meeting of this enterprise is being held this (Saturday) morning, when a very favourable statement on the borehole results to date will doubtless be made by the acting chairman, Mr. A. Mackie Niven. It is hoped that the West Reef may be struck by the morning of the meeting, and that results therefrom may be available.

Reviews.

THE GEOLOGY OF THE COUNTRY SURROUNDING JOHANNESBURG.

By E. T. MELLOR, D.Sc.

The above publication has just been issued by the Department of Mines and Industries, and is intended to serve as an explanation of Sheet No. 52 of the Geological Survey Map of the Transvaal. The area included in the map, which extends for 30 miles east and west of Johannesburg, embraces the whole of the country usually referred to as the Witwatersrand, as well as portions of adjoining districts. The author describes the area and physical features of the country embraced by the map: The whole of the area forms part of the "high veld" and lies from a little below 5,000 to close upon 6,000 feet above sea level. The principal geological formations occurring are mentioned and briefly described. Among the formations represented the Witwatersrand System assumes greater importance on account of the immense economic importance of the gold deposits associated with it. With regard to the Witwatersrand System in the Heidelberg District, the author states that the system presents much the same characters as in the Witwatersrand, except that both the system as a whole and many individual members in particular are less strongly developed. As in the Eastern Rand, the Main Reef group of conglomerates is represented by a single member—the Main Reef Leader. With regard to the relation between the Witwatersrand and Ventersdorp systems in the Heidelberg areas, Dr. Mellor states that: "Where the Ventersdorp volcanic rocks lie upon the lower Witwatersrand rocks they frequently show a very marked unconformity to the beds of that system, and they may be underlain by boulder beds and conglomerates. At the same time, in the Witwatersrand and Heidelberg areas, the Ventersdorp volcanic rocks are everywhere conformable to the Elsburg beds, upon which they rest in these localities."

THE PETROLEUM YEAR BOOK, 1921. Founded and edited by Sydney H. North, Assoc. Inst. P.T. The Saint James's Press Co., Ltd., 15 Henrietta Street, Covent Garden, London.

The increasing importance of the oil industry in every part of the world, and the excellence and utility of the book itself, sufficiently explain the welcome this work has received at the hands of geologists, chemists, producers and users of crude oil and its products. It contains a mass of information upon its subject, concisely and well arranged, and the book cannot but prove useful to those engaged in the various processes of petroleum technology. Among its contents one finds the statistics of production, imports, exports and prices of crude oil, fuel and lubricating oils and benzine; articles on the geological characteristics of the oil-fields of the world by Mr. E. H. Cunningham Craig, F.G.S., on oil-field plant and equipment, and the situation, area and output of various oil properties. A chapter on the characteristics of petroleum deals with chemical composition, specific gravity, calorific value, etc., of crude, fuel oil and distillates, and with percentages of products from the world's oils, flash points, boiling points, etc. The application of petroleum is discussed by Eng.-Lieut.-Commander F. T. Addynan, R.N. (ret.), M.I.M.E. Storage and distribution questions are amply dealt with, and under the heading "miscellaneous" are pages devoted to the regulations for carrying and burning fuel oil, specifications for fuel oil, import duties on petroleum and products, conversion tables, foreign weights and measures, etc., etc. Altogether one receives abundant value and information of a kind that has involved a great deal of trouble and thought in the collecting thereof, for the modest figure of half-a-guinea. Copies of the book may be obtained from the office of this paper.

Report of Executive Committee of the Transvaal Chamber of Mines.

The report of the Chamber for the quarter ended with November, to be presented at the ordinary meeting on the 19th inst., has just come to hand, and supplies among other points the following information:—

Native Labour.

With regard to native labour the returns furnished by the Witwatersrand Native Labour Association, Ltd., show the following result for November: Number of natives employed by members of the Association on the last day of month, 191,092.

Definition of Official.

In the past misunderstandings have been caused by the absence of a generally accepted definition of the term official. An investigation is proceeding with a view to deciding, in agreement with the various organisations affected, exactly what classes of employees are to be regarded as officials on the mines, with special reference to the "border-line" type of occupations.

Adjustment of Wages.

The wages of mechanics, improvers and apprentices, and certificated winding engine drivers on the Witwatersrand gold mines were stabilised by agreement till the end of 1921. The various unions concerned have been notified through the S.A. Industrial Federation that the wages of these classes of employees will be reduced from 1st January, 1922, in accordance with the automatic scale for the adjustment of wages agreed upon between the Chamber and the Federation.

As from 1st October, a further reduction of 4s. per shift was made in the wages of mine employees (other than mechanics, certificated engine drivers, and apprentices and improvers in the mechanical trades) in accordance with the terms of the August agreement.

Christmas Day.

As Christmas Day falls this year on a Sunday, it has been arranged to substitute Monday, 26th December, as the special holiday on the gold mines.

Adjustment of Wages on Collieries.

The adjustment of wages on collieries has been the subject of negotiations between the Collieries Committee of the Chamber and the Federation during the past three months without agreement being reached. At the end of November the following notice was posted on the Collieries:

"Notice is hereby given that as from 1st January, 1922 the wages of day's pay employees and contractors on this

colliery will be reduced in accordance with the following scales, namely:—

"That adjustments of wages shall be based on the rise or fall in the cost of living on a scale approximately corresponding to that rise or fall in the Johannesburg area as published by the Director of Census.

"(1) That in lieu of the £3 per week increase granted in August, 1920, there shall be substituted in the case of workmen earning without that increase 20s. per shift or over, an increase of 4s. per shift in respect of the first 20 per cent. increase in the cost of living, and an additional increase of 6d. per shift in respect of each 3 per cent. increase or portion thereof above 20 per cent., until (at 56 per cent.) an increase of 10s. is reached. Variations beyond these limits not to be subject to fluctuation with the cost of living, but to be considered if and when the necessity arises.

"(2) That in lieu of the 40 per cent. increase on the basic rates of pay granted in August, 1920, to colliery employees other than those who receive the £3 per week increase, there shall be substituted an increase of 20 per cent. on the basic rates in respect of the first 20 per cent. increase in the cost of living, and an additional increase of 1 2/3 per cent. on the basic rates for each 3 per cent. or portion thereof increase in the cost of living above 20 per cent. The operation of this scale to be limited, *mutatis mutandis*, in the same manner as that referred to above.

"In applying these scales, wages to be adjusted quarterly and to be based on the average cost of living figures of the last but one preceding quarter as published by the Director of Census in respect of the Johannesburg area, *i.e.*, in the quarter January-March the adjustments will be based on the average of the July-September quarter, namely, 25.6 per cent."

Increased Efficiency and Reduced Working Costs.

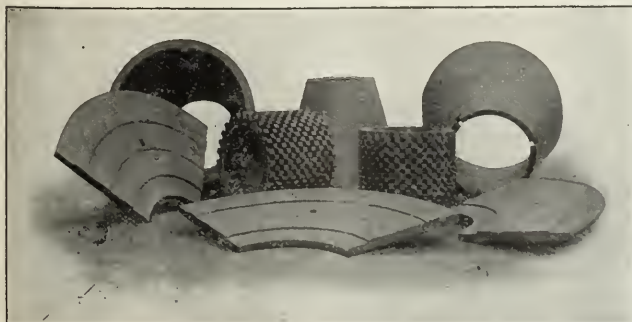
On the 10th November and again on the 15th General Smuts presided at a conference between representatives of the Government, the Chamber of Mines, and the workmen's unions. The proceedings resulted in a fairly satisfactory amendment to the Mining Regulations, permitting of certain further rearrangements of underground work. Other matters of importance referred to at the conference, such as trade union restrictions and revision of the underground contract system, were left to be decided between the Chamber and the unions.

Income Tax Act.

Judgment has been given against the Van Ryn Deep, Ltd., in its appeal against the assessment of the Commissioner for Inland Revenue on the question of the inclusion of the Provincial Gold Profits Tax as a working cost for the purposes of the Income Tax Act. It has been decided not to take any further action in the matter.

The Chamber of Mines Building Company, Ltd.

The Chamber's new building is nearing completion, and it is expected to be ready for occupation about the end of February next.



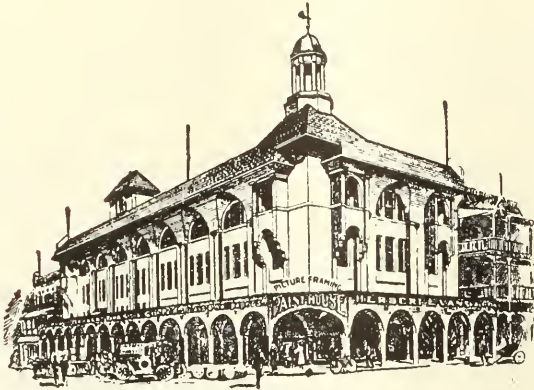
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EDITORIAL.

THE CONFERENCE.

The price of gold continues to decline. The latest quotation is 98s. 9d., and at this figure a number of our mines are in jeopardy unless working costs can be substantially reduced. A small reduction in working expenses along the Reef was effected last month. This may be due to a slight increase in efficiency. The recent conferences perhaps have already borne some fruit. The Central Mining Rand Mines group, for example, worked at 25s. 4d. in November, as compared with 25s. 5d. in October, and the mines under J.C.I. control reduced working costs from 24s. per ton to 23s. 7d. Other groups show similar small reductions. But as

against this the premium fell to a much larger degree than that by which working expenses were reduced.

The Corner House mines, for instance, took the valuation for November at £5 0s. 9d. net per fine ounce, which is 1s. per ounce less than in the previous month. The Barnato group adopted the figure of £5 2s. the C.M.S. group £5 3s., less exchange on remittances, and the Consolidated Goldfields £5 2s., less estimated gold realisation and exchange charges of 1s. 6d. It seems strange to us that there is no uniformity of policy amongst the mining groups as to fixation of the selling price of the product during any particular month. That, however, is not the point which we wish to make here.

The outstanding fact is this, that whilst costs are being reduced by pennies the premium is falling by shillings. This way lies ruin, not only for the low grade mines, but for the whole country, which, as Mr. Burton very rightly pointed out the other day at Ladysmith, is riding on the back of the gold industry, a phrase which we too only recently employed. On all sides it is admitted that there is the most urgent need of reduction in working expenditure. There are indeed evidences that even the most rabid of the trade unionists have at last seen the peril that lies in our present path.

On Thursday a Conference was held in the interests of the industry, Johannesburg, the Reef, and in fact the country at large, to consider ways and means to save the low-grade mines from closing down, with all the untold hardships that this would entail. With regard to commenting on the initial session of this Conference we are somewhat handicapped in consequence of being a weekly paper and having to go to press considerably before the dailies. We assume, however, that the Labour leaders will show some opposition to the reforms suggested by the Chamber.

These modifications of existing personnel and practice are stated elsewhere in this issue, and in order that there shall be no misconception as to what the Chamber of Mines is after, it should be made quite clear that there is no intention or desire on the part of the management to abolish the colour bar. The reformations which the Chamber are at present very rightly pressing for involve at the utmost the retrenchment of perhaps 3,000 white men who until recently were agriculturists rather than miners and who are engaged on semi-skilled work. There may be some hardship in the retrenchment of these men. But the alternative holds out nothing but the certainty that much greater hardships will have to be borne by the skilled miners as well as the unskilled men and by the community at large as well as by employees of the mines.

Gold has already fallen to a price which makes it impossible for several mines to carry on. Largely in consequence of the deliberations of the Washington Conference, the Irish settlement, and the generally improved outlook in Europe and America, the British pound has made a sudden and large leap towards pre-War parity with dollars. The price of gold accordingly has fallen, and in the opinion of many it will fall further. One, therefore, can only hope that the Conference at present sitting will arrive at some agreement which will have far-reaching and beneficial consequences. Elsewhere in this issue a correspondent suggests that one of the low-grade mines should be devoted to experiment along the lines advocated by the Chamber. There is something in the suggestion, but we do not think it goes far enough. With gold falling by shillings a week and costs declining by pence a month, the industry is galloping along the road to ruin at such a pace that nothing but a drastic and wide sweeping reform from Randfontein to Springs can save us from an industrial disaster of the first magnitude.

TWO GRAVE BLUNDERS.

In recent months the Government of the Union of South Africa has, in our opinion, made two very big mistakes. Doubtless it has made other errors. *Errare est humanum*. Governments, after all, are but the essence of humanity

and we fully admit that it is infinitely easier to criticise than it is to carry out what is usually termed constructive statesmanship. But there are, to our way of thinking, two blunders of which General Smuts' Cabinets have been guilty and which could easily have been avoided. The first of these was the ratification of what is known as the Steel Contract with the Pretoria Iron Mines, now merged in the S.A. Iron and Steel Corporation, in August of last year, and the second blunder has been the recent appointment of Mr. Karl Spilhaus as Union Trades Commissioner on the Continent of Europe. There is no connection between these two *faux pas* of statecraft; the one has nothing to do with the other, and we do not attempt to appraise the relative demerits of these two mistaken acts of commission.

To deal with the earlier error first, it will be recalled that, after a debate extending over the greater part of two days, the agreements entered into between the Minister of Railways and the Pretoria Iron Mines, Ltd., otherwise the South African Iron and Steel Corporation, Ltd., were ratified and confirmed in the House of Assembly on August 9th. The chief clause in these contracts was that the Railway Administration agreed to take from the Corporation one-half of its output of rails and other iron and steel requirements, and in confirming and ratifying this agreement our Parliament of the People partially committed the iron and steel requirements of the Railways of the country to the South African Iron and Steel Corporation, Ltd., for a period of 17 years; and this notwithstanding the existence of an agreement of a very similar nature entered into by the Government with the Union Steel Corporation at Vereeniging eight years previously, and which latter agreement still had eight years to run. The Select Committee on Railway and Harbours, in their seventh report, recommended that the agreement should not be confirmed.

Writing at the time, we said: It is not often that this journal finds itself on the side of Labour, but in this particular instance we are quite in sympathy with Col. Creswell, Mr. Boydell and Mr. Sampson, who, with the majority of Sir Thomas Smartt's party, strenuously opposed the ratification of the contract. Whilst we dissociate ourselves from Labour's usual hysterical demand for nationalisation, we are nevertheless in full sympathy with the Unionists and with Colonel Creswell and his lieutenants in asking that the agreement should not be ratified and in pointing out the many pitfalls and perils which may result from the signing of the contract. For if this agreement does not constitute a monopoly it constitutes something perilously near it, and at a time too when South Africa is just beginning to realise its iron and steel producing potentialities. The S.A. Iron and Steel Corporation is not the only enterprise in this country which proposes to manufacture iron and steel in South Africa from South African ores. . . . Whether the warnings of some members of the House will materialise and will cause the Government in the fulness of time to regret the new contract which it has entered into with the Pretoria Corporation remains to be seen. The chief criticism of the Government's action in this matter is that the Ministerialists have rushed through the House legislation in conflict with the findings of the Select Committee, which advocated that the Railway Administration should intimate publicly that it would be prepared to purchase its requirements in South Africa without binding the Administration to any one manufacturer. There are many other aspects of this matter which press for consideration and which will be dealt with at a later date. For the present the cardinal fact which dominates all others in connection with the establishment of an iron and steel industry is that Pretoria, that most favoured city of the Union, has secured a preference to the probable detriment of other centres which are endeavouring to inaugurate an iron age in this country. True, the iron is there. But the history of the steel industry in other countries seems to make it clear that it is often better policy to bring the iron ore to the coal fields than to transport coal to the iron mines.

Since that article was written we have on various occasions examined the affairs of this Iron and Steel Corporation and have never been very optimistic as to the company's ability to carry out its contract with the Government. And

now the publication of the second balance sheet and report of the company presented to shareholders at the meeting held in Pretoria during the week does not make us any more hopeful on the point. That balance sheet is commented on in our financial columns in this week's issue. *Inter alia*, it shows that out of a capital of £1,500,000, 350,000 shares have been issued and 1,150,000 are in reserve. Even if all these shares were issued, it would not be sufficient to carry out the corporation's ambitious projects. The amount of capital involved in the original scheme, of which not a quarter has been issued, was a year ago declared to be insufficient. The scheme favoured by English experts is a 75,000-ton iron and steel works, which it was estimated by the chairman in December last would cost two and a half millions. It may be that even that will not suffice; in some quarters it is contended that a sum of three and a half millions will be necessary to complete the Corporation's ambitious programme. The balance sheet further shows that at the end of June last the company had an overdraft of £29,296, presumably with the National Bank, and that its cash in hand amounted to the magnificent sum of £6 6s. 2d.! We assume, too, from the report that the iron works have been idle since April 29th.

One would imagine that it would have been just as well to await the time when the Corporation was producing before committing the Railways to an undertaking to purchase half the Corporation's output, even though the Corporation was generous enough to agree to remit one-third of its profits in excess of 10 per cent. to the Railway Administration. There are other matters arising out of this Iron and Steel Corporation and its contract. According to the report of the Transvaal and Delagoa Bay Investment Company for last year, that concern agreed to participate to the extent of £40,000 in the guarantee of working capital of the S.A. Iron and Steel Corporation, Ltd., and in the report of the same company for this year which has just been published we read: "*Under the guarantee of working capital for the South African Iron and Steel Corporation, Ltd., referred to in the last annual report, 2,012 shares were taken up at par. Subsequently, however, owing to the times being considered unpropitious, it was decided to postpone a further issue, and your company has no more interest in or liability under the guarantee.*"

Who were the other guarantors in this million and a half venture, which we are now told will require not less than two and a half millions of money? We have asked that question before, and we now ask it again. If the million and a half was guaranteed and underwritten, it would appear to be the duty of the Government in the interests of the country at large, and particularly in the interests of the Railways for the fulfilment of the contract, to call upon the company to provide capital to the end that the Corporation may at the earliest opportunity attain to a position which will enable the Pretoria Iron Works to make good its undertakings. Perhaps there was some protective clause in the financial agreements which rendered it not obligatory for the sponsors to put up the capital upon which the company was registered. If this be so it may be asked whether it is policy for the State to enter into a preferential contract with a private concern which has not so far been able to carry out its undertakings with an important administrative department of the State. The whole business at least merits an impartial commission of inquiry; indeed, from our point of view there has been no indication of ability to fulfil the undertaking, and the contract should be nullified.

As to the appointment of Mr. Karl Spilhaus as Trades Commissioner in Europe for the Union of South Africa, the Government's unfortunate choice has aroused a chorus of disapproval throughout the country. Since our last issue went to press there have been several indignation meetings and numerous resolutions of protest have been forwarded to the Government on the subject of this appointment. The most noteworthy of these meetings was held at Capetown on Monday night, when the appointment was publicly condemned and strong speeches were made. Returned soldiers committees have been equally emphatic in their condemnation of the appointment, which as a matter of course is bound to irritate men who served on the Allied side during

the War. Whatever the abilities of Mr. Spilhaus may be, we consider that the Government could have made an equally satisfactory appointment from a business point of view by appointing a British or Dutch-born subject. The Trade Commissioner, it should be remembered, will not only be a commercial envoy to Germany. He is, we take it, to endeavour to improve business relations as between the Union and our former European Allies, and the French at least can hardly view such a Dominion ambassador as Mr. Spilhaus with approval.

And from a sentimental and patriotic point of view there can be no question whatsoever that the Government's ill-considered choice has greatly offended a large section of the community and has tended to estrange the feelings of a large number of General Smuts's most ardent supporters.

It would be little use condemning the Government's action in these two matters if there were no possibility of the blunders being rectified. But in regard to the Spilhaus appointment we believe that, despite the Government's avowal to stand firm it is not too late to admit that the choice is now known to have been impolitic, and that if it is necessary to have a Trades Commissioner in Europe some other name will be substituted for that of Mr. Spilhaus.

And so with the Steel Contract. If it is not possible to rescind this by a special Act of Parliament it surely should be quite practicable for the Government to admit that the warnings of 15 months ago were not without reason and to rectify the injustice that was then done other actual and potential producers of iron and steel by giving them the same encouragement to progress with a basic industry as was then given to a corporation which at the end of last June had £6 6s. 2d. in the bank and an overdraft of nearly £30,000, and which at the present time seems to be almost further off ability to deliver the goods than it was more than a year ago.

The Government will be well advised to listen to advice in these two matters. For if some effort is not made to placate public opinion both in regard to the Steel Contract and the Spilhaus appointment the Ministers of the present Cabinet will have to prepare able defences of their actions in these two matters when Parliament assembles.

THE PRICE OF DIAMONDS.

Quite a controversy has arisen during the week in regard to the policy of the big diamond producers in maintaining the price of their products. The matter arose out of the statements made by Sir David Harris at the De Beers meeting last week in explanation of the position of the diamond market. De Beers and the associated big companies are usually credited with knowing their own business best, but the *Cape Times*, backed up later by the *London Daily Mail*, has come out with the proposal that in the interests of all concerned, viz., the producers, Government, and people of South Africa, the price of diamonds should be lowered and what is considered a bigger and more profitable market thus be tapped. We must confess that we have no sympathy whatever with this suggestion. The case for the producers is that since the big lull in the demand for diamonds last year, the world generally has been passing through a period of severe depression, which has been felt most acutely in the diamond industry. For many months there was a complete cessation of sales by the Syndicate of diamonds purchased by them from the four large producers, and up to now no sales of any importance have taken place. In consequence of the stagnation in the diamond market and of representations by the Diamond Syndicate, meetings of the four large producers and the Diamond Syndicate were held at Capetown in March and May of the present year, when matters were discussed, and a satisfactory arrangement as to future deliveries was come to. The severe and continued depression compelled the industry to take steps to curtail operations and to economise wherever possible, which unfortunately necessitated the retrenchment of large numbers of employees, both European and native. All mining work was stopped, and expenditure in every department was greatly reduced. A slight improvement in the diamond market has been noticeable recently,

but it is still necessary to exercise patience and economy for the depression through which the industry is passing makes the present a difficult period. The policy of the big producers has year after year been publicly explained and defended by its spokesmen, and the Union Government has been thoroughly convinced of the wisdom of that policy and has given to it entire support. We have read the arguments of the *Cape Times* and the cabled summary of those in the *Daily Mail*, and can find nothing in them in the least likely to cause those responsible for the diamond industry to change their views. The diamond trade of the world—the great luxury trade—is a very delicate and complex mechanism, and its working is properly known only to the experts. Well-meaning efforts to improve it by suggestions that run contrary to the hard-won experience of years can, we believe, only result in embarrassing those who have their fingers on the pulse of it.

TRANSVAAL AND DELAGOA BAY INVESTMENT COMPANY, LTD.

The Transvaal and Delagoa Bay Investment Co., Ltd., which owns the Transvaal and Delagoa Bay and the Douglas Collieries, has had another excellent year, as will be seen from the speech of Mr. S. C. Black, fully reported in this issue. The company is in an exceptionally strong financial position, and has paid 25 per cent. in dividends for the year. Both the collieries of the company are doing well, despite the recent unfavourable developments in the coal trade, and the company has other valuable assets in the shape of undeveloped coal-bearing areas and considerable real estate at Delagoa Bay. The company, it may be noted, paid its first dividend in 1903, and has paid regular dividends ever since. On the broad aspect of labour, Mr. Black made a brief but significant statement. He said: "With regard to the labour position generally, a great deal of unrest is fomented on the question of a reduction of wages from the high water mark of a year ago. But the white workers of South Africa must recognise that they are not a privileged class above economic laws, and when all the world over, the reduction of wages follows on the fall in the cost of living, they too will be subject to the same cause and effect." Wages on the collieries are, of course, now under discussion, and doubtless Mr. Black would have had much more to say on the subject but for that fact. Mr. Isaac Hodges, who has just returned from England, paid a tribute to the successful administration of the company, and expressed confidence in its ability to meet the hoped-for expansion in trade. The history of the company, indeed, goes to show that it is one of the soundest and best managed of its kind in the country, and all concerned are to be congratulated on its continued success.

Notes & News.

East Rand Gold, Coal and Estate.

Owing to a printer's error, a line in the speech of the Chairman, at the annual meeting of the East Rand Gold, Coal and Estate Company, dealing with white wages, was given incorrectly. The passage under the heading of working costs should have read as follows: White and native wages are responsible for a total increase of £2,000 for the year; explosives, £2,100; stores, £2,000, or an average of £500 month, that is to say, under pre-War conditions the last year's working would have cost for the year's tonnage £6,100 less than under current conditions. These increases with reference to white wages bring the cost to 57.76 over pre-War costs, at which increased figure it now stands. The increase in mine stores and explosives over pre-War rate varies between 40 per cent. and 300 per cent. according to the class of article. As against this, of course the selling price of coal has advanced, but not in proportion to the increased cost of working.

Transvaal Silvers.

A full report of the annual meeting of Transvaal Silver and Base Metals, Ltd., will be found in another part of this issue, and should make most satisfactory reading for the shareholders. The year's work has developed what was but a very favourable prospect into a highly promising mine, equipped with an excellent plant. The company continues to be financed by the General Mining and Finance Corporation, and the latter has agreed to meet the financial requirements until such time as regular production enables the revenue to provide for expenditure. In other words, the parent corporation will stand by the Transvaal Silver Company up to the producing stage. Mr. Errol Hay, in the interesting remarks wherein he supplemented the chairman's speech at the meeting, put the present value of the bullion product at £41 per ton, and estimated working costs at £21 per ton, including realisation, shipment and transport, as well as mine charges. The capital of the company, it may be noted, was increased during the year to £300,000, firstly by the exercise of 69,740 options issued with the original shares, and secondly, in May last by the creation of 160,080 new shares issued to provide further necessary working capital. In view of the excellent nature of the latest developments at the mine, the capital, even with the further obligations to the General Mining, is moderate, and the future of the company seems assured.

* * *

Phosphates in the Union of South Africa.

The Bulletin of the Imperial Mineral Resources Bureau entitled *Phosphates* furnishes the following information with regard to the occurrence of phosphates in the Union:—So far as is known at present, the only deposits of phosphate-rock of any considerable commercial importance in the Union of South Africa are the aluminous phosphates of Saldanha Bay, on the south-west coast of Cape Province. Analyses of samples of the phosphates obtained show from 10 to 23 per cent. of phosphorus pentoxide, from 16 to 77 per cent. of silica, and from 7 to 37 per cent. of iron oxide and alumina. Other districts within the Union where phosphates are known to occur are Weenen, in Natal, where the deposits are of low grade, carrying only about 8 per cent. of phosphorus pentoxide, and Lulukop, in the Zoutpansberg district of the Transvaal. Lulukop is an isolated hill of very pure limestone which carries considerable quantities of apatite and magnetite. The apatite is reported to amount to about 10 per cent. of the rock in places. The deposit lies in a remote and unhealthy district, and it does not seem probable that any considerable supply will be obtainable from this source.

* * *

New Mine Rescue Apparatus.

Ever since the invention of the miner's safety lamp by Humphry Davy, Great Britain has devoted keen attention to the subject of safety devices in mines. Experiments recently conducted by the British Scientific and Industrial Research Department have resulted in the design of two new types of rescue apparatus which are proving most successful. Both types of apparatus are what is known as "regenerative": that is to say, the air expelled by the lungs is purified, supplied with oxygen, and returned to the lungs. Therefore, when a man wears this apparatus he is able to enter smoke or poisonous atmosphere without suffering ill effects. The apparatus and the lungs really formed a closed circuit, and the lungs serve as a pump to circulate the air round that circuit. In one type of apparatus the oxygen is supplied from liquid air and in the other type it is obtained from a solution of compressed gas. Both types of apparatus are designed to enable the wearer to undertake continuous heavy physical exertion for at least two hours. As a matter of experience, they can satisfy all the breathing needs of the wearer for three hours.

The Bailey-Jeppe Group.

Annual meetings of the companies of the Bailey-Jeppe group were held on Thursday, but owing to the exigencies of going to press before the holiday we have to withhold comment till next week.

* * *

Another American View of the S.A.R.

Mr. Joseph T. Mannix, a well-known American journalist who is visiting Johannesburg, has expressed the opinion that our railway service is particularly up to date, more especially with regard to the smoothness of the travelling and the care shown in the upkeep of the rolling stock. He finds South Africa advancing, despite the rough country, steep gradients and narrow gauge, which so seriously handicap the South African engineer. He thinks the S.A.R. far better than Australia, with a mileage double that of the Union. He also testifies to the courtesy with which he was treated by officials of all grades. He deprecates the tendency among a section of railwaymen to depreciate South African railway conditions and those of the British service. He found railway employees and others unduly pessimistic with regard to the future, politically and otherwise. Mr. Mannix drew attention to the necessity for more advertisement.

* * *

Consolidated Gold Fields Report.

The annual reports of the Consolidated Goldfields have reached us, and a longer review is held over till next week, when doubtless the chairman's speech will be available. The following extracts from the report of the Johannesburg manager, Mr. D. Christopherson, are of especial interest at this juncture:—The total expenditure on working costs on all the producing mines on the Witwatersrand for July, 1921, was £2,572,000, which represents on the 2,010,000 tons milled 25s. 7d. per ton, writes Mr. Christopherson. For July, 1914, this figure was £1,904,000, or 16s. 9d. per ton on 2,275,000 tons milled, a difference of 8s. 10d. per ton. The expenditure of £2,572,000 can be estimated to be made up as follows: White wages, 35 per cent.; native wages, 18 per cent.; stores, 40 per cent.; sundries, 7 per cent. So far as white wages are concerned an agreement has recently been arrived at whereby wages will be reduced to a certain point, on a sliding scale, according to the cost of living figure as compared with pre-War cost. Thereafter the agreement provides that further reductions are to be subject to discussion. When that time arrives, conditions are likely to be such that it will be clear to all concerned that in order to avoid disaster and unemployment on an unprecedented scale further reductions in wages must be faced.

New Machinery for Breweries.

At a recent exhibition in London, England, many new types of plant for use in breweries and allied industries were displayed. One of these was a large bottle-filling machine which handled 24 bottles simultaneously. The bottles travel on a band conveyor which automatically places them under the filling heads; as soon as a bottle is in position it is raised by a plunger so as to make a tight joint with the filling head. Gas is then admitted to raise the pressure in the bottle and a valve opens to admit the beer or other liquid, which fills up the bottle quietly without frothing. When filled, the bottles are automatically removed on the band conveyor. This machine can fill 220 dozen quart bottles per hour. Another interesting exhibit was a series of tanks and other vessels made of aluminium which has the property of not disturbing the delicate processes of fermentation. Moreover, aluminium does not affect the flavour of the liquor. An important improvement in the manufacture of casks was also shown. A machine has been designed to force the hoops on to casks, and it is capable of driving the six hoops on each of three standard 40-gallon barrels in one minute.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Electricity in Mines.—*The Colliery Guardian*, November 18, p. 1409.

Boiler House Management.—*Iron and Coal Trades Review*, November 18, p. 721.

Climax Malleable Works.—*Iron and Coal Trades Review*, November 18, p. 733.

Rolling Mill Power Costs.—*Iron and Coal Trades Review*, November 18, p. 737.

The Baudy Motor.—*The Electrical Review*, November 18, p. 666.

Haihs Alternating-Stress Testing Machine.—*The Electrical Review*, November 18, p. 669.

Research on Insulating Oils.—*The Electrical Review*, November 18, p. 687.

Power Station Design.—*The Engineer*, November 18, p. 531.

Electrification on the L.B. and S.C.R.—*The Engineer*, November 18, p. 538.

British Concrete Machinery.—*The Engineer Supplement*, November 18.

400 H.P. Wood Refuse Suction Gas Engine.—*The Engineer*, November 18, p. 547.

Coal and Fuel.

Producer Gas for Coke Oven Heating.—*The Colliery Guardian*, November 18, p. 1403.

Coal Cutting by Machinery.—*The Colliery Guardian*, November 18, p. 1419.

Coal Handling Section.—*Coal Trade Journal*, November 9, p. 1204.

The Low Temperature Carbonisation of Coal.—*The Electrical Review*, November 18, p. 665.

Economics.

Immigration, Capital and Development.—*The Canadian Mining Journal*, October 28, p. 862.

Monetization of Silver.—*Mining and Scientific Press*, November 12, p. 661.

Are Prices Low Enough?—*Iron and Coal Trades Review*, November 18, p. 740.

Mining

The California Rand Silver Mine.—*Mining and Scientific Press*, November 12, p. 667.

Mining in Russia.—*Mining and Scientific Press*, November 12.

The Proper Use of Materials of Construction.—*The Colliery Guardian*, November 18, p. 1408.

Mr. E. J. Way's Bioscope Improvement.

The first annual meeting of Bioscope Improvements, Ltd.—the new company formed on the Rand to exploit Mr. E. J. Way's patent to obviate the rewinding of bioscope films—was held this week. Sir Wm. Dalrymple was in the chair, and his brief speech was supplemented by a lengthy statement from the managing director, Mr. E. J. Way, on the prospects of the patent. It would certainly seem to the uninitiated that the innovation has a great commercial future.

* * *

Railway Electrification Questions.

Considerable correspondence has appeared in the Press in recent months (says Sir William Hoy in his latest bulletin) in regard to the merits of the three-phase system of electrification said to have been standardised throughout Italy. In the light of what has been stated, the following extract from the *Electric Railway and Tramway Journal*, of August 12 last, will be of interest: "The electrification of the Sampierdarena-Ovada-Alessandria and the Milan-Bologna lines has been authorised. The former enterprise will be carried out by the maintenance departments of the State Railways, while the work in connection with the latter will be done by private enterprise. The route of the primary main intended to feed the plants from which the Benevento-Foggia line is being electrified was also approved in principle, the system to be employed being that of continuous current at high tension. This main, which, in its turn, will be fed by plants belonging to private industry as well as from the plant now under construction by the State Railways, is so planned that it will also serve the Sulmona-Castellannare-Adriatico and the coast line as far as Foggia, when these lines are electrified." A recent issue of the *Railway Engineer* contains a summary of electrification progress on the Japanese railways in the environs of Tokyo, wherein it is stated, *inter alia*, that developments have taken place progressively since 1905, and that the "direct current" system has been adhered to.

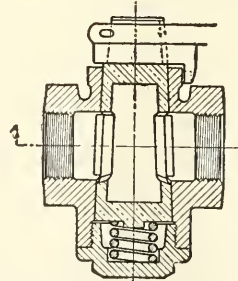
A New Hand Tool.

The breast drill is one of the most familiar of small hand tools in engineering shops, and many engineering people will therefore be interested in a novel form which has been brought out by a British firm. This tool provides four separate speeds. The usual toothed crown wheel is replaced by a disc with four concentric circles of conical holes. On the drill spindle there is a pinion which meshes with one circle of these holes. In order to change the speed of the drill the pinion is moved from one circle of holes to another. At all speeds the gearing runs very smoothly yet rigidly, and the whole tool is remarkable for its lightness.

The Latest Oil-Fuel Burner.

The number of types of oil fuel burner is legion, and the engineer who has to choose among them often finds it extremely difficult to decide among so many closely competing claims. It is interesting therefore to come across a new type which is radically different in its design from all the others. The purpose of an oil burner is to reduce the oil to a fine spray and to mix that spray so thoroughly with air that the oil will be completely burned. As a rule the oil is forced through fine orifices or some other fixed contrivance to "atomise" the oil. In the new form a rotating cone is employed. This cone is fitted at the end of the oil pipe and is rotated at a high speed by means of a small fan operated by the system of air in which the oil is ultimately burned. The oil, in emerging from the pipe, trickles down to the inner surface of the spinning cone and spreads out under centrifugal action into a thin film which travels forward to the outer edge of the cone. This edge is finely serrated and breaks up the oil film into an extraordinarily fine spray, which is carried into the furnace by the stream of air already mentioned. By a simple adjustment the form of the flame can be altered to suit any purpose, so that the burner can be employed for ordinary boiler work or for forges and special furnaces, in addition to domestic and central heating. This burner has been fully tested under working conditions and has proved most satisfactory and economical in every way.

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West Street,
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New S.A.R. Works and Improvements.

POINTS FROM THE ANNUAL REPORT OF THE CHIEF CIVIL ENGINEER.

From the annual report of the Chief Civil Engineer of the S.A.R. we take the following:—

Increase in traffic in Natal necessitated deviations and doublings, particulars of which are included below.

Cato Ridge—Clairwood: Deviation.

On the 14th February, 1921, the line was opened for coal traffic in order to afford early relief to the accumulation of this class of traffic on the old main line. This deviation is 40 miles 12 chains, being very slightly longer than the existing main line between Cato Ridge and South Coast Junction. The completion of the single track, to secure this relief, was accomplished in face of great difficulties in the supply of cement and permanent way material. Construction work is still in progress while the line is used for traffic purposes, but even in spite of the fact that the Transportation Department have only partial occupation it is affording very great relief. The decision to double the track between Booth Junction and Mount Vernon and between Cato Ridge and Cliffdale, required so much work to be done that it could not be opened for traffic by the middle of February when the single line was opened. The finishing off of the single line was impossible where the doubling was being carried out so that when traffic began the line was far from complete. The track-laying in the big yard at Booth Junction was much behind at the date of opening, but every effort has been made to push on with the work and at an early date full facilities will be available for dealing with the increased traffic which can be brought down the line. Rapid progress is now being made with the buildings and quarters, which in 1920 were delayed by a scarcity of artisans. The installation of signalling had to be postponed till the track was in place, but is now proceeding without delay. Water supplies for locomotives have been put in at Marianhill where the water is pumped from the Umblatuzan to a large storage reservoir, and at Cliffdale where the water is led by gravitation from a small stream to a reservoir at the station. The construction of cuttings of the magnitude required on this deviation, especially where the strata have been much disturbed by faults, has resulted in a number of large and small land slides, which have considerably increased the amount of work to be done and the cost of the line. When opened for all classes of traffic the saving of engine power will be considerable, as the coastward load would be limited more by brake than tractive power, and it is anticipated that from 1,000 to 1,200 tons with 100 axles can be handled with one 14th class engine, which is approximately 100 per cent. more than can be handled *via* the old route. The section between Shongweni and Dassie Hoek is very heavily tunnelled; "Delville" and "Shongweni" tunnels are 1,001 and 993 yards long respectively. The total length of the ten tunnels aggregates 2¼ miles. This deviation embraces the heaviest piece of railway construction in the Union and must certainly rank high in the records of railway construction in any part of the world. But although the construction work has been of such magnitude the real engineering problem was the survey, and is certainly the most brilliant piece of location ever done in South Africa. It will always remain an eloquent testimony to the railway engineering skill of this country.

Cedara—Nottingham Road: Deviation.

With few exceptions contracts for the earthworks and concrete have been let over the whole length of 30 miles. The native labour supply having somewhat improved, satisfactory progress is at present being made.

Improvements: North Coast Line, Natal.

The earthworks from Umgom to Tongaat are well advanced and little remains to be done between Tongaat and Chakas Kraal. The tunnels between Umgom and Duffs Road are nearing completion and good progress is being

made with a third tunnel between the same places. A fourth tunnel is under construction, and the fifth and largest (472 yards), between Ottawa and Verulam, was pierced during the year. The progress of the work generally has been hampered by limited supplies of material and by shortage of labour.

Glencoe—Vryheid: Relaying.

The section of line between Glencoe and De Jagers Drift (25¼ miles), including four deviations sanctioned in 1919, has now been completed. Work from De Jagers Drift to Vryheid East was begun in June, 1920, but up to the end of February, 1921, 13½ miles of relaying and ballasting only had been completed. In March, however, the native labour supply improved and five miles were relaid, bringing the total for this section up to 18½ miles. The increase in the coal traffic on this branch has been great, and in order to expedite the working of trains the construction of five new crossing stations between Glencoe and Vryheid was authorised. Two of these have already been opened for traffic, and it is expected that the remaining three will be ready by the end of June, 1921.

Ladysmith—Umbulwana: Deviations.

This work comprises three deviations:—No. 1—South of Umbulwana, length 31 chains, improves grade from 1 in 40 to 1 in 66; No. 2—South of Umbulwana, 29 chains long, improves grades and curves and shortens line; No. 3—North of Umbulwana, length 25 chains, improves grades and curves and shortens line. These deviations include the provision of a double line tunnel of 200 yards, and provide for double line formation and culverts from 183 miles to 185½ miles. Contracts were let in October, and the work is in progress.

Doubling Line: Nottingham Road to Tendega.

Surveys have been made and estimates prepared for doubling the following sections:—Nottingham Road—Mooi River, Chieveley—Ennersdale, Umbulwana—Ladysmith, Matiwane—Elandslaagte, Wessels Nek—Wasebank, Wallsend—Glencoe, Glencoe—Dundee, Scheepers Nek—Tendega. Surveys of intermediate sections are in progress.

TRANSVAAL.

Roberts Heights Line.

This line, approximately 6 miles long, has been put in hand on behalf of the Defence Department. Work began in November with white unskilled labour. At the end of March the earthworks and masonry were nearly completed and the track was being laid.

Lydenburg—Olifantspoortje Relief Works.

The earthworks for a line of railway from Lydenburg to Olifantspoortje are being constructed as relief works for out-of-work Europeans out of funds placed at the disposal of the Administration by the Government from the unemployment vote. Work was begun in February, 1921, and at the end of March sixty-five European labourers were employed.

Regrading: Kaapmuiden—Komatipoort.

The Malelane deviation, 84½ miles to 87 miles, was opened for traffic on the 19th July. The western portion of the Hectorspruit deviation, 78½ miles to 76½ miles, was opened for traffic on the 11th October. The eastern portion of the same deviation, 74½ miles to 76½ miles, was opened on the 29th November. The temporary triangle at Malelane has been removed to Hectorspruit, thus reducing the length of a cross trip to 38 miles, 19 each way. By these improvements the load per train over the section Waterval Boven to Hectorspruit has been increased from 870 to 1,200 tons. Probably the whole of these works would have been completed several months earlier but for the delays in the delivery of cement. Wood sleepers have been laid through-

out these deviations and the undeviated portions of the line have also been relaid with wood sleepers. In December, 1920, authority was given for regrades at 63 $\frac{3}{4}$, 65 $\frac{1}{2}$, 67 $\frac{1}{4}$, 72 $\frac{1}{2}$, and 73 $\frac{3}{4}$ miles, also for a deviation between 69 $\frac{3}{4}$ and 72 $\frac{1}{2}$ miles. This will complete the regrading to Komatiport. Work upon these has already been begun. A temporary deviation in connection with the reconstruction of the bridge near the Crocodileport station at 112 miles was begun in December. During the year a survey was made for a remodelling of the station yard at Waterval Boven.

Aper—Witbank: Doubling.

This work has been carried out between Welgedacht and Sundra and between Kendal and Oogies. On the former section the earthworks and culverts are nearing completion, and the platelaying has already been completed. On the latter section earthworks, platelaying, and culverts have been completed, and ballasting is in progress. The summit at Oogies has been lowered, making an easy approach to Oogies station on a 1 in 600 grade, and doing away with a sharp reverse grade. With the exception of a section of 3 $\frac{1}{2}$ miles between Sundra and Eloff and 4 $\frac{1}{2}$ miles between Aber and Kendal, the line is now doubled from Welgedacht to Oogies. A new colliery line, 1 $\frac{1}{2}$ miles long, from Kendal Station to Kendal Colliery has been put down and opened.

Aper—Springs: Doubling.

Estimates for this work have been prepared.

Marshalling Yard, Kendal.

Plans, sections, and estimates are in course of preparation for this work.

Danswart—Aper: Deviation.

This deviation has been staked out and plans prepared.

Fourteen Streams—Klerksdorp: Relaying.

The relaying of this section of the line with 80 lb. B.S.S. material was continued through the year, and Bloembof was reached about the end of March, when, except for ballasting, the work was stopped for lack of rails and further funds. At the end of November white labour replaced the natives on this work.

Cape Western Main Line: Improvements.

The deviation and regrade between 107 miles 56 chains and 109 miles was completed in July. Minor improvements in grade and curvature were also effected or in hand during the year at 68 $\frac{1}{4}$ miles to 68 $\frac{3}{4}$ miles, 117 miles 27 chains to 118 miles, 160 $\frac{1}{2}$ miles to 161 $\frac{3}{4}$ miles, 176 miles to 176 $\frac{3}{4}$

miles, 206 $\frac{1}{2}$ miles, north approach to the Blood River Bridge near Ketting, 292 miles to 293 miles 60 chains, 301 miles to 302 miles 10 chains, 328 miles 60 chains to 329 miles 40 chains.

Cape Midland Main Line: Improvements.

A survey, plans, and estimates were made for deviating the line between Mimosa and Alicedale, securing a 1 in 80 grade in lieu of the existing 1 in 40. The deviation would be about 20 miles in length.

Deviation of Line and Station Improvements: Queenstown.

Investigations were made for deviating the main line, and providing a new layout for traffic and locomotive working at Queenstown.

Grain Elevators.

The work on the foundations of the terminal elevator of 42,000 colonial tons capacity at Congella was let by contract on the 1st March, 1921, and work was commenced shortly afterwards. These foundations consist of reinforced concrete monolithic slabs supported by reinforced concrete piles varying from 36 feet to 25 feet in length. The contractors for the excavations and footings of the Capetown terminal elevator started work on the foundations on the 24th January.

Bloembfontein: New Workshops.

About 80 per cent. of the site has been levelled and the culvert, including both inlet and outlet, has been completed. Platelaying is nearly complete and half the ballasting has been done. One-third of the fencing has been finished. Work is well advanced with the buildings. Most of the concrete work of the main block has been done. The erection of the steelwork has been let out to contract. None has actually been erected, but the assembling and riveting is in progress. The building for the electric power station is complete, including floors, but excepting roof. The foundations of the accumulator house are completed. Excavations for the foundations of the electrical workshops are also complete and concrete being placed in position. The excavation and foundations for the mechanical engineer's offices are complete and the brickwork up to the underside of the stoep roofs. It has been decided to augment the water supply by an additional 4-inch pipe to an underground concrete tank of 75,000 gallons capacity from which water is to be pumped to an elevated tank of 20,000 gallons capacity for the supply to the air compressors and from which it can gravitate to supply part of the shops.

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The Week in the Sharemarket.

WEAKER ON THE FALLING PRICE OF GOLD AND THE LABOUR POSITION.

The falling price of gold continues to be the dominant factor in the market, and prices of all gold shares were affected by it during the week. The latest price, dated London, 14th December, is £4 18s. 9d., which is a rise of 7d. on the lowest figure touched during the week. Since the date in 1919 when it became possible for the gold mining companies to realise gold in the open market, it has ranged from 98s. to 127s., and the prospect is that the rehabilitation of the pound sterling may soon bring back gold to its 1918 figure. The latest cabled reports of a world financial conference—however excellent in itself—must mean another drop in the gold premium, and everything points in that direction. The gold share market on Thursday seemed to have touched bottom, and there seems to be a slight reaction on local selling as London quotations came better. The market was closed on Friday, which may allow nervous people to take stock of the situation. Even Transvaal Silvers, despite the satisfactory annual meeting, are weaker in sympathy with the general market, but recovered slightly. Diamond shares, in view of the latest news of the market, remain quiet at low levels, and colliery shares, in view of the possibility of a strike, are also out of fashion. Until the result of the Conference between the Chamber of Mines and the trade union leaders becomes known no interest in the market is likely; and even good dividend declarations are not expected to help matters. The approaching holidays, of course, will make for a quiet and inactive market till the New Year.

	Fri. 9th.	Sat. 10th.	Mon. 12th.	Tues. 13th.	Wed. 14th.	Thur. 15th.
Rand Select. Corp.	53 0*	52 6*	52 6*	53 0*	53 0*	—
Randfontein Cent.	—	9 6*	10 0†	10 0†	—	10 0†
Randfontein Est.	11 1½	14 1*	14 0*	13 3*	13 0*	13 0*
Roberts Victors	7 0*	7 1*	7 5*	7 0*	7 6*	7 0*
Rooibergs	3 9*	3 9	3 9	3 3*	3 3*	3 3*
Rouxville Diamonds	1 0	1 0*	1 0	1 0*	1 0*	1 0*
Simmer and Jacks	2 6*	2 6*	—	—	—	—
S.A. Alkali	13 6†	13 3*	12 6*	13 0	12 9*	12 6*
S.A. Lands	4 2*	4 2*	4 2	4 1*	4 1*	4 2
S.A. Townships	9 6	—	9 0*	—	9 0*	9 3
Springs Mines	37 6*	38 0	37 3	36 9	35 9	34 6
Sub-Nigels	11 3*	11 6*	11 3	11 0*	10 9*	—
Transvaal Silvers	27 0*	26 3	27 6	26 0	25 0*	23 0
Union 5 per cent.	£59*	£99*	£99*	£99*	£99*	£99*
Van Ryn Deeps	70 9	70 6*	70 3	70 0	68 3	68 0*
Village Deeps	7 6*	7 6*	—	—	7 6*	—
West Rand Cons.	2 0*	2 0*	2 0*	2 0*	—	—
Western Rand Est.	3 0†	3 6†	2 6*	3 0†	2 9†	—
West Springs	8 6*	8 9	8 6	8 6	8 3	8 0
Witbank Colls.	—	—	—	34 0*	—	—
Witwatersrands	13 0*	13 6*	13 3*	13 3	—	13 0*
Wit. Deeps	8 0*	—	—	—	8 9*	—
Wolhuters	3 1*	3 1*	3 1	3 0*	3 0	3 0*
Zaaiplaats Tins	2 9	2 9	2 6*	2 6*	2 6	2 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Mining Men and Matters.

Sir Abe Bailey, Bart., has returned to South Africa.

* * *

Sir H. Ross Skinner has returned to the Rand.

* * *

The friends of Monsieur Eugene Renaud, who was until 1919 the Johannesburg representative of the Credit Mobilier Francais, Paris, will hear with deep regret of his death, which took place the other day at Santiago, South America. M. Renaud arrived on the Rand in February, 1912, and left South Africa in the latter part of 1919. He made many friends during his sojourn in Johannesburg who will all deplore his demise and recall his geniality, courtesy and kindness of heart.

* * *

Mr. Owen Letcher, Editor of this Journal, has been elected a Member of the Institution of Mining and Metallurgy, London.

REVIEWS (BOOKS RECEIVED).

Tutorial Land and Mine Surveying.

By Thomas Bryson, A.R.T.C., M.I.Min.E. Price, 10 6 net. Publishers: Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

The book embodies a systematic study of land and mine surveying in which the plan is to discuss briefly and generally the scope of each part of the subject, and afterwards present the details through the medium of answers to questions which have been set at the colliery managers' examinations and the examinations of educational institutions, such as the City and Guilds of London Institute, London University, and the Union of Lancashire and Cheshire Institutes. The scope of the book is necessarily limited, and consequently an endeavour has been made to present the essentials of the subject to meet the particular requirements of mining students in as concise a form as possible. The construction and testing of instruments has been treated in detail, and the last chapter contains notes of a survey of underground workings.

	Fri. 9th.	Sat. 10th.	Mon. 12th.	Tues. 13th.	Wed. 14th.	Thur. 15th.
Anglo-Am. Corp.	19 0*	19 0	18 9	18 3	18 0	17 6
Apex Mines	—	7 0*	7 3*	7 6*	8 0†	7 6†
Bantjes Cons.	6 0	5 1*	6 6†	6 3*	5 10*	5 9*
Brakpan Mines	49 0*	—	—	48 0*	47 6	45 6*
Bushveld Tins	0 7*	0 7*	—	0 7*	—	0 9
Cinderella Cons.	—	2 0*	2 0*	—	—	2 0*
City and Suburbans	2 4*	2 4*	—	—	—	2 0*
City Deeps	47 6b	46 6*	47 0*	47 0†	—	44 3*
Clydesdale Colls.	20 0*	20 0*	20 3*	21 0*	20 6*	21 6*
Con. Diamonds	12 10*	12 3	12 6*	12 3	12 0	11 6*
Con. Langlaagtes	13 3*	13 6*	13 6*	13 6*	14 0*	13 9*
Con. Main Reefs	10 0†	—	9 3*	3 3*	9 6*	9 6†
Coronation Colls.	—	38 0†	—	—	—	—
Do. Freeholds	0 6*	0 6*	—	0 7*	0 6*	0 6*
Do. Syndicates	5 9*	5 7	5 6*	5 3	4 6*	4 3*
Crown Diamonds	3 0*	3 3*	3 3*	3 2*	3 3*	3 0*
Crown Mines	35 0*	35 0*	—	—	—	—
Dagga Mines	2 6*	2 6*	2 6*	2 6*	2 6*	—
E.R. Coals	1 9*	—	—	—	—	1 6*
E.R. Deeps	0 6*	0 6*	0 6*	0 8†	0 6	0 6*
E.R. Props.	4 6*	4 6*	4 6*	—	—	—
E.R. Debentures	£85*	£85*	£85*	£85*	£85*	£85*
Frank Smith Dmds.	3 1*	3 0*	3 1*	3 0*	3 0*	3 0*
Geduld Props.	46 0	45 6*	45 6*	44 0*	43 6*	43 3*
Geldenhuis Deeps	—	—	5 6*	—	—	—
Glym's Lydenburgs	7 0*	—	7 0*	—	7 0*	7 0*
Govt. Areas	82 6	82 6	81 0*	81 9	81 0	76 9
Hume Pipes	14 0†	—	—	—	—	12 6†
Knight Centrals	4 6*	4 6*	5 0†	4 4*	5 0†	4 3*
Lace Props.	6 0*	—	—	—	—	7 0†
Leeuwpoot Tins	8 9	8 6*	8 9	—	8 0*	8 0*
Luipaardsvlei Est.	2 6†	—	—	—	1 0*	—
Lydenburg Farms.	4 6*	1 6*	4 6*	4 9†	4 6*	—
Meyer and Charltons	75 0†	75 0†	75 0†	—	75 0†	—
Middelvlei Est.	1 0*	—	—	—	1 0*	1 0*
Modder B's	28 0	27 9	27 0*	27 6	26 3	25 3
Modder Deeps	43 6	43 3	43 6	43 3	42 3	42 0
Modder Easts	7 0*	7 0*	7 0	6 6*	6 3	6 3
Natal Navig. Colls.	—	—	27 0*	—	—	27 6*
National Banks	—	207 6*	207 6*	207 6*	220 0†	217 06*
New Era Cons.	7 0*	7 6*	7 0*	7 1*	7 0*	7 0*
New Geduld Deeps	1 4*	—	1 1*	—	1 4*	1 4
New Kleinfonteins	—	5 6*	5 4*	5 6*	5 3*	5 0*
New Modders	73 0	73 0a	72 6	71 9	70 0	69 3
New Primrose	—	—	—	5 3*	—	—
New Unifields	5 0	4 0*	4 6*	4 6*	4 6*	—
New State Areas	20 3*	20 2*	20 0	20 0	19 9*	19 6*
Nigels	—	4 3*	—	—	4 9*	—
Nourse Mines	9 6†	9 6†	9 3†	9 0†	8 0*	8 0*
Pretoria Cements	42 6*	41 6	43 0	42 0*	41 9*	41 9*
Princess Estates	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Rand Nucleus	—	1 0*	—	—	1 0*	1 0*

The Crocodile River Iron Deposits.

RUSTENBURG'S HIGH GRADE HEMATITES.

The report by Dr. Wagner on the Crocodile River iron deposits has just been published. It forms an exceedingly interesting compilation, and should be studied by all who are interested in the development of the iron industry of this country. The following extracts have been taken therefrom:—

The deposits of high-grade hematite, with which the present report is more particularly concerned, are situated in the northern part of the Rustenburg District of the Transvaal in a rugged mountainous tract of country traversed by the Crocodile River between latitudes S. 24° 35' and S. 24° 40'.

The precise limits of the deposits have not as yet been determined. The ore has been proved to occur on Buffels-hoek No. 151, Wachtenbietjesdraai No. 829, Donkerpoort No. 830, Kwaggashoek No. 759, Grootfontein No. 145, Klipgat No. 672, and Rosseauspoort No. 32, workable deposits being apparently confined to the four first-named farms.

The iron area is at the present time rather inaccessible, particularly during the rainy season, when the roads are quite impracticable to motor traffic. The nearest point on the railway is Warmbaths station, distant approximately 68 miles from Buffelspoort. The distance to Brits station, the nearest on the Pretoria-Rustenburg line, is approximately 83 miles.

Chemical Composition

The ore is of great purity and, except for one exposure, is of Bessemer grade throughout, analyses showing from 60 to 69·5 per cent. of iron, from 45 to 6·32 per cent. of silica, and from 0·06 to 0·05 per cent. of phosphorus. It appears to be quite free from sulphur.

The following partial analyses of samples from different parts of the area are of interest as showing the uniformly excellent quality of the ore:—

	I.	II.	III.
Fe	65·0	67·4	67·75
SiO ₂	2·28	1·08	1·6
P	·03	·05	·01

Available Reserves.

The available reserves of high-grade ore in the area must be very considerable. Taking, for example, the stretch of ore exposed on the crest of the northern range on Kwaggashoek No. 759. This, as previously stated, has a length of 880 yards, and the thickness of the ore-body ranges up to 40 feet, probably averaging about 20 feet. Assuming that this is the average thickness at the outcrop, and that the deposit is regularly wedge-shaped, and only persists to a depth measured along the dip equal to half its length, then the single stretch of ore would represent some 38,000,000 cubic feet, equivalent to over 4,600,000 long tons.

Granting that the assumptions on which the estimate is based are quite unjustifiable—they probably err largely on the conservative side—the figures are none the less of interest as affording some indication of the potentialities of the deposits, particularly when it is borne in mind that many large ore-bodies not exposed at the surface probably await discovery by underground exploration.

Prime Necessity of a Railway to the Deposits.

It cannot be too strongly emphasised that, until a railway is built to the deposits, their exploitation will be quite impracticable, as the cost of getting the ore to rail under existing conditions would be prohibitive.

Mining Conditions.

Conditions, on the whole, are extremely favourable to cheap mining. Apart from the *talus-ore*, which will probably be used in the first instance, all the hematite exposed

at the surface is capable of open-cast or adit mining, and as the outcrops are in most instances situated at a very considerable distance above the adjacent valleys, it will be very many years before the necessity for underground mining proper will arise. The ore is very hard and tough, and will be difficult to drill and break. Power drills and blasting gelatine will, however, doubtless overcome this, and conditions otherwise are so favourable that quarrying costs should not exceed 3s. per ton, and the cost of adit mining 7s. 6d. per ton.

Rough sorting, with cobbing, will be required at the quarries to get rid of unreplaced remnants of banded ironstone occurring in the ore. These are of distinctive appearance, so that the sorting will be a very simple matter, and should not cost more than 6d. per ton. With reasonable care, there should be no difficulty in maintaining a grade of over 60 per cent. of iron.

The Ore from the Metallurgical Point of View.

The ore, as already indicated, is of almost ideal purity, and, except for one exposure on the eastern part of Donkerpoort No. 830, appears everywhere to be of Bessemer grade, *i.e.*, to contain less than 0·05 per cent. of phosphorus, which renders it suitable for the acid Bessemer process of making steel.

It is, however, very dense and close-grained, and if smelted by itself—some slight addition of siliceous ore would in any case be necessary—will require a very high blast furnace and coke of exceptional strength.

The hematite is also admirably suited for decarburising and refining in the basic open-hearth and electric-furnace processes of making steel, and will doubtless be very largely used for this purpose.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET BUT FIRM—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—OILS AND COLOURS—UNION'S IMPORTS AND EXPORTS. NINE MONTHS TO SEPTEMBER 30, 1921—BRITISH TRADE RETURNS—EXPORT TRADE CREDITS—SHIPBUILDING. 1920-1921—INCREASING USE OF OIL FUEL—COAL REDUCTIONS AND PROSPECTS—METAL MARKET.

General.

In view of the continued drop in the gold premium (mid-week's quotation being 98s. 10d. per oz.), the result of this week's Conference between the Chamber of Mines and the Industrial Federation—fraught as it is with such vital consequences to the industry and to the miners—is eagerly awaited. All indications at the moment point to a further decline in the price of gold, and although that decline may not be a big one for some little time, it still adversely affects at least half-a-dozen of our low grade propositions. A further decline in the rate will automatically put *hors de combat* several others. It is, therefore, absolutely necessary for the mine workers, if they are going to save the position generally (in the case of a few of our mines it will probably be impossible to save them), to accept with a good grace the reforms proposed by the Chamber of Mines and bring about such a radical reduction in the cost of production as will enable us to work our low grade mines at a fair profit. It must not be forgotten that the Rand is not going to be kept alive and prosperous by the exploitation of such mines as the Government Areas, New Modders, Van Ryn Deeps, etc., but that its *raison d'être* exists and is bound up with the bulk of the mines, the majority of which are low or lower grade, but which under fair conditions of production should see many years of fairly profitable development—to the advantage of shareholders, the miners, the Rand in particular and South Africa generally. The obverse of the shield—the trade unions and workers refusing to recognise the gravity of the present position and accepting the sacrifices which will adequately meet the case—is unthinkable, and the community hopes and thinks that the crisis will be met and tided over by the ultimate acceptance by the workers of such conditions as will enable the industry to carry on operations in the face of the eventual return of the price of gold to normal. "Wait and see" was the phrase used by a famous statesman, and we do not doubt that the wait will be of short duration and that we shall eventually see a satisfactory solution to the present disturbing situation. Apart from the cost of wages, that of material is certainly helping the industry; there is at present no sign of advancement therein, but rather the other way about. A responsible merchant in conversation this week said that a radical reduction in workers wages, important as it undoubtedly is, is probably not the biggest factor in the present position. The proposed extra two hours to be got from the natives would, he thought, prove to be of even more importance. The industry employed, he estimated, about a quarter of a million of boys, and if we obtained from them an extra two hours' work per diem this would mean, approximately, the labour of an additional 60,000 boys per day—a very big point and one which, he thought, was not generally taken into account. Given this additional work on the part of the natives, lower wages of the white miners, and greater efficiency on the part of the latter, there was nothing, in his opinion, to prevent the industry looking with complacency to the resumption of the normal price of gold and to the profitable working of most of our mines for many years to come. This December month is never good for the mining community, and no large turnover is expected, but inquiries elicit the fact that, though things are quiet, prices and the tendency are firm, and provided satisfactory arrange-

ments are come to with the mine workers as regards wages and the introduction of the much-needed reforms underground, there are good prospects of improving business conditions after the New Year. The only feature in the course of a rather dull week has been a demand for and increase in the price of hammer handles. The market in turps is very firm, stocks being rather low; the price is about 12s. 6d. per imperial gallon. The announcement last week of a tentative agreement on the Irish question has been followed during the past few days by the conclusion at the Washington Conference of the Four-Power Agreement, which has been enthusiastically welcomed on all sides and is, without doubt, of far-reaching importance to the world's future. The Ferreira Deep tragedy has cast a gloom over the community, which otherwise, in the face of the important decisions arrived at oversea and the approaching holiday season, was inclined to be very cheerful and hopeful.

Iron and Steel.

As was expected, business has been rather quiet during the week, but prices have remained firm, and the general

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JOHANNESBURG.

tendency is good, auguring well for increased activity and a bigger volume of business early in the New Year. Some merchants report that in many lines they are now obtaining much better prices than previously, and that some commodities are becoming scarce, with an upward tendency as regards prices. This is not unexpected, as the labour troubles this year have certainly had a deterrent effect on extensive indenting on the part of merchants.

Latest quotations.—Dunswart iron, 22s. per 100lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channels and joists, 35s. 6d.; shafting, $\frac{1}{2}$ in., $\frac{3}{4}$ in. and $\frac{1}{2}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{1}{8}$ in., 9d. to 1s.; $\frac{1}{4}$ in., 45s. to 50s. per 100 lbs.; $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 43s. to 48s.; hexagon, nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{3}{4}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{3}{4}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 3s.; hanmer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., exceedingly scarce, 35s.; barbed wire, "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standard, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening, 3s. to 9s. 6d. per square yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.

Engineering Shops.

Business in these is quiet just now, but after the holidays increased activity is generally anticipated.

Engineering Opinions.

In engineering circles, now that wages are likely to see a lower level, it is anticipated that the Railway may early next year launch out in regard to some schemes which have been pending for some time. An influential engineer said that in his opinion the time was now propitious for carrying out the Kalahari Desert reclamation scheme advocated by Professor Schwartz, which would give employment to thousands of unemployed men. The brains and everything requisite for the carrying out of such a scheme, which would probably alter the plan of Africa, are here within a radius of Johannesburg. Although numerous people are pouring cold water on the scheme, particularly the official class, no Government engineer being willing to consider any scheme in which he has no part himself, and does not want to push unduly anything in regard to which he would not reap the maximum praise, there seems to be nothing against Professor Schwartz's plan being put in execution. In times like these, or, in fact, at any time, the Government, he thought, need not fear that such a policy would not win popular approval, even if to some extent unsuccessful. The Government, if it went in for such a scheme, would find its popularity enhanced rather than decreased. As a start, an independent Commission, unfettered to the smallest extent by officialdom, should be appointed to consider all the available data. Other countries, such as the United States, would carry out such a scheme with the greatest of enthusiasm and in the shortest time, and here on the Rand we have the most stupendous industrial accomplishments, as evidenced by some of our huge mine installations. It only needs the technical and practical collaboration of the brains and unlimited navy labour of the country set in motion to carry such a scheme to completion, with probably the result that the whole climate over extended areas would be beneficially affected.

Latest British advices report some improvement in the iron and steel trades, as a result of the reduction in the Bank rate, which has to some extent relieved financial stringency. The tone is decidedly hopeful, but few large orders are being placed. The Scottish Steelmakers' Association have decided to decontrol prices of shipbuilding material and makers will fix their own minimum prices and return to a competitive basis as in the pre-war period. Pig-iron manufacturers are anxious for business, and are cutting prices so severely that French pig-iron competition has received a check, there being now only a few shillings difference per ton between Midland and French products. As the quality is similar buyers consider purchases of home material more advantageous at present. There is strong pressure for delivery, consumers' stocks being exhausted. The galvanised sheet trade is showing activity with increasing business.

A steel manufacturer in Sheffield has brought to the notice of the Chancellor of the Exchequer an extraordinary state of affairs obtaining there owing to the high rate of out-relief afforded by the Board of Guardians. His workmen, he says, are all finding it more remunerative to be unemployed than at work. He is able to employ his men for only two days per week, at a total wage of 45s. 9d. per week, while those of his workmen totally unemployed receive from the Board of Guardians 35s. 6d. per week, in addition to 15s. per week unemployment insurance, making a total of 50s. 6d., or 4s. 9d. per week more than those who are working for two days of the week. This high rate of outdoor relief, which is in several districts of London considerably higher still, is not unnaturally encouraging unemployment.

A great engineering feat is presently being carried out at St. Paul's Cathedral, in the direction of strengthening the huge fabric. While the south transept arch is being repaired the mighty dome has to be held up. This is being done by a steel structure weighing about 150 tons supporting about 4,000 tons, which is about an eighth of the total weight of the dome. The cost of the raw steel for the structure amounts to £7,000, and exceeds that of the actual repairs to be executed.

Owing to excessive dumping of goods from Germany, the Australian steelworks are threatening to close down, and



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Bulawayo and Salisbury

are demanding higher duties, combined with legislation against dumping. A motion has been introduced into the House of Representatives, Australia, favouring the resumption of trade with Germany.

In the United States iron and steel, according to latest reports, show an improvement in production and orders. Negotiations are in progress for extensive tonnage in steel rails. The price trend is more stabilised in many important industries, with a tendency to advance. Crude oil prices have had a sharp advance.

Timber and Building Materials.

Business has been fairly good during the past fortnight, people wishing to get as much building work done as possible before the holidays. The loss of the timber ship "Losna" recently has caused much inconvenience here. Stocks of timber on hand are not too plentiful, and fresh consignments, several of which are afloat, will be welcomed. The demand for timber in Britain is still very large, and an upward movement in the price may be witnessed within a few weeks.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver board, 4½d.; floorings, 6½d. to 7d.; ceilings, 4½d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 7s. 6d. to 8s. 6d.; corrugated iron, 9½d. to 10½d. Furniture timber, Burnah teak, 18s. to 19s. 3d. per cube here for first quality, 15s. 6d. for second, at the coast; American oak and Japanese oak, 1s. 2d. to 1s. 3d. at the coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic ft. at mills; Honduras mahogany, 30s. per cubic ft.; American yellow pine, 1s. 9d. per ft. of 1 x 12 here; American pine shelving, 1s. to 1s. 3d. per ft. Prices for bricks remain about the same at 70s. for blue stock; 60s. mixed; £4 10s. to £5 for wire cuts, £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag, 8 lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

There is no change to report in this section, the approaching holidays having the effect of causing business to come more or less to a standstill; no activity is looked for until after December is behind us. Iron is 6d. to 7d. and timber 9d. to 11d. Stocks are plentiful.

Electrical Goods.

Business, though fair, is not quite up to previous Christmas standards, and general expectations have so far been disappointed. A prominent dealer said people have not the heart this year to launch out; the Jews, he said, usually spend a lot of money on decoration for Christmas, but up to now there has been no activity in this respect, nothing but talk of strikes and bad times; people come in and ask about prices, and go out without buying. There is still a little business doing with the country, the exiguousness of which, in contrast with former times, is sometimes striking. For example, this week a large importer was commissioned to send out to Vereeniging per passenger train goods to the value of 7s. 3d., the expenses of which amounted to 3s. Prices of electrical wares remain much about the same, and no alterations are expected either upward or downward at the moment. In common with other industries, a quiet time is expected to rule until after the New Year.

Oils and Colours.

White lead in oil, small sizes, 10½d. lb., 39s. per 50 lb. kegs; English red lead, 10d. lb., 9d. lb. in 50 lb. kegs; dry white lead, 1s. 6d. lb.; linseed oils, raw or boiled, small bottle 1s. 6d. each, 7 lb. tins 8s. each, 4 imperial gallons 37s. 6d.; spirits of turpentine, small bottle 2s. each, 10s. 6d. per imperial gallon; turpentine substitute, 5s. 6d. per tin, each 5-6th imperial gallon; oxide in oil, 25s. to 45s. per 50 lbs.; oxide dry, 14s. 6d. per 100 lbs.; putty in 100 lb. drum bulk 4½d. lb., in bladders 6d. lb.; colours ground in oil, 42s. 6d. to 75s. per 50 lbs.; dry colours, 6d. to 10s. 6d. lb.; colours ground in water, 1s. to 2s. lb.; in turpentine, 3s. to 10s. 6d. lb.; in gold size, 3s. to 6s. lb.; ready mixed

paints, 1s. 6d. lb., 1s. 4d. per lb. in 70 lb. drums; roof paints, 11 lb. tin 16s. 6d., 70 lb. drum 75s.; varnishes, 27s. 6d. to 47s. 6d. per imperial gallon; pumice stone, 1s. 3d. lb.; bees wax, 1s. 3d. lb.; alum, 9d. lb.; creosote, 4s. 6d. per 5-6th imperial gallon; gum, 3s. 6d. to 8s. 6d. lb.; methylated spirits, 5s. 6d. per tin 5-6th imperial gallon, bottle, 1s.; resin, 8d. lb.; plaster of Paris, 24s. per 100 lbs.; caustic soda, 1s. 3d. lb.; seccotine, 1s. tube; coal tar, 17s. 6d. per 1 imperial gallons; Stockholm tar, 47s. 6d. per 5 imperial gallons; common glue 10d. lb., good quality 1s. 3d., finest Russian 1s. 6d.; gold leaf, English plain 3s. 9d. per book, transferred 4s. 3d. per book; aluminium leaf, plain 1s. 9d. per book, transferred 2s. per book.

Union's Imports and Exports for Nine Months to September 30, 1921.

Imports were £42,512,273 to the end of August, as compared with £68,756,850 for the corresponding period of 1920. Exports £40,403,083, compared with £62,595,317 for the eight months of 1920. For September month imports amounted to £5,750,000, or a little more than £500,000 more than August, and some £5,250,000 less than September last year. Exports exceed those of the corresponding month in 1920 by £200,000 and are over £1,000,000 in excess of August, 1921, figures. As a matter of fact, the month of September has produced the highest monthly export total so far this year. Imports for the nine months ended September are 28½ millions lower than the corresponding 1920 period, or 41 per cent. The principal decreases were in soft goods, including boots and shoes 56 per cent. less, food and drink 65 per cent. less, motor cars 77 per cent. less, iron and steel manufactures 46 per cent. less, wood and timber 48 per cent. less. Imports of manufactures and of mining machinery show increases of 52 and 75 per cent. respectively. The total machinery imports, excluding locomotives and agricultural machinery, were valued at £3,845,000, as compared with £2,874,000 in the 1920 period. Of our total requirements the United Kingdom has supplied 53.9 per cent., the Dominions 10.2 per cent., and foreign countries 35.9 per cent., as compared with 55.1, 12.1, and 32.8 per cent. respectively last year. The United States sent us goods to the value of 6½ millions, as against 11¼ millions during the first three quarters of last year, representing 16.6 and 16.4 respectively of our total imports. The United Kingdom took the bulk of our exports, 36¼ millions, or 78.4 per cent. of our total exports. Foreign countries took just under 7 millions, or 15 per cent., the United States being first with slightly under 2 millions, 4.2 per cent., and Germany a little over 1½ millions, 3.6 per cent. proportion of the total. The exports are nearly 21½ millions lower than in the 1920 period, the principal declines being in wool, diamonds, and hides and skins, of ten, eight, and three millions respectively. Food and drink exports show an improved value of a little over 2½ millions, maize, sugar and fruit shipments of 1¾ millions, £672,000 and £283,000 respectively.

GOVERNMENT EXAMINATIONS.

MINE MANAGERS' EXAMINATION

Total certificates (metal) granted to date 1921 -- 36
Secured by students of Messrs. Lucas & Wolfe -- 21
Balance for S.A. -- 15

In addition to above we obtained 5 coal certificates last two examinations

OVERSEERS' EXAMINATION

During 1918 and 1919 we secured the majority of the certificates granted. 21 certificates in 1920, and 23 certificates to date 1921 (metal and coal)

SURVEY EXAMINATION

We have obtained practically all the certificates granted by the Mines Dept. during recent years and have secured 62 certificates to date

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British Trade Returns.

The British Board of Trade returns for November show imports to be £89,000,000, compared with £144,000,000 for November last year, and exports £63,000,000, compared with £118,000,000 for 1920. There is, however, an improvement of £5,000,000 in imports and £1,000,000 in exports compared with October month. Up to the end of June British exports had declined from 79 millions in January to 33 millions, but with returning confidence in July exports had progressively climbed to 62 millions in October. This notwithstanding, the decrease in exports and imports for the ten months was 115 millions, compared with the same period for 1920.

Possibilities of Export Trade Credits.

A well-known engineering authority with South African connections says that British and South African firms are neglecting their opportunities by not availing themselves of the possibilities afforded by the new policy of oversea export trade credits instituted by the Board of Trade. He says thereby one can be sure of a satisfactory deal and save delay in cross references and other guarantees without putting one's hand in one's pocket, but this *bona fide* chance is apparently not being utilised to the extent it deserves. In the meantime export coal to France, Italy and elsewhere is being financed under the scheme, and now that it is applicable to practically every country an extension of its sphere of operations may be looked for.

Empire Exhibition.

Three members representing the Executive Council of the British Empire Exhibition, 1923, are visiting the Dominions early next year, beginning with the Union of South Africa. They will visit practically every part of the Union and Rhodesia, and will consult the respective Governments with regard to a number of technical details. The Board of the British Trade Ship has decided to reduce the charges to exhibitors to one-third.

Shipbuilding, Year 1920-1921: Increasing Use of Oil Fuel.

In the annual report of Lloyd's Register of Shipping mention is made of the closing of many American yards, including Hog Island, opened during the War, which contained some fifty building slips side by side. In the United Kingdom and on the Continent many contracts for new tonnage were cancelled, and in recent months an unprecedented slump had occurred in new orders for tonnage. A noteworthy feature was the number of ships using oil fuel. The new tonnage classed during the year ended June last totalled 911 vessels, of 3,245,130 tons, or 25 per cent. less than in the preceding twelve months. Of these 911 vessels, 240, of 1,219,270 tons, were built in the United States and 439, of 1,163,590 tons, in the United Kingdom. The oil tankers of all types built to class during the year amounted to 112, of 614,464 tons, and 353 vessels, of 1,867,110 tons, or 58 per cent. of the total tonnage of new ships classed during the year, were fitted for burning oil

fuel. The report states that the figures given indicate that industrial conditions generally during and subsequent to the War have given a tremendous impetus to the supersession of oil over coal for the purpose of combustion. For the first time it is recorded that of the steamers built to class during the year those propelled by means of oil fuel exceeded those fitted with boilers for the use of coal.

Need for Lower Costs.

In a speech this week, Mr. Patrick Duncan, Minister of the Interior and of Education, touched upon the need of cutting costs and the necessity of co-operation between workers and employers. It was obvious to everybody, he said, that if South Africa was to maintain her industrial position costs must come down, and the problem could only be solved if all parties, workers, employers, and the Government realised that everyone has to give something and to regard his own interests as subsidiary to the interests of the whole. The present problem called not for strikes but for co-operation, and the time had arrived, he thought, for the workers to sit around a table and try to arrive at a solution in the interests of all. The Government should hold the balance between workers and employers and see that industrial conditions were brought down so as to allow the industry to take its proper place in the world. With regard to the necessity for the Government encouraging development, Mr. Duncan, in referring to the electrification of a section of the Union railway, said this was only a step towards a great industrial future and to developing the resources of the country.

Coal Reductions and Prospects.

Owing to scarcity of business and the keen competition from England, collieries have still further reduced their prices for export by 5s. During the past few days some large orders have been secured for export at 20s. f.a.s. But even with this reduced price there is not sufficient business to keep the collieries fully employed; many of them are working half-time only.

The General Manager of Railways has announced that as and from January 1st, 1922, reductions will be made in the rates for bunker coal of 4s. 6d. per 2,000 lbs. to Durban and Delagoa Bay, and 5s. 6d. per 2,000 lbs. to Cape ports.

The present price of second-grade Welsh coal f.o.b. Cardiff is 24s. per ton, having declined to the extent of 51s. per ton since December last, as compared with a 27s. 3d. per ton decrease in the price of Natal coal. Even after allowing for the reductions in rates operative from 1st November and 1st January next, the bunker coal rates will be higher than pre-war rates by 169 per cent. to Durban, 166 per cent. to Delagoa Bay, and 77 per cent. to Capetown. Had the Railway Administration not reduced the shipment coal rates as much as it did, the greater portion of the foreign coal trade would have been lost, meaning a serious position for the railways and unemployment at the collieries. South Africa must keep in line with the world's coal prices or lose the business.

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The Luchenza-Nyasa Railway.

It is said that there is every probability of this projected railway being made a standard line in preference to laying it down as a narrow gauge line. Preparations, it is understood, are being made in London for the calling of tenders for the construction of the line.

S.A. Reserve Bank.

The statement of the S.A. Reserve Bank for the week ended December 10 showed the ratio of cash reserve to liabilities to the public as 74.9.

Consequent on the agreement arrived at over the Irish question, the tone of the London Stock Exchange improved during the week, a feature being the buying of Government securities.

African Wireless.

The official scheme for an Imperial wireless chain is progressing well. Material is now being despatched to Egypt for the Cairo station, which is the second link in the chain. The plans for the other overseas stations are also being pushed along, and should shortly be complete.

Reduction in Freights.

Homeward freights from New Zealand have, it is announced, been reduced by 11 to 25 per cent.

Metal Market.

Latest London quotations: Standard copper, £66 17s. 6d. cash, £67 17s. 6d. forward; electrolytic copper, £74 cash, £75 10s. forward; standard tin, £171 7s. 6d. cash, £173 2s. 6d. forward; foreign lead, £25 15s. cash, £25 2s. 6d. forward; quicksilver, £10 7s. 6d.; bar silver, 35½d. per oz., and bar gold, 98s. 10d. per oz.

The Municipality of Salisbury, Rhodesia, have, on the advice of their consulting engineers, Messrs. Clifford-Jones and Searle, of this town, accepted tenders for a new electrical generating plant for the Municipality, consisting of Dowson and Mason mixed draught producers, Browett Lindley four-cylinder vertical gas engines, and Electric Construction Co.'s three-phase alternators. The whole of this plant, together with the auxiliaries for same, has been ordered from Messrs. Hubert Davies and Co., of this town. The main switchgear has gone to Sykes and Co., and will be of the Reyrolle iron-clad type. The converting plant has gone to Messrs. Bruce Peebles and Co. for their well-known La Coer converter. The total cost of the new plant installed is in the neighbourhood of £50,000. The fuel used will be Wankie bituminous coal, and is guaranteed not to exceed two lbs. of coal per unit of electricity generated, as against 7½ lbs. of coal for the present steam plant. It is hoped to have the new plant installed and running within twelve months, and no doubt its progress will be watched with great interest by engineers, as it is the first electrical generating plant for town lighting burning bituminous coal in South Africa.

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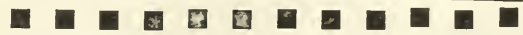
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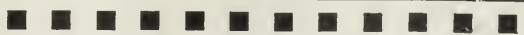
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DECLARATION OF DIVIDEND No. 20.

NOTICE IS HEREBY GIVEN that a Dividend of 15% (Fifteen per centum), equal to 3s. (Three Shillings) per share, has been declared by the Board of Directors for the half year ending 31st December, 1921, which will be distributed free of Union Dividend Tax.

The Dividend will be payable on a date to be hereafter notified to all Shareholders registered in the Books of the Company at the close of business on the 31st December, 1921, and to holders of Coupon No. 20 attached to Share Warrants to Bearer.

The Transfer Registers of the Company will be closed from the 1st to the 7th January, 1922, both days inclusive.

Dividend Warrants will be issued to South African Registered Shareholders from the Head Office, Johannesburg, and to European Shareholders from the London Office, 5 London Wall Buildings, Finsbury Circus, London, E.C. 2.

Holders of Share Warrants to Bearer are hereby informed that they will receive payment of a Dividend of 3s. (Three Shillings) per share—on or after a date which will be notified later—on presentation of Coupon No. 20 at any of the undermentioned Offices:—

Head Office of the Company, Johannesburg.
London Office, No. 5 London Wall Buildings,
Finsbury Circus, London, E.C. 2.
Paris Agency, Credit Mobilier Francais, 30 and 32
Rue Tailbout.

Coupons may be presented any day (except Saturday), and must be left four clear days for examination.

By Order of the Board,

THE CONSOLIDATED MINES SELECTION
COMPANY, LIMITED (England.),
Secretaries.

Per J. H. GRATTON.

Special Note.—The estimated profit for the year, including £100,000 transferred from Gold Reserve, amounts to £616,000. Of this total, £103,000 has been appropriated for Government Taxation, £228,500 for Capital Expenditure and Development Suspense and £255,000 for Dividends Nos. 19 and 20, each of 15 per cent., leaving a balance of £29,500 which, added to the unappropriated profit brought forward from last year, makes a total of £63,500 to be carried forward.

Head Office: Second Floor, The Corner House,
Johannesburg.
15th December, 1921.

Postal Address: P.O. Box 6249.

SPRINGS MINES, LIMITED.

(Incorporated in the Transvaal.)

DECLARATION OF DIVIDEND No. 6.

NOTICE IS HEREBY GIVEN that a Dividend of 7½% (Seven and one-half per centum), equal to 1s. 6d. (One Shilling and Sixpence) per share, has been declared by the Board of Directors for the half year ending the 31st December, 1921, which will be distributed free of Union Dividend Tax.

The Dividend will be payable on a date to be hereafter notified to all Shareholders registered in the Books of the Company at the close of business on the 31st December, 1921, and to holders of Coupon No. 6 attached to Share Warrants to Bearer.

The Transfer Registers of the Company will be closed from the 1st to the 7th January, 1922, both days inclusive.

Dividend Warrants will be issued to South African Registered Shareholders from the Head Office, Johannesburg, and to European Shareholders from the

London Office, 5 London Wall Buildings, Finsbury Circus, London E.C.2.

Holders of Share Warrants to Bearer are hereby informed that they will receive payment of a Dividend of 1s. 6d. (One Shilling and Sixpence) per share—on or after a date which will be notified later—on presentation of Coupon No. 6 at the Head Office, Johannesburg, or at the London Office, 5 London Wall Buildings, Finsbury Circus, London, E.C.2. Coupons may be presented any day (except Saturday), and must be left four clear days for examination.

By Order of the Board,

THE CONSOLIDATED MINES SELECTION
COMPANY, LIMITED (England.),
Per J. H. GRATTON.

Special Note.—The estimated profit for the year 1921 amounts to £407,000. Of this total, £59,000 has been appropriated for Government Taxation, £131,500 for Development Suspense and £197,500 for Dividends Nos. 5 and 6, each of 7½%, leaving a balance of £19,000 which, added to the unappropriated profit brought forward from last year, makes at total of £78,000 to be carried forward.

During the year the Consolidated Mines Selection Company, Limited, was called upon to subscribe for 60,000 shares at £3 per share to provide funds for capital expenditure in terms of the Government Lease Agreement.

Head Office: Second Floor, The Corner House,
Johannesburg.

15th December, 1921.

Postal Address: P.O. Box 5657.

Rand Selection Corporation, LIMITED

(Incorporated in the Transvaal.)

DECLARATION OF INTERIM DIVIDEND No. 44.

NOTICE IS HEREBY GIVEN that an Interim Dividend of 12½% (Twelve and one-half per centum), equal to 2s. 6d. (Two Shillings and Sixpence) per share, has been declared by the Board of Directors for the half year ending the 31st December, 1921, which will be distributed free of Union Dividend Tax.

The Dividend will be payable on a date to be hereafter notified to all Shareholders registered in the books of the Corporation at the close of business on the 31st December, 1921, and to holders of Coupon No. 44, attached to Share Warrants to Bearer.

The Transfer Registers of the Corporation will be closed from the 1st to the 7th January, 1922, both days inclusive.

Dividend Warrants will be issued to South African Registered Shareholders from the Head Office, Johannesburg, and to European Shareholders from the London Office, 5 London Wall Buildings, Finsbury Circus, London E.C. 2.

Holders of Share Warrants to Bearer are hereby informed that they will receive payment of an Interim Dividend of 2s. 6d. (Two Shillings and Sixpence), per share, on or after a date which will be notified later, on presentation of Coupon No. 44, at the Head Office of the Corporation, Johannesburg, or at the London Office, 5 London Wall Buildings, Finsbury Circus, London, E.C. 2. Coupons may be presented any day (except Saturday), and must be left four clear days for examination.

By Order of the Board,

THE CONSOLIDATED MINES SELECTION
COMPANY, LIMITED (England.),
Secretaries.

Per J. H. GRATTON.

Head Office: Second Floor, The Corner House,
Johannesburg.

15th December, 1921.

Postal Address: P.O. Box 888.

The Week's Meetings.

TRANSVAAL SILVER AND BASE METALS, LTD.

Report of the proceedings at the second ordinary general meeting of shareholders, held in the board room, General Mining Buildings, Johannesburg, on Thursday, the 8th day of December, 1921.

In the absence of the chairman of the company, Sir George Albu, in Europe, Mr. Leopold Albu presided.

The chairman, in moving the adoption of the report and balance sheet, said:

Gentlemen, — Owing to the absence of your chairman, Sir George Albu, whose stay in Europe, due to a combination of business and health reasons, has been prolonged to a date somewhat later than he intended on leaving South Africa, the duty of presiding at this meeting has devolved upon me.

In reviewing the affairs of your company, I will first deal with the financial side, as reflected by the accounts and the report of the directors.

The capital of the company, which at October 31, 1920, stood at £70,180, was increased during the past year to £300,000, firstly by the exercise of 69,740 options issued with the original shares, and secondly, in May last, by the creation of 160,080 new shares, which were issued in order to provide further funds for the carrying out of the programme of development and equipment of your property.

The total funds provided by the issue of shares, including premium on the issues which were made during the year under review, amount to £317,480. At October 31 last these had all been spent on the acquisition and development of your property, and your company owed besides sums amounting in all to £13,092, mainly for stores and machinery, which were paid for during November. The funds for this purpose was advanced by the General Mining and Finance Corporation, which will finance the immediate requirements of your company until such time as regular production will enable it to provide for all expenditure out of revenue. On present indications this should be the position in the near future; in fact, had it not so happened that the completion of the plant was delayed to some extent by the late arrival of some of the material, we should have reached the producing stage a few months ago, in which case the funds raised by capital issues would have been sufficient for the requirements of your company.

Company's Expenditure.

On the other side of the balance sheet you will notice that property has been increased by £8,608, consisting of £4,000 paid for the mining rights on Snyman's portion of the farm Dwarfontein, No. 145, in extent 518 morgen, and £4,608, being the purchase price of the freehold of Roets's portion of the same farm, in extent 361 morgen. The latter is the portion on which No. 1 shaft and the reduction plant are located. It will therefore be seen that we now hold the mineral rights of the whole of the ground on which Nos. 1 and 2 mines are situated. Then there is the expenditure on development, shaft sinking and equipment, which totalled at October 31 last £214,097 as against £48,384 to the same date in the previous year. This expenditure covers the bulk of the equipment necessary on the present scale of working, the only portion of any importance unfinished at October 31 being the concentration plant, the completion of which is definitely looked for within a few

weeks. Although the completion of the plant has unfortunately been somewhat delayed, it is a matter for congratulation that the expenditure incurred falls within the estimates, in some cases showing a small saving on the amounts originally voted.

Shipping of Bullion.

Sundry general expenses since the inception of the company, including preliminary expenses, transfer duty, interest, rentals under prospecting contracts, and general expenses at mine and head office, amount to £38,691, from which must be deducted £3,215, representing receipts from trial shipments of ore and discount on stores purchased.

The more liquid assets of the company consist chiefly of stores on hand £12,074, and cash £1,091, while payments in advance amount to £7,357. Of this total £4,390 represents cost of dumping ore on surface, which is available for treatment as soon as the concentration plant is ready, while £1,845 is accounted for by charges on the trial run of the desulphurising and smelting plant on hand-picked ore. The bullion resulting from this trial run was shipped to Europe about the middle of November, but the value—approximately £3,600—will only be taken in as revenue in the accounts for the current year.

Satisfactory arrangements have been made for the shipping of the bullion to Europe, and it is hoped that regular shipments will commence in January.

Development Policy.

Turning to the technical aspect of your company's affairs, you will see, on reference to the manager's report, that the past year has been devoted chiefly to carrying out a comprehensive development policy on the main lode of Dwarfontein, to opening up the old Brakfontein Mine, and to the erection of our new plant.

So far as development is concerned, the total footage accomplished was 8,761 feet on the main lode, and 157 feet on the Brakfontein lode, or 8,918 feet in all. Of this footage, 6,790 feet represents work actually on the lode, values being available for 6,470 feet.

On the main lode at No. 1 mine, for 4,410 feet sampled, payable values are indicated for 1,870 feet, or 42.4 per cent., which must be considered distinctly satisfactory, particularly so since the average intrinsic value of the ore exposed, at 12.4 per cent. lead and 11.4oz. silver is, at present prices, approximately 100s. per ton. At this mine, ore of high value already has been proved over a distance on the strike of some 1,800 feet, and to the dip of over 300 feet. Perhaps one of the most encouraging features of recent development is that at the third level, which is the deepest working of the mine, the lode instead of pinching out and becoming valueless, as some predicted, has actually widened to a marked extent, and is, perhaps, better defined and of higher value than at any other point under attack at the present time.

An Encouraging Strike.

Another gratifying feature of recent development is that the second level drive west, which for some months has been passing through an unpayable zone, corresponding to that met with on the first level recently, has encountered a wide lode carrying excellent values. I need hardly say that this strike, in the western end of the property, following on the good values met with to the dip on the third level, is most encouraging.

At No. 2 mine, the proportion of pay-

ability, viz., 15.7 per cent., has been low, due almost entirely to the fact that, east of the shaft, the lode has pinched, and, with the exception of an area between surface and the first level, is practically valueless. West of the shaft, however, development has shown more hopeful features, and the shoot of high grade ore exposed by T.W. 1 winze sunk from surface has given definite signs of opening out on the lower levels. Whether or not this is a sign of a new mine existing in depth, I am not yet in a position to say, but it is most encouraging to note that, within the past few weeks, the lode on the third level drive west has widened to from seven to nine feet, and that excellent values are shown over the full width. This drive is being extended in the direction of the third level drive east of No. 1 shaft, where, as already mentioned, similar phenomena are being encountered, and, although the faces of the two drives are approximately 2,500 feet apart, the prospects of a substantial body of high grade ore being opened up between the present working points, and also to the dip of the existing workings, are undoubtedly good.

Brakfontein Lode.

I need hardly remind you that the main lode is by no means the only mineral occurrence on your property. As you are aware, extensive prospecting work, carried out during the previous year, exposed the outcrops, over a very considerable distance, of other mineralised bodies, such as the Brakfontein, Boschpoort, East, Spies and Le Grange lodes. It is obviously impossible, with the means at our disposal, to commence shaft sinking and development at all these points at once and, apart from work on the main lode, we have, therefore, confined ourselves in the meantime to opening up the Brakfontein lode, leaving the other occurrences for future exploitation. On this lode the old shaft of the Brakfontein mine has been recovered, stripped to three compartments, and sunk to the second level, a total depth of some 220 feet. In order to carry out this work, the shaft was equipped with temporary hoisting, pumping and air compressing plants, and, within the last fortnight, the Tangye air compressor has been removed from No. 1 shaft, where it has been superseded by the new Ingersoll compressor, and, together with the necessary boiler plant, has been erected at Brakfontein with the object of carrying out a development programme on this lode. Following on the unwatering of the workings, the old first level of the mine was re-sampled and gave the following results over that portion of the lode which was exposed in the drive:—

Payable: 70 feet, having an average value of 12.0 per cent. lead and 12.6oz. silver over 35 inches.

Unpayable: 60 feet, having an average value of 0.8 per cent. lead and 0.9oz. silver over 42 inches.

The proportion of payability shown above, at nearly 54 per cent., must be considered satisfactory, and it is noteworthy that the samples were, of necessity, taken only over that portion of the lode which was exposed, and that further lode matter exists both in the hanging wall and footwall of the drive, the width at this point being considerable. Within the past few days the lode has been intersected by the second level station crosscut; values are not yet available, but it is evident from its appearance that they will be satisfactory. It is, of course, too early to make predictions regarding the future of the Brakfontein lode, but there are strong reasons for thinking that the conditions

which are found on the main lode, as regards continuation in depth, are equally likely to apply in the case of Brakfontein.

Ore Reserves.

Turning to the question of ore reserves, you will see from the Manager's report that the fully developed and payable ore consists of 103,115 tons, valued at 10.53 per cent. lead and 9.76oz. silver, the intrinsic value of which, at to-day's prices, is roughly 85s. 4d. per ton. This estimate takes no account of a further 21,838 tons of ore, which, pending completion of certain winze connections, it has been deemed advisable to exclude from the payable ore reserve, although, so far as we can judge, a considerable proportion will be payable. The estimate also excludes the ore developed at the Brakfontein Shaft, since, until ventilation arrangements have been made, this ore is not available for mining. Omitting the blocks of ground mentioned, the ore available for mining and treatment comprises not only the ore reserves, amounting, as already mentioned, to 103,115 tons, but also the ore in development dumps, which, on a conservative basis, is estimated at 4,000 tons, and in an old seconds dump, containing 2,700 tons. In all, therefore, the payable ore available for mining and treatment may be stated at, roughly, 110,000 tons. This quantity may appear somewhat small, after the colossal figures to which we are accustomed in the case of our gold mines; but, bearing in mind the high grade and relatively small capacity of the plant, it must be considered quite satisfactory.

Reduction Works Equipment.

In regard to the reduction works, you will remember that at our last meeting your chairman informed you that it had been arranged to erect the first unit of the plant with a capacity of 4,000 tons per month. Since that time the general outlook for the company led us to revise our original decision, and to proceed at once with the erection of a somewhat larger unit, capable of dealing with 7,500 tons per month. Estimates and plans were prepared accordingly, and after the plans had been submitted to Dr. Heberlein, who was advising us in a metallurgical capacity, the orders for those items which had to be obtained from overseas were placed forthwith.

The first portions of the plant to arrive were the desulphurising pots and small smelting furnace, erection of which was put in hand during May, the plant being completed and running by the middle of October, when a start was made on smelting hand-picked ore. Excellent results were obtained, the extraction being 95.3 per cent. for the lead and 96.6 per cent. for the silver.

Towards the beginning of August a start was made on the erection of the sorting and crushing station, which was completed early in November, and is now running satisfactorily.

The only outstanding portion of the reduction works viz., the concentration plant, was delayed to some extent by late deliveries, with the result that erection was started only towards the end of September last. This work has been pushed ahead with all possible speed, and is now practically completed, so that the full plant should be in operation within the next few weeks.

At the Producing Stage.

Bearing in mind the difficulties which have had to be faced, I feel you will agree with me that the time taken to bring the company to a producing stage is remarkably short, particularly in comparison with the five to seven years' interval to which we have grown accustomed in the case of our gold ventures, and I think that we can congratulate ourselves on the progress which has been made.

I have already said that the first unit of the reduction plant is designed for a monthly capacity of 7,500 tons of ore, and you have been informed previously that the smelting plant, when running to full capacity, is capable of turning out some 750 tons of bullion per month, worth at to-day's prices, approximately £31,000. This basis is adequate for our requirements at the present time, and in fact, an increase to the capacity would not be justified until the ore reserve had been considerably augmented. I need hardly point out, however, that if the satisfactory features of development, which recently have manifested themselves, are to be continuous, the question of additional plant is one which will have to be taken into account.

The present width of the lode in our deepest workings, viz., the third level east of No. 1 shaft and west of No. 2 shaft, is averaging about eight feet. At this width, each foot of driving develops, approximately, 90 tons of ore, which means that the insignificant distance of only 84 feet of payable driving per month is sufficient to develop ore equal to the capacity of the plant. I do not wish to enlarge upon this statement, neither do I desire to minimise the fact that the present width of the lode in these workings is unusually high. I merely mention it in passing to show the enormous importance to the mine of the recent developments, and to indicate the vast possibilities should the present favourable indications continue.

Well-Known Geologist.

With the object of leaving no stone unturned which may conduce to the ultimate success of the company, we have recently considered it advisable to engage the services of Mr. Theo. Kassner, a geologist of international repute, who will be remembered in this country for his researches into the geology of the Rand some years ago. In the interests of shareholders, we consider it inadvisable to publish Mr. Kassner's report in detail at the present time, and I propose, therefore, only to quote his final conclusions. In the summary at the end of his report, Mr. Kassner says: "The various indications on your holdings lead me to conclude that the whole mineralised zone is attached to an earth movement which forms a cleft line running many miles through the country. The fact that you have already established a considerable amount of argentiferous galena ore in true fissure veins proves that your property has numerous possibilities, and it tends to the assumption that we will locate much larger bodies of ore in depth than hitherto anticipated. This fact is corroborated by the development of the ore bodies in shafts Nos. 1 and 2, which I have illustrated in plan No. 2.

"The earth movements, which naturally have to be taken into account, should not give reason for disappointment. The whole trend of rich ore chimneys indicates especially that a greater concentration lies in a deeper zone between shafts Nos. 1 and 2. The aim of development for the supply of your plant should therefore be in an eastern direction from shaft No. 1, and in a western direction from shaft No. 2 in the deeper levels. The mode of occurrence which I have illustrated and described will repeat itself all along the line where the opening and shutting of the cleft is clearly noticeable in the larger scale.

"There is already an ore reserve of about 100,000 tons developed in your mine which should supply the plant for nearly one year. Although there is at present a considerable amount of unprofitable work to be done in order to pass the disturbed zone, there are at the same time promising regions for ore. There is, however, no doubt that you should

always have sufficient ore to feed your plant.

"I see no reason for supposing that the galena ore should abruptly come to an end, or that the fractured line should be the reason for limiting the mineral. On the contrary, it is proved that in your deepest levels in shaft No. 2, where you have had throughout disappointing results, the lode opens up exceptionally well in a width of about nine feet. Also in the fracture line in shaft No. 1 one notices that the galena is absent, but occurs in small patches repeatedly, which shows that it leads to the true fissure with payable ore again. In addition, there is the Brakfontein lode developing very favourably, and which is in reserve for expanding the undertaking. Further, there is Boschpoort, where the lodes are proved to be galena-bearing.

"I may conclude that your present undertaking in the area should prove lucrative to your company, and will no doubt become of great benefit to the country in general."

Well, gentlemen, there is but little more to add to the remarks I have already made. When your chairman addressed you at the last annual meeting the mine was still in the initial stages, and, although the outlook was most promising, the quantity of development work accomplished did not justify our regarding the property as more than a very favourable prospect. The past year's work, however, has put quite a different complexion on affairs, and although, even now, we have barely commenced to open up the undoubtedly vast resources of the company, there can be no doubt that what, a year ago, was a prospect, is now rapidly becoming a mine.

More than that I do not care to say at the present juncture. We do not know the extent of the ore deposits, and we cannot foretell the eventual possibilities of the concern until work has progressed even considerably beyond the present stage. It would be unwise, therefore, to make statements which, later on, might prove to be unduly optimistic, and so we propose to take the more desirable course of saying little and pushing development ahead with all possible speed. In the meantime you will see that we are by no means letting the grass grow under our feet in our handling of the company's affairs. We started out to found an industry in this country, and we are leaving nothing undone which will assist us in this direction. It was with this idea in view that we engaged Dr. Heberlein, one of the leading metallurgists in Europe, to give us expert advice regarding the lay-out and details of the plant. It was in furtherance of this idea that we more recently engaged Mr. Kassner to investigate our holdings from a geological point of view, and it is most encouraging to know that these gentlemen have even more than confirmed the opinion we hold regarding the enormous future possibilities of the company.

In conclusion, it gives me much pleasure to express, on behalf of your board, their appreciation of the services of your technical adviser, Mr. Errol Hay, and your manager, Mr. J. Ritchie, to whom, as well as to the officials and men on the mine, our thanks are due for the progress which has been made during the year under review.

Questions and Replies.

The chairman invited questions.

Mr. J. I. Benjamin asked the chairman whether he could give the shareholders any idea what the cost of producing bullion would be inclusive of realisation, shipping, transport and other charges. Mr. Benjamin also asked for further particulars of the item of £38,000 sundry expenditure.

The Chairman: Mr. Errol Hay will reply to the first question. As to the second one, I think you will find it fully explained in the balance sheet.

Mr. van Zyl: I notice from the balance sheet that the company owes money to the General Mining and Finance. Can you tell the meeting how the company is to be financed in the future.

Mr. Errol Hay, in replying to Mr. Benjamin's first question, that in regard to the question of costs reckoned per ton of bullion, it was of course impossible to say exactly what they would be, because that depended very largely on the grade of the ore they were going to expose in the future, but so far as they could tell from the ore exposed at present their cost per ton would be about £21. It meant that if lead fell to £21 the whole of the silver would still be profit, which was a very large item, the silver contents of a ton of bullion being worth about £20. In regard to the payability of ore reserves, a statement had been made that they were originally calculated at £15 per ton of lead. They had never been calculated at £15; the lowest they had ever been taken at was £22, and naturally the company calculated their limit of payability on the value of the metals at the time. It was exactly the same procedure that the General Mining and Finance adopted in regard to their gold mines; they stated that the ore reserves had been valued on the basis of gold at so many shillings per fine ounce. Obviously they could not take lead at £15 per ton when it was now £25. The payability was calculated, as it had always been, on the prices of metals at the present time. He did not think that shareholders need be afraid that if lead went down a few pounds a ton it would make any material difference to the result. There was rich ore and there was poor ore, but the quantity of ore that was on the margin of non-payability was almost negligible, so that the company's ore reserves would not be affected by any small drop in the price. In regard to working costs, the figure of £21 included realisation, shipment, transport, as well as the mine charges. The present value of bullion was somewhere in the neighbourhood of £11 per ton.

Mr. Farquharson, in replying to Mr. Benjamin's question about the item of £38,000 for sundry expenditure from the inception of the company till October 31, said he thought it was well known that the practice on the Rand always had been that the general administration of a mine during the construction stage was charged to general expenses. Naturally those expenses were fairly heavy and out of that £38,000 an amount of £21,000 was accounted for by the manager's salary and the office of the mine and head office expenditure, insurance, and all that sort of thing. The remainder was accounted for by transfer duty which the company paid on the properties and the renewals of the prospecting leases. Those were the main items. Then there was the fee they paid for bringing out the expert mentioned in the chairman's speech.

On the question of the financing of the company, the chairman quoted from his speech showing that the company was financed by the General Mining and Finance Corporation, and added that the Corporation would continue to finance the requirements of the company until such time as a regular production would enable it to provide for all expenditure out of revenue.

Upon it being put to the meeting the report and accounts were adopted and confirmed, as was likewise the appointment of Mr. Leopold Albu as a director of the company.

Mr. H. G. L. Panchaud was re-appointed auditor.

The meeting closed with a vote of thanks to the chairman.

THE TRANSVAAL AND DELAGOA BAY INVESTMENT CO., LTD.

The annual general meeting of share holders of the Transvaal and Delagoa Bay Investment Co., Ltd., was held on December 13th, 1921, Mr. S. C. Black presiding. In the course of his speech the Chairman said:—

The report and statement of accounts now submitted for your adoption show a very satisfactory result for the year under review. The Company's capital stands at £300,000, of which £22,500 are held in reserve. You will recollect that it was increased from £185,000 in November, and details are set forth in the report. The realised net profit after writing off £7,647 9s. 2d. for depreciation, and making provision for Government and other taxes amounts to £98,046 16s. 10d. We brought forward from last year £29,314 14s. 11d., making together £127,361 11s. 9d. Interim dividend No. 19 of 2s. per share absorbed £27,750, and the balance to credit of profit and loss account thus stands at £99,611 11s. 9d. The profit again shows improvement compared with that of the previous year.

The interim dividend of 10 per cent. was paid in June, and we recommend a final dividend of 15 per cent., making in all 25 per cent. free of Union of South Africa Dividend Tax, for the financial year. After payment of this final dividend, which will absorb £41,625, there remains a balance of £57,986 11s. 9d. to the credit of profit and loss account.

Improved Financial Position.

The financial position has been further improved which, I feel sure, is as gratifying to shareholders as it is to the Board. Cash and equivalent assets, less sundry creditors, total £196,295 17s. 3d. and shareholdings £95,058 12s. 2d. All shares are reckoned at or under cost, but in no case above the prices ruling at August 31, 1921.

The item "Contingent Liabilities," which last year figured at £42,723 14s. 8d., is now reduced to a sum of £1,794 13s. 4d. This is principally due to the South African Iron and Steel Corporation, Ltd., having decided to postpone the issue of further capital, in consequence of which our guarantee lapses.

The Transvaal and Delagoa Bay Collieries' output of 936,177 tons is somewhat less than for the preceding 12 months, but as we obtained a better price for overseas coal during a portion of the year, this is not of great consequence.

You will remember that at our last annual meeting, I had occasion to refer to the irritating delays in the delivery of certain machinery and plant. I am now glad to state that the new electrical power plant, as well as the electrical coal cutters, have arrived, were promptly erected, and are at work. The cost of same and other additions to permanent works, chiefly housing accommodation for our employes, amounted to £31,286 3s. 3d. We had previously made provision to the extent of £25,000 in respect of the electrical machinery and plant and, as is our custom, we have written off liberally for depreciation during the current year, so that the whole of our permanent works, shafts, plant, machinery, water service, locomotives, etc., now stand in the books at the very moderate sum of £51,177 6s. 4d.

The manager's report gives the usual information as to the state of the mine, works and plant generally.

A Promising Coal Mine.

The Douglas Colliery, whose report and balance sheet to June 30, 1921, are laid on the table, has had a satisfactory year, and its financial position is much improved. A colliery is being opened up and equipped to work its freehold farm

Leeuwpoot, in extent 4,147 acres, and eventually also some outlying portions of our farms Driefontein and Blesboklaagte. The new installation is designed for an output of 50,000 tons per month, machinery and plant are of the most modern type, and their efficiency should be second to none in South Africa. The first unit of its plant was finished at the end of October last, and the other two units will be completed by about the middle of March next. The company's funds should be sufficient to meet the cost of the installation, including the new railway line. The mine itself is most promising in every respect. It is well laid out for economical working, and the coal which was struck at no great depth is about 12 feet in thickness, and of high quality, and we shall have every facility for production on a large scale. Hitherto, it is true, we have not always been able to work the existing plant of the Transvaal and Delagoa Bay Collieries to its full capacity, owing to insufficient orders or scarcity and irregularity of railway trucks, but we are looking forward to, and preparing for, a time when the demand for good coal and the facilities for transport may increase.

The Transvaal Coal Owners' Association, of which both our collieries are members, continues to do efficient work, the total quantity of coal distributed by it for the 12 months ended June 30, 1921, being 6,943,463 tons. The association has been, and is, sparing no effort to extend the coal trade wherever possible, and it has earned a well-deserved reputation, especially in shipping circles, by supplying a sound stable quality and by prompt delivery at the different ports.

At the present moment the outlook for the 1922 export trade is none too favourable. We are faced with competition from many quarters, but we feel confident that, with lower shipping freights and sympathetic consideration on the part of the South African Railways in the matter of further reducing railway rates, both the export and bunker coal trade should not only be maintained, but may be expected to show expansion.

On October 29 last year our Government appointed a commission to inquire into and report upon the question of grading and pooling of South African coal intended for export or bunkering purposes, so that only coals of good quality shall be exported. Also the safeguarding of the supply of coal for local consumption, and for the use of the South African Government railways. The Transvaal Coal Owners' Association was represented on the commission by its chairman, Mr. John Roy, and I take this opportunity to acknowledge the excellent services he has rendered to the coal industry through his intimate knowledge of the trade.

Other Countries' Examples.

There is no change of importance, except the addition of some 966 acres of a freehold coal bearing farm, purchased during the past 12 months. Last year I touched on the subject of the large number of options acquired on farms for the purpose of prospecting. Many of these, on being tested, proved disappointing, but our operations have revealed information useful to a company such as ours, whose business it is to be well informed on the extent and value of the coal bearing areas of the Transvaal. The prospecting work in Upington district of the Cape Colony for pyrites is proceeding, but until more definite information, which we hope to possess shortly is available, the potentialities of this undertaking remain undetermined. At Delagoa Bay, which port I visited in August, I found signs of distinct progress in many directions. The authorities are fully alive to the necessity of many urgent undertakings to increase the business of the port, but it is

hardly surprising that they find that the present time is not propitious for incurring large public expenditure. However an important improvement, with regard to additional plant for loading of coal, is being carried out. The advantageous position and excellence of the harbour will no doubt in time find adequate recognition, and our company should eventually derive proper returns from its large and valuable land holding in and near the town of Delagoa Bay.

The board looks with satisfaction to the past history of this company. We declared our first dividend in 1903, and we have continued to pay regular dividends ever since. This year, for the first time, we departed from the practice of declaring only one dividend per annum, because directors felt that when ready money was scarce, shareholders would welcome the payment of an interim dividend.

With regard to the labour position generally, a great deal of unrest is fomented on the question of a reduction of wages from the high-water mark of a year ago. But the white workers of South Africa must recognise that they are not a privileged class above economic laws, and when all the world over the reduction of wages follows on the fall in the cost of living they too will be subject to the same cause and effect.

Before concluding, it is a pleasure to express the board's appreciation of the excellent services of your general manager of the collieries, Mr. James McPhee, M.Sc., M.E., who, in addition to his ordinary duties, has given a great deal of care and attention to the new construction work on the Transvaal and Delagoa Bay Collieries, as well as to the new plant and installation of the Douglas Colliery. We also tender our thanks to his staff and workmen generally, and to our office staffs, both in Johannesburg and in London.

PRETORIA SILVER LEAD.

Annual Meeting.

The annual general meeting of the Pretoria Silver Lead Co., Ltd., was held on Wednesday under the chairmanship of Mr. Chas. A. O. Bain, chairman of the company. There was a fairly large number of shareholders present, and from the Chairman's speech, in moving the adoption of the report and balance sheet, we make the following extracts:

We have been obliged, said Mr. Bain, to call this meeting in order to conform to the Company Law, but I should have been better pleased if it could have been held a month later. By that time I should have been able to disclose to you a more interesting position than I can do to-day, because the results of the development work now being carried on would by then be available; but the law compels us to hold a meeting before the end of this year, and so I shall tell you how the development work stands now and am glad to be able to meet you with cheering news. Before, however, dealing with the mining and technical side, I would just like to refer briefly to the

accounts. The issued capital of your company is a very small one, being only £80,030, and your property, which is paid for and upon which there is no liability of any kind, is a large one, consisting of about 1,600 acres. It is situated about three to four miles from Argent Station, adjoining the Transvaal Silver Company's property, and, in fact, being portion of the same farm. The mine is connected with the station by a road which has lately been a good deal improved by the Transvaal Silver Company and by ourselves, but which still leaves much to be desired in wet weather. In conclusion, regarding this item, one need only remark that you have a very large property and a very small capital.

The cash in hand amounts to £6,525 odd, and that, with other liquid assets, represents a sum of £9,473 15s. 4d. This sum of money, unless something unforeseen occurs, should enable us to sink our main shaft to the first level at 130 feet crosscut to our reef and carry on development for some distance. It is too early as yet to give any indication as to what steps will be taken to provide more money permanently, because our programme will depend on the values disclosed in development and the arrangements made for the disposal of our ore, but should more money be temporarily required, there will be no difficulty about having the sum required advanced. I mentioned just now that I had cheering news of our mine to give you. Mining work is always subject to fluctuations and delays and the work on your mine has been no exception to the general rule. We pushed ahead as fast as possible, and in spite of heavy rains and awful roads, and having to transport machinery and materials from all parts of the Transvaal during the rainy season, we were ready to start sinking, and in fact did start sinking, the main shaft at the end of March. Up to that time we had done what development we could on the lode itself by means of winzes, and the results amply confirmed our reports and assays as to the richness of the lode. When it was found necessary to stop sinking the winzes for the time being until the main shaft had reached the first level, we took out a quantity of ore from the lowest point touched in the winze and sent a ton of fair average value in to town to be smelted and tested.

The test was most satisfactory, and I will read you a few words from the report which was handed to us by the analyst, Mr. Rex Rundle, consulting metallurgist, who kindly helped us in this matter and took no end of trouble and great personal interest in the test.

Mr. Rundle says the furnace was a roughly-built blast furnace devoid of many conveniences which would have increased its efficiency.

The quantity of ore treated was 2,450 lbs., or nearly one ton and a quarter, and the assay value was 48 per cent. of lead and 6oz. of silver per short ton.

The ore was a mixture of galena and carbonate, and it proved to be very

nearly self fluxing. It ran down with great ease and the quality of lead recovered was excellent, being very soft.

The silver lead bullion recovered weighed 890lb., and contained 106oz. of silver per short ton.

This shows an extraction of 75 per cent. of lead and 83 per cent. of silver and it can safely be assured that on a large scale and under better conditions the lead recovery will be 90 per cent. with a much higher recovery of silver.

Mr. Rundle concludes by saying that he was greatly impressed with the purity of the ore and the ease with which it can be treated.

This, you will agree, is an extremely satisfactory statement, especially when it is known that the ore was smelted just as it came from the winze without sorting, crushing or concentrating, and also when taken in conjunction with the report just issued of the operations of our neighbours, the Transvaal Silver Mines, wherein we are informed that their No. 1 shaft is down 382 feet and their No. 2 shaft 314 feet, and in both they have got good values in depth. We can reasonably expect, therefore, that our lode and our values will be no worse.

I now come to the Brakfontein lode, upon which the Transvaal Silver Company has sunk their No. 3 shaft, which has been sunk down to the second level, which, Mr. Abu informed us at the meeting last week, was a depth of 220 feet, at a distance of from three to four hundred yards east of our present workings. Mr. Oliver King believes that this lode traverses our property from north to south, but no work has been done to confirm this opinion, and for the present we are quite satisfied to confine our attention to our main lode.

As to the future, we must be guided by our progress and by circumstances. If it is necessary, and if it will be profitable to extend our programme and find more money, do not fear that we shall not come to you and ask you to share with us the responsibility and profit of finding it.

That is all I have to say to you to-day. You have a large property and a rich property, and the unfortunate delay in opening it up does not in any way detract from its richness, and I feel confident that our development will now go steadily ahead.

Mr. Shimwell seconded the adoption. Mr. Bielski asked when the company would be turning out ore, and the Chairman replied that he expected the first development ore to be sent up in about six to eight weeks' time.

The report and balance sheet were then passed and the auditor re-elected, his fee being fixed at seventy guineas.

The Chairman said: Before closing the meeting I should like to read you the latest news which I have just received from the mine. The manager, Mr. Calder, says: "In my letter of the 10th instant I ventured the opinion that we had passed the danger zone, and now I go further. Our shaft troubles are behind us. We have now, as far as I can see, a clear run for sinking and development."

B.S.A. Annual.

We have received a copy of the 1921-22 edition of this publication. The Annual maintains the high standard it has set in former years—in fact, this year's publication is better than ever. There are informative articles on all phases of mining, commercial, and agricultural activities in Southern Africa, and the varied nature of the literary contents of the Annual can be judged from the fact that the contents include "Witchcraft in Angola," "Clubland on the Rand," and "The Turf in South Africa." There are many magnificent photographs and a beautiful coloured plate depicting Plettenberg Bay. The whole of the book—including the front cover and the supplement plate—was designed and

printed by the proprietors and printers, Messrs. Hortors Limited, at their works, 78 Bree Street, Capetown, and their efforts reveal a high standard of craftsmanship in the Union. The *B.S.A. Annual* makes the best of Christmas cards to send to friends overseas. It is altogether a magnificent production.

SWAZILAND TIN.

The following are the results of the operations of this company for the month of November, 1921:—Concentrate recovered, 18 tons; estimated net profit for the month, including credit adjustments on previous shipments (taking tin at £160 per ton), £91.

A MECHANICAL DIAMOND CUTTER & POLISHER.

Mr. S. Schonken, New York, is the inventor of a machine which, if all the advantages claimed for it are found to be correct, may revolutionise the world's diamond-cutting industry entirely.

The object of the invention is to ensure as nearly as possible mathematical accuracy in the polishing of the facets, irrespective of the size of the gem to be polished.

In the present-day method of polishing the facets in a diamond it has been found advantageous to divide the operatives into three groups: the "turners," who set the stones in the lead; the "eight-square" cutters; and the "brillanders," who make the eight star facets and sixteen girdle facets above the girdle and sixteen girdle facets below the girdle. It requires long practice and skill to bend the copper wire to give the "dop" the proper angle of inclination.

The "eight-square" operative can only handle four tongs at the same time, whilst the "brillander" can only work with one stone at a time, as, there being so little to take off, it would entail a risk of waste to attempt to make more than one facet at the same time.

The new invention requires no division of the facet work, nor does it require the services of a turner. The stone comes from the "bruter" already set and fastened in a pot; directions on a tag attached to the pot tell the polisher just what he has to do, and there is no possibility of polishing a facet too deep with the consequent loss of weight to the stone, for the reason that the arm holding the dop is stopped automatically when the facet is completed. The machine permits one operative to work with nine or more stones at one time and can cut equally well primary facets, star or girdle facets.

According to the *Journal of Industries*, persons who wish to get further information about this invention can consult all the documents concerning it at the Office of the Industries Division, 451 Market Street, Pretoria.

NATAL COAL RETURNS

The coal return for the Natal Province for October, 1921, is as follows:—

	Coal sold. Tons of 2,000 lbs.
Dundee Coal Co.	47,568
Hlobane	33,222
Natal Navigation	29,596
Enyati	23,241
Wallsend Natal	21,731
South African... ..	19,794
Northern Natal Navigation Collieries, Ltd.	14,342
Durban Navigation	12,356
Newcastle	10,214
Natal Steam	9,380
Tendega	9,181
Natal Cambrian	8,833
Buffalo	8,183
Bernica	6,591
Ballengeich	6,332
Utrecht	6,273
Tshoba	3,375
Elandslaagte	2,480
Vryheid Coke Co.	1,521
Dewar's Anthracite	871
New Tendega	846
Avon	309
Natal Ammonium	175
Star	53
Doon	26
Vrede	—
Parksville	—
Totals	276,493
Corresponding month, 1920	279,974

**A REDUCTION IN PREMIUM
INSURANCE
AGAINST THE UNSEEN ENEMY
FRICTION.**

MODERN INSURANCE covers every hazard of industry except, perhaps, one
We suggest—

**A lubricating policy
for your entire plant.**

If you have correct lubrication for your cylinders, but not for your shaftings, you are only "half insured" against preventable friction—and expensive power loss.

If your turbines are correctly lubricated and other bearings incorrectly lubricated, you are suffering a serious "partial loss" of productive power—and production.

The reduction in the gold premium demands that working costs and losses shall be reduced in every direction.

Only by correct lubrication throughout your plant can you insure yourself against—

—loss of Fuel: correctly-lubricated machinery requires less fuel.

—loss of Power: preventable friction slows down machinery and invites costly repairs.

—loss of Production: the machine that slows down, slows down your output.

—less of Profit: after all, this is the important net loss.

The premium you pay for correct lubrication may be a few pence more per gallon of oil. This few pence a gallon represents not added expense but a marked saving in expense. It protects your machinery, while it speeds your output. Generally it reduces actual oil consumption.

If you are interested in insuring your plant against needless power losses, production losses, and profit losses, we suggest that you get in touch with our nearest branch.

Our lubricating recommendations are based upon—

- 1.—Experience gained through more than 50 years in manufacturing lubricating oils of highest quality.
- 2.—Our engineers' close contact with the efficient operation of all types of running equipment throughout the world.

Stocks are carried in principal towns throughout the country.



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LIMITED.**

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East London. Port Elizabeth. Mossel Bay. Bloemfontein.
Kimberley. Lourenco Marques.

New Era Consolidated, Ltd.

(Incorporated in the Transvaal.)

DECLARATION OF DIVIDEND No. 13.

NOTICE IS HEREBY GIVEN that a Dividend of Ten per centum (10%), equal to 6d. per share, has been declared by the Board of Directors for the year ending 31st December, 1921, which will be distributed free of Union Dividend Tax.

The Dividend will be payable on a date to be hereafter notified, to all Shareholders registered in the Books of the Company at the close of business on the 31st December, 1921.

The Transfer Registers of the Company will be closed from the 1st to the 7th January, 1922, both days inclusive.

Dividend Warrants will be issued to South African Registered Shareholders from the Head Office, Johannesburg, and to European Shareholders from the London Office, Primer's Hall, Austin Friars, London, E.C.2.

By Order of the Board,

THE CONSOLIDATED MINES SELECTION
COMPANY, LIMITED (England).

Per J. H. GRATTON.

Head Office: Second Floor, The Corner House,
Johannesburg.

15th December, 1921.

Postal Address: P.O. Box 1128.

Geduld Proprietary Mines,

LIMITED.

(Registered under the Limited Liability Laws of the Transvaal.)

DECLARATION OF DIVIDEND No. 14.

NOTICE IS HEREBY GIVEN that Dividend No. 14, at the rate of Ten per centum (2s. per share), has this day been declared, payable to Shareholders registered at the close of business on Tuesday, 31st January, 1922, to holders of Coupon No. 11 attached to Share Warrants to Bearer, and to persons entitled to new shares in exchange for Option Certificates WHICH MUST BE SURRENDERED ON OR BEFORE THE 31st INSTANT. Dividend Warrants will be posted to Shareholders in South Africa as early as possible after receipt of final returns from the London Office.

The Transfer Books and Register of Members will be closed from the 16th to the 31st January, 1922, both days inclusive.

By Order of the Board,

UNION CORPORATION, LIMITED,

Secretaries.

per J. McFADYEN

Head Office:
94, Main Street (P.O. Box 1125),
Johannesburg.

9th December, 1921.

THE NATAL NAVIGATION COLLIERIES AND ESTATE COMPANY, LIMITED.

NOTICE OF DIVIDEND (No. 38).

SHAREHOLDERS ARE HEREBY NOTIFIED that the Directors have declared a Dividend of Five per cent. (1s. per share), plus a bonus of Two and a half per cent. (6d. per share), making a total of Seven and a half per cent., for the half year ending 31st December, 1921, payable to all shareholders registered as such in the Company's Books on the 31st December, 1921.

Dividend Warrants will be issued as soon as possible after receipt of returns from the London Office.

The Transfer Books of the Company will be closed from the 2nd January to 9th January, 1922, both days inclusive.

By Order of the Board,

J. T. JONES, Secretary.

28, Natal Bank Chambers,
Durban, 7th December, 1921.

The Modderfontein Deep Levels

LIMITED.

(Registered under the Limited Liability Laws of the Transvaal.)

DECLARATION OF DIVIDEND No. 14.

NOTICE IS HEREBY GIVEN that Dividend No. 14 at the rate of Eighty-five per centum (1s. 3d. per share) has this day been declared, payable to Shareholders registered at the close of business on Saturday, 31st December, 1921. Dividend Warrants will be posted to Shareholders in South Africa as early as circumstances permit, after receipt of final Returns from the London Office.

The Transfer Books and Register of Members will be closed from the 2nd to the 16th January, 1922, both days inclusive.

By Order of the Board,

UNION CORPORATION, LIMITED.

Secretaries.

per J. McFADYEN.

Head Office:
94, Main Street (P.O. Box 1125),
Johannesburg,

9th December, 1921.

How to Expand our Coal Trade.

See Article in this Issue.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

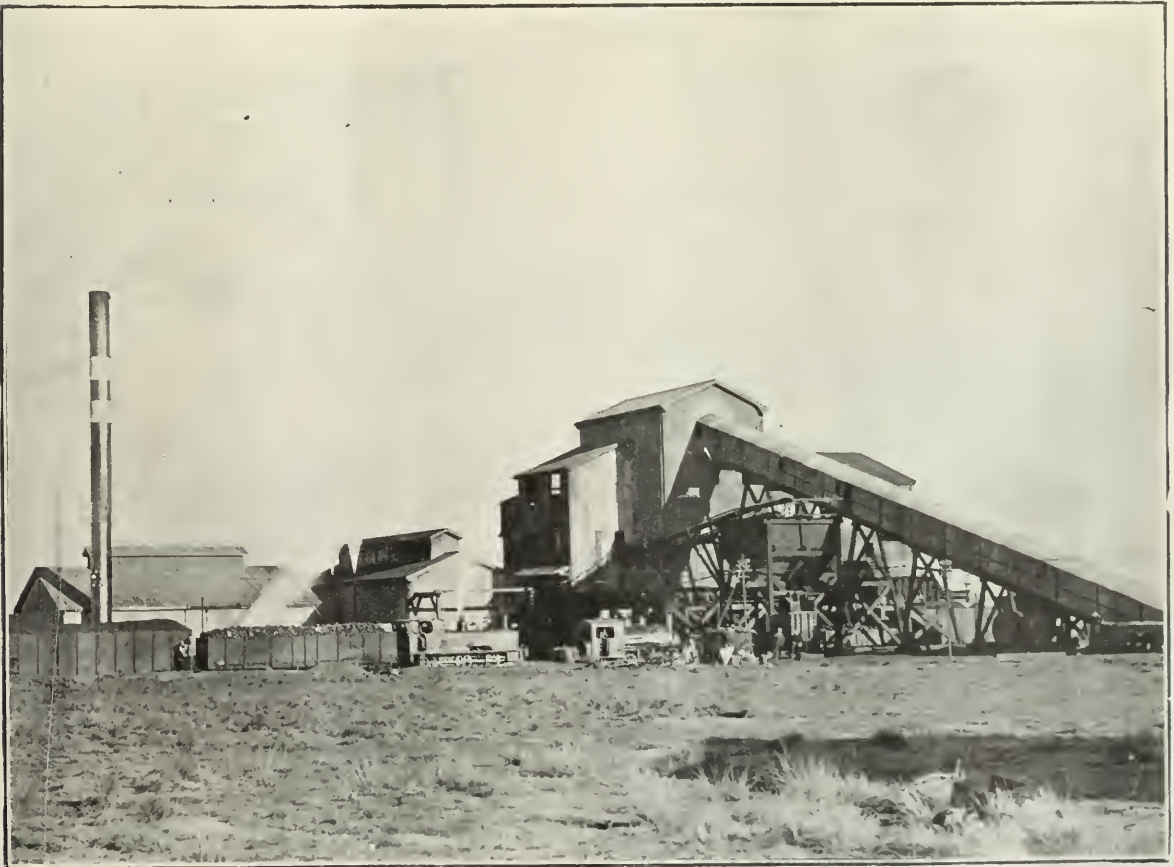
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, DECEMBER 24, 1921.

No. 1578

Will there be a Coal Strike?



Our Frontispiece this week depicts a scene at one of the T. and D.B. Collieries in the Witbank District. The T. and D.B. is one of the most successful and well managed coal mining concerns in the country and its affairs and those of another large and important colliery enterprise—the S.A. Coal Estates—are dealt with in a leading article appearing in this issue, which reviews the position of the coal trade generally. Interest in the collieries of the Union is intensified at the moment by the prospect of a coal strike. The ballot of the colliery employees on the proposed reduction of wages has resulted in an overwhelming majority against acceptance, and a further conference was held yesterday afternoon to consider the serious position that has arisen.

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& CO., LIMITED

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Lattice Poles.

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Insulators.

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SHIPS, MINES, POWER STATIONS.

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P.O. Box 239 Cape Town,

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9-10, Cotts Buildings, Rissik and Fox Sts.

JOHANNESBURG.

P.O. Box 7404 JOHANNESBURG.

Telephone 408 Central.

Telegrams: "SIEMENS"

THE S. A. COAL ESTATES MEETING.

MR. JEPPE THROWS OUT A VALUABLE SUGGESTION.—THE COMPANY'S PITS; POSITION AND PROSPECTS—LARGE OUTPUT CAPACITY.

At the meeting of the S.A. Coal Estates (Witbank), Ltd., held in Johannesburg the other day, Mr. Julius Jeppe, who presided, made a lengthy and effective speech, in which he reviewed the present position and prospects not only of this company, but of the South African coal trade generally. In the course of his remarks, Mr. Jeppe stated that he would welcome some understanding with the Railway Administration which would in some way provide an automatic rise or fall of rates of carriage according to the condition of the market for bunker and export coal.

It seems to us that the point made by Mr. Jeppe in this respect is worthy of mature consideration by the Government, the Railways, the shipping interests, and the coal owners.

Our overseas coal trade is conditioned by many intricate and fluctuating factors wrapped up in the general outlook for world commerce. What is wanted is a close co-operation between producers, transporters and consumers, in other words, as between the collieries, the railways and the ships which purchase our coal. And this co-operation should be capable of the very finest adjustment, and, moreover, an adjustment which shall synchronise with fluctuating conditions. It may be that the coal trade of this country would function more successfully and would respond more readily to the incidence of present and future demand if the Government created an establishment or a Commissioner specially to watch and regulate this aspect of our coal trade.

We deal with this matter more fully in a leading article in this issue. This week, too, we reproduce Mr. Jeppe's speech in full, and hereunder we give some extracts from his statement in regard to the position at the mines.

Speaking at the S.A. Coal Estates meeting, Mr. Jeppe, in the course of his remarks, stated: At the Bailey pit the whole of the shaft sinking and the machinery, plant and equipment is now, after passing through a troubled area, proceeding normally and satisfactorily, the quality of the coal being excellent. The present output from the pit is about 15,000 tons a month, which can be increased to 40,000 tons, the plant being designed for that quantity, but in view of the restricted market at present, and it being naturally more economical to produce from two pits rather than three, it is intended to haul our allotment as soon as possible entirely from the Landau and Navigation pits, leaving the Bailey pit as a stand-by, and to meet any expansion in the demand which may occur. In pursuance of this policy, we have recently only been working the morning shift at the Bailey pit.

At the Navigation pit since the close of the period under review the shaft-sinking machinery plant and equipment has also been practically completed, and in a short time we will be able to haul sufficient coal from this pit and the Landau to complete our monthly allotment. The development in this pit is well advanced, and the quality of the coal is excellent, averaging, as it does, about 13 calorific value. During the sinking of the main shaft for this pit four seams of coal were passed through, three of them being of good thickness and quality, the other seam being of fair quality and promising to be a valuable asset later on, though it will be very many years before this seam will be called upon for production. Two of the four seams of coal are within 7 feet of each other, the lower being 6 feet wide and the upper 18 to 20 feet, of which the bottom 12 feet will be worked; the quality of both seams is the best, and it is intended to work these seams together, thus reducing costs.

There is nothing of special importance to remark about the Landau pit; it is in a perfectly satisfactory condition, producing coal of first-class quality, the machinery and plant is in good condition, and the general manager, by certain adjustments of the working conditions, has increased its capacity to more than it has ever produced before—namely, to about 43,000 tons per month.

The total output of saleable coal from the three pits for the month of November was 62,053 tons, but we are in a position to easily supply up to 120,000 tons a month from the present three pits at short notice and on the single shift basis.



The Landau Colliery of the S.A. Coal Estates: General View of Plant from West Side.

On your portion of the farm Volvekrans, 2,120 acres in extent, a series of boreholes was sunk with the object of proving the extent and value of the coal, with the result that in the main seam the lower nine or ten feet gave 12.84 calorific, and the upper seam, about 8 feet thick, averaged 12.5 calorific.

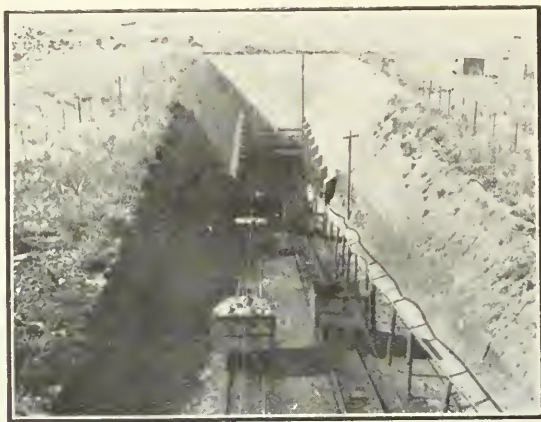
I may here state that with the exception of the area on Bosmanspruit, the whole of your properties are adjacent to each other, and the fact that Volvekrans is at the farthest end of your holdings, a considerable distance from your present pits, augurs well for the values in the intermediate area.

In addition to the present Landau pit situate on the farm Klipfontein, you have another area on the same farm sufficiently large to provide an entirely new pit. The area of coal-bearing ground in the new district is estimated at about 2,200 acres, containing a seam the lower 10 feet of which has been proved by numerous boreholes to contain coal possessing a calorific value between 12.5 and 13. The

greater portion of this area can be attacked by adits, while the rest would require shallow shafts, so that it could be worked at a low level of costs.

The total area of your holdings, freehold and leasehold, is just under 46,000 acres, of which about 38,000 acres may be taken as coal-bearing, and the coal which has been proved is of excellent quality. To estimate the life of your properties as a coal mining proposition is a difficult matter. There are several seams of coal on your properties, but for the purpose of considering your life only the two seams at present being worked will be taken into account. On this basis we find that in the areas commanded by your present pits it is estimated there are about 4,800 acres of coal-bearing ground of first-class quality, totalling about 70 million tons of marketable coal. This alone even at the maximum rate of production of 120,000 tons a month, will last for nearly 50 years.

Then, again, there is the area on Klipfontein adjoining the present Landau Colliery of 2,200 acres, and the other on Wolvekrans of 2,100 acres, both of which I have just referred to, in which the total can be put at about 52 million tons.



Landau Colliery: Trucks coming out of the Incline Shaft.

To this must be added your other properties which either from a certain amount of boring or from their situation in relation to proved areas may be considered as partially proved; these areas total about 21,500 acres, and on a conservative basis may be estimated to produce 164 million tons.

Lastly, there is the farm Bosmanspruit, in extent 7,059 acres, under practically the whole of which it is known that the coal measures extend, but in regard to which in the absence of any borings thereon or in the neighbourhood no estimate of tonnage can be made.

The total estimated tonnage contained in the company's properties, excluding Bosmanspruit, may be put at 280 to 300 million tons, and this is without taking into account the other seams which run through your property, and which will some day be of commercial value.

Van Ryn.

The chairman, at a meeting of the Van Ryn Gold Mines in London during the week, stated that as a set-off to the increased value of gold produced, the working costs were £92,866 more than last year, but the net result was satisfactory, inasmuch as the profits from mining were £112,855, an increase of £8,051 as compared with last year. The chairman declared the crux of the whole position lay in a gradual reduction of working costs, approximately in proportion to the decrease in the gold premium, but he was certain progress would be painfully slow. An interim dividend was declared of 1s., free of income tax.

Letters to the Editor.

THE FERREIRA DISASTER.

A Tribute from Kimberley.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—I have just received a copy of your esteemed journal (December 17th), and cannot express to you the feeling of national pride with which you must inspire not only myself, but the whole nation, in the few words which preface your account of the Ferreira Deep Disaster. Such men are real noblemen and the salt of the earth. The deep grief we all feel here and the heartfelt sympathy we have with those bereaved, you will, I know, understand.—Yours faithfully,

A. W. WEATHERBY.

Federal Hotel, Durban.

THE GENESIS OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal*.

A correspondent writes:—

Carbon takes a peculiar place among the elements, not only because it forms the most important bricks in the edifice of animated nature, but nature in a gaseous state, like its relative, nitrogen. The cause of its abnormal appearance lies, perhaps, in the complicated construction of its molecule. Since the atoms of most of the other elements form extremely simple structural connections (the atoms of most gases form pairs in each molecule, the atoms of the other non-metals do not exceed eight to each molecule), the molecule of carbon possesses probably thousands of atoms, and resembles, in form, the cell of a bee's hive, being hexagonal. During synthetic construction more and more sides continually form and unite, under high temperatures, comb-like. Even during analysis and separation of molecules, one gets chemical unions, the bodies of which suggest the same inference. Look at the honey-stone, mellite, a yellow mineral existing in lignite measures, which was formed through gradual oxidation of the coal. Its chemical constitution suggests plainly the former cellular construction. This complicated structure is perhaps the cause why carbon is insoluble in common solvents, and the reason why it yielded later than other elements to liquefaction. Is the diamond related to the mellite?

ANSWERS TO CORRESPONDENTS.

"Z" (Federal Hotel Durban).—The stock first mentioned is purely speculative, but we regard it as an attractive gamble. Genuine indications have, we believe, been discovered. With regard to the second-named stock, we do not regard this with favour. It seems to us that a reconstruction of this company on terms not favourable to present shareholders is almost inevitable.

A Nigél Reconstruction?

A cryptic cable message from London states: "A poll of shareholders of the Nigél Gold Mining Company resulted in the acceptance of the scheme for the conversion of shares." We have had no public intimation on the subject from Maritzburg, but doubtless it will arrive in due course.

Mr. J. L. Siddall, Secretary of the Central Mining and Investment Corporation in London, who has been on a lengthy visit to South Africa, leaves on his return next week.

THE FERREIRA DISASTER.

RECOVERY OF BODIES—THE COUNTRY DEEPLY STIRRED—H.R.H.'s INTEREST AND SYMPATHY.

Just before going to press last week the curtain was rung down on the disaster at the Ferreira Deep by the death of Mr. Johnston, the last survivor of the catastrophe, after having been entombed in the mine for 90 hours. Since then the work of extricating the bodies has continued, but naturally enough, after there was no possibility of saving life, the dangerous work has proceeded with more caution.

It is impossible in a matter of this kind to bestow a full measure of praise for the boundless courage and devotion exhibited by the rescue gangs. In our last issue we stated the names of some of the leaders in the gallant but unsuccessful fight to save the lives of the entombed men....Many others—too numerous to mention—and natives as well as white men, worked splendidly day and night and at great personal risk. It is impossible to give the names of all these underground heroes, but we would here repeat what we briefly stated in our last issue, that the Rand is proud of these Ferreira miners, and mourns with the bereaved families the loss of life that this terrible disaster has entailed.

The bodies of two of the unfortunate mine-workers who met their death in the Ferreira Deep disaster were recovered on Sunday.

That of Christopher Jacobus C. van Tonder (reclaimer), who was killed outright when the collapse of rock occurred, was brought to the surface about daylight.



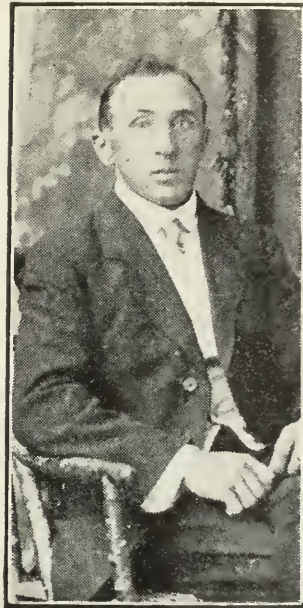
Mr. Ivor Rees, who superintended rescue operations at the Ferreira, with some of his men, who created a shaft sinking record at the Crown Mines.

The body of Mr. Johnston was extricated on Monday

The remains of Mr. Parau have also been recovered, and were interred on Tuesday. At the time of going to press Mr. Seeligsohn's body had not been found.

The body of Arthur Clark Logan (shaft timberman) was reached before noon. The remains were conveyed to the Government mortuary, and were interred on Monday.

The tragic story of Logan's sufferings, pinned down in the rock barrier, has been told. With Johnston (foreman timberman) he was found alive when the rescue party reached the position and were able to communicate. He was the first to die, after 77 hours' suffering, and Johnston lasted fifteen hours longer. It was impossible with the most heroic efforts to extricate either alive.



The late Mr. Johnston, a victim of the Ferreira Disaster.

Logan was always nearest the rescue parties, but was wedged down more badly than his comrade, and was pinned face downwards.

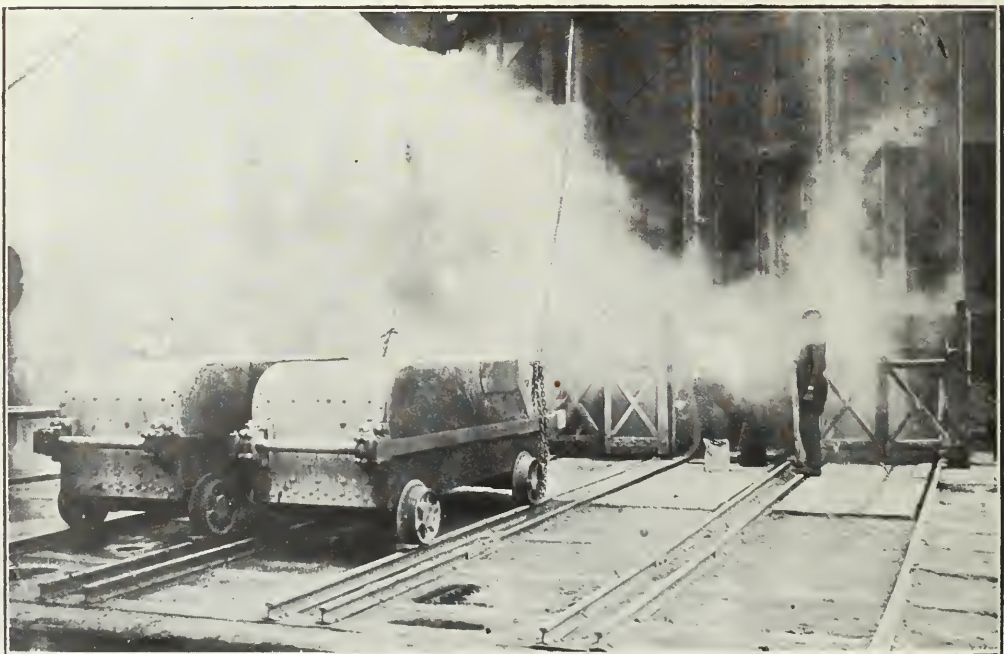
The workers below were at the beginning of the week still struggling with the position, and shifts were continuously going on as before, the unceasing objective being first to recover the remaining bodies of the five Europeans killed. Operations had perforce to be cautiously undertaken, but the utmost expedition was used under the dangerous circumstances.

The heart of the public was stirred profoundly by the tragedy at the Ferreira Deep, and numerous messages of sympathy and condolence have been received by the management of the mine. H.R.H. the Governor-General, in a letter to the mine, expressed his deep sorrow at the occurrence, and suggested that the management should transmit to the Government the names of men who heroically toiled in the effort to extricate the victims, in order that these gallant miners should have an opportunity of being recommended for the King Edward Medal—the miners' V.C. In expressing his sympathy with the relatives of the victims,

The Ferreira Deep Disaster.



An Anxious Crowd at the No. 2 Shaft Head.



Smoke Issuing from the Burning Shaft.

H.R.H. sent a donation of £10 towards any relief fund that might be initiated. "The Star" inaugurated a relief fund.

The Prime Minister, General Smuts, telegraphed, "Will you convey to those who have been bereaved through the recent disaster at the Ferreira Deep the most sincere sympathy of myself and colleagues. We greatly regret their sad loss. I wish to congratulate all who were concerned in the heroic attempts at rescue and deplore that their efforts were unavailing."

The Private Secretary to the Minister of Mines and Industries wired: "The Minister of Mines and Industries desires to express his very great regret at hearing of the serious occurrence at the Ferreira Deep, and his deepest sympathy with the relatives of the men who met their death in the heroic work of fighting the fire in the mine."

From the Mayor of Germiston the following wire was received: "The disaster has cast a gloom over Germiston. Kindly express heartfelt sympathy with the widows and relatives."

Similar expressions have been received from the Mine Managers' Association and many other public bodies and municipalities.



Rescue Party Preparing to Descend.

The Mayor of Krugersdorp wired: "On behalf of the citizens of Krugersdorp and Randfontein, I wish to tender you their very deepest sympathy in the awful tragedy which has swept five valuable lives away. We watched with pride and heartfelt sympathy the very gallant efforts of the employees on the property made to rescue life even at great risk to their own."

Mine Officials' Association.

The Underground Officials' Association wrote expressing sympathy with the management, officials and men of the mine, and conveyed to the relatives of the dead heroes the deep sorrow of the members in their bereavement, and recorded the pride of the members of the association in the courage and devotion of all when the call of danger came. "We share the disappointment of those who laboured so strenuously that their efforts were in vain," the letter added.

At the annual general meeting of the Mine Surface Officials' Association of South Africa, held in the Technical and Scientific Club, Fox Street, Johannesburg, on Saturday evening, on the motion of Mr. Wunch, seconded by Mr. J. H. Johnson, the meeting expressed its sympathy with those who suffered in the recent disaster at the Ferreira Deep.

New Views on Mineral Concentration.

VALUABLE PAPER BY MR. MORDEY.

A feature of the ordinary general meeting of the South African Institute of Electrical Engineers held last week was the paper on "Mineral Concentration by Alternating Currents," read by Mr. W. M. Mordey.

Mr. Mordey broke new ground in his paper, and pointed out that he was only dealing with the preliminary study of certain effects, and not with developed practical processes. The concentration of minerals by taking advantage of their magnetic properties is a subject well known to the student of ore dressing. Minerals have been arranged in groups of decreasing magnetic susceptibility known as strongly magnetic, feebly magnetic, non-magnetic, and diamagnetic. The last group is exceedingly small and unimportant, and so far no practical attempts have been made to utilise that property of magnetic repulsion in mineral concentration. However, there are several machines which are capable of concentrating minerals falling under the first three groups, in successful operation.

Mr. Mordey's work has opened up an entirely new phase of concentration in a magnetic field. He explained how it was possible, even in the case of highly magnetic materials, as well as with some feebly magnetic materials, which had hitherto resisted treatment by ordinary methods, to obtain a concentrating effect not by attraction but by repulsion. The repulsion was not what had hitherto been known as a "diamagnetic effect," which was a feeble repulsion that a magnet exerted on certain materials which were negatively magnetic, but a new effect which he termed "Hysteretic Repulsion." The effect was due to a utilisation of the property of magnetic hysteresis which was possessed in various degrees by magnetic substances. Mr. Mordey described his experiments, showing how, by making use of this effect, it was possible to cause even strongly magnetic materials to retreat from a strong magnetic field as if they were not magnetic. This was the result of placing these materials in the magnetic field set up by multiphase alternating current magnets. He explained how this principle might possibly be applied to practical purposes by causing such a field to act on a stream of pulp or slime running down a channel or launder. There were no moving parts at all in this apparatus except the stream itself, which, as a result of the invisible magnetic and brushing action, arrived at the end of the channel with the concentrates on the one side and the tailings on the other side of the stream.

MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.

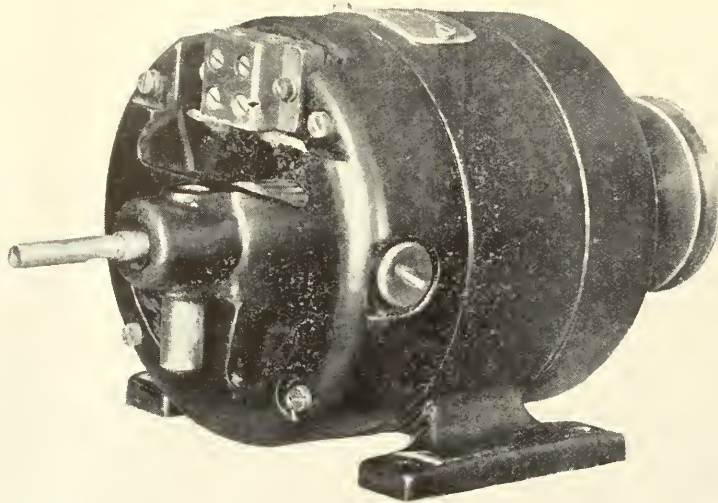
MANAGERS' EXAM., September, 1921

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Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

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THE MINING CONFERENCE.

MINES' POSITION—LOWER COST FACTOR—THE CHAMBER'S THREE PROPOSITIONS—LABOUR'S REPLY.

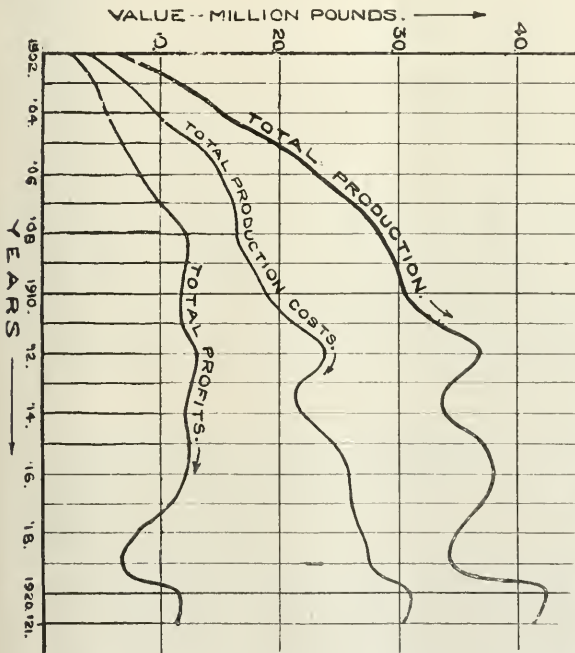
In the recent conference between the Prime Minister, the Chamber of Mines and the S.A. Industrial Federation, the Prime Minister only dealt with the alterations to the mining regulations, and suggested that other proposals should be discussed by the Chamber and the Unions concerned in the mining industry. The suggestion led up to the conference held on Thursday, the 15th, at the New Law Courts.

There were present Mr. H. O. Buckle (in the chair), Sir Evelyn A. Wallers, Sir William Dalrymple, Messrs. J. G. Lawn, P. M. Anderson, C. E. Farquharson, S. Evans, F. R. Lynch, D. Christopherson, A. French, H. R. Hill, F. G. A. Roberts, E. L. R. Kelsey, and J. Boyd, representing the Chamber of Mines.

Representing the South African Industrial Federation there were Messrs. J. Thompson (president), J. Geddes (acting secretary), W. Price, Geo. Brown, J. H. Hume, D. McIntosh, J. Robertson, E. S. Hendrikz, W. H. Smith, W. Butler, J. Hobson, J. G. van Gass, J. McDowall, M. Dunne, G. W. Johnston, G. W. Greener, A. Leask, H. Day, J. Lewis, J. Garbutt, E. R. Hippert, B. Davies, J. Pickavance, R. Temant, R. Oelfse, J. Naysmith, J. George and H. Silburn.

business, is carried on for profit, and if instead of making profit it makes losses, it must close. The mines which would close when gold returns to normal employ more than half the European employees of the mining industry, so that the gravity of the position cannot be exaggerated. There is only one alternative, and that is to change the present losses into profits by lowering the cost of production. Another aspect well worthy of consideration is the following: Gold mining is a very speculative business and not likely to attract capital unless the profits are very substantial—much larger than those obtainable from regular investments. In the development of new fields no one will put money into the scheme on the faith of a fluctuating premium. The mines must be able to produce gold at much less than 85s. per ounce in order to set the industry on a firm footing.

The three propositions made by the Chamber with the hope of bringing down working costs were sent to the Federation by letter, and are as follows: The first point brought forward was the alteration of the underground contract system. Under the present system the contractors' wages average £66 per month, as compared to £38 for the day's pay men who are doing practically the same work. The mines propose to substitute some form of "no cost" contract; that is to say, a contract where payment is made on fathomage (or footage), but where the cost of native labour and of stores is not included, though probably with a bonus for economy in those respects. The second point brought forward was the *status quo* agreement. The workers were asked to terminate that agreement. There are con-



This "graph" shows the trend of production, working costs and profits during recent years. The 1921 results are based on those secured for the first 10 months of the year.

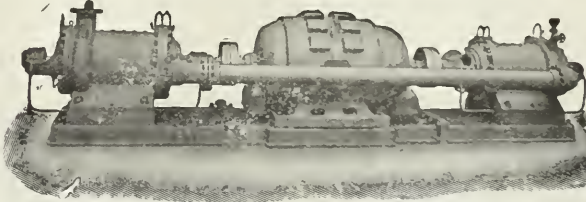
Mr. Buckle addressed the gathering, and briefly explained the gravity of the present situation. He pointed out that the price of gold in London on Tuesday was 98s. 2d. per ounce, and further that before it reaches the mines here, realisation charges and exchange have to be deducted, leaving about 96s. as the price per ounce received by the mines. This meant that the following mines would be working at a loss:—Durban Deep, E.R.P.M., Geldenhuis Deep, Luipaards Vlei, New Goch, Robinson, Roodepoort United and Wolhuter.

A return of the price to 85s. per ounce would mean that under present working conditions about 15 mines only would be working at a profit. Gold mining, as well as any other

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siderable classes of unskilled or semi-skilled work which can be done by natives, and it is uneconomical to employ white men on such work. This does not involve any threat to the position of skilled craftsmen or efficient miners, but there is a considerable amount of European labour which is inefficient or redundant, and the mines cannot afford to carry that labour any longer.

The third point brought forward was the question of organisation. If those mines on the margin of unpayability are to pull through, the managements must have a free hand to utilise their labour complement to the best advantage. "The recognition of the principle of 'one man one job,'" said Mr. Buckle, "which you have so frequently pressed for, is impossible now. I cannot even try to indicate in what particular directions other reorganisations will work out; that must be left to individual mines. In fact, I may say that you will observe that, while point No. 2 is a definite one (we want you to definitely abandon the *status quo* agreement), the first and third points are a suggestion for an attitude of mind rather than for any particular agreement. The whole principle is that of 'no cost' I have already indicated. Similarly on the question of reorganisation: obviously the alterations will have to be suited to the circumstances of each particular mine. But what we do want to indicate is that, if these mines are to carry on, it can only be by the unions co-operating with the alterations the managements desire to make and not by obstructing them. In a great many cases I am sure the men themselves on the mines concerned will be prepared to stretch a good many points sooner than see the mine closed, and what we want is that the unions should encourage that attitude and not oppose it."

Mr. Buckle further pointed out that, firstly, all the mines would not be saved by these steps being taken, but some effort had to be made. Secondly, the figures which were given in the letter to the Federation of possible retrenchments were, of course, based on the assumption, or rather the hope, that all the existing mines could carry on. If they cannot, of course when any mine closes the whole of its employees go and have to be added to the number stated, and, thirdly, when a mine is absolutely on the edge of extinction, it is not possible to predict what may have

to be done. The management of such a mine will have, in conjunction with the men, simply to see what can be done to make it possible to carry on at all, and restrictions of every kind will have to go. This concluded a rough outline of the Chamber's proposals.

Mr. Hendrikz, on behalf of the Miners' Union, replied as follows: With reference to point 1, this was a matter for the rank and file, and they would be the deciding factor. In reference to point 2 he had no hesitation in saying that they could not agree to it. No. 3 was also a matter for the rank and file. He also stated that he had been instructed by his executive to open no discussion there. They wanted the Chamber of Mines to give full details of the three proposals.

Sir Evelyn Wallers said that the individual mines had to deal with matters of detail. However, the workmen's union further pressed for details, to which the chairman replied that it was not possible to supply more information. He had explained the difficulties, and he would again emphasise that in proposals Nos. 1 and 3 the Chamber was not asking for a definite pledge. After some further discussion the meeting was adjourned.

A further meeting was held on Tuesday, when the delegates sought to arrive at a definition of the word "official."

The Pretoria Mint.

Though it is contended in some quarters that the Pretoria Mint is now unnecessary, in view of the continued withdrawal of gold from circulation, good progress continues to be made with the construction work. It is pointed out that though gold coins may not be required for a year or more, the Mint will find plenty of work in coining silver. As the obnoxious ten shilling notes are soon to be withdrawn from circulation and replaced by silver, coinage of extra quantities of the latter will be required. Of course, the Mint should have been located beside the Rand Refinery at Germiston, and extra expenditure will be involved in transporting the refined gold and silver to Pretoria. The Government, however, is now too far committed in the matter to alter its plans, and the new Mint will soon be added to the important public institutions of Pretoria.

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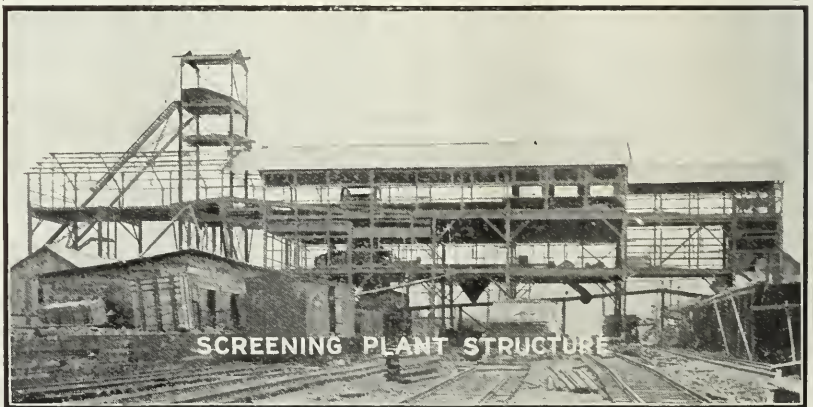
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The Status of the Reduction Officer

By a Metallurgical Correspondent.

The position of the Reduction Officer is being encroached upon by the Mechanical Engineer to such an extent that it looks as if the Reduction Works Superintendent will become an office of the past. It has been advocated not once, but on several occasions, before the South African Association of Engineers, that all mechanical operations, both on the surface and in the mine, should be under the control of the Mechanical Engineer. In a measure this has already been accomplished, because in some cases we find all mechanical operations in the mine under the control of the Underground Engineer, who has his own staff. From all accounts this system is not a success. Here is an illustration. A breakdown occurs in the air supply at so and so level. The Mine Captain, failing to find the Underground Engineer, tells a fitter of the mishap and that operations on that level are suspended for want of air. Mr. Fitter informs the Mine Captain that he was told to finish so and so job, and the level remains held up. As the Mine Captain's duties are to win ore, all mechanical operations are subordinate to that end, and the Underground Engineer controlling the maintenance of ordinary wear and tear simply creates a position which may or may not work harmoniously with mining operations.

On some of the large mills the maintenance of the Butter's Filter Press is under the Mine Engineer, who appoints his own fitter. There is also the cyanide fitter, tube mill fitter, battery fitter and crusher fitter under the Engineer. From our experience and investigation of the system we are informed that it is not by any means an improvement over the older system of one superintendent. The old saying that two heads are better than one, though undoubtedly correct, does not work unless a friendly co-

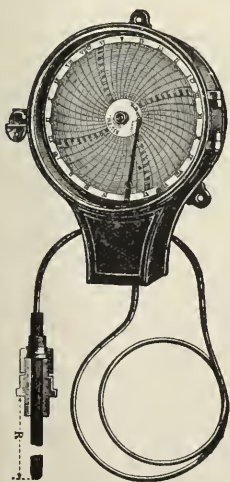
operation exists. This is where the system fails, and the Reduction Officer is just in the position of the Mine Captain where operations are held up and he has no power to give an order. A diploma in the metallurgy of gold and 15 years' experience in reduction works practice ought to be sufficient for the Reduction Officer to control his own department. The Mechanical Engineer, however, through close organisation, is forging ahead, and with the possibility of the elimination of amalgamation plates for the recovery of gold and the abandonment of sand tanks, the Mechanical Engineer is striving to control this branch of engineering with a chemist to assist him in the cyanide treatment of the ore. Even the Consulting Metallurgists of the different groups are subordinate to the Mechanical Engineer, and what is wrong with the majority of the mills is that the Chief Metallurgist did not have enough of his own way in the design, and in that connection we might remind the Chamber of Mines that the majority of serious errors in reduction works design was not the work of the Metallurgist.

The Government, in being confronted with irregularities in reduction works practice or design in the past, did not hesitate to call in a metallurgist to make a report.

We admit that the qualification of the Mechanical Engineer is a high one, and with a period of underground service we see no reason why the laws should not be altered to enable the Mechanical Engineer to obtain a mine manager's certificate. We must not overlook the fact, however, that the Witwatersrand is a field for specialisation, and the mere holding of a mechanical engineer's certificate is no qualification to make a report either upon gas engines or cyanide works without the necessary experience.

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The Week in the Sharemarket.

PRACTICALLY UNCHANGED DIVIDENDS SATISFACTORY POSITION POSSIBLY "WORSE BEFORE IT IS BETTER."

Prices at time of writing are practically unchanged when compared with those of last week, and business remains stagnant. In view of the approaching Christmas holidays—the market will be closed from Friday afternoon till Wednesday morning—there is little disposition to do business, and some bear covering on Friday is the most that can be expected. The dividend declarations are generally regarded as satisfactory, but they are offset by the falling price of gold—97s. 8d. at time of writing—and the attitude of Labour towards reduction of working costs. If the Labour people refuse to co-operate as desired in the interest of the majority, doubtless mines will have to close down, and this may convince them in regard to the sincerity of the repeated warnings they have received. One market authority opines that the position may be "worse before it is better," and what with threats of colliery strikes and the Rand miners' attitude towards essential economies, the New Year may usher in a period of some anxiety and unrest. However, the ultimate result cannot fail to make for good. Gedulds, on the news of a strike of reef going two ounces over 28 inches in the horizon of the No. 7 shaft, firmed up a little, and people say the mine may yet prove in its lower levels "the jewel-box of the Rand." Transvaal Silvers were also a firm feature on the news that the treatment plant was running most satisfactorily, and Pretoria Silvers firmed up in sympathy. Diamonds, Tins and Colliery shares remain becalmed awaiting a favourable wind. And on this peaceful note we may close, wishing the readers of this column a cheerful and contented Christmas.

	Sat. 17th.	Mon. 19th.	Tues. 20th.	Wed. 21st.
Anglo-American Corporation	—	16 9	16 7½	16 3
Apex Mines	7 6†	7 6†	7 6†	—
Bantjes Consolidated	5 9*	5 9*	5 9*	5 9*
Brakpan Mines	46 0*	—	—	47 0*
Bushveld Tins	0 7*	0 7*	0 7*	0 7*
City and Suburbans	2 3*	2 4*	2 4*	2 4*
City Deeps	44 0*	44 6*	45 6†	44 0*
Consolidated Diamonds	11 3	11 3*	11 6*	11 6*
Consolidated Langlaagtes	—	14 6*	14 3*	—
Consolidated Main Reefs	9 0*	9 0*	8 3*	8 6*
Consolidated Mines Selections	10 6*	10 0*	—	10 0*
Coronation Collieries	38 0†	38 0†	—	—
Coronation Freeholds	—	0 7*	—	0 6*
Coronation Syndicates	5 0*	4 6*	1 6*	4 9*
Crown Diamonds	3 0*	3 1*	3 1*	3 1*
Daggafontein Mines	2 6*	2 3*	2 0*	2 0*
East Rand Coals	1 6	1 6*	1 6*	1 6*
East Rand Deeps	0 6*	—	—	0 8†
East Rand Minings	—	—	7 0	—
East Rand Debutures	£85*	£85*	£85*	£85*
Frank Smith Diamonds	3 0	3 0*	2 10*	2 9*
Geduld Proprietary	44 0*	45 9	44 6	044 0*
Glynn's Lydenburgs	7 0*	7 0*	—	7 0*
Government Areas	81 0b	81 0*	80 6	80 9
Hume Pipes	—	12 6*	—	13 0*
Knight Centrals	4 3*	4 4*	4 6*	4 9*
Lace Proprietary	—	—	5 9*	6 6†
Leeuwpoort Tins	—	—	7 9*	7 9*
Luijpaardsvlei Estates	—	1 0*	2 0†	2 0†
Lydenburg Farms	—	4 4*	4 5*	4 4*
Meyer and Charltons	—	75 0†	—	—
Middelvlei Estates	—	1 0*	1 0*	1 0*
Modder B.'s	26 6	26 3*	26 0	26 0*
Modder Deeps	42 6*	42 6	42 6	42 3*
Modder Easts	6 6*	6 6*	6 0*	6 0*
National Banks	217 6†	217 6*	217 6*	220 0†
New Era Consolidated	7 5†	7 6†	6 9*	—
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins	5 1*	5 3*	5 3*	5 0*

	Sat. 17th.	Mon. 19th.	Tues. 20th.	Wed. 21st.
New Modderfontein	70 0*	70 0a	70 3	69 9*
New State Areas	19 9*	19 6*	19 9*	19 6*
New Unifeds	5 0†	—	4 0*	5 0†
Nigels	5 0*	4 6*	4 9*	—
Nourse Mines	8 3*	8 3*	8 6*	8 3*
Pretoria Cements	42 0*	41 9*	41 0*	41 6
Princess Estates	1 0*	1 0*	1 0*	1 0*
Rand Nucleus	1 0*	1 2*	1 3†	1 0*
Rand Selection Corporations	54 0*	—	53 9*	53 6*
Randfontein Centrals	10 0†	—	—	10 0†
Randfontein Estates	13 0*	13 0*	13 0*	13 0
Roberts Victors	7 5*	7 0*	7 0*	7 0*
Rooibergs	3 4*	3 3*	3 3*	3 9*
South African Alkali	12 6*	12 0*	12 6	12 0*
South African Lands	4 1*	4 1*	4 1*	4 0*
Springs Mines	35 3	35 6*	35 3*	35 0
Sub-Nigels	10 0*	10 3*	10 6*	10 9*
Transvaal Silvers	24 0*	25 0*	27 6	25 0*
Van Ryn Deeps	68 3	68 3*	68 9†	67 6*
Village Deeps	7 3*	7 3*	8 0†	7 6*
West Springs	7 9*	7 9	7 9*	7 6*
Western Rand Estates	3 0†	3 0†	—	3 0†
Witwatersrands	—	—	—	13 0*
Wolhuters	—	2 10*	2 10*	2 9*
Zaaiplaats Tins	2 6*	2 6*	2 6*	2 6*
Union 5 per cent.	£99½*	£99½*	£99½*	£99½*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Mining Men and Matters.

Mr. F. P. Memmel, the well-known Rhodesian geologist, is on a professional visit to the territory lately known as "German East."

* * *

His many old friends on the Rand will regret to hear of the death in England of Mr. Strangman Hancock, formerly manager of the Jumpers Deep.

* * *

His many friends on the Rand will regret to hear that Sir Henry Strakosch has been laid up for some days at a local nursing home with a slight touch of pleurisy.

Mines Department Changes.

It is notified that from and after January 1, 1922, the following areas will be included in the district under the supervision of the Inspectors of Mines as follows:—(1) Inspector of Mines, Pretoria: The magisterial districts of Zoutpansberg, Pietersburg, Waterberg, Rustenburg, Pretoria except the farm Zuurfontein No. 369, Middelburg, Lydenburg, Baberton, Carolina, Ermelo, Piet Retief, Wakkerstroom, Standerton, and Bethal. (2) Inspector of Mines, Germiston: The whole of Germiston magisterial district; farm Zeurfontein No. 369, Pretoria magisterial district; the whole of Boksburg magisterial district, except the farm Witpoortje No. 12; the southern portion of Heidelberg magisterial district, bounded on the north by and including the farms Rooikraal No. 257, Prosit No. 54, Rietvlei No. 186, Eendracht No. 267, Heidelberg town lands, Poortje No. 123, Groenfontein No. 122, Frischgewaagd No. 337, Hartebeestfontein No. 193, Modderbult No. 328, Leeuwbank No. 67, Klipdrift No. 179, Wildeals Kraal No. 147, Gegund No. 109; and Cornelia Colliery, Orange Free State. (3) Inspector of Mines, Brakpan: The whole of Benoni magisterial district, farm Witpoortje No. 12, Boksburg magisterial district; the whole of Springs magisterial district; and portion of Heidelberg magisterial district not included in Section 2 of this notice. (4) Inspector of Mines, Bloemfontein: Cornelia Colliery transferred to Germiston inspectorate.

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EDITORIAL.

A MINING EPIC.

"There is a great and lofty virtue that we call courage, taking our name from the heart. It is the greatness of a great heart, the repose and confidence of a man whose soul is rested in truth and principle," wrote an Englishman of letters in bygone years.

The words "courage" and "endurance," and all the fine qualities they denote, have been much on the lips of the people of the Witwatersrand during the past few days. We have watched with anxiety, tempered by admiration, the grim battle for life that has been fought out in the bowels of the Rand, and the grief that fell upon the whole community when it was known that the rescue work had proved

unavailing has been softened by the knowledge that in these days of industrial discord and strife and bleeding the spirit of self-sacrifice is not dead on these goldfields.

It is a fine and inspiring definition of the quality of courage—that which we give at the commencement of this article. Yet heroism is such a volatile and elusive element that perhaps no mere words can define or befit it. There have been miners who have shirked the glamorous horrors of warfare just as there have been explorers who, having braved the ice-packs or the wild beasts and men of Equatoria, have, on return to civilisation, trembled before a simple audience.

And of this we are sure: that there are those who have won the Victoria Cross in cavalry charges who would have shuddered at the prospect of descending into the smoke and fire and treacherous ground at the Ferreira Deep last week.

We in no way wish to minimise the valour of those many deeds, thrice glorious, which were accomplished by soldiers and sailors in the Great War, but we do feel certain of this: that it requires a specially valorous form of courage to toil 2,000 feet in the depths of the earth in a mine that is on fire and in which many thousands of tons of rock are moving, with the object of succouring those who have been entombed. There is none of the glamour of battle in this work, and even modern warfare still has a certain measure of glamour. It is a perilous task, enacted without the saving grace of God's sunshine.

The victims of the Ferreira Deep disaster came by calamity in an endeavour to fight the flames and to rescue those who had been smitten in the first of the chapter of accidents. Their comrades, in turn, knowing the perils which beset them, slaved day and night under terrible and harrowing conditions to save the unfortunate men who were buried when the shaft station collapsed. It is regrettable that, although the rescuers were able to talk and in some way minister to two of the men, there was no survivor of this catastrophe. But whilst we grieve with the bereaved ones, we find a magnificent consolation in the fact that men, both white and black and of various nationalities, have not spared themselves in a great effort of self-sacrifice and devotion.

Miners, whether they be managers or the least remunerated of the day's pay men, all the world over have always shown a magnificent courage under the most difficult and hazardous of circumstances. In the present welter of harsh words and industrial turmoil we have perhaps come to overlook this trait in the character of those who go down into the deep in skips and cages. And we are all the more proud, therefore, of the knowledge which we have gained that this mundane Rand still has miners who possess "this great and lofty virtue that we call courage, taking our name from the heart."

THE UNION'S COAL TRADE.

Two of the principal collieries operating in the Witbank district, namely, the Transvaal and Delagoa Bay Investment Company, Ltd., and the S.A. Coal Estates have within the past few days held their meetings in Johannesburg, and some study of the chairmen's speeches at these meetings enables one fairly accurately to gauge the present state of the South African coal trade and its outlook. Both these companies are paying dividends. The Transvaal and Delagoa Bay, as we pointed out in our last issue, has been a steady and prolific distributor for the last 18 years, and the dividend of 10 per cent. paid out last June is now being supplemented by a 15 per cent. declaration, which brings its total for the year up to 25 per cent. free of Union dividend tax. The Coal Estates Company, which is an amalgamation of the old profit-earning companies, Anglo-French and Cassel, makes its initial declaration of 5 per cent., or 1s. per share.

These results have been secured by sound management rather than by any large expansion in the overseas market for South African coal, upon which the prosperity of our

collieries mainly depends. It is true that the South African coal trade has benefited by the misfortunes of the Motherland during the past year, and particularly from the protracted and calamitous coal strike in Great Britain of a few months ago. But competition is now making itself felt.

As Mr. S. C. Black remarked at the Transvaal and Delagoa Bay meeting, the outlook for the 1922 export trade at the present moment is none too favourable. The collieries are faced with competition from many quarters, but it is felt that, with lower shipping freights and sympathetic consideration on the part of the South African Railways in the matter of further reducing railway rates, both the export and bunker coal trade should not only be maintained, but may be expected to show expansion.

It is clear, too, that the coal miners must toe the line with the workers on other mining fields and bow their heads to the inevitable. The costs of working demand reduction on the coal mines just as much as they require reduction along the Reef. Our coal export trade recently has been falling off owing to the high figure of ocean freights; in fact, since the British mines are once more in vigorous and economical working there is danger of its being totally lost. And this may well have a big effect on the whole industrial aspect of the country unless something can be done to reduce the costs of production.

Obviously, if the export cannot be maintained, the relatively higher cost of a reduced production will compel the coal companies to raise their price to the South African consumer. Either there must be cheaper working or pits must be shut down; those excepted which the limited house trade requires.

The companies have proposed reductions which will still leave the coal miners higher wages than those presently earned on the gold mines; for instance, men drawing 30s. a shift are asked to come down to 25s., and those getting 26s. to 23s. 1d. The men are willing to forego only 2s. per shift, and hence the deadlock which may result in a strike.

At the S.A. Coal Estates meeting, Mr. Jeppe also ably stated the view of the collieries in regard to relations existing between the employer and the worker and made an eloquent plea for peaceful and cordial relations between both. It is clear that our collieries, like our gold mines, are facing difficult times, and if they are to weather the storm of the present depression it is essential that there shall be a whole-hearted effort on the part of all concerned—Government, Railways and employees, as well as the collieries themselves—to retain the present quota of the export and bunkering trades and to keep the coal trade in such a state of efficiency that when any expansion of the market offers our collieries shall be able to take full advantage of the opportunities that may offer.

And in this connection Mr. Jeppe, at the Coal Estates meeting, threw out a very valuable suggestion when he said that he would welcome some understanding with the Railway Administration which would in some way provide an automatic rise or fall of rates of carriage according to the condition of the market for bunker and export coal. Mr. Jeppe went on to explain the importance of such an arrangement. He said: "For instance, it often happens that when tendering for large contracts it is found impossible to quote a low enough price, as it would necessitate a small reduction in the rail rate, and this requires negotiation with the Railways, which means considerable delay and the possible loss of the contract to South Africa, whereas if a basis could be arrived at it would mean that the required reduction to obtain that contract, coupled, of course, with a reduction in the coal owner's profit, would be automatic."

This idea, we submit, is deserving of the most careful consideration. Our internal coal trade is comparatively small and the collieries of the country in large degree depend upon the sales of coal for export and bunkering purposes. This overseas trade is conditioned by a host of complex factors dependent on fluctuations in the volume and distribution of world commerce. The overseas demand is thus evanescent. A sharp demand for South African

coal at the ports will spring up with the rapidity of a breeze and as quickly vanish if the highly complex machinery of supply and transport is not instantly ready to satisfy the demand.

What is wanted, so it seems to us, is some organisation representative of producers, transporters, and purchasers capable of fine adjustment with a pre-arranged policy in regard to carriage rates and an ability to synchronise with the varying market conditions. The Government has already taken a hand in the regulation of our coal trade in respect of pooling and grading at the ports. And we therefore throw out the suggestion that it might be advantageous to all concerned to create an establishment or to appoint an official with plenary powers specially to watch and direct the export coal trade of the country. An office of this nature in touch with the High Commissioner and with trades representatives, with its finger on the pulse of commerce and working in co-operation with the coal exporters and the Railways might do much to avoid friction between suppliers and transporters, to minimise delays in the acceptance or refusal of contracts and to ensure that all the machinery necessary for the establishment and retention of the overseas coal trade was able to function in synchronisation with the incidence of demand.

THE GOLD FIELDS REPORT.

Features of the Gold Fields' report are dealt with in other parts of this issue, and we hope next week to print some extracts from the speech of the chairman, Lord Harris. As usual, the major portion of the reports printed consists of the annual review of the South African interests of the company by the manager in Johannesburg, Mr. Douglas Christopherson. As Mr. Christopherson's report is dated August 24, it necessarily confines itself to the general conditions of the year ended June 30 last. In that period, of course, the gold premium bulked largely, and though it is not easy to say anything that is both new and true on the subject, Mr. Christopherson does manage to put the known facts in a simple and impressive form. Speaking of the fluctuations of the premium, Mr. Christopherson says:—"It is generally expected that each year the fluctuations between maximum and minimum will show a flatter curve with a reducing average price. The effect of the complete disappearance of the gold premium may be instanced by stating that had the gold won by the industry for July, 1921, been calculated at Mint par value the profits for that month would have been reduced by £900,000 to a sum of £275,000, that is assuming there was no reduction in the July working costs. As still further evidence of what this would mean, of the 39 producing companies concerned 10 would have made losses varying from £5,000 and over per month, 10 would have made losses varying from £2,500 to £5,000 per month, 4 would have made losses varying from £1,000 to £2,500 per month, and only 15 mines would have earned profits." He concludes:—"It can, of course, be safely assumed that the very factors which contribute to the return of gold to Mint par value will operate to reduce the cost of production, so that the cost of stores will be further reduced and there will be a general all-round reduction in the price of commodities, and consequently in the cost of living, but even allowing for this there will remain the urgent need of effecting large economies in these and other directions, especially in the case of low-grade mines. There is no reason, if all will co-operate towards that end, why working costs should not be reduced, if not to the pre-War figure, to something approaching it."

Devoutly do we wish that as a result of the conversation now taking place Mr. Christopherson's hope will be realised. Mr. D. Wilkinson, the consulting engineer to the group, contributes a brief and severely business-like analysis of the position of the different subsidiaries as at June 30 last, and refrains from generalising on the mining situation. The new industrial and commercial interests of the "Gold Fields" are still too young to bear fruit, but with the expected revival of business next year they will doubtless justify their acquisition.

Notes & News.

The "Mining Journal" wishes its many readers and supporters the compliments of the season, and heartily reciprocates the various greetings which have been conveyed to us by the Chairman and Committee of the Witwatersrand Commercial Exchange, the Baldwin Locomotive Works, and other firms and individuals.

* * *

The Coronation Syndicate.

In another part of this issue will be found a full report of the speech made by Mr. Mackie Niven, the Acting Chairman of the Coronation Syndicate, at the annual meeting of that enterprise last week. The speech is of extraordinary interest, inasmuch as it reflects the activities of this undertaking, which is doing exploratory work of great value and importance on either extension of the Reef. That work must appeal to all who have imagination enough to see that there must be a future for the Far East and Far West extremities of the Rand. Work on the Far South-East property of the company has been suspended to allow of efforts being concentrated on the exploration of Luipaardsvlei, No. 10 on the West Rand; and it must be admitted that the results won by the Syndicate from drilling up to the present have been surprisingly good. It is satisfactory to note that the "J.C.I." people are co-operating with the Coronation Syndicate in their pioneer work, and that the technical resources of the House of Barnato are at the disposal of the Syndicate in its praiseworthy efforts to open up new areas of the Rand. The Acting Chairman's speech should have an excellent effect in London, where it is understood that efforts are now being made to raise further capital for the work of the Syndicate.

* * *

The Silver Market.

In view of the growing silver-lead industry of the Transvaal, the course of the silver market has become a matter of greatly increased interest for us. In connection with the silver situation the "Financial Times" recently had this to say: "To what extent speculation has been responsible for the recent advance in silver, which has just touched 43½ per ounce, the highest price since last December, it is difficult to say, but there have been certain changes in the world conditions during the last few months which have undoubtedly tended to favour a rise in the price of the metal, and it is only natural that these should have been taken advantage of. The recent buying is reported to have come mainly from China, but it is difficult to find any economic reason for an increase in the demand from that source, except that stocks have been allowed to run rather low and an effort is being made to re-establish them. There is no mystery with regard to the previous fall in silver. The two principal causes were admittedly the sudden setback in the trade prosperity of India, and indeed of the Far East generally, coupled with the amount of the metal released by the dilution—to use a polite term—of our own subsidiary coinage, together with that of most of the other principal European countries. These two causes have begun to lose their effect. Since July the trade balance has again turned in favour of India, while the quantity of silver released through the substitution of nickel in our own coinage has mainly been absorbed."

* * *

S.A. Alkali.

The finances of the S.A. Alkali, Ltd., reflect the protracted but successful fight that has been put up by the company to evolve a process for the exploitation of its property. Put briefly, the profit and loss account is in debit £71,551, to which a further sum for depreciation has yet to be added. Before any dividends can be paid, this accumulated debit will have to be paid off out of profits, with or without the aid of the share premium account. The S.A.T.M. & F. Corporation, together with "certain other parties," have agreed on terms to find up to £50,000 for the

further development of the deposit and the discharge of the company's present indebtedness. Parliamentary ratification is required of the new and extended lease which the Government is now prepared to grant the company, and thereafter, with the successful solution of the technical difficulties that have hindered progress, there promises to be a prosperous future for this new industry.

FIELD-MARSHAL HAIG'S PRAISE.

We take from the London *Times* of November 24 the following article entitled "Mining Engineers in Warfare—Earl Haig's Tribute."

Field-Marshal Earl Haig yesterday afternoon visited Cleveland House, City Road, the headquarters of the Institution of Mining Engineers and the Institution of Mining and Metallurgy, where he unveiled two memorials erected in honour of members of those associations who fell in the Great War.

The mining engineers' memorial is the work of Mr. Allan G. Wyon, and consists of a bronze figure of Remembrance blessing the memory of those whose names are inscribed on the neighbouring alabaster tablets. The figure stands on a bronze bracket, and is backed by marble onyx, on the lower part of which is a gold mosaic representing the rising sun.

The mining and metallurgy memorial, by Lieutenant-Colonel P. N. Nissen, a member of the Institution, consists of the Engineers firing a mine. The upper part of the pedestal is of malachite, and bears four bronze friezes showing various subjects connected with mining and mine warfare.

Earl Haig, who was accompanied by Lady Haig, said in reply to an address of welcome that the first reason which urged him to be present that day was that he was able to pay a personal tribute to a section of the many thousands of brave men who fought under his command in France, and paid the last and greatest sacrifice that love of King and country could demand from true and loyal citizens. The second and more particular reason was the opportunity of saying a few words of especial thanks to a body of men whose work in France seldom drew upon itself much notice or glory at the time, but was surpassed by none in the demand it made on the skill, courage, and resolution of the individual concerned, or the services it rendered to the Army as a whole.

Mighty Explosions.

One thought naturally of the Battle of Messines, and the mighty series of explosions which tore great gaps in the German lines on June 6, 1917, and gave the signal for one of the most successful of our attacks. That was the work to which the Institutions sent so many gallant men, and it was indeed a signal triumph of British mining in warfare. Yet few outside those who took part in that work, or benefited by its results, realised the immense amount of steady and persistent toil, in every circumstance of peril that might well appal the stoutest heart, which went to the preparation of that triumph. Few realised how vast and important to the safety of our troops was the work of our miners, little commented on by the Press, that went on day by day and year by year, all along the British front. There was no truce at any time in the warfare underground, no respite, only periods of redoubled activity, or more than common strain.

He was glad to thank them, not for himself only, but on behalf of the whole Army, for that body of gallant men.

The unveiling was followed by a solemn silence for one minute, after which Earl Haig pronounced the words, "Their name liveth for evermore," and "The Last Post" and the "Reveille" were sounded by trumpeters of the Honourable Artillery Company.

Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

Gold Fields Finances.

The detailed annual report of the Consolidated Goldfields, to hand by last mail, supplements the cabled figures given in a recent issue. The revenue of the operating subsidiary—the New Consolidated Goldfields—is about £94,000 less than that of 1919-20, but nearly half a million has to be written off for depreciation, which absorbs not only the earnings, but leaves a debit balance of £111,200 to be carried forward. The financial position, however, is one of exceptional strength. Cash and short loans and debtors total £617,800, and advances and mortgages £295,300. After deducting amounts due to sundry creditors, a surplus of £653,200 is shown. This sound position is obviously due to the realisation of War Bonds and similar securities. Notable changes in the investment list comprise the reduction in V.F.P. preference shares, and the acquisition of shares in South African industrial undertakings, which, the directors opine, will lay "the foundation for profitable future business." The list of investments includes the following of interest in this country:—

African Agricultural Estates 10 per cent. debts.	£53,207
African Land and Investment ord.	83,320
African Land and Investment 6 per cent. cum. pref.	20,770
*African Land and Investment 5 per cent. debts.	28,100
Albany Brick Tile and Potteries	19,950
Allen, Waack & Shepherd 10 per cent. part. pref.	12,780
Allen, Waack & Shepherd ord.	19,170
*Anglo-American Corporation of South Africa ...	16,500
Consolidated East Coast Engineers	48,750
*Crown Mines, Ltd. (10s.)	5,372
*De Beers Consolidated Mines (£2 10s.) def. shares	6,000
*Elandsfontein Estate	11,753
*Gold Fields Rhodesian Development (10s.) ...	531,571
Gold Mines Investment Co.	34,084
*Government Gold Mining Areas (Modderfontein) Cons.	74,000
*Johnson, Matthey and Co. (£5) ord.	10,000
Jupiter Gold Mining Co. (in liquidation) ...	160,604
Knights Deep (in liquidation)	110,946
National Mining Corporation (10s. paid) ...	50,000
*New Modderfontein (10s.)	83,648
*Nourse Mines	19,865
*Robinson Deep " " cum. pref. (1s.) ...	219,934
Robinson Deep " B " ord.	349,122
*Simmer and Jack Proprietary	841,508
*Simmer Deep, Ltd. (in liquidation), 7 per cent. prior lien debts. (75 per cent. paid) ...	58,875
*Simmer Deep, Ltd. (in liquidation), 5½ per cent. first debts.	141,700
*Sub Nigel	170,264
*Van Ryn Deep	27,500
*Victoria Falls and Transvaal Power 6 per cent. cum. pref.	53,252

* Dividend payers or interest bearing.

A company known as Harrismith Townlands Development Syndicate, Ltd., has been registered, with a capital of £7,600. The office is at 158-160, Exploration Buildings.

Geduld Options: A Reminder.

An official notice has been issued warning holders of Geduld Options that the latter expire on December 31 at noon. The options, if will be recollected, give the right to take up shares at 40s. The dividend recently declared will be payable on all shares issued for options exercised.

Gold Fields Rhodesian.

The report of the Gold Fields Rhodesian Development Co., Ltd., for the year ended May 31 last shows a profit of about £112,000, against nearly £128,000 for 1919-20, not, however, a serious falling off allowing for recent difficult times for finance concerns. After again making up the total dividend for the year to 1s. per share there will be £99,052 to be carried forward, as compared with £111,966 brought in. The net liquid assets amount to nearly £270,000, against the issued capital of £1,257,110 in 10s. shares, so that the company is in an exceptionally strong position to take advantage of any attractive new business which may offer later on. The investments are entered in the balance-sheet at a book cost of £814,965, against £674,647 a year ago.

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Gaika G.M. Company.

As the result of the treatment of a somewhat larger tonnage of ore at a lower average cost, the Gaika Gold Mining Co., Ltd., is able to report a profit for the year ended June 30 last of £31,243, against £28,396 for 1919-20. The directors recommend a final dividend and bonus of together 1s. 6d. per share, making a total for the past financial year of 2s. 6d., as compared with 1s. 6d. for its predecessor. There will be £6,921 to be carried forward, against £9,865 brought in. The ore reserves at June 30, after including some blocks of low-grade but payable ore are put at 9,000 tons higher than a year previously, namely, 73,000 tons, averaging 13·2 dwts. per ton.

Ex-Enemy Shares.

The Custodian of Enemy Property for the Union has returned to South Africa. The full text of the official statement issued in mail week on the subject of enemy shares is now to hand. It states that a complete agreement has been come to on all points between the Public Trustee in England and the Union Custodian in connection with the allocation of enemy shares in companies working in South Africa and all other outstanding matters. Further, a scheme of procedure has been agreed upon with regard to the disposal of enemy shares in the mining companies. Under this arrangement all enemy shares in a company will be offered in one block, and, in the first instance, to the groups and companies respectively concerned. Negotiations with regard to such sales in connection with companies incorporated in England will be carried on by the Public Trustee, and with regard to shares in companies incorporated in South Africa by the Custodian for the Union. The Public Trustee's Department is now preparing certain statistics, which are expected to be ready for despatch to South Africa by the end of December, and as soon as they arrive negotiations for the disposal of the whole of the enemy holdings will be commenced, and it is hoped that these negotiations may be satisfactorily completed by the end of January.

RAND GOLD MINING DIVIDENDS TO DATE.

It is too early to attempt to compile a complete list of the dividends declared for the second half of the year, but mention may be made of some of the more notable declarations already announced. The Brakpan distribution is 15 per cent., or 3s. per share, which compares with 30 per cent. for the corresponding half of last year. City Deep pays 17½ per cent., as compared with 20 per cent. for the same half of last year. Consolidated Main Reef pays 5 per cent., against 8½ for the second half of last year. Crown Mines pay 22½ per cent., against 50 per cent. for the same half last year. Consolidated Langlaagte is 7½, or 1s. 6d. per share, which is at the same rate as for the same half of 1920. Government G.M. Areas dividend is 30 per cent. or 6s. per share, which is also the same as that declared this time last year. Geduld pays 10 per cent., or 2s. per share, as this time last year. Langlaagte Estate pays 7½ per cent., as last year. Meyer and Charlton pays 50 per cent., against 70 per cent. for the December half of last year. Modder Deep pays 85 per cent., or 4s. 3d. per share, as last year. Modder B pays 55 per cent., against 50 per cent. for the December half of 1920. New Modder pays 50 per cent., against 57½ for the corresponding half of last year. Nourse Mines pay 3¼ per cent., against 5 per cent. for the second half of 1920. New Kleinfontein, which last year at this time paid 5 per cent. after a silence of three years, again makes a 5 per cent. distribution. New Primrose pays 7½, against 5 per cent. last year. New Unified distributes the same amount as last year, viz., 5 per cent., or 1s. per share. Springs Mines pay 7½, or 1s. 6d. per share, against 15 per cent. for the corresponding half of last year. Robinson pays 1 per cent., which is exactly half of the distribution made this time last year. Rose Deep pays 7½ per cent., against 17½ per cent. for the second half of 1920, and Village Deep pays 6¼ per cent., against 7½ for the same half of last year. Van Ryn pays 5 per cent. for the half-year, against 7½ per cent. for the same half of last year. "Knights" pay 15 per cent., the same as last year, and Van Ryn Deep pays

30 per cent., or 6s. per share, against 40 per cent. last year. The Simmer and Jack 2½ per cent. (the same as last year) and the Sub-Nigel 5 per cent. (as against 7½ per cent.) complete the list to date.

TRADE ENQUIRIES.

With a view to being of service to its advertisers and readers, *The South African Mining and Engineering Journal* publishes the following notices, which have been furnished by the American Trade Commissioner, Mr. P. J. Stevenson. Firms that are interested in any of these matters should communicate with Mr. Stevenson either by mail (P.O. Box 6989, Johannesburg) or in person at 42, Standard Bank Chambers, when further particulars will be made available to inquirers:—

A firm manufacturing sheet metal products, including corrugated and galvanised sheets, roofing, siding, specialties and similar lines, is interested in securing representatives in the principal cities of the Union. Their output is described as being of high quality.

A firm that manufactures a special metal for roofing and walls wishes to secure selling agents in South Africa. This product has three coatings over a core of specially annealed steel, asphalt, asbestos, and waterproofing. It is used for the same general purposes as corrugated iron, and is especially adaptable for the coal and chemical industries and in the railway field.

A manufacturer of good quality ash shovel handles wants to get in touch with a responsible broker with a view to opening up business in long shovel and "D" handles.

A company that are large producers of tubular goods, boiler and ship plates, well supplies and plumbers tools wishes to secure a firm to act as selling agents to importers of these lines. While consideration will be given to firms that import material for stock and conduct a wholesale business, preference will be given to a firm not engaged in a wholesale way.

GEDULD PROPRIETARY MINES, LTD.

(Registered under the Limited Liability Laws of the Transvaal.)

**NOTICE TO HOLDERS OF
OPTION CERTIFICATES.**

Holders of the above Option Certificates giving the right to subscribe for £1 (One Pound) shares of the Company at the price of £2 (Two Pounds) per share, are hereby reminded that the Option will expire at 12 o'clock noon on the 31st instant, after which time the Option Certificates become valueless.

Application Forms which must be completed in connection with the exercise of these Options can be obtained at the Head Office of the Company.

The recent dividend declared will be payable on shares issued for Options exercised at or before 12 o'clock noon on the 31st instant.

By order of the Board.

UNION CORPORATION, LIMITED.

Secretaries.

per J. McFADYEN.

Head Office:

91 Main Street,

(P.O. Box 1125),

Johannesburg.

22nd December, 1924.

ENGINEERING SECTION.

CHRISTOPHER AND SHILLITO, LIMITED.

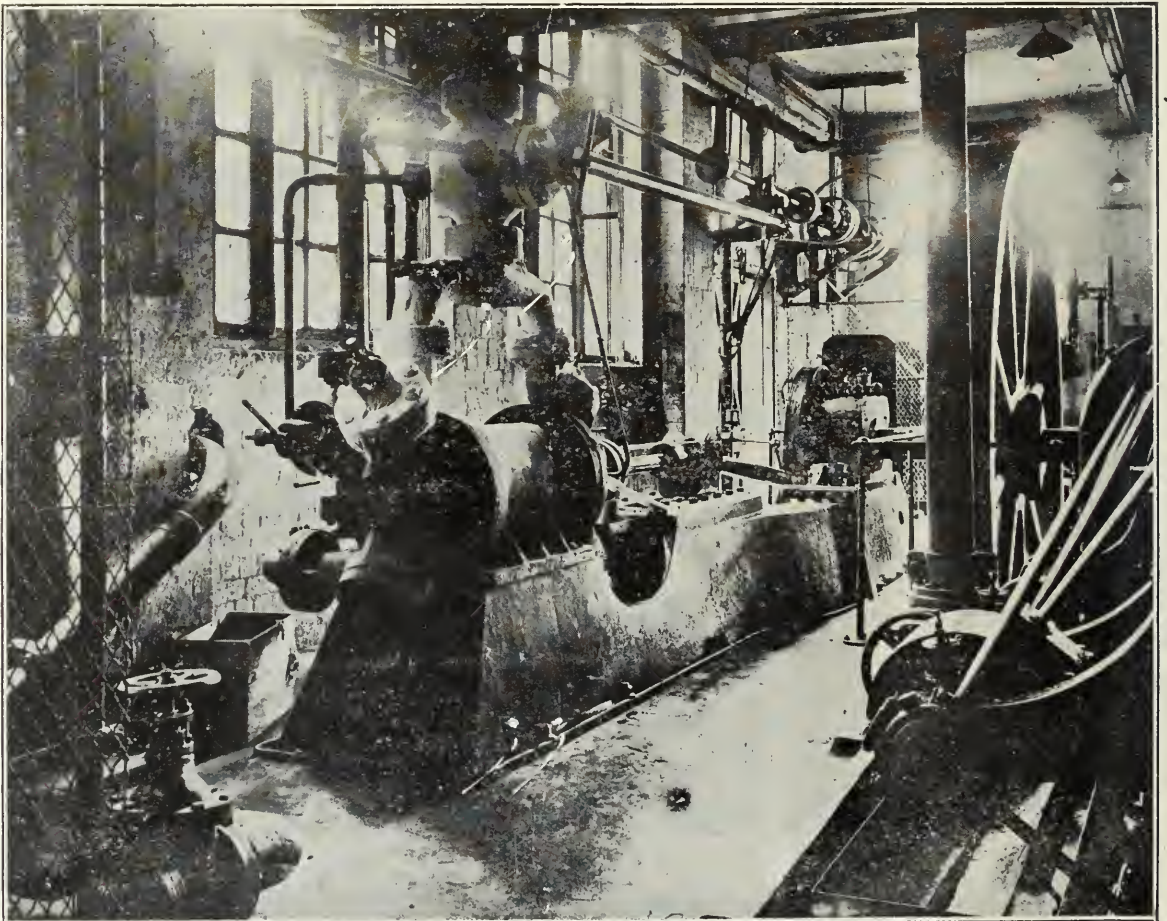
GENERAL ENGINEERS.—IRON AND BRASS FOUNDERS.—STEEL STRUCTURE CONTRACTORS.

The engineering business known as Christopher and Shillito, Limited, was purchased from the United Engineering Company in 1915. In November, 1918, the business was acquired by H. Shillito, H. Morrison and T. P. Smith. The works are situated at the corner of Fifth and Miller Streets, New Doornfontein, on the north side of the Johannesburg-Germiston railway. They are situated over 21 stands, and are housed in substantial buildings of brick, steel and galvanised iron construction. The works provide employment for over 80 Europeans and about 150 natives. The works have their own native compound.

The nature of the work undertaken by Christopher and Shillito, Ltd., consists of all classes of general engineering and structural work. Roof trusses, mine headgears, and bridge construction are done. Foundry work of all descriptions in both cast iron and brass is also undertaken.

Raw Materials.

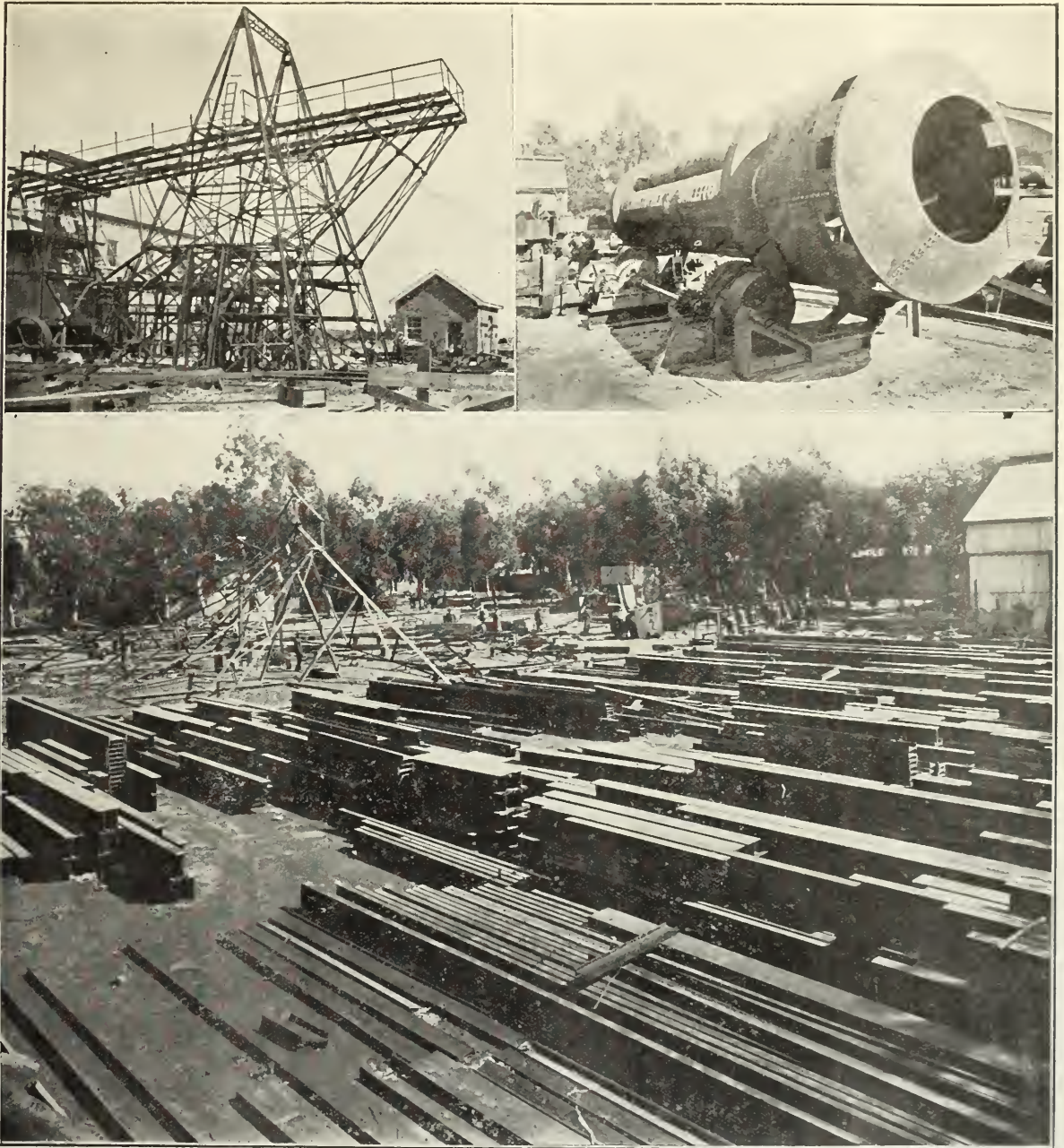
The works generate their own electric power and are thus in the fortunate position of enjoying a constant and reliable source of power. The raw materials used here consist of imported hematite pig iron, and girders, beams, and angle



80-ton Ammonia Compressor installed at Newtown in 1919. Designed, manufactured, and erected by Messrs. Christopher and Shillito.

irons of both local and overseas manufacture. The coke used is supplied by the Vryheid Coke Company and is most favourably reported upon in every respect. The quantity of sulphur present in this coke has never been found to be in excess of .7 per cent. An interesting point mentioned by the management on the removal of sulphur from the coke

is it possible that some or other of these forms of sulphur present are rendered leachable, and when coke is exposed to the action of rain the sulphur is to a certain extent removed? Again, does the residual sulphur in the coke oxidise while the coke is exposed to the action of rain water and air, and form soluble compounds which are removed by the water?



(1) Structure manufactured and erected by C. and S., Ltd. (2) Ore roaster of 2,500 tons. (3) Part of the stock and erection yard of the Steel Construction Department, the main works being on the other side of the trees on the left.

was the following: He stated that if the coke is exposed to the action of rain that the quantity of sulphur was diminished. This point should provide some interesting discussion, and might possibly be the source of research. The sulphur in coal has been determined to exist in two forms, namely, organic sulphur and mineral sulphur. When in the latter form it has been found present as iron sulphide as well as calcium sulphate. During the process of coking

Departments.

These works are fully equipped in the following departments: Designing the structures, pattern making, founding, forging, fitting, and steel construction working.

The importance of designing need hardly be dwelt upon more especially so in certain types of the work con-

ducted here. For instance, in the design of roof trusses and super-structures reliability and safety are primary considerations, and the work has to be conducted with the greatest of care.

Pattern making is an operation whose importance cannot be lost sight of and which always precedes the operations conducted in the foundry. In this department castings in both iron and brass are executed, and for the purpose of melting these metals the foundry has been provided with three cupolas and one brass furnace. Castings weighing anything up to 12 tons can be handled in these works.

Forging is conducted in the smith shop, and in order to facilitate the working of this department another steam hammer has recently been installed. A small set of rolls for rolling out small and light bars has just been added to the equipment.

In the machine shop the firm have added several new lathes, and several other improvements which they have found necessary. Their equipment is thus of the most modern, and fully capable of coping with all the work demanded of it. Other items of interest in the machine equipment of these works are: A Ryerson high-speed friction saw which is capable of cutting through a 12 in. by 6 in. girder in half a minute, a set of 14 foot plate-bending rolls operated by two steam engines, and three punching and shearing machines.

In the steel construction yard all structural work in steel is conducted. Roof trusses, super-structures, mine headgears, and bridges all rank among the items which can be turned out in this department. In the photograph depicting the steel construction department can be seen some skips, tips, and roof trusses, as well as the enormous stocks of steel girders, beams, angles, etc., held at these works. The engineering works also include a large weighbridge with a capacity up to 15 tons, supplemented by 6 other scales distributed about the works.

Achievements.

On a tour of inspection round the works many articles of general engineering interest were to be seen. Among these there was an eighty ton ammonium compressor, a sinking platform, and 450 sections of tubing for lining a circular shaft. Other notable engineering achievements of these works are a 30-ton ammonium compressor for the Benoni Ice Company, and an 80-ton compressor which has now been running for the last two years at Messrs. Angen and Piel's Cold Storage, Newtown. This machine is capable of a 25 per cent. larger output than that for which it had been rated. Headgears have been built for several Rand gold mines as well as Natal collieries. The steel work for the Bijou Theatre was also constructed at these works. The company has also turned out a rotary roasting furnace which is being used for treating refractory gold ore on the Machavie Gold Mining Company. This roaster has a capacity of 2,500 tons per month.

Progress of the Government Vaal River Barrage.

Excellent progress is being made with the Vaal River Barrage, and according to Mr. W. Ingham's latest report, the whole of the 36 gates are now at the Barrage. Several sets of the operating gears have been delivered, and the remainder will be delivered by the end of the year. Four gates are completely assembled and two are being assembled. The Goliath crane has now been erected, and the Barrage will be completed about the end of April next year.

Rand Water Board New Works.

According to the latest report by Mr. W. Ingham, the Chief Engineer of the Rand Water Board, the following tenders are now being dealt with or are due on the dates referred to below:—Steam turbines and pumps for River Station, Vereeniging; generating sets, etc., for Main Station, Vereeniging, and engine and boiler houses, etc., for Main

Station, Vereeniging—these tenders will be reported to the Committee on the 18th instant; weighbridge for Vereeniging Main Station—5th December, 1921; boilers, stokers, etc., for Main Station, Vereeniging—22nd December, 1921; steel roof trusses, etc., for engine and boiler house, Main Station, Vereeniging—6th January, 1922; pipes for the pipe line from River Pumping Station to Main Station, Vereeniging—6th January, 1922.

A New Copper Flotation.

Arton Copper Copany, Ltd., is the name of a new company registered at Pretoria, with a capital of £50,000. The registered office is 3rd Floor, National Bank Buildings, Johannesburg.

THE HYDROGEN, OXYGEN & PLANT CO., Ltd.

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P.O. Box 5404.

The Supply of Steel Ropes to the Rand Water Board.

BRITISH Versus GERMAN TENDERS.

The official minutes of the last meeting of the Rand Water Board contain an extraordinarily interesting reference to the acceptance of the tender of a German manufacturer for steel pipes for the conveyance of water from Vereeniging to the Rand. In the course of a report on the subject it is stated:—

With regard to the tenders for the supply of cast-iron pipes, the lowest complete tender was that submitted by Capt. R. R. Kennedy, acting on behalf of Le Société Anonyme des Hauts Fourneaux et de Fondéries de Pont-a-Mousson, Nancy, France. It was estimated, however, that the cost of the cast-iron pipes for which alternative tenders were invited, based on Capt. Kennedy's offer, would be approximately twice the amount payable for a similar length of steel piping. The consideration of these tenders, therefore, resolved itself into a question of the purchase of steel pipes for the purposes of the Vaal River scheme, and an examination of the tenders showed that the lowest tender received for steel pipes made to the Board's specification was that submitted by the National Trading Company, who offered steel pipes to be manufactured by the Mannesmann Tube Company, of Dusseldorf, Germany. Messrs. Stewarts & Lloyds (S.A.), Ltd., submitted the lowest tender for steel pipes of British manufacture, but it will be seen from the following comparison that this tender appreciably exceeded that of the National Trading Company:—229,300 feet of steel piping (assorted sizes as per specification), including 80,000 feet of Hessian wrapped steel piping: Stewarts & Lloyds (S.A.), Ltd., £392,476; National Trading Company, £275,686; difference in favour of the National Trading Company, £116,790. If allowance were to be made for the extra cost of jointing Messrs. Stewarts & Lloyds' pipes, due to the shorter length of the tubes offered by them as compared with the Mannesmann tubes, the above-mentioned difference would be increased to about £120,000 in favour of the National Trading Company's tender.

Terms of Payment.

The prices tendered by the National Trading Company are firm prices, excepting in so far as they may be affected by any variations in the current South African railrage rates and Customs duty. Any increases or decreases in these charges applicable to deliveries under the contracts in question would be for the account of the Board. The tender is made on a British sterling basis, and will not, therefore, be affected by fluctuations in the value of the German mark. Furthermore, the National Trading Company accepts the Board's terms of payment on condition that payments are made on a par basis as between South Africa and London. These terms provide for the payment in Johannesburg of 80 per cent. of the value of each consignment on delivery to the Board in good order and condition, and 20 per cent. within six months after the complete delivery of the materials. As regards the period required to carry out these contracts, the National Trading Company undertakes to commence delivery about the middle of March next, and to make the final deliveries during the month of November, 1922.

In concluding his report (No. 120, dated October 17, 1921) dealing with these tenders, which was considered by us on the 21st ult., the chief engineer stated that no tenders, or combination of tenders, had been submitted for pipes of the dimensions specified by the Board which were lower than those of the National Trading Company. Subject to the decision of the Board in regard to the question of policy involved, the chief engineer recommended the acceptance of the National Trading Company's tender for the piping required under these contracts.

Some Considerations.

In the course of our review of the tenders for the supply of pipes, we realised that no exception could be taken, from a technical point of view, to those submitted by the National Trading Company, which were for material to be manufactured in Germany. On examining the matter from the financial aspect, however, it was seen that the lowest tender for pipes of British manufacture exceeded the National Trading Company's tender by £120,000 approximately, a sum representing, in respect of interest and redemption, an annual charge of about £11,000 a year for a period of 27 years. Taking this comparative position into consideration, there would have been no hesitation in arriving at a decision in this matter had it not been for the question of policy involved and the unsettled conditions at present obtaining in Germany. We had to recognise, however, that no financial loss to the Board would be involved in the acceptance of the National Trading Company's tender. It has already been mentioned that the contract price would be paid in British sterling, free of all fluctuation in the value of the German mark; and, further, that no payments would be made by the Board until the materials had actually been delivered to the Board at selected railway stations along the route of the pipe-lines. As the question naturally arose regarding the possibility of difficulties arising in Germany which might interfere with or prevent the National Trading Company from delivering the required material to the Board, and thus cause a delay in the completion of the first unit of the Vaal River scheme, exhaustive inquiries were made in this direction before a decision was arrived at. Our inquiries in this regard failed to elicit any information of a nature which, in our opinion, would have justified the Board in declining the favourable offer submitted by the National Trading Company. In view of all the circumstances, and after the most careful investigation, the tender of the National Trading Company was accepted.

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WRIGHT'S ROPES

H. ALERS HANKEY - - - Sole Agent.

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Making Bridges out of Old Ropes.

We have received from Mr. C. M. Rasmussen, rigger, of P.O., Linden, Johannesburg, the following account of a bridge which he has constructed in the Eastern Transvaal out of disused wire rope. It seems to us that transport conditions in the outlying districts could be substantially bettered by the employment of methods such as are discussed in the accompanying brief article.



Swinging Bridge over Crocodile River.

Swinging Bridge across the Crocodile River when in Flood, near Barberton.—The structure is very strong. A bridge of this nature will carry several tons weight, and can be erected to carry any weight desired for wagons, etc. It can be erected in a very short time and at a very small cost; this bridge was erected complete in one week, with about five natives, from discarded 1 in. wire ropes several hundred feet long.

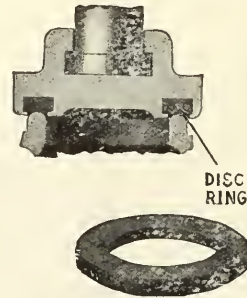
Method of Construction.—First, two posts were cross-braced about 15 feet apart and 30 feet high (according to the height of the river when in flood) and were erected on each side of the river. Next, two strong wire ropes were stretched across the river suspended on top of tressles; all four ends were anchored, and the bridge was then erected, hanging in the wire ropes. Bolts according to strength of bridge required are bolted on to the wire ropes every 6 feet, and to the bottom part of bolt is a railway sleeper or any other wood. Across the sleepers longways are planks nailed or bolted on. A bridge of this type can be erected very cheaply if native wood is utilised, and discarded wire ropes can be bought at small cost from any mine. A bridge like this will last for a century and more and cost very little for upkeep. If such bridges were more widely known, they would be extensively erected, not only privately, but also by the Government for tapping the railway communications.

The Rhodesian Cement Company.

The Rhodesia Portland Cement Company is temporarily to suspend operations owing to lack of demand for the product and a large accumulation of stock at the works. The chairman at the annual meeting said that the dumping of cheap Continental cement at African ports was partly responsible for absence of activity of the company, and slackness at Katanga was also a contributing factor. The company, nevertheless, was in a sound position. The meeting confirmed an interim dividend of 10 per cent. paid previously, and passed approved dividends of 10 per cent. It is understood that about a dozen white employees will be suspended. Last year the company circulated practically £50,000 locally in wages and stores.

FAIRBANKS

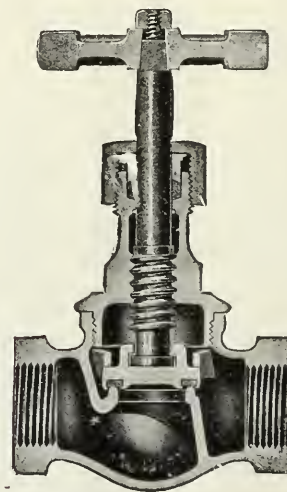
Vulcabeston Renewable Disc Valves.



Asbestos Fibre, as everybody knows is not affected by heat or acids.

Vulcabeston is a compound of Asbestos Fibre saturated with rubber and other materials and vulcanised under Hydraulic pressure. It is the ideal material for a valve seat, and you can get it only in Fairbanks Valves with Renewable Discs.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET BUT IN HOPEFUL MOOD—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS.

General.

Things wholesale, especially in mining materials, inevitably slacken off towards the end of the year, giving place to the retailers, who reap their best harvest. It is a time when merchants naturally take stock of their possessions and of possibilities immediately confronting them. Under these circumstances there is no call to dip into last week's transactions, which were quiet and on the scarce side. But, underlying the present paucity of business, one gathers, in no uncertain manner, during one's peregrinations that the general tone of commercial affairs is absolutely sound, and, provided that a satisfactory arrangement is arrived at between the Chamber of Mines and the Trades Unions as to future working costs and greater efficiency on the part of workers underground—to which at the moment everything seems to point (the continued drop and probable further decline in the price of gold will only add weight and cogency to the mineowners' attitude on the question)—the mining community is unanimous that early next year we should see improved business conditions. A very prominent commercial man said that, in his opinion, people were beginning to properly appreciate the continued drop in the price of gold, and that there was only one radical cure for it, and that was a drastic cut in costs of production. The slash in wages, which was imperative, should not be confined to the miners, but should operate in like fashion with salaries—in other words, the cut should be made from top to bottom. That was, he said, the only way to prevent the eventual incidence of the drop of the premium to normal affecting our mines, or most of them, detrimentally. The prices of stores were gradually declining (notwithstanding a temporary slight advance in timber), and were likely presently to go lower, and this, together with the anticipated decline in salaries and wages, and above all increased efficiency of the workers underground, should tide us over most of our mining propositions' difficulties. With regard to the price of timber and the recent upward movement, there is no gainsaying the fact that in the face of the increased prices in England merchants to-day are not taking advantage of this, but are selling their old stocks at about recent levels, but as soon as those stocks already afloat are landed and disposed of there can be no question that prices must rise in consonance with oversea prices. With this exception building materials appear to be at zenith, and lower costs are confidently anticipated. The turps market remains firm at last week's prices.

Iron and Steel.

The market during the past week, as is usual at this season, has been standing, and very little business has been put through. The holidays may be said to have started with Dingam's Day, and their influence will be felt until after the turn of the year. Steel plates are firming, and there are shortages in small lines already, which will be accentuated within a few weeks. The tone of the market, although very quiet, is undoubtedly firm and hopeful.

Latest quotations.—Dunswart iron, 22s. per 100lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{3}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{3}{4}$ in. iron, 31s.; steel, 37s.;

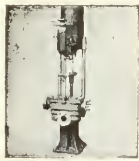
$\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channels and joists, 35s. 6d.; shafting, $\frac{3}{4}$ in., $\frac{3}{8}$ in. and $\frac{1}{2}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon, nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lbs.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lbs.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{3}{4}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; hammer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., exceedingly scarce, 35s.; barbed wire. "Shorthorn," 69 lbs., 13 $\frac{1}{2}$ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening, 3s. to 9s. 6d. per square yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.

The Iron and Steel Corporation.

At the second ordinary general meeting of the above the chairman, Mr. A. C. Romyn, stated that at the last meeting he had advocated the erection of a 75,000 tons p.a. iron and steel works, electrically driven and capable of extension. He stated that, unfortunately, universal financial stringency had compelled them to postpone the immediate execution of their technical programme. In view of unfavourable markets the board awaited more favourable times for exploiting the company's interests. Mr. Delfos, the company's managing director, is conducting negotiations.

Second-hand Machinery.

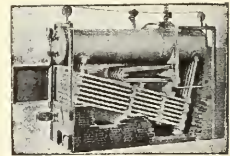
Trading this month has been by no means dull, as companies have been compelled to buy, having allowed their stocks to run down too low in the endeavour to tide over the present year, but necessity has caused many to replace, and when second-hand stuff can be had it is economical to purchase. New steel plates have come down to such an extent that the mines are practically turning up their noses at second-hand stuff unless it is exceptionally cheap. A good deal of second-hand plate has been sold at practically scrap prices. Battery spares are very scarce, particularly



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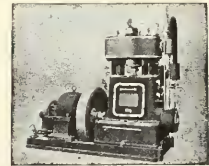
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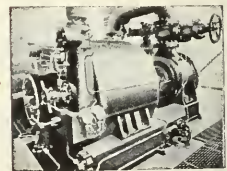


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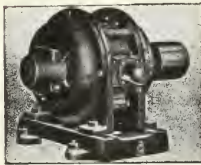


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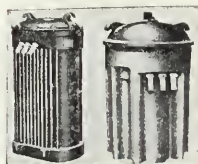
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for certain sizes, and those old companies which continually purchased second-hand have drained the market to such an extent that there is a scarcity of the sizes required by some outcrop mines. It is predicted in second-hand circles that at the commencement of the year, and until further companies close down (save the mark!) and sell their plant, there will be a scarcity of second-hand requirements. There is no getting away from the fact that the Germans are flooding the market with necessitous goods and bringing down prices considerably. When are the British firms going to compete with this dumping? Not until the British workman learns that his bread and butter is being taken away from him by the Germans and is really again working to regain what he has lost. Steaming boilers, certain sizes, are still scarce, and what are in the market are fetching high prices.

Timber and Building Materials.

In view of the holiday in the building trade, which started last night (23rd inst.), a fair amount of building has been expedited during the past fortnight, and merchants have not been in bad humour during that period in respect of sales. It is stated on all hands that as soon as we are well in to 1922 a lot of building contracts will be given out, and everything seems to point to very increased business during the first months of the year. It is learnt also that the master builders are proposing a further reduction in wages after the end of the present month, to which, it is anticipated, there will be no great opposition.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver boards, 4½d. to 4¾d.; floorings, 6¼d. to 6¾d.; ceilings, 1¾d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 6s. 6d. to 7s. 6d.; corrugated iron, 9d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1in. 10½d., 1½in. 11d., 2in. 11½d. at coast; and Japanese oak, 1in. 1s. 1d., 1½in. 1½d., 2in.

1s. 2d. at coast; West African mahogany, 1in. to 1in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks, although remaining about the same, have a hardening tendency, and should we have heavy rains the tendency will be upward. Brickmakers report business better now than it has been some years at this season. Things are expected to improve a lot in January next, or February at the latest. Blue stock, 70s.; mixed, 60s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000 at kilns. White lime, 7s.; unslaked, 10s. 6d. per 180lb. bag, 8lb. bag 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Electrical Goods.

Business, in contrast with previous Christmas weeks, has been very poor; people, a leading agent said, are not to-day going in for previous Yule-tide celebrations. There is a fair amount of trading with the country, but nothing big, but indications, my informant said, point to very big things next year.

Mr. Buckles Quarterly Review.

Coming so soon after his "straight talk" at last week's round table conference with the men, Mr. Buckle's quarterly review of the industry this week was necessarily in the nature of a repetition of the facts as they are. Mr. Buckle did not pretend to say anything new on the subject, but his speech provides a useful summary and succinct review of the situation. If the community of the Rand and the country at large are not now fully alive to the seriousness of the position to-day, it certainly is not the fault of the President of the Chamber of Mines.

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The Week's Meetings.

FUTURE PROSPECTS OF THE COAL TRADE.

SOUTH AFRICAN COAL ESTATES, (WITBANK), LTD.

Mr. Jeppe's Able Review.

A Valuable Suggestion.

Immense Tonnages of Coal.

The New Clewer Township.

The first Ordinary General Meeting of shareholders in the South African Coal Estates (Witbank), Limited, was held on Thursday, December 15th, in the Board Room, the Jeppe Arcade, Johannesburg. Mr. Julius Jeppe, C.B.E., presided, and amongst those present and represented by proxy were: Sir Abe Bailey, Bart., Messrs. Alfred Barker, J. G. Carter, J. G. Currey, C. C. Curtin, W. E. Drummond, W. J. Gau, W. H. Harris, E. M. Hind, L. Ludlow, G. B. Pascoe, Ralph Ryan, Gordon Sandilands, B. Southwell, M. A. Sutton, and W. H. Sutton, with Mr. A. Woodrow, Secretary, representing in all 523,585 shares out of an issued capital of 925,505 shares.

The Chairman said:—
Gentlemen,—In moving the adoption of the Report and Accounts which are in your hands, I must remind you that the period covered is for six months only, from January 1 to June 30, 1921, this Company having, you will remember, purchased the business of the Cassel Coal Company, Limited, and the Transvaal Navigation Coal Estates, Ltd., as from the beginning of this year.

Finance.

Perhaps it will be as well to recall to you that your Company is registered with a capital of £1,000,000, of which £702,000 in fully paid shares was issued as purchase consideration to the selling companies, £140,407 was subscribed as working capital, leaving a further £140,400, an option over which at 20s. per share is held by the subscribers of the initial working capital, and of which the option over 83,093 shares has been exercised, and £17,193 in reserve, which are also under option at the same price.

In the Balance Sheet you will notice the capital appears at £850,716; this includes, as you will see, 2s. per share on the 83,093 shares just referred to, the option upon which was exercised by the South African Townships, Mining and Finance Corporation, Ltd., in order to enable your Company to comply with the provisions of the Companies Act, 1909, and that is the reason why only 2s. per share has been paid up on these shares.

"Sundry Creditors" at £103,362; more than half of this is due to the purchase of the Welgedacht plant and its removal and re-erection, the remainder being for ordinary merchants and other accounts and Government taxes.

"Capital Reserve Account" £8,327 represents the profits earned by the selling companies between January 1 and the date of the incorporation of your Company, such profits being part of the assets taken over and therefore of a capital nature.

Property Shareholdings.

Turning now to the Assets, you will find "Property Account" stands at £386,721; this includes the various freehold and leasehold properties as enumerated in the Directors' Report, equivalent to 45,989 acres, and are the same as taken over from the selling companies with the exception of the freehold of a portion of Volvekrans, which has been purchased since the amalgamation and the value set down in the balance sheet is in accordance with the price paid to the selling companies.

"Machinery, Plant, Buildings, etc.," at £374,763, represents not only assets taken over, but an additional cash expenditure since the beginning of the year of about £100,000, which I will refer to again.

Of the other items on this side of the balance sheet, I might mention "Shares in other Companies" at £59,333 represents, in addition to the usual shareholdings in the Coal Owners' Association, the Insurance Company, and the Native Labour Association 100,000 fully-paid shares in the Cassel Clydesdale (Springs) Gold Mines, Ltd., as well as 50,000 more on which 2s. per share has been paid. This Company owns two freehold portions of the farm "Daggafontein," No. 25, in the Far East Rand district, in extent 600 morgen, as well as a myn-pacht of 120 morgen, equal to 173 mining claims. The Board has power to increase the capital of that company to £1,000,000 (it is now £300,000) in order to provide further working capital in the event of the company being successful in obtaining a lease of additional ground from the Government. As you will be aware, the ground owned by this company is in a good gold area adjoining the Springs Mines and close to the New State Areas' ground.

"Preliminary Expenses and Commission on Shares" at £17,031. The principal item in this sum is the underwriting commission on the working capital shares, which accounts for £14,040; of the remainder £2,772 was paid to the Government in duties on the formation of the company.

"Sundry Debtors" £22,471, principally consists of the amount due at the end of the month from the Coal Owners' Association for coal sold during the month.

The other items on this side of the balance sheet require no special comment.

The appropriation account shows a profit of £19,364 from revenue and expenditure account. This has been dealt with by allocating, as previously stated, £8,327 to capital reserve account, these being the profits of the selling companies earned prior to the registration of this company; and by carrying the balance of £10,536 (after providing for income tax) forward to the current year.

A Period of Difficulty.

The period covered by the report and accounts has been one of difficulty, due to the depression in the coal trade.

As you are aware, the old Navigation pit was sealed on account of the fire which took place in the early part of 1920, and in consequence of this it was decided to open up two fresh pits on that section of the property, and the sinking, development and equipment of these pits is naturally spread over a considerable period of time, so that though the Bailey pit was hauling some

coal in January it was only able to put out 14,302 tons in the month of June, and in the Navigation pit in that month the main shaft was still being sunk, the air shaft having been completed and development commenced. The extra capital expenditure of £100,000 which I referred to in dealing with the accounts was practically all absorbed in this construction and development work, and in overhauling and adding to the plant at the Landau Colliery. With the exception, therefore, of an average monthly output from the Bailey pit of about 10,000 tons, your company's output during this period was produced from the Landau pit.

Had it not been for the fact that your directors were able to obtain plant and machinery from the Welgedacht Colliery the period of non-production on the Navigation section of your property would have been considerably longer.

Not only was your company suffering from the effects of non-production during the necessary construction and development period on this section, but your business was also affected by the acute depression which suddenly overtook the coal trade just before the beginning of the period under review. You will remember that towards the end of 1920 the prosperous period which the trade had been enjoying for some time quickly took a turn for the worse in consequence of the serious slump in shipping freights all over the world combined with the decrease in the export of manufactured goods from Great Britain, which resulted in coal being carried from that country to the East—our competitive markets—practically as ballast in ships which otherwise would have gone out empty in order to bring back the return cargoes to England. The effect of this naturally was to considerably decrease both the export and bunker trade of South Africa, and to compel a reduction in price in order to meet this competition.

Railway Rates.

The railway rates had also been raised considerably above pre-war-rates, so much so that had these not been lowered the bunker and export trade would have been killed; however, I am glad to say that the Railway Administration was quite reasonable on this matter when approached and have by successive steps considerably reduced the rates for carriage, but they are still very much higher than before the war, and it seems clear to me that further reductions must be made if we are to keep our markets. So far as I am personally concerned, I would welcome some understanding with the Railway Administration which would in some way provide an automatic rise or fall of rates of carriage according to the conditions of the market for bunker and export coal. For instance, it often happens that when tendering for large contracts it is found impossible to quote a low enough price, as it would necessitate a small reduction in the rail-age rate, and this requires negotiations with the railway, which means considerable delay and the possible loss of the contract to South Africa, whereas if a basis could be arrived at it would mean that the required reduction to obtain that contract, coupled, of course, with a reduction in the coal owner's profit, would be automatic.

Position at the Pits.

I would now like to give you some information with regard to the present position at your property. At the Bailey Pit the whole of the shaft sinking and

the machinery, plant, and equipment thereof has been completed and development is now, after passing through a troubled area, proceeding normally and satisfactorily, the quality of the coal being excellent. The present output from the pit is about 15,000 tons a month, which can be increased to 40,000 tons, the plant being designed for that quantity, but in view of the restricted market at present, and it being naturally more economical to produce from two pits rather than three, it is intended to haul our allotment as soon as possible entirely from the Landau and Navigation pits, leaving the Bailey Pit as a stand-by, and to meet any expansion in the demand which may occur. In pursuance of this policy, we have recently only been working the morning shift at the Bailey Pit.

At the Navigation Pit since the close of the period under review the shaft sinking machinery plant and equipment has also been practically completed, and in a short time we will be able to haul sufficient coal from this pit and the Landau to complete our monthly allotment. The development in this pit is well advanced and the quality of the coal is excellent, averaging, as it does, about 13 calorific value. During the sinking of the main shaft for this pit four seams of coal were passed through, three of them being of good thickness and quality, the other seam being of fair quality and promising to be a valuable asset later on, though it will be very many years before this seam will be called upon for production. Two of the four seams of coal are within seven feet of each other, the lower being six feet wide and the upper 18 to 20 feet, of which the bottom 12 feet will be worked; the quality of both seams is the best and it is intended to work these seams together, thus reducing costs.

There is nothing of special importance to remark about the Landau Pit; it is in a perfectly satisfactory condition, producing coal of first class quality, the machinery and plant is in good condition, and the general manager, by certain adjustments of the working conditions, has increased its capacity to more than it has ever produced before, namely, to about 43,000 tons per month.

The total output of saleable coal from the three pits for the month of November was 62,053 tons, but we are in a position to easily supply up to 120,000 tons a month from the present three pits at short notice and on the single shift basis.

On your portion of the farm Wolvekran, 2,120 acres in extent, a series of boreholes was sunk with the object of proving the extent and value of the coal, with the result that in the main seam the lower nine or ten feet gave 12.84 calorific, and the upper seam, about eight feet thick, averaged 12.5 calorific.

I may here state that with the exception of the area on Bosmanspruit, the whole of your properties are adjacent to each other, and the fact that Wolvekran is at the farthest end of your holdings, a considerable distance from your present pits, augurs well for the values in the intermediate area.

In addition to the present Landau Pit, situate on the farm Klipfontein, you have another area on the same farm suitably large to provide an entirely new pit. The area of coal-bearing ground in this new district is estimated at about 2,200 acres, containing a seam, the lower 10 feet of which has been proved by numerous boreholes to contain coal possessing a calorific value between 12.5 and 13. The greater portion of this area can be attacked by adits, while the rest would require shallow shafts, so that it could be worked at a low level of costs.

The total area of your holdings, freehold and leasehold, is just under 46,000 acres, of which about 38,000 acres may be taken as coal bearing, and the coal which has been proved is of excellent quality. To estimate the life of your properties as a coal mining proposition

is a difficult matter. There are several seams of coal on your properties, but for the purposes of considering your life only two seams at present being worked will be taken into account. On this basis we find that in the areas commanded by your present pits it is estimated there are about 4,800 acres of coal-bearing ground of first class quality, totalling about 70 million tons of marketable coal. This alone, even at the maximum rate of production of 120,000 tons a month, will last for nearly 50 years.

Then, again, there is the area on Klipfontein adjoining the present Landau Colliery of 2,200 acres, and the other on Wolvekran of 2,100 acres, both of which I have just referred to, in which the total can be put at about 52 million tons.

To this must be added your other properties which, either from a certain amount of boring or from their situation in relation to proved areas, may be considered as partially proved; these areas total about 21,500 acres, and on a conservative basis may be estimated to produce 164 million tons.

Lastly, there is the farm Bosmanspruit in extent 7,059 acres, under practically the whole of which it is known that the coal measures extend, but in regard to which in the absence of any boreholes thereon or in the neighbourhood no estimate of tonnage can be made.

Vast Tonnages.

The total estimated tonnage, therefore, excluding Bosmanspruit, may be put at 280 to 300 million tons, and this is without taking into account the other seams which run through your property, and which will some day be of commercial value.

I might also mention to you that in order to ensure an adequate water supply throughout the year from the permanent springs which exist on the property, your board decided to construct a storage dam; this dam, which is now in course of construction and nearly completed, will store 50 million gallons of pure water, and will thus ensure a constant water supply more than sufficient to provide for your company's requirements, and in addition to ensure an adequate supply for the purposes of the township which I will refer to later. I may add that the difficulty previously experienced by the Landau Colliery in consequence of the acidity of that colliery's water supply has been entirely removed since the amalgamation by the use of the pure water obtained from the sources on the Navigation property. Had it not been for this and the large sums of money we have spent since the amalgamation in overhauling and adding to the plant and machinery, this colliery would have experienced very considerable difficulty in providing its old output, which by the steps taken has now been considerably increased.

Question of Working Duff.

There is a further question which I might refer to, and that is a matter of reduction of costs of production. It is only at present in course of detailed examination, and I cannot say what action in this direction will be taken by your board when the experts have presented their conclusions. At present the motive power for the working of your colliery is produced by burning saleable coal, and we are considering whether by utilising our waste product, that is to say the duff that has to be dumped every month, motive power of a different nature cannot be produced at a very much lower cost.

All I can say at present is that the problem is engaging the earnest attention of the Board, the more so as it is highly desirable that costs of production must be lowered in this, as in all other industries, wheresoever it can be done.

Before the amalgamation took place

your Board went thoroughly into the question of reorganisation. We were fortunate in securing the services of Mr. J. R. Thom as general manager of the combined concern, and under his management and advice the reorganisation of the concern has been successfully carried through. There is no doubt that there will be considerable gain to shareholders by the amalgamation, not only by the centralisation of offices, but on account of the elasticity of the operations which has been attained, thereby enabling the management to produce their required output at the least cost by concentrating on two pits, and leaving the third to provide any excess which may at any time be required, and in addition, so far as the Landau Colliery is concerned, by removing the difficulties consequent upon the acidity of that company's water which I have already referred to.

Clewer Township.

Now, I must say a few words to you about the new township which has been laid out upon your property in the near vicinity of your pits, and within reasonable distance of several collieries. Your Board considered that, while filling a much-felt want in the district, it would also provide a healthier and pleasanter place of residence for your company's employees, and having decided to lay it out on garden city lines, they offered prizes for the best design. The first prize was awarded to the plans sent in by Mr. Harold Porter, of Johannesburg, and these plans are now in course of being carried into execution. The site of the township is one of the finest and healthiest in the Province, and is laid out in zones of residential, commercial, and industrial stands, as well as agricultural small holdings. The township proper is divided into two portions, and in the first instance only stands in the eastern portion are being sold, the whole of which has been surveyed and laid out. The title granted is freehold, subject to the usual restrictions required by the Provincial authorities in such townships. Brugspruit Station, on the Pretoria-Lourenco Marques line, is within a quarter of a mile of the township, which has been named 'Clewer' township, and the Johannesburg-Witbank line is within a mile and a half. An unlimited supply of pure potable water is laid on to the township, and electric current is also provided. The company has donated 200 morgen of ground for town lands, and another 200 morgen for grazing. In the centre of the township a large park has been provided, and adjacent thereto ground has been reserved for recreation grounds. Sites have also been laid out for such necessary institutions as Town Hall, Court-house, hospital, schools, and market. Purchasers desirous of building can also obtain bricks upon the property at reasonable prices.

There are about 1,057 stands in the whole township, excluding the agricultural plots.

On the 5th of last month a public sale of the stands in the eastern portion of the township was held, and I am glad to be able to inform you that you were very largely attended by keenly interested purchasers, and the results were very satisfactory, a considerable number of residential and commercial stands being sold at good prices, and since that date inquiries have been numerous, and sales continue to be effected. I have no hesitation in predicting that Clewer Township has a very successful future before it.

Competitive Factors.

In conclusion, I should like to address you as to the future prospects of the coal trade in South Africa. I may say at once that I am not disheartened by the rather strenuous competition we have had to encounter in export markets during the last 12 months. This period has coincided with the worst of the depression in Great

Britain; conditions have existed which have compelled shipowners to carry coal at any rate they could get, and coal-owners to sell coal for export at very low prices, owing to various reasons, such as the accumulation of coal following the settlement of the coal strike and the decrease in the industrial and household demand. Several factors antagonistic to our own coal industry made their appearance at one and the same time, but already there are signs that these will not long continue. As soon as Britain resumes normal exports to the East shipowners will no longer carry coal practically as ballast, nor can shipowners make their industry pay at the present low freight rates; moreover, as trade in Great Britain recovers there will be an increasing demand for industrial coal, which will have a natural tendency to raise the export price. There is also the additional well-known fact that the collieries in Great Britain are at present being run at a loss, which cannot long continue; either their costs will have to go down appreciably or prices will have to go up. Of one thing I think we may rest assured, and that is that unless a very great change takes place in the efficiency, or rather want of efficiency, in relation to output of the British miners, pre-war prices for British coal will never return. At the end of 1913 second grade Welsh coal was sold at Cardiff at 17s. per long ton, and upon that figure the collieries made a good profit; to-day the same coal is placed on board at round about 24s. a ton, and the collieries are making considerable losses, in which the shipowners are also sharing.

At the same time there is no use concealing from ourselves that in order to achieve and keep our rightful position in the world's coal trade, we shall have to ask for assistance from all parties engaged in the business. For instance, it seems to me that labour must be asked to contribute to this desirable end by reducing the cost of production by an increase of efficiency and a reduction in remuneration. The former is quite as important as the latter when considering costs of production, and should, at any rate, be easier of attainment. For instance, a few months ago it was estimated that the American miner on the average produced a very much greater quantity of coal in a given period than the British miner, and the American, it is well known, gets high wages. So much so has this been the case that America has captured markets abroad which hitherto have been considered Britain's preserves, and it all depends on the British miner whether these markets are permanently lost or not. Cannot a lesson be read from this by the Transvaal miner? By an increase in efficiency of output costs could be reduced without reducing wages so much as they otherwise will have to be, and with reduction of costs markets for our coal abroad can be captured, which at present is impossible. I would also say to the miners that these frequently recurring sectional strikes or threats of strikes also cause unsettlement and uncertainty, and therefore affect efficiency, and the further investment of capital in the industry. Peaceful and cordial relations between employer and employee are just as essential to industrial development and progress as similar relations between the nations are necessary for the development and progress of international trade, and I would urge the miners to do all they can to attain this desirable end, and towards which the employers will be only too willing to assist on any reasonable grounds.

I say the same thing to the shipping companies, who, however, have always dealt very fairly with us, but with regular communication with certain markets at low rates of freight, other markets, such as South America, might be opened up.

And then there is the question of the port. As you are aware, all our coal is

shipped through the port of Lourenco Marques. There is room for improvement in the handling appliances there; frequent stoppages of the plant occur, so that the coal and trucks are held up, ships are detained longer than necessary, and, in short, efficiency in the conveyance of coal from the truck to the ship does not at present exist in as high a degree as is reasonably expected. The existing plant there is not up-to-date nor of sufficient capacity. It is time that the authorities recognised this; some time ago a new plant was promised to be ready last June, but up to the present this has not been realised, nor do we know when it is likely to be ready. Again, the charges which are made there by the Portuguese Administration for the handling of the coal are, in the opinion of the industry, higher than need be, and might well be somewhat reduced in the interests of both parties.

Mr. Jeppe Hopeful.

The above remarks apply to the shipping trade. It must also be remembered that our internal trade is dependent upon the industrial demand, and that until new South African industries are created to take the place of those gold mines which during the next few years will close down, we must, for any increase in our local trade, look to expansion in our present export markets and the exploitation of new ones, and this can only be done by lowering the cost of production. Taking all things into consideration, however, I am confident that with the revival of European trade, and a sincere and effective co-operation between miners and coal masters, a wise treatment by railway and shipowners, we are assured of a prosperous future for the industry, in which your property, containing, as it does, coal of the very best quality, and for all practical purposes unlimited in quantity, will undoubtedly share to the fullest extent.

In conclusion, I wish, on behalf of the Board, to convey our thanks to the efficient and zealous staff for the loyal way in which they have supported the general manager, Mr. Thom, during the past year.

I also have pleasure in stating that the directors have decided to declare a dividend of 5 per cent.

The directors' report and accounts were adopted; the appointment of Mr. Bailey Southwell was confirmed, and he was re-elected a director of the company; and Messrs. A. F. Brotherton and F. W. Diamond & English were appointed auditors for the ensuing year. A dividend of 5 per cent. was declared.

The proceedings then terminated.

CORONATION SYNDICATE, LTD.

RECENT RICH STRIKES ON EAST AND WEST RAND.

Important Reef Extensions Proved.

The sixteenth annual ordinary general meeting of shareholders of the Coronation Syndicate, Ltd., was held at the head offices, 29-32, Bettelheim Buildings, Johannesburg on Saturday, December 17th. Mr. A. Mackie Niven presided.

In moving the adoption of the report and accounts, Mr. Niven said, gentlemen, I have to apologise for the absence of the chairman, Mr. Gustav Sonn, who has been in Europe for some months, and who, when the last mail left London, was busy on your company's affairs. Mr. Harry Gramann, another of the directors, is also in London, and at no distant date, your board hope to be in a position to report to you that satisfactory arrangements have been made to provide the further funds required to develop the valuable properties which you have already acquired and which I will refer to later.

The accounts which are now presented, are made up to June 30 last, and differ but little, from those submitted at the annual meeting held a year ago.

Van Ryn Reef Located.

What is of much more interest to shareholders, however, is the work done, the results obtained and the prospects of the more recently acquired undertakings of the company. When the present directorate took control there was, and we thought deservedly so, a great deal of interest being taken in the development of the Far East Rand. The board acquired for the company on favourable terms two interests in that quarter.

In the Balfour district, south-east of Heidelberg, we own what we call the 1,000 claim block, situated mainly on the farm Wilgepoort, and as to the acquiring of which you were advised a year ago. When a good equipment had been erected on the two prospecting shafts, these had been enlarged to hauling shafts, work was continued for many months. The work done is fully reported on by the company's general manager, Mr. J. A. Thornburn, in a report attached to the directors' report and accounts.

Happily, there is no dispute as to the reefs which have been sunk upon and opened up, all competent mining men agreeing that here we have the Van Ryn or Modderfontein reef, which has made the reputation of the rich gold mines of the Far East Rand, the New Modder, Modder B, Modder-Deep, Brakpan, Government Areas, Springs, and other mines, the mines which have to carry the gold mining industry when the older mines of the Central-Rand are on the wane.

As pointed out in the directors' report, assays on some parts of the reef run very high. The assay plan has been prepared to include all results obtained from samples taken from just below the surface soil downwards. The exclusion of the sampling results from points near the surface of the shafts gives a higher average in inch dwts. Unfortunately, the company's funds were insufficient to enable work to be continued on this property, as well as at the same time to prove the West Rand ground to be referred to later. All work was, therefore, stopped in June last. What we have done, however, is to prove (1) that our large claim area contains the very valuable Van Ryn or Modderfontein reef; (2) that these carry gold, as on the properties from which the reef gets its name.

The limited amount of work done, while proving quite payable values, has not cut one of the rich shoots which is the characteristic feature of this reef elsewhere. There is no reason to doubt, however, that when funds are provided, and development undertaken on a scale adequate to the great extent of the property, we should be able to open a payable mine capable of carrying a very large crushing unit.

Randfontein Extension Proved.

I now come to the West Rand property known as Luipaardsvlei No. 10. A year ago the chairman said that the company had undertaken a big task in trying to prove the extension of the Witwatersrand reefs on the Far East Rand, as well as on what may be called the Far West Rand. He claimed then that we had succeeded on the Far East Rand, and this, as I have said, has been confirmed by the work we have done during the year under review.

On the Far West Rand we have, however, succeeded beyond our most sanguine anticipations. At last meeting, although the first borchole on the property was reported as being down nearly 1,700ft., no success had been met with, two small leaders only of no value having been cut. To-day we have a very different tale to tell.

No. 1 Borehole (A) was stopped at a depth of 2,260ft., the strata having been disturbed, and the reef displaced. The information gained, however, was most valuable, and, together with trenching operations, which disclosed the footwall shales, enabled your technical advisers to choose what proved to be a favourable site for the second borehole (B). This borehole was discontinued at a depth of 1,180ft., having apparently missed the Randfontein leader through the thickening of the dolomite, but at 770ft. it cut a very rich reef, now recognised as the West Reef of the Randfontein series, with the very satisfactory value of 10.4dw. over a stopping width of 48in. Although the lower portion of the Randfontein series had been completely proved in this borehole beyond any doubt, to make assurance doubly sure, the site of a third borehole was selected (C). The depth reached by the drill last night was 1,150ft., and we should cut the Randfontein West Reef very soon now.

Thirty-Six Ounces to the Ton.

At a depth of 834ft. in this borehole the Randfontein leader was cut, assaying 36oz. to the ton over a width of 2in., which, calculated over a stopping width of 48in., gives the very highly satisfactory value of 30.3dw. This reef, usually in the Randfontein mines, has a width of from a streak only to 4in., and is so rich as to give a payable value over 48in. As the dip of the strata is 40deg., I need hardly remind you that it will be quite possible to carry a stope 36in. wide on such a dip, and that the value over the narrower width would be considerably higher.

What we have now proved therefore is (1) That both the Randfontein Reefs are in our property, and (2) that they are very rich in gold contents. These reefs can, with the information now gained, as the result of the boring operations, be located nearer the surface. I may mention in passing that these Randfontein Reefs have nothing to do with the Black Reef Series as has been suggested. The Black Reef formation is on a different horizon, and is to be found outcropping in quite a number of places on this and the adjoining farms. The Black Reef Series was cut quite near to the

surface in each of your boreholes. We have therefore practically an outcrop proposition, on which a mine can be opened quickly and at much less cost than the modern deep level proposition.

The latest development of the all slimming method of ore treatment by means of crushers and tube mills, instead of the very costly gravitation stamp battery method of reduction, should enable a fully equipped mine to be established at a much less outlay than was thought possible even six months ago. Under the Gold Law your company will be entitled to a minepart of 20 per cent. of the area of the farm of 3,205 morgen, which equals 641 morgen, or 923 reef claims, an area extensive enough to carry a very large reduction plant. In addition there will be a grant for a further number of discoverers' claims by way of reward for the successful boring operations. Under the Mineral Leases Act it will be possible also to secure additional ground from the Government on profit sharing terms.

I think, therefore, one may safely predict a successful and profitable future for the company on a very large scale. Shareholders are to be congratulated on the very good results from our recent operations. It has been a long wait, but as soon as the negotiations for the providing of additional funds are completed, and I am satisfied this will be very soon now, the future progress of the company should be completely assured.

Effect on Gold Mining Industry.

May I, in conclusion, refer to the possible effect of this company's work not only on the West, but on the Far East Rand. Our claims at Balfour are twenty miles beyond Heidelberg, and the result of our success there should lead to the opening up of a stretch of country many miles in extent to the great benefit of the community generally. What we have accomplished on the West Rand is to prove the connecting link, so long sought for, between the Randfontein Company's properties and the valuable farms of the West Rand Estates, proved to be rich by quite a number of boreholes.

Already there is considerable activity on the line beyond Luipaardsvlei No. 10

on the part of prospectors and others, and the Western Rand Estates.

Easy Mining Proposition.

Who knows but what the discovery of the pay reef so often talked of, extending from Randfontein to Klerksdorp, may not soon be realised? What the opening up of new payable lines of reef on the Far East and Far West Rand will mean to the people of the Union and the Government finances I need not enlarge upon. The country is badly in need of a fillip of this kind and your company is fortunate in being one of the pioneers in this direction at both ends of the Rand. Thanks are due to Mr. J. A. Thorburn for his untiring efforts in shareholders' interests, not only on the claims at Wilgepoort, but especially as supervisor of the boring operations on Luipaardsvlei No. 10. The disappointment of all concerned on the non-success of the first borehole, following on the failure of all our predecessors to locate the reef, although some seventeen boreholes were put down in the neighbourhood, was enough to damp the enthusiasm of the most optimistic. Mr. Thorburn, however, who years ago had been associated with some of the former ventures, was never downhearted, and the location of the now successful boreholes was the result of his careful study of the available geological evidence and the correlation of the work of his predecessors. He has also had the valuable help of the consulting engineer, Mr. J. M. Calderwood, who has made a close study of the extension of the Witwatersrand formation both East and West.

Our thanks are also due to Professor Lawn and the technical staff of the Randfontein Company, whose properties are immediately north of us, for information and assistance freely given at all times. I now beg to move the adoption of the reports and accounts.

Colonel J. Donaldson seconded, and the report and accounts were unanimously approved.

Messrs. Gustav Sonn, A. Mackie Niven, Harry Graumann, M.L.A., and Harry Hargreaves were re-elected directors, and Messrs. Aiken and Carter, and Messrs. Douglas, Low and Co., re-elected auditors.

New Type of Concrete Road.

Concrete roads have become quite familiar in many parts of the world, especially where highways capable of carrying very heavy traffic are required. The making of a satisfactory concrete road is, however, a matter of great skill; and in many cases disappointing results have been achieved. One of the drawbacks of concrete as a road material is that it contracts to a certain extent in setting and also as the temperature falls. Again, when concrete of the usual kind is laid in position the scum always works to the surface and forms a layer which when dry prevents a proper junction being made between different portions of the roadway. The consequence is that cracks appear in the roadway, especially at places where the laying of the concrete has been arrested, as in the case of the end of a day's work. A British road engineer has developed a new method which he claims obviates these difficulties. He lays the concrete in alternate portions and does not fill the intervening spaces until the material in the first portions has set and contracted. Further, he makes the edges of each portion exactly vertical by means of special appliances. This ingenious method results in the roadway being split up into straight close joints instead of a number of irregular cracks. When the coating of tar is applied it fills up these narrow joints, which act really as expansion joints. In actual practice the joints are not straight across the road but at an angle, in order to prevent the whole weight of a heavy load resting on the edge of one slab. Reinforcement is of course employed to strengthen the concrete, but in no case is it taken across the joints.

The Marvels of Aluminium.

Ever since aluminium was produced in a commercial form the greatest interest has been taken in its application to various engineering structures where lightness with strength is desirable. It was soon found that when aluminium was alloyed with other metals its strength was greatly increased without any great change in weight. Various alloys of aluminium have been used in the structure of airships and aeroplanes, and the results have been so promising that a special committee was formed in Great Britain to undertake systematic research of the properties of aluminium alloys. A report recently issued by this committee embodies the results of seven years of research conducted in the National Physical Laboratory, which is subsidised by the British Government. This research has resulted in the discovery of many alloys which are of great promise for practically all kinds of engineering, particularly motor-car manufacture, railway rolling stock, internal combustion engines, and steam engineering. The only problem awaiting solution is the production of these alloys on a commercial scale. Already a beginning has been made in this direction by a British Government factory; and British manufacturers are looking closely into the possibility of producing some of these wonderful substances for regular use in place of steel.

Why Costs Must Be Reduced.

Telling Facts, Figures and Diagrams in this issue.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, DECEMBER 31, 1921.

No. 1579

A Well-Known Land Mark on the Central Rand Destroyed by Fire.

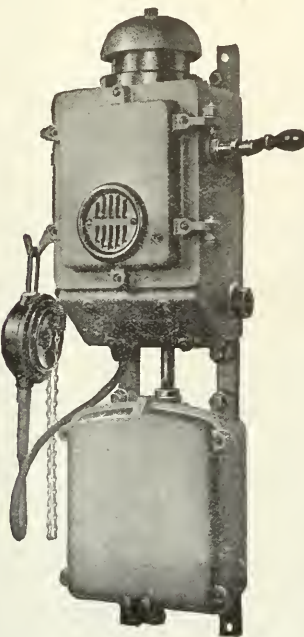


The headgear of the Village Main Reef Gold Mining Company, which was completely gutted by fire last week. The mine, as is generally known, ceased production some months ago. The Village Main Reef was one of the first deep level properties on the Rand to commence production.

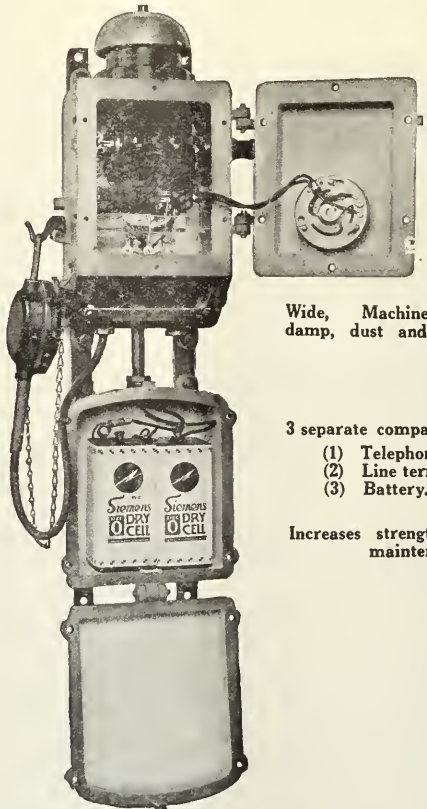
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Deep Mining: Problems and Achievements.

THE WORLD'S DEEPEST MINES—CHAMPION REEF, VILLAGE DEEP AND ST. JOHN DEL REY—TURF SHAFT BEING SUNK TO THE THIRTY-THIRD LEVEL—WORKING CONDITIONS AT 6,200 FEET—COSTS OF WORKING CONTRASTED—THE CITY DEEP PROSPECT—THE RAND'S DEEPER LEVEL FUTURE DEPENDENT ON OPERATING EXPENSES.

The subject of mining at great depths is always of great interest. There is a spectacular and almost romantic value in the conception of man's ability to probe into the bowels of the earth and to bring up from a depth of a mile or more an ore which will yield its metallic content at a profit to the adventurers—the old Cornish word for mine shareholders seems to have a singularly fitting application here—who have financed the stupendous and speculative undertaking. From an economic standpoint the question is of prime importance since the easily accessible minerals lying at shallow depths are being rapidly exhausted, more particularly in districts where the mining industry is highly developed.

Below Sea Level.

The Rand already can lay claim to one of the deepest shafts anywhere in the world. The Turf Mines shaft of the Village Deep, situated near the southern end of Eloff Street Extension, Johannesburg, has reached a vertical depth of 6,200 feet below surface. It thus rivals the deep workings of the Michigan copper fields and has been regarded as probably the deepest metalliferous mine in the world.

It is not particularly easy to visualise such an enormous depth, but to help one to appreciate the magnitude of this deeper level achievement it may be stated that the depth is not far short of a mile and a quarter, and this Turf shaft sunk on the high plateau of the Witwatersrand has penetrated far below sea level. The City Deep new southern shaft will, however, be sunk to an even greater depth than this, and in his valuable paper read some little time ago Mr. E. H. Clifford, the company's consulting engineer, described the arrangements made to work ore at a depth of 7,000 feet.

Which is the Deepest Mine?

Hitherto it has generally been understood that the deepest metalliferous mines of the world were situated in the Michigan copper fields, where the Calumet and Hecla Company is mining ore through the Red Jacket shaft for over 5,000 feet vertically below the surface, and is planning to make the 8,100 feet line of the inclined shafts a main haulage way, with subsidiary shafts to open levels to a depth of 10,000 feet. In the same district at the Quincy mine, the Pewabic amygdaloid lode, which has a dip of 54 degrees flattening a mile down on the slope to 40 degrees, is to be mined to a depth on the dip of 10,000 feet, being already worked for a length of three miles and a depth of over a mile.

In his paper on the City Deep project Mr. Clifford stated: "The greatest depths yet reached in mining are at the Morro Velho mine in Brazil, the Ooregum mine in Mysore, and the Village Deep mine at Johannesburg. It is a curious coincidence that all three are gold mines are of nearly the same depth, viz., 6,000 feet, the two former being somewhat greater and the latter some 100 feet less than this figure."

It was pointed out at the time that the Village Deep southern shaft (the Turf Shaft) had then reached a depth of 6,093 feet. Since then a further hundred feet have been sunk and we were of the opinion that either this shaft or one of the shafts of the St. John del Rey in Brazil had penetrated to a greater depth than any other metalliferous shaft in the world.

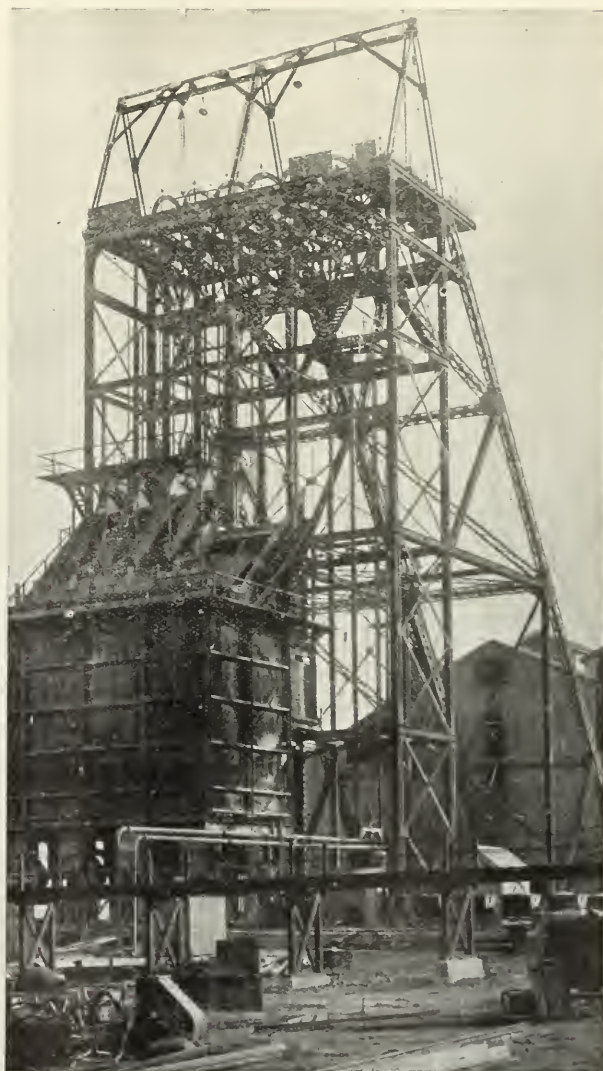
The Carmichael Shaft, Mysore.

But in an article on mining economies appearing in this issue of the Journal Mr. Hegarty, formerly mine captain of the Champion Reef Company on the Kolar gold fields, states that the Carmichael shaft of that property has been sunk to 6,500 feet vertical depth. The subject is of so much economic and general interest that we shall welcome from our readers in various parts of the mining world authoritative facts and figures regarding actual depths, cost of

working, and earth temperatures, and with a view to obtaining further information on the subject we give herewith some data which should prove of interest.

Conditions in the Turf Shaft.

We are indebted to Mr. Whitehouse, the manager of the Village Deep, for the following particulars of present mining operations in the Turf shaft of that company, which has penetrated to a greater depth than any other mine in Southern Africa. Sinking is now proceeding from the



Headgear at the Turf Mines Shaft of the Village Deep: The deepest shaft on the Rand.

thirty-second level to the thirty-third and a vertical depth of approximately 6,200 feet from surface has been reached. The strata at the bottom of the shaft are dipping at an angle of about 33 degrees to the south, and it is worth noting that the dip in the upper workings of this deep level proposition was 26 degrees. Thereafter the angle of inclination steepened to 40 degrees and as greater depth was attained it has flattened to 33 degrees, but at a depth of 6,200 feet the dip of the strata is about 7 degrees nearer the vertical

than it was in the upper levels of the mine, a fact which is in conflict with the general conception held a few years ago of the Witwatersrand conglomerates as a synclinal basin with a consistent tendency towards a flattening of strata as greater depths are reached.

At the thirty-third level the economic limit of hoisting on the basis of present hauling arrangements will be reached and further stage hoisting will be necessary. Two subsidiary hoists will therefore be installed at the thirty-third level. The temperature at the bottom of the shaft is 84 degrees dry and 81½ degrees wet. In Mr. Hegarty's article it is stated that ore is broken and hoisted from a depth of 6,500 feet at a cost of 8s. per ton. We scarcely think that this figure admits of any close comparison with Village Deep costs; we are not sure as to what items are included in Mr. Hegarty's figure and whether these items are the same as those of the Village Deep Company.

Deeper Level Costs.

It will, however, here be worth while to state the underground costs of the Village Deep, Ltd., which company is dealing with ore at a depth of 4,500 feet to over 6,000 feet from surface. Costs per ton mined:

	s.	d.
Breaking	5	7
Shovelling	1	3
Tramming	1	3
Hoisting	2	10
Pumping	0	9
Timbering	2	4
	14	0

Doubtless there are other charges to be added to this total. As we have already stated, we are unable to draw any close comparisons between Rand and Mysore costs in respect of hoisting gold-bearing ores from a depth of over a mile from surface. The Indian field has, however, apparently a substantially lower expenditure per ton than the Witwatersrand.

Dependent on Costs.

The prospect of winning gold from the auriferous conglomerates at even greater depth than have yet been reached is conditioned by the quantity and selling value of the gold in the ore and by the cost of winning it.

Engineering Problems.

Just after the Boer War Mr. Hans C. Behr, at that time consulting mechanical engineer to the Consolidated Gold Fields of South Africa, read his "Magnum Opus" on the subject of winding from great depths. At that time the Rand was commencing on its deeper level projects. The heyday of outcrop propositions had been reached and the success encountered in the preliminary development of the first row deeps had encouraged the controlling houses to proceed with the development of the propositions which had been taken up to the south right along the Rand. Maintenance of gold values, earth temperatures, ventilation, and the human factor called "industrial fatigue," were not considered to present any material obstacles to working at a depth of a mile or more from surface. The great problem was the haulage of ore from such depths and the down and up trips

of men, tools and stores. Mr. Behr's noteworthy paper, which provoked a tremendous amount of discussion from Messrs. H. H. Webb, Henen Jennings, A. M. Robeson, and other technical giants of those days, went to show that by the adoption of stage hoisting and the most modern types of winders there were no insurmountable obstacles to hoisting from the deeper levels of the Witwatersrand, and all that has happened since has proved the accuracy of Mr. Behr's estimates, amplified and supported by the bulk of the Rand's technical experts.

The Human Factor.

But it must be admitted that whilst the mechanical factor has given no cause for qualms the economic situation has not changed for the better. The values in the deeper levels have not come up to expectations, costs have been steadily rising, labour's demands have increased, and unfortunately efficiency has not kept pace with these demands for more pay and less work. Efficiency has, in fact, declined and the problems which confront the mines on the Rand as a whole, and the deeper mines in particular, are rather of the economic and human type and not of the mechanical kind.

We cannot determine or regulate the value per ton of the ore that lies in the deeper reaches of the great Rand basin, and we must therefore, if we wish to continue to win gold from great and increasing depths, so adjust the other factor—that of cost of production—that this ore yields a profit when it is brought to the surface and made to disgorge its precious, but low-grade, content.

It all resolves itself to this then, that the cost of working must be reduced if the deeper level projects of these fields are to prove successful. No man, no body of men in possession of sanity, can be particularly enthusiastic about sinking money in an undertaking a mile below the surface of the earth unless there is a fair prospect of securing a good return from such a tremendous speculation. And with working costs at their present high level the prospect of securing such a good return simply does not exist.

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**MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.**

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
	Total for S.A.		17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 6 failures this year (1921)

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St. Johannesburg

Mining Economics: Some Lessons from Other Fields.

HOW AUSTRALASIAN AND ASIATIC PRACTICES COMPARE WITH RAND METHODS—MINING FROM 6,500 FEET IN MYSORE—RUNNING MINES WITH FOREMEN AND COLOURED LABOUR—A STUDY IN COSTS—CARMICHAEL SHAFT OF THE CHAMPION REEF DEEPER THAN THE TURF SHAFT.

(By W. A. Hegarty.)

The following article, which has been specially written for the "Mining Journal" by a practical mining man who has had a wide and varied experience, contains several points which should have a valuable interest for the Rand at the present time when gold mining in the Transvaal stands at the cross roads of industry. Mr. Hegarty had a large experience of mining on the Witwatersrand before he was employed on the various mines he describes in this article, and as a practical man his comparisons are of value. The article shows how the big Australian metal producers have fared during the past three difficult years, and it also describes the methods of mining and the systems of labour control at some big Asiatic properties where coloured labour is employed under efficient European supervision. Mr. Hegarty's statement that the Carmichael shaft of the Champion Reef Company has reached a vertical depth of 6,500 feet will come as a surprise to most of our readers. We have been under the impression that either the Turf Shaft of the Village Deep or the St. John Del Rey mine in Brazil constituted the deepest workings for gold in the world, and we refer to this question in another article appearing in this issue.

In view of the possibility of a number of the low grade mines of the Reef ceasing operations owing to the increasing cost of production, falling premium, high wages, inefficiency, etc., it may be interesting if some notes on the mining industries of other countries at the present time were given by one who has worked for the past eight years as miner, shift boss, foreman and mine captain in Australia, India, New Zealand and South Africa.

How High Costs Have Closed Down Many Australian Mines.

Australia: During the war the mining industry was at its zenith. Broken Hill, N.S.W., where the famous silver lead mines are situated, and which is probably the biggest mining field in Australia, was employing between nine and ten thousand men. Wages were high, contractors were making big money, metals soared to a price never dreamt of, and things were going along swimmingly. Then the Armistice was announced. Within a few days metals had taken a turn, the price of lead falling from £35 per ton to £23, spelter following suit. Broken Hill companies, after a few weeks, came to the conclusion that, it being impossible to carry on, they should close down many of the mines pending a readjustment of wages; contract prices were to be revised, hours of working were to be gone into. A conference was arranged between the representatives of the union and the Mine Managers' Association, and after a good deal of argument on both sides, neither would give way; subsequently the whole of the mines closed. To-day, what is the position? Only the mines with a richer percentage of metals can carry on, all the low grade mines at the present have ceased operations, and this once prosperous mining field which employed 10,000 men, to-day gives employment to 2,000; and until such time as there are considerable reductions in the price of materials and a revision of the whole of wages agreement, both with the staff and the worker, I am afraid these mines will remain unproductive.

The Rand and Broken Hill Compared.

The Rand mining position to-day is much on a par with Broken Hill. It may be information to those in Africa who have practically acquired what mining knowledge they possess in this country if I were to give a little outline of the methods of mining adopted on the Barrier. Broken Hill has a line of lode in extent about 10 miles. The system of working is back stoping. I may mention that some of the stopes from foot to hanging are from 200 to 300 feet in width. Stopes that are being depleted are filled with sand, and the backs caught with bulks. Contracts are set fortnightly or monthly, as the case may be, at so much per ton. The minimum wage is 16s. 8d. Contracts vary in price according to the ground. There is no such word as inefficiency on this field. Every man gets paid for what he earns. Broken Hill has been the greatest technical college the Australian miner has ever had. His experience has varied from running ground to the hard sulphide. "No specialising" is practiced and the miner must be prepared to take any job on, from the "brace" to the "well."

Mount Morgan, Queensland's one great mine, is in the same position as Broken Hill, viz., closed down. It had over 2,000 employees. The monthly return from this great mine was from 10,000 to 12,000 ozs. and 300 tons of copper per month. The causes of closing down as given by the company were high cost of production, the low price of copper, cost of materials, high wages, etc. The company is asking for a 20 per cent. reduction in wages and, according to my last mail, there is every chance of a settlement and the mine reopening. The cost of production per ton has risen since 1914 by 50 per cent.

Many other big mines have closed, comprising Mount Boppy (gold), all of the Cloncurry field (copper), Great Cobar (copper) and a number of the Tasmanian mines.

New Zealand and Burma.

Waihi, the big mine of the North Island, is still carrying on; Reefton, in the South Island, also. It may be stated in New Zealand wages did not increase much during the war in the mining industry.

After finishing my trip to New Zealand I was offered, and accepted, a position with the Burma Mines Corporation, to proceed to the Northern Shan States, Upper Burma. This mine is situated 650 miles north of Rangoon and practically on the borders of China and Thibet. It would be hard to believe that in such an isolated position that on my arrival I was to view one of the most up-to-date mines it has been my lot to see, and at the same time one of the cheapest worked mines in the world.

In giving a description of the mine, a recent American visitor stated it was one of the most modern and up-to-date he had seen, even surpassing the American mines. In the report of the mine superintendent for 1920 the estimated reserves were 5,000,000 tons of crude ore, containing 28 per cent. lead, 17 per cent. zinc, and 30 oz. silver per ton.

The mine itself is worked by adit. The bottom adit, which is $1\frac{3}{4}$ miles in length, and is in size 15 by 12, is 900 feet below the summit of the hill, giving a height in backs of over 700 feet. The system of working is by square set on a rill of 45 degrees. The ground, being very heavy, requires bridging, back-lathing, and in places it is necessary for face-boards to be used. The labour used is Chinese, and for this particular class of work they are unequalled. What struck me most was that in a mine of these dimensions, with a tonnage or, at my time, 10,000 tons per month, the underground department had only nine whites, comprising the superintendent, two foremen, and five shift bosses and one sampler.

The cost of production per ton, put in the outside bin, which has a holding capacity of 10,000 tons, was four rupees. The mine was worked two shifts, and each shift had one foreman and two shift bosses, that is to say three men had the control of between 400 and 500 boys, with probably 70 working stopes and other development. The rate of pay for the white bosses varied from 350 rupees to 550, mostly covenanted.

Gold Mining at 6,500 feet.

After a year's engagement with this company, I resigned with the intention of returning to South Africa, where the money was more and a lot easier to be got, but fates decided otherwise. Whilst waiting for a boat at Rangoon I got into communication with the different superintendents on the Kolar goldfields, with the result that I accepted a position on the Champion Reef Gold Mines, Mysore State, Southern India, where more surprises awaited me. Not hearing much of this goldfield, I expected to see the usual things found on fields without any history. Champion Reef's main circular shaft is down 4,400 feet and has a circumference of 52 feet, 6-ton skips for ore hoisting, and two riding skips, each having a carrying capacity of 40 boys. The secondary shaft in "A" section, Carmichaels, has reached a depth of 6,500 feet vertical.

The mechanical appliances comprise overhead electric lift, which is attached to the headgear for handling timber, machinery, etc., into the skips, and is one of the finest, no man-power being required.

Rival Costs and Staff Conferences.

The organisation on the different mines is of a very high standard, each mine vying with the other to obtain the best results. Mine superintendents, chief engineers and chief mine agents meet every Monday morning in conference. In the afternoon the chief mine agents call the mine captains together and a general discussion takes place on any knotty problem that may arise for the economic work of the mine or the safety of the men employed.

In comparing South African and Indian mining from an efficiency point of view, South Africa must take a back seat. Very many men are sent from England to the Kolar goldfields, every man is covenanted. He signs on for three years, the rates of pay vary from 250 to 700 rupees, and he must hold the best credentials as a miner.

The system of working is underhand and rill back stoping. The stopes are not opened to a great length, as the open stope has a tendency to create air blasts. It has been proven that the quicker a stope is filled after the ore is beaten out is the safer plan. Therefore, even at the deepest parts of the mine, filling is the general rule.

In comparing costs with the Rand mines, I find a great difference. Whereas the Rand's costs are abnormally high, I find in "A" section, Carmichael's, Champion Reef, for one month a total tonnage of 4,434 tons were broken and sent to bins, at a cost of 8s. per ton. Appended cost sheets for verification. During this month a daily tally of 1,500 coolies were employed; native contractors, 9; No. of stopes working, 32; developing places, 13, under the supervision of 5 white timbermen-miners, 1 shaft timberman and mine captain.

A Practical Man's View.

In conclusion, I may say that the situation of the gold mining industry of South Africa does not appear to me to be a difficult proposition. What can be done in one country can be done in the other, especially in South Africa. Of all the mining countries I have visited the system of mining as adopted by the South African mines is the easiest, but apparently the most expensive. As this article has been written before the conference between the Chamber of Mines and unions, it is the earnest hope of the writer that a solution will be found to keep the wheels of the only industry that the country possesses revolving.

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—**loss of Fuel:** correctly-lubricated machinery requires less fuel.

—**loss of Power:** preventable friction slows down machinery and invites costly repairs.

—**loss of Production:** the machine that slows down, slows down your output.

—**loss of Profit:** after all, this is the important net loss.

The premium you pay for correct lubrication may be a few pence more per gallon of oil. This few pence a gallon represents not added expense but a marked saving in expense. It protects your machinery, while it speeds your output. Generally it reduces actual oil consumption.

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Figures that Talk.

THE POSITION OF THE MINING INDUSTRY IN STATISTICS AND DIAGRAM—WHY COSTS MUST BE REDUCED—THE RAND ON THE BRINK OF AN INDUSTRIAL ABYSS.

The following statistical statements which have been forwarded to the S.A. Industrial Federation by the Chamber of Mines, in response to the request of the former for amplification of the Chamber's proposals, show how enormously working costs have risen on the mines of the Rand and how urgent is the necessity for a reduction in working expenditure.

Statement No. 1 gives, among other figures, the following:—

Working Costs per ton.

Working costs per ton milled		Working costs per ton milled	
s. d.		s. d.	
1910	17 7	1916	18 1
1911	18 0	1917	19 2
1912	18 8	1918	21 7
1913	17 11	1919	22 11
1914	17 1	1920	25 8
1915	17 5		

Native and coloured wages: £655,073; percentage of 1914, 12·2.

Stores: £4,068,946; percentage of 1914, 39·8.

Totals: £8,909,211; percentage of 1914, 39·2.

Number of tons milled: 1,898,560 (decrease).

Number of Europeans employed: 793 (increase).

Tons milled per European employed: 126 (increase).

Number of natives and other coloured employed: 4,310 (increase).

Tons milled per native employed: 14 (decrease).

Statement No. 4 shows that the 17 mines which closed down between 1915 and November, 1921, crushed during 1915, 4,933,787 tons, and were employing in June, 1915, 3,547 Europeans and 35,639 natives.

Earnings of Contractors.

Statement No. 5 shows the number and average earnings of contractors employed on the Witwatersrand gold

£21,354,166.

WORKING COSTS 1914.

£33,020,875.

WORKING COSTS 1921.

£11,666,709.

INCREASE IN WORKING COSTS.

£2,500,000.

INCREASE IN REVENUE DUE TO PREMIUM ON GOLD — £ 2,500,000.

£5,000,000.

INCREASE IN WORKING COSTS DUE TO EUROPEAN LABOUR — £ 5,000,000.

HOW THE RAND'S WORKING COSTS HAVE INCREASED SINCE 1914.

Total White Employees and Pay.

	No. of Europeans employed during December.	Estimated Total Pay.
1910	21,065	£6,692,200
1911	23,433	7,972,600
1912	22,717	7,647,000
1913	21,228	7,332,600
1914	20,930	6,874,100
1915	21,873	7,210,500
1916	21,932	7,636,400
1917	21,980	8,101,600
1918	22,027	8,522,400
1919	22,305	8,931,286
1920	20,308	10,054,282

Striking Comparisons.

Statement No. 3 contains comparisons of certain costs incurred by the gold mines in the Transvaal. The increases in 1920 over 1914 are shown as follow:—

European salaries and wages: £4,185,192; percentage of 1914, 58·4.

mines in June, 1921. The following is a summary of the statement:—

Class of Work.	Shifts worked during month.	Average gross earnings per shift worked, including guaranteed wage.	Gross earnings for the month, including guaranteed wage.
Shaft sinking	823	79 7	£3,275
Shaft helpers	474	67 1	1,590
Shaft stagemen	173	61 6	532
Machine developing	10,857	61 10	33,564
Hand developing	232	40 9	473
Machine stoping	22,715	49 11	56,661
Hand stoping	10,596	42 11	22,539
Reclamation	561	37 11	1,064
Mixed work	8,445	47 2	*19,933

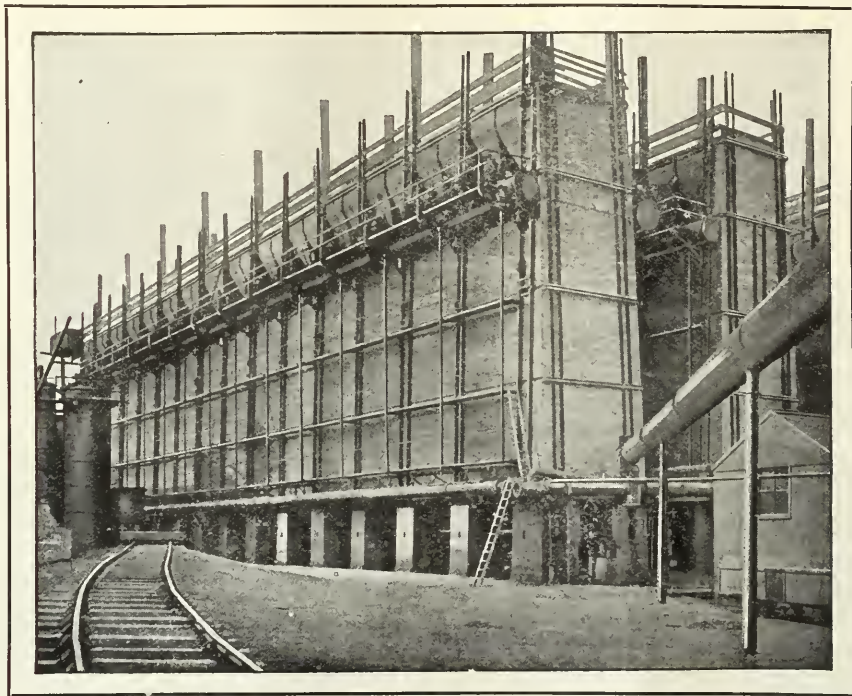
54,876 50 11 £139,631

* Includes two diamond drillers.

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Comparative Table of Gold Dividends for 1921

COMPLETE LIST TO DATE.

We give hereunder a statement of dividends declared by Transvaal gold mines to date, with comparisons for 1920, 1919 and 1918. In our next issue the declarations of financial corporations, collieries, etc., will also be noted.

WITWATERSRAND GOLD MINES.	Date 1921	Rate per cent.	Capital £	Total for 1920		Total for 1919		Rate 1918
				per cent.	Rate per cent.	Amount £		
Brakpan Mines	June	15	834,600	15	27½	224,365	32½	
	December	15						
City Deep	June	20	1,250,000	32½	23¾	296,875	27½	
	December	17½						
Consolidated Langlaagte ...	June	5	950,000	12½	12½	118,750	5	
	December	7½						
Consolidated Main Reef ...	June	3¾	1,247,602	15	8¾	109,165	6¼	
	December	5						
Crown Mines	June	10	940,106	77½	40	376,942	20	
	December	22½						
Ferreira Deep	March	7½	980,000	22½	12½	122,500	22½	
	September	7½						
Government G.M. Areas ...	June	25	1,400,000	50	37½	525,000	27½	
	December	30						
Geduld Proprietary	June	7½	1,176,256	17½	—	172,908	11¼	
	December	10						
Langlaagte Estate	June	5	886,500	10	15	132,974	12½	
	December	7½						
Meyer and Charlton	June	50	200,000	120	120	240,000	110	
	December	50						
Modder B.	June	40	700,000	82½	92½	647,500	82½	
	December	55						
Modder Deep	June	65	500,000	145	115	563,095	97½	
	December	85						
New Kleinfontein	December	5	1,151,540	5	—	—	—	
	June	42½						
New Modderfontein	December	50	1,400,000	102½	70	980,000	51½	
	June	5						
New Primrose	December	7½	250,000	15	10	32,500	—	
	June	5						
New Unified	December	5	827,824	8¾	3¾	31,043	3¾	
	June	2½						
Nourse Mines	December	3¾	2,750,000	3	7½	206,250	2½	
	June	1						
Robinson	December	1	700,000	27½	25	175,000	17½	
	June	7½						
Rose Deep	December	7½	—	2½	—	—	—	
	June	2½						
Simmer and Jack	June	7½	1,307,236	20	—	—	—	
	December	7½						
Van Ryn	June	7½	500,000	15	12½	62,500	10	
	December	5						
Van Ryn Deep	June	30	1,196,892	65	—	718,134	45	
	December	30						
Village Deep	June	3¾	1,060,671	10	6¼	66,292	3¾	
	December	6¼						
Witwatersrand	June	10	469,625	20	10	46,962	15	
	December	15						
Wit. Deep	June	5	550,000	—	—	—	15	
	October	3¾						
Wolhuter	April	3¾	860,000	12½	5	43,000	6¼	
	October	3¾						
OUTSIDE DISTRICTS GOLD MINES.								
Sub Nigel	June	3¾	775,000	12½	10	62,500	11½	
	December	5						
Glynn's Lydenburg	January	5	170,000	10	5	8,500	16¼	
	July	3¾						

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Minerals in the North-West Cape Province.

VARIOUS MINERALS DISCOVERED—THE ASBESTOS INDUSTRY—OPTIONS GALORE.

(By a Special Correspondent).

Many parts of South Africa have seen far more money sunk in prospecting work and option payments than has been recovered from mining, and this is very true of the North-West of the Cape, the district stretching from south of Prieska to Upington and from Kenhardt across to Griquatown. There is hardly a farmer there who has not received option rentals at some time or other (often for years on end), and hardly a mineral that has not been sought for—yes, and found. To date, however, only one of the varied assortment has proved payable, namely, blue asbestos (amphibole asbestos or crocidolite of the mineralogist.)

The Asbestos Workings.

This substance is so typical of the Griquatown shales or jasper shales of the geological system now known as the Transvaal series, that the low ranges of hills composed of these shales which run from south of Prieska to north of Griquatown are marked on many maps as the Asbestos Mountains (the old Dutch farmers called them "Gift-Bergen," from the number of poisonous plants that were at times to be found growing thereon). The Transvaal system, with its asbestos deposits, runs right away to the north of the Transvaal. The mining of the blue asbestos started about 1891, the Cape Asbestos Company, formed very largely through the influence of the late Mr. Oates of De Beers, starting work in that year on the farm Koegas. There were many difficulties to contend with, the great distance from the railway (150 miles to De Aar), the thinness and somewhat erratic nature of the reefs which made ordinary mining methods unpayable, and the quality of the products. Manufacturers used to white asbestos were very chary of using blue, as although much stronger than the white, it is much harsher and requires special machinery to work it. The obstacles to be overcome in finding a market for this product may be judged from the facts that about 1899 some 300 tons of blue asbestos were dumped into the sea at Port Elizabeth to save storage charges, and on another occasion a claim for some £2,000 was made by a German firm for damage to their machinery through having tried a consignment of the material. However, through the energy and perseverance of Mr. Oates, ably backed up by the manager, Mr. Rundle Olds, these difficulties were overcome; a cheap method of mining was adopted by which each native worker got as much asbestos as he could and sold it at a fixed price to the company, facilities for manufacturing the crude fibre were started in England, Italy and Germany, and the blue asbestos slowly but steadily pushed into public notice and favour. The company has always pursued a conservative policy, dividends being considered of secondary importance to sound development and a secure financial position, and today the Cape Asbestos Company is, for its size, one of the strongest and most powerful concerns in the Union. Asbestos is found on practically every farm in the asbestos ranges, and there is hardly one where debris heaps are not visible on the hillside showing the position of old or present workings; only on a few, however, has anything approaching real mining been done, usually the work is little better than rabbit-burrowing.

Extension of the Field.

For many years this work was confined to the Prieska District, but of late numerous ventures have been started round Kuruman, and one or two in the Northern Transvaal. It should be noted that blue asbestos is found in quantity in no other part of the world, the quantity mined at present is about 6,000 tons per annum, which is very small compared with the output of white asbestos. There is no doubt that this output could be very largely increased; there is also little doubt but that the demand will increase also

when normal times again arrive. There ought to be a good future for the blue asbestos industry, especially if more efficient methods of mining can be adopted. At present it is practically all hand-labour, for although several mechanical installations have been tried for crushing and stamping the products, so far they have not been successful to any great extent. The problem of mechanical stamping is, however, surely not insoluble.

Some of the asbestos reefs are silicified, especially in disturbed areas, and the very ornamental stone known commonly as "crocidolite" or "tiger-eye," blue, yellow or brown occurs. When first discovered this material was despatched to England and Germany in small packets by parcel post and realised as much as five shillings per ounce. Then certain people, anxious for "get-rich-quick" results, sent it over in sackfuls and killed the market. At present there is practically no demand for crocidolite, which seems a pity as it is a very handsome stone.

Copper and Lead.

Copper is widely distributed over the north-west, both in the Transvaal series and in the older formations to the west. Most of the deposits are very small, though the ore



Opening up a Diamond Prospect in the North-Western Cape Province.

is rich and has tempted many prospectors and speculators to spend money on developments. There are several shafts 70 to 100 feet deep sunk in these veins in the hope of striking something better. There are two or three much larger lodes in the granitic areas to the west, notably at Vogelstruisbult and Areachap, but up to the present none of them have been thoroughly proved. Galena also occurs in places rich enough to encourage serious prospecting, but the results so far have not been satisfactory.

The Elusive Diamond.

Equally elusive has been the search after diamonds. Some farms are literally honey-combed with prospecting pits; every indication of a diamond mine is present except the mine itself, surface deposits, so typical as to strike the eyes of even a casual passer-by, well-marked fissures, even occasional diamonds, lying on the surface—still no mine found after years of active search. Many diamonds have been picked up in various parts of the district, both south and north of the Orange River. At least one farmer carries a diamond licence habitually (last year he picked up a stone weighing 55 carats and this year one of 34), and experts declare these stones to be mine stones—not river stones. In 1905 an enlargement of one of the fissures was discovered on the farm Sanddrift, and it was thought that the mine was at last located. There was great excitement in Prieska, a small syndicate was formed, and diamonds were actually obtained. The promoters could have sold

out at a handsome profit, but they refused to part. The work went on through 1906 and 1907; in March of the latter year 253 diamonds were registered, weighing altogether 36½ carats; the "mine" proved to be only about one claim in extent, the diamonds were not only small but of poor quality and the company ceased operations.

Saltpetre.

Deposits of saltpetre in the asbestos ranges have been known for many years to the farmers; the first attempt to work them commercially was in 1890, when a syndicate of Port Elizabeth business men took options over a number of farms. In 1899 Dr. Hahn, of Capetown, the brothers Struben, and a well-to-do prospector named Maidments, who travelled the country with his wife in a gaily-painted caravan, were all actively working on the saltpetre deposits, the two former floating companies for the purpose. The Struben Company still exists, I believe, and owns some farms near Griquatown, but it long ago gave up saltpetre and turned to ranching.

On the outbreak of the war, in 1914, with the consequent scarcity of potash salts, attention once more fell on the Prieska saltpetre, and several syndicates, some local, others financed from Johannesburg, started operations. In 1918 most of these were merged in Mr. Bleloch's Company, the South African Nitrate and Potash Corporation. Unlike its predecessors, this company worked on the rocks themselves, instead of the soil and detritus, but the results were equally disappointing. Altogether several hundred tons of saltpetre have been obtained at various times, but so far it has been found impossible to discover deposits consistent enough to work on a large scale.

Gold and Oil.

Two or three farmers have ruined themselves, and a good deal of Johannesburg money has been spent in the search for gold around Marydale, but there is nothing to show except useless shafts and fine samples and assays; no real reef was ever discovered. Most of the big mining concerns of Johannesburg and Kimberley have been actively interested in some parts of this district at one time or another, and have spent large sums in prospecting, or have acquired properties. There are several other minerals to be mentioned, but they only require passing notice. White asbestos has been worked towards Upington, but the quality is poor and the quantity limited; mica of good quality has been located, but so far no actual work has been done; heavy spar occurs in quantity, but the demand is limited and the price to be obtained is very low. The bold oil-drilling experiment at Carnarvon is just across the boundary of the district, and should that prove successful

it will undoubtedly stimulate a search around Prieska where indications of petroleum have been observed in the Karoo shales which abut in several places in the Griqualand formations. There are vast deposits of rich iron ore now lying neglected, which would become valuable if oil or coal were discovered anywhere near them.

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 African Iron and Steel Products.—Improvements in linings for tube mills and the like.
 Percy Leonard Chapman.—An improved form of carburettor for internal combustion engines.
 Michael John Thorp and Alexander Jeremiah Orenstein.—Improvements in connection with scraping and dressing amalgamated plates.
 John Thomas Hird and Charles Henry Longridge.—Temperative safety device.
 Alfred Aaron Kloot.—Process for the manufacture of tiles and building materials from spent wattle bark.
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 Morris Green.—Improvements in separating metals from their salt solution.
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 James Richard Armstrong-Kelly.—Improvements appertaining to shovels and the like.
 William Edwin Bleloch and Harry August Stockman.—Improvements in means or apparatus for crushing or reducing minerals, ores and other materials.

GOVERNMENT EXAMINATIONS.

MINE MANAGERS' EXAMINATION

Total certificates (metal) granted to date 1921 — 36
 Secured by students of Messrs. Lucas & Wolfe — 21
 Balance for S.A. — 15

In addition to above we obtained 5 coal certificates last two examinations

OVERSEERS' EXAMINATION

During 1918 and 1919 we secured the majority of the certificates granted, 21 certificates in 1920, and 23 certificates to date 1921 (metal and coal)

SURVEY EXAMINATION

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The Miners' Phthisis Bureau.

A CRITICAL NOTE.

(By a Special Correspondent.)

The report of the Miners' Phthisis Medical Bureau for year ended 31st July, 1920, recently appeared in your columns. It is a work full of information on one of the most important aspects of mining life in South Africa. The work accomplished by the Bureau in the period under review has been tremendous, and comprises 42,030 clinical examinations and investigations, with the addition of 29,062 radiographic negatives 12 x 10, in addition to other work.

The Bureau examined 4,613 youths and men of European blood as candidates for underground work, but the legal definition of "The Anti-primary Stage" has now brought up the percentage of rejections to the highest point yet reached. It cannot be doubted that this special selection of picked men will shortly produce a considerable lowering of the incidence rate of Silicosis. Of the 4,613 candidates examined, 70.26 per cent. were of South African birth, and 29.74 per cent. were born oversea. Fifty-seven per cent. of all the candidates were permanently rejected on account of respiratory defect, or other physical unfitness, while 16 per cent. were temporarily rejected with the option of applying again for another examination.

When we come to the disease prevalence rates, we cannot help feeling that a great deal yet remains to be done to give us more satisfactory figures. During the year under review when 15,468 "working miners" were examined, the prevalence rate for tuberculosis was found to be 297 per 100,000. The prevalence of the anti-primary stage of silicosis was found to reach the high figure of a prevalence of 3,633 per 100,000. The examinations of the 15,468 "working miners" showed that the prevalence rate of primary and secondary stage silicosis uncomplicated by tuberculosis was 5,236 per 100,000, "the highest rate so far reached."

While the report suggests that conditions are better underground than formerly, we cannot feel cheerful over the showing that the average period which it took to acquire a decisive stage of the disease was—

1917-18	9 years 1 month
1918-19	9 " 2 months
1919-20	9 " 5 "

The speed is very slow when the matter is so vital!

It may be that machines are still at the root of the trouble, for the report states "that although underground conditions of work, as a whole, have undergone improvement for several years, the conditions of machine drilling work have not participated equally and simultaneously in the advance."

The attached report of the Miners' Phthisis Board contains one very interesting fact of use to all who contemplate farming at the termination of their mining career. It had cost the Board the total sum of £1,150 19s. 10d. per settler, at the end of 3 years and eight months, in respect of an average holding of a 75 morgen plot!

TUNNELLING OFFICERS CORPS OF ROYAL ENGINEERS (SOUTH AFRICAN BRANCH).

The third annual dinner was held at the Carlton Hotel, Johannesburg, on the 17th instant. Ex-officers representing most of the British Tunnelling Companies from all parts of the Reef and several outside districts took part in a pleasant reunion, before going on to the Empire. Major Kinahan was in the chair, and the duty of proposing the King's health fell upon Lieut. Tute, who had come from White River. Lieut.-Col. Pam referred in well-chosen words to the many tunnellers killed in the War, whose memory was honoured by a silent toast.

Letters of regret had been received from all parts of the Union, Rhodesia, and the Congo, and it was mentioned that great interest in the local dinners is taken by old tunnellers in England and Canada, who live too far apart to permit of

reunions. It is hoped that the good wishes of those present to the ones in this country who could not attend, and the old friends overseas, may reach them by means of the report in this journal.

Capt. Brodigan, who had volunteered to undertake the arrangements for the dinner, was suitably thanked for a successful evening, and Capt. MacWilliam, of the Robinson Deep, was elected to organise next year.

Those present included: Lieut. C. Albu, Capt. G. M. O. Barclay, Lieut. R. Bendall, Lieut. H. F. Brand, M.C., Capt. V. F. Brodigan, Capt. Bryant, Capt. W. G. P. Cobbet, Capt. E. P. Cowles, M.C., Capt. A. A. English, M.C., Capt. T. L. Farthing, Capt. N. W. Graham, Lieut. W. W. Hammond, Capt. C. C. Henwood, Capt. A. Hildick-Smith, Lieut. E. H. A. Joseph, Major B. A. D. Kinahan, M.C., Capt. K. J. MacWilliam, Capt. H. A. Mills, Lieut. W. E. C. Mitchell, D.S.O., Lieut.-Col. E. Pam, O.B.E., Capt. G. Pellew, M.C., Capt. C. K. Pitt, M.C., Lieut. C. Ransom, Capt. J. Ritchie, Lieut. L. A. Robertson, Capt. F. H. Rogers, M.C., Lieut. B. Rount, Lieut. C. F. Roy, Lieut. W. M. Thomas, Lieut. H. A. Tute, Capt. H. A. B. Tyers, D.S.O., Lieut. Wakeford.



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The Financial Aspect of 1921.

UNION LOANS—THE RESERVE BANK—GOLD PREMIUM AND EXCHANGE VAGARIES—SHAREMARKET PRICES.

From the financial point of view the year that closes to-day must be written down as most disappointing. Not only has it failed to realise the high hopes entertained at its commencement, but it has witnessed a continued sagging away of public credit, the gold premium, and almost the whole list of sharemarket quotations. The price of gold a year ago was 116s. per oz., and there were hopes that the diamond market would recover. In both cases the tendency has been downward, and there seems little hope for immediate improvement. What may best be described as the chaotic state of the German exchange, and the confusion that has arisen therefrom in the financial and commercial conditions of other countries are, of course, mainly to blame for our financial troubles. The outlook is, of course, not without its good features. The net result of the Washington Conference must be a reduction of national expenditure and relief from a crushing burden of taxation. This, with the prospect of a settlement of the Irish trouble, may help the world to recover from the severe financial crisis. That crisis revealed itself in a universal slump in the values of commodities, and the upheaval in the exchanges which had a chastening effect on every class of trade. The channels of commerce have been clogged by exchange difficulties, and the coming international economic conference will have no easy task to unravel them. South Africa suffered, of course, with the *debacle* in British trade and industry, and our post-War boom was dissipated during the year. As mining and agriculture are our staple industries, they suffered most of all, and we have had twelve months' progressive decline in those and the other branches of industry and commerce dependent upon them.

Union Loans.

New Union loans have been issued during the year, both in London and locally. The former was successful, though the amount raised was absorbed in paying off other forms of public indebtedness. The loan issued locally is still open to public subscription. The new Reserve Bank was none too successful in its appeal to the public, and its initial operations have so far had little effect on the financial position.

A Year of the Sharemarket.

As in every other department of finance, the year has been most disappointing in the sharemarket. The trend of prices has been stationary where not steadily downwards, and business has been of the most meagre description. The general world conditions already referred to have, of course, been at the root of the matter, but there have been certain more local causes as well. Sectional strikes and labour troubles on the mines, consequent on the necessary efforts to reduce working costs and establish pre-War discipline have been a disquieting feature of the year, and it would seem that the men's unions are not yet willing to recognise that wages must come down and efficiency be restored if the mining industry is to be saved. The close of the year sees matters at last coming to a head, and naturally the market in shares and the attitude of investors is profoundly affected. Until finality is reached on the questions at issue, we must expect stagnant markets and an absence of enterprise. In diamond shares the market has gone from bad to worse during 1921, and in face of the reports from the world's markets for the stones, of course it could not be otherwise. Tin shares have fallen away on the sagging in the price of the metal, and the suspension of mining operations on the Transvaal properties. Colliery shares on the troubles of the coal trade have naturally eased off, though there has been no great pressure to sell. Transvaal Silvers, though firmer of late, experienced a big drop on the price a year ago, and Pretoria Silvers have fluctuated in sympathy with them. Industrials, such as Pretoria Cements and Hume Pipes, have not escaped the general decline, but they remain firm at the lower levels. The best commentary on the fluctuations in the

year's prices is afforded by a comparison of those at the beginning of the year and on the 28th of the current month, when the market re-opened for the closing days of the year.

	1920.	1921.
Anglo-American Corporation	24 0*	16 6*
Apex Mines	7 6*	7 6+
Bantjes Consolidated	—	5 9+
Brakpan Mines	64 6+	48 6*
Bushveld Tins	0 6*	0 6
Cinderella Consolidated	2 0*	—
City and Suburban	—	2 6
City Deeps	49 6*	43 6*
Con. Langlaagtes	15 0†	14 0†
Con. Main Reefs	14 6	8 9
Con. Mines Selections	—	10 0*
Coronation Freeholds	1 0*	0 6
Crown Diamonds	4 0*	3 2*
Daggafontein Mines	7 6*	—
East Rand Coals	2 6*	1 6*
East Rand Props.	7 0*	—
Eastern Golds	0 6*	0 5*
Frank Smith Diamonds	8 4*	2 9*
Geduld Props.	50 0*	42 9
Glencairns	1 6*	—
Glencoe Collieries	10 0*	—
Glynn's Lydenburgs	—	7 0*
Government Areas	85 0*	82 0
Hume Pipes	21 0*	—
Jupiters	2 3*	—
Klerksdorp Props.	2 0*	—
Knight Centrals	5 4	4 3
Lace Props.	8 0*	6 6†
Leeuwpoot Tins	15 0	8 0*
Lydenburg Farms	5 6*	4 3*
Modder B.'s	30 9*	26 9
Modder Deeps	44 3*	42 6
Modder Easts	20 9	5 9†
Modder Wests	—	1 0*
Natal Navigation Collieries	33 0*	—
New Eland Diamonds	35 0†	—
New Era Consolidateds	8 3*	6 9*
New Geduld Deeps	1 7†	1 4*
New Kleinfonteins	6 6	5 6*
New Modderfonteins	73 0	70 0
New State Areas	25 6*	20 0
New Unifields	5 6*	4 0*
Nourse Mines	9 0*	8 6*
Pretoria Cements	62 6*	40 6†
Princess Estates	0 8*	—
Rand Nucleus	1 0*	—
Randfontein Estates	—	13 6
Roberts Victors	12 0†	7 0*
Rooibergs	—	3 9*
Rouxvilles	13 6	1 0
S.A. Alkali	—	12 3
S.A. Breweries	29 6†	—
S.A. Lands	4 10*	4 0
Springs Mines	38 6	33 0*
Sub Nigels	14 3*	10 6*
Transvaal G.M. Estates	10 0*	—
Transvaal Silvers	60 0	25 6*
Van Ryn Deeps	77 3*	66 6*
Village Deeps	—	7 6*
Village Main Reefs	4 6*	—
West Springs	14 9*	7 9*
Western Rand Estates	3 3*	—
Witwatersrands	12 6*	—
Wit. Deeps	—	8 0†
Wolhuters	3 6*	3 0*
Zaaplats Tins	6 6*	2 9*
Union 5 per cent.	£94 ³ / ₄ *	£94 ¹ / ₄ *

*Buyers. †Sellers.

Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

Central Mining Dividend.

A good impression has been created in London by the declaration of a dividend of 6s. by the Central Mining people, involving a distribution of £127,500. The final dividend for 1920 was 6s., making 12s. for the year; in 1919, 18s. was paid, of which 6s. was a bonus, and in 1918 the distribution was 10s.

Luipaardsvlei Estate Finances.

The Luipaardsvlei Estate holds its annual meeting usually in London, but as a typical Rand low-grade mine its position is of financial interest. The outstanding Debentures were reduced during last year to £55,950, and by 1st January next the Board expect to bring the outstanding amount down to about £48,000. They have again written off a large amount—namely, £17,584—for depreciation on machinery, plant, buildings, etc. Cash in hand and gold in transit stood at £38,700, as against £16,667 last year, a very substantial improvement. The improvement in the profit and loss account as compared with the two previous years was considerable. There was a net profit of £22,960, compared with a loss during the previous year of £2,596, and a loss of £5,316 during the year before. This result was partly due to the effect of the price which was obtained for the gold, the average for the year having been £5 12s. 1.07d. It was further due to the fact that they had virtually suspended development from 1st July, 1920; also to the retrenchment scheme, which, in agreement with the mine workers, was instituted in May of last year, and which had brought about a considerable reduction in the number of white men employed in the mine. Another factor was a slight reduction in the cost of stores and materials, which had made further progress during the current financial year. The gradual reduction of working costs, both as to labour and stores, might be regarded as permanent, but development could not, of course, be suspended indefinitely, and, in fact, they had already, since 1st July last, resumed development and were paying for it out of monthly revenue. They had a total reserve representing nearly four years' crushing. It was the intention to give increased attention in the near future to the development of the Battery Reef sections of the property. Mr. E. Turk, replying to questions at the meeting, said that he did not altogether agree with the suggestion that had been made that working costs were coming down by 7s. or 8s. per ton, but if they only came down by 3s. or 4s. per ton it would be an enormous advantage to their company, seeing that, on their crushing of 250,000 tons a year, every shilling saved meant £12,500, or 5 per cent. on the capital. They were not in the position of some companies, with a debit balance; as soon as the financial position justified it they would be in a position to distribute dividends.

Kamfersdam.

The accounts of Kamfersdam Mines for year ended 30th June, 1921, show a loss of £7,613, making total debit of

£218,814. The annual meeting was held at Gresham House, London, E.C., on December 8th.

S.W. Africa Company.

The report of South-West Africa Company for 1920 states that company has claimed payment at pre-war rate of exchange of all amounts owing by debtors in Germany and cash assets in Germany which had been sequestered by the German Government, and proceeds of sale of certain securities belonging to company sold by that Government, together with compensation. Amounts totalling about £590,000 have been received in respect of these claims since 31st December, 1920. No provision has been made for depreciation on investments. Investments standing in balance-sheet total £1,284,457. Part of investments represented by British, Colonial and foreign (other than ex-enemy) securities stood in books at £624,689. Market value of these securities on 31st December, 1920, was about £478,000. Arrangements have been completed for purchase by company from Public Trustee of ex-enemy shareholdings in company amounting to about 1,200,000 shares. Union Government has recognised company's title under its Damaraland concession to whole of its unsold freehold, amounting to about 1,600,000 acres, and has extended until 17th November, 1923, period within which company retains sole right to prospect for minerals within area of Damaraland concession. Active exploring operations are being undertaken in various parts of area within which company temporarily retains sole mining rights, with a view to securing such properties as may appear desirable. Otavi Exploring Syndicate continues operations on mottramite (vanadium ore) occurrence mentioned in last report. Up to present about 700 tons of high grade ore or concentrates have been marketed.

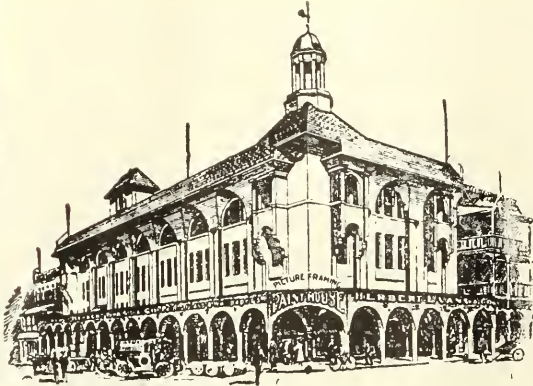
Increased Insurance Rates.

It may not be generally known that as from January 1 all fire and motor-car insurance offices in this country have agreed to raise the minimum premium to 7s. 6d. instead of 5s. This will apply to renewals as well as new proposals. The reason given for the change is the great increase in the cost of general administration.

THE LOCAL SHAREMARKET.

Steadier After Christmas Holidays—Industrial Crisis Causes Setback.

When the market opened on Wednesday after the holidays, a much steadier tone prevailed than when it had closed on the preceding Friday. Most gold dividend payers were steady, some of the gilt-edged Far East shares even higher. Business, however, remained on a restricted scale and the holiday feeling pervaded the market. The result of the colliery conference was not known till after the market closed, and it naturally put a damper on business on Thursday. Coming on top of it, the Chamber of Mines message to the Rand miners and the V.F.P. attitude towards its employees caused a flutter, and provided the topic in the market, to the exclusion of business. It is recognised that the Chamber of Mines could not reasonably adopt any other course in the ultimate interests of the industry, and it is hoped that the common sense of the men on the gold and coal mines will prevail against the menacing attitude of the trade union leaders. At any rate the next few days should see the matter decided one way or another, and we can now only await events. The year in the sharemarket is reviewed in another part of this issue, and a table of comparative quotations is given, reflecting the changes of the twelvemonth. The Stock Exchange will be closed on Monday next.



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EDITORIAL.

THE INDUSTRIAL OUTLOOK IN THE NEW YEAR.

Once again the industrial situation on the Transvaal mining fields is fraught with all sorts of unpleasant possibilities. The year-end conferences, both as regards the gold and coal mines, took a dramatic turn on Wednesday, when the final effort to settle the colliery wages dispute broke down, and when the Chamber of Mines brought discussions which recently have been in progress regarding the gold mines to a head by sending to the S.A. Industrial Federation notice of the termination of certain wage agreements and of intention to withdraw from the *status quo* agreement.

The letter from the Chamber of Mines gave formal notice that each of the existing agreements re piecework and guaranteed payment underground, or underground contract

work, would cease and determine as from the date upon which the working place or places concerned was next measured subsequently to January 31, 1922, and would be replaced by day's pay or by a "no cost" form of contract, details of which would be intimated at a later date. The Chamber also intimated that as from February 1, 1922, it withdrew from the *status quo* agreement.

Simultaneously the Victoria Falls and Transvaal Power Company declined to enter into further conference with the S.A.I.F. to discuss the increased minimum rates of pay recently demanded by the trade unions; and the engineers, boilermakers and moulders employed in the town engineering shops decided at a meeting to repudiate the notice given by the employers of a reduction of wages to operate from January 1.

In view of the letters from the Chamber of Mines and the V.F.P., and the seriousness of the colliery position, the Executive of the S.A. Industrial Federation announced that a meeting of the Joint Executives would be held on Friday at the New Trades Hall.

By reason of being a weekly paper and having to go to press the day before publication, we are unable to comment on the deliberations of the Labour Executives at this meeting, nor can we attempt to foreshadow the trend of events in this kaleidoscopic field of industry during the next few days. At the moment of writing, however, it seems certain that there will be a strike on the Transvaal coal fields on Monday, and it is quite possible that in consequence of the other decisions referred to above the trouble may not be confined to the Collieries. We understand that for some days and nights past the Railways have been rushing coal trains through from Witbank to the Rand and that the power stations have a substantial supply on hand. We take it, too, that the Railways have also made provision for emergencies. So far there is no threat of trouble from the Nurahs, and had there been any deeply-laid conspiracy to foment a general strike the Railway workers would scarcely have lent their aid to the employers by transporting coal. Of course, if there is anything in the nature of a general commotion along the Reef much of this coal will not be required. But there again we are speculating in unknown quantities. No one can tell at this juncture what the next few days may bring forth, and there does not seem to be any assurance as to the ability of the Government to adequately police and protect the Reef and the coal fields if the situation develops into a nasty one.

Writing on the matter under the disadvantage of not being endowed with the fine sense of prophetic instinct which is necessary to foresee the events of the next few hours in this country of surprises is not a satisfactory task. It will be better if we confine ourselves to the facts of the several cases as they present themselves at the present moment. And here we are on much more certain ground. Broadly speaking, the crux of the whole situation is simply this, that the miners, both on gold and coal properties, and the workers in allied industries like the Victoria Falls Power Company and the engineering shops are, at the instance of their paid agitators, refusing to look economic facts in the face. The Union's oversea coal trade is in jeopardy of being lost because competitive factors have come into the markets, and unless the cost of production can be reduced we shall lose what little grip we retain of the bunkering and export trades which have been built up so laboriously during the past few years. Similarly the gold premium is waning, and unless there is a general reduction of costs right along the Reef numerous mines will have to close down—some of them never to be re-opened.

To our way of thinking this is not the time for further conferences or for arbitration. The facts are patent and no amount of talk and exchanges of letters can alter them. In the councils of labour Time apparently is a factor of no consequence. No doubt the men's leaders would be prepared to argue from now until Doomsday on the questions of economics upon which our gold and coal mines must make a decision immediately if a tremendous catastrophe is to be averted.

We hold no brief for the Chamber. We have, in fact, frequently attacked the central organisation of the mines for procrastination and weakness in the past. But we now commend its present attitude of determination to save the mines of the country from ruin.

Strikes and deadlocks are unpleasant things. The employers certainly do not desire or seek them. But workers on the South African mines have simply got to realise the hard and sober necessity for coming into line with mine workers in other parts of the world, and in the face of falling costs of living and general trade depression accepting rates of pay which bear some economic relation to the ability of the mines to pay such wages and at the same time to earn an adequate interest for shareholders.

South African mine workers, in common with most other people in the world, have been living in a fool's paradise for the past few years, and we earnestly trust they will realise that the proposals of the Chamber of Mines, both in respect of gold and coal miners, are only reasonable, and that the Chamber's actions in regard to bringing these long-standing controversies concerning wages to an end will be in the best interests of the community at large—a term which, of course, includes the miners themselves.

THE YEAR WITH THE MINING INDUSTRY.

I.—The Rand.

The year which has now come to a conclusion has not been one of happy memories for South African mining. It must, in fact, be regarded as a period during which depression has gradually grown until at the end of the twelve months we find that practically every branch of the mineral industry, in common with all other branches of trade activity, is under a cloud.

The year 1920 was marked by political and industrial unrest, chaotic financial conditions and by general unsettlement and insecurity all the world over. South Africa did not entirely escape the turmoil born of the War, and although this country felt the effects of the great conflict less than almost any other country in the world we found that towards the close of 1920 the pendulum of time was swinging the Union backwards from unexpected prosperity to a period of severe financial stringency, coupled with unemployment.

These conditions, which are the joint outcome of circumstances arising out of the Great War and of labour unrest, have been accentuated during 1921, and they have left a deep impression on the mining industries of the country. The gold premium has undoubtedly been the outstanding feature in the situation on the Rand. Had the mines received the old standard price for their product there would, in the face of recent labour demands and additional taxation, have been an industrial catastrophe which would have engulfed the whole Reef. As it is to-day we are faced with the fact that gold has declined in price to 98s. per oz., and on the present basis of costs a large number of our mines are working at a loss.

What apparently is happening is simply this, that the old world is gradually putting its house in order. Trade and credit conditions as between Great Britain and America are improving, and the British pound recently has made something in the nature of a leap towards parity with the American dollar. This has brought about a depreciation in the gold premium, that ephemeral and accidental factor which has saved the mines of the Rand. In Europe and America the costs of living are declining; they are declining here, too, and just as the expenses entailed in the production of an article are coming down overseas so is it absolutely essential that the costs of production of the gold mines of the Rand—the industry which is virtually carrying the whole country on its back—should likewise be reduced. Happily for the whole country, the gold industry during 1921 has carried on with little curtailment of production. There has been nothing in the nature of a general downing of tools, and the ill-advised strikes of the election period,

and more recently at the Crown Mines, were not allowed to continue for any length of time or to extend into commitments of first importance, simply because the bulk of the workers are opposed to throwing away their bread and butter at the behest of a few agitators. After the fiasco of February the Chamber of Mines abolished the stupid practice which it had adopted during the War period of collecting doles for the trade unions to fatten on—a piece of maladministration which this journal severely criticised. And in August, after numerous conferences and the exchange of lengthy letters, the Chamber, despite its mis-handling of the factor of the gold premium, obtained a small reduction in wages on the mines. In November the industry gained a further appreciable, though not magnificent, advantage in respect of an amendment of the Mining Regulations which admits of more work being obtained from native labour.

All this has been helpful, but it is insufficient to save many lower grade properties from inability to work except at a loss. There appears to be a widespread illusion that mines, unlike other industries, possess some magical properties which enable them to continue to lose large sums of money and yet to keep working. This, of course, is an absurd and utterly impossible view to take of the situation. The year end finds the industry in the throes of another dispute, and no better presentation of the facts and figures can be given than those advanced by the Chamber of Mines the other day in substantiation of their case for the reduction of costs. We reproduce in another portion of this issue some of these statistics, and would earnestly commend them to the attention of our readers.

It is not surprising to find that during a year of depression such as that through which we have just passed there has been little accomplished in the direction of expanding our field of gold mining industry in the Southern Transvaal. The closing of Daggafontein and the despatch of the now famous Heidelberg cables have tended to damp enthusiasm in so far as the eastern annexe of the Rand is concerned. On the other hand, interest in the Far West Rand has been stimulated by the borings on the farm Luipaardsvlei No. 10, and it may be that in the not far distant future this property, and perhaps the Western Rand Estates to the south, will bulk fairly largely in the picture of future expansion.

As to the mines already working, the only large proposition which is assured of entry into the list of producers within the next year or two is the New State Areas. Against this must be set the fact that several of the older propositions of the Central Rand are approaching exhaustion, and that unless costs are materially reduced a number of other mines which still possess substantial unworked claim areas will have to cease production on account of the low-grade character of the ore. Technically speaking, the past year has not brought forward very much in the nature of improvements in underground practice, but in metallurgy the experiments undertaken by the Consolidated Mines Selection group at Springs and Brakpan have resulted in an inclination of thought towards the ideal plant, which will be without the gravity stamp battery and will embrace the principles of all-sliming. The New State Areas equipment will be modelled on these lines.

It must not, however, be gathered from the foregoing that we have said the last words in respect of either above or below ground technique on the Rand. On the contrary, it is probable that one of the developments of the near future will be a fitting and proper appreciation of the fact that centralisation and standardisation of technical practice has been overdone and that substantial economies and improvements may be effected by working our mines as individual units, all members of a group or groups of control, but requiring at the same time divergent methods of handling according to variations in size, gold contents depth, and a host of other factors.

In concluding this necessarily brief review of the year's events on the Rand one cannot but refer to the disaster at the Ferreira Deep, which has cast such a gloom over the whole Reef at the close of the year. But, whilst we all

deeply grieve with the dependants of the brave men who lost their lives in this calamity, the whole country takes pride in the magnificent courage exhibited by the rescue parties.

In our next issue this review will be continued so as to embrace the diamond, coal, and base metal industries of the country.

Notes & News.

Swaziland Tin.

The working results of this company for the current half year have, by reason of the depressed condition of the metal market, shown no profit. The directors have in consequence been reluctantly compelled to pass the dividend which, under happier circumstances, would have been declared per 31st December, 1921.

Oil Shales.

It is well known that oil shales have been worked for the production of oil for a number of years in Scotland, France, and a few other countries, but lately deposits in the Kimmeridge clay in England have been receiving attention, whilst those in Norfolk are under development. Much research has also been undertaken on the vast oil shale deposits in the United States, especially those of Utah, Colorado and Wyoming, those at De Beque, Colorado, being actively developed. Interesting information on the subject of this source of oil is given in a volume entitled "Oil Shales," by H. B. Cronshaw, B.A., Ph.D., A.R.S.M., just issued in the series of monographs produced under the direction of the Mineral Resources Committee of the Imperial Institute. It is published by Mr. John Murray at 5s. net. The monograph first describes oil shale and the similar material torbanite; the mining and distillation of oil shale; and the composition and properties of shale-oil. Descriptions follow of deposits of oil shale and torbanite in various parts of the British Empire, including those in the Utrecht district of Natal, Wakkerstroom district of the Transvaal, Albert County in New Brunswick, Pietou County in Nova Scotia, Blue Mountains in New South Wales, and Mersey district in Tasmania. Accounts of foreign deposits are given next and include those of the United States, France, Bulgaria and Brazil. A map showing the oil shale deposits of the world and a bibliography conclude the volume.

Union's Mineral Production in November.

The following are the principal items to be noted in connection with the mineral statistics of the Union for the month:—Output: Gold, Witwatersrand, 690,892-416 fine ozs., value £2,934,724; other districts, 15,341-599 fine ozs., value £65,167; total, 706,234-015 fine ozs., value £2,999,891. Silver, 82,971-871 fine ozs., value £14,289. Diamonds, 47,607-84 carats, value £159,188. Coal (sales), 916,688 tons, value £375,436. Copper ore and concentrates (sales and shipments), nil. Tin concentrates and metallic (sales and shipments), 151-312 tons, value £13,300. Other base minerals (sales and shipments), value £9,305. Total value, £3,571,499.

Glynn's Lydenburg.

One of the interesting facts emphasised by Mr. Max Honnet, the chairman, at last week's annual meeting of Glynn's Lydenburg was that it cost the company 92s. 7d. to produce an ounce of fine gold last year. With the drop in the price of gold the company will, of course, have to economise in the current year. As regards the vital question of mine life, the chairman said the present ore reserve, with the addition of further ore which they might reasonably expect to develop, would enable them to carry on profitably for a few years to come. On the advice of Mr. R. A. Barry, the new consulting engineer, the Board had initiated a comprehensive scheme of development and exploration. Of this the principal feature would be the sinking of a vertical shaft in the southern extension of the Werf Mynpacht mine to explore that important region. "Our mining advisers all agree it is here that our main hope for the future lies."

said the chairman. He concluded: "The steps we are taking to secure the future of the company are, in our opinion, absolutely necessary and in the interests of shareholders, and we will devote our energies and resources to the accomplishment of that end. In doing so we will husband our funds, by which I mean that the prosecution of the work I have outlined will be our first care, and that we will suspend or curtail dividends to such an extent as may be found necessary, until such time as we have put the company into a position of reasonable security for the future."

African Oils.

In order to comply with the requirements of the Committee of the London Stock Exchange, the African Oil Corporation, Ltd., has issued the following public statement:—"The purchase consideration paid to the vendor, Mr. Arthur Pratt, for prospecting and option contract over the farms Virginia and Kronhoek, and certain 29 prospecting claims known as Pongola Bush, was £1,200, in cash and allotment of 110,000 fully-paid shares and an option to acquire at par within three years of the date of the registration of the Company shares to the nominal value of £139,000, out of which 75,000 shares of 10s. each (equals £37,500) have been called up. Additional property was acquired on the 5th December, 1919, for which £500 cash and 40,000 fully-paid shares were paid to acquire a contract on two further farms, Ijzermijn and Goedgevonden, adjoining Virginia and Kronhoek. The farms embrace a total area of 4,517 morgen 428 square roods. The contracts secure to the Company prospecting rights for a period of five years in each case and thereafter leases for a further period of 55 years. In the terms of the leases to be entered into the Company can mine oil shale and coal, subject to the payment of a royalty of 6d. per ton in respect of oil shale and 2d. per ton in respect of coal, the minimum rental payable under each lease being £1,000 per annum. Surface and water-rights are secured for all mining purposes. The borrowing powers for the purpose of the Corporation conferred on the Directors are unlimited, but up to the present no money has been borrowed. The Corporation was formed to acquire and to exploit the rights over the above-mentioned four farms situate in the Wakkerstroom District of the Transvaal, and also the coal and oil shale area in Natal mentioned above, Pongola Bush, adjacent to the Wakkerstroom District.

The late Mr. H. Wilson Fox, M.P.

London papers to hand by this mail comment at considerable length on the much regretted death of Mr. Henry Wilson Fox, M.P., a former editor of the S.A. MINING JOURNAL, which occurred in London on November 22. *The Times*, in a sympathetic and appreciative reference, says of the deceased gentleman:—

Born in London on August 18, 1863, he was the second son of Wilson Fox, M.D., physician in ordinary to Queen Victoria. He was educated at Charterhouse, Marlborough, University College, London, and Trinity College, Cambridge, of which he was exhibitioner and scholar, obtaining honours in the Natural Sciences Tripos. He was called to the Bar in 1888 by Lincoln's Inn, of which he was an equity scholar. In the following year he went out to Johannesburg on the staff of the Consolidated Gold Fields of South Africa, and in 1892 he edited the SOUTH AFRICAN MINING JOURNAL, and assisted Mr. John Hays Hammond in drafting the Rhodesian mining laws. He was appointed Public Prosecutor of Rhodesia, and during the rebellion in Matabeleland and Mashonaland in 1896-7 he served as Director of Transport and Commissariat for the Salisbury force, being mentioned in dispatches and receiving the medal with clasp.

Returning to England in 1897, Mr. Wilson Fox was appointed in the following year manager of the British South Africa Company, of which he became a director in 1913. He took a prominent part in the formation of the Charter Trust and Agency, and represented the Chartered Company on the principal Rhodesian directorates. He was also the inventor and patentee of a system of hydraulic storage. At a by-election in February, 1917, he was returned unopposed as a Unionist for the Tamworth Division of Warwickshire, and was again unopposed at the General Election of 1918 as the Coalition candidate.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Storage Battery Locomotives in Metal Mining.—Mining and Scientific Press, November 26, p. 751.

Power Production in the Eastern States.—Mining and Scientific Press, November 26, p. 734.

Air Break Switchgear for Collieries.—Colliery Guardian, December 2, p. 1535.

Iron and Steel.

Damping Down and Restarting Blast Furnaces.—Iron and Coal Trades Review, December 2, p. 809.

German Steel Company Reports.—Iron and Coal Trades Review, December 2, p. 806.

Electricity.

Application of Electricity Supply to Municipal Service.—Electrical Review, December 2, p. 765.

Electric Vehicles for Municipal Purposes.—Electrical Review, December 2, p. 764.

Metallurgy.

Air Lift in Theory and Practice.—Mining and Scientific Press, November 17, p. 711.

Time Studies in Metallurgical Analysis.—Mining and Scientific Press, November 17, p. 708.

Geology.

A Practical Method for Determining Dip and Strike.—Economic Geology, September, p. 405.

Geology of Gypsum and Anhydrite.—Economic Geology, September, p. 393.

Coal.

Present Status of Coal Carbonisation.—Colliery Guardian, December 2, p. 1542.

The Production of Oil from Coal.—Colliery Guardian, December 2, p. 1536.

Health and Welfare in the Coal Industry.—Colliery Guardian, December 2, p. 1547.

Coal Transport Rates and Wages Must Come Down!—Coal Trade Journal, November 30, p. 1270.

Powdered Fuel.—Iron and Coal Trades Review, December 2, p. 802.

Mining.

Exploring Strata by Boreholes in Faulty Ground.—Iron and Coal Trades Review, December 2, p. 794.

The Motor Truck in Mining.—Mining and Scientific Press, November 26, p. 745.

Breaking the World's Shaft-Sinking Record.—Mining and Scientific Press, November 26, p. 749.

Mechanical Shovelling Underground.—Mining and Scientific Press, November 19, p. 696.

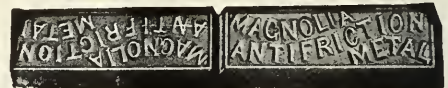
Use of Scrapers Underground.—Mining and Scientific Press, November 19, p. 703.

A New Aspect of Machine Mining.—Iron and Coal Trades Review, December 2, p. 800.



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(Incorporated in the Transvaal.)

Declaration of Dividend No. 18.

NOTICE IS HEREBY GIVEN that a Dividend of 5 per cent., equal to One Shilling per share, has been declared for the six months ending 31st December, 1921, payable on or as soon as possible after the 9th February, 1922, to Shareholders registered in the Books of the Company on the 31st December, 1921.

The Transfer Books of the Company will be closed from the 1st to 10th January, 1922, both days inclusive.

The Dividend will be payable to Shareholders on the South African Register by Warrants to be issued from the Head Office of the Company in Johannesburg, and to Shareholders on the London Register by Warrants to be issued from the London Office of the Company.

By Order of the Board,

NEW CONSOLIDATED GOLD FIELDS, LTD.,
Secretaries.

Per F. H. DOWN.

Head Office:
Consolidated Gold Fields Buildings,
Simmonds Street, Johannesburg.
21st December, 1921.

Lord Harris Reviews the "Goldfields" Year.

STRONG CASH POSITION—SEVERE DEPRECIATION AND ITS CAUSES—REPLY TO CRITICISM.

A brief cabled summary of the proceedings at the "Goldfields" meeting in London has already appeared in our columns, and the features of the directors' annual report have also been reviewed. The mail brings the detailed report of the lengthy speech made by Lord Harris at the meeting, and we take from it some extracts dealing with the most interesting points. Lord Harris made extended reference to the cash position, in the course of which he said:—The cash position is quite good, the combined figures are £709,000 odd, as compared with £741,000 odd last year. The accounts of the old company call for little comment. In the absence of a dividend on the shares in the New Consolidated Gold Fields, our only income is the interest on the few assets we retain, £3,600, to which has to be added the amount brought in from last year, £162,600, a total of £166,243; against this have been charged the dividends on the two classes of preference shares, and this leaves a balance of £57,342 to carry forward to next year. The total assets of the two companies, after deduction of liabilities, are £4,446,000, to which must be added the unrealised appreciation of share holdings, unflated properties, stands and buildings, which we estimate to amount to a very big figure.

Depreciation.

What I have said I think explains to you the position. It is very unfortunate that, notwithstanding the very large revenue we have received, you do not receive a dividend, as we are bound, much as we dislike it, to use our profits in meeting depreciation. I would further add this. In the case of quoted securities, we have, of course, no difficulty in arriving at the amount of depreciation, but in the case of unquoted securities we must use such knowledge as we have and give consideration to every factor which in our opinion governs the situation and the value of the investments, and I think I can fairly say that, in view of the unsettled state of business throughout the world, we have perhaps been more drastic than we should have been in ordinary times.

Causes of the Depreciation.

Perhaps it would not be out of place to refer here to what has mainly caused our heavy depreciation. Curiously enough, it was one of our stand-bys, and the one South African share which we determined to retain. No less than one-third of your depreciation this year is due to our holding in Robinson Deep. Unless our experts are altogether wrong, the price to which Robinson Deep "A" share has fallen is entirely without justification, but it is a quoted stock, and therefore it is our duty to write them down to the market price, and this has been done. Let me remind you that on engineering advice, with which all parties to the deal were absolutely satisfied, an amalgamation took place between the Robinson Deep and the Beoyens property. The Robinson Deep shareholders were amply protected by the issue to them of cumulative preference shares which were estimated, and are still estimated, to return to them at least as much, but probably a great deal more than they could have realised by working Robinson Deep on its own. From the Robinson Deep point of view the policy of amalgamation has been amply justified by subsequent events. The mine, as you are aware, is situated at a very short distance from the town of Johannesburg, and is among the mines which have suffered from subsidences, accompanied by serious earth tremors. To make a long story short, all the working shafts of the old Robinson Deep have suffered to such an extent that they have practically become unworkable, and had it not been for the foresight of our technical advisors in sinking the deep shaft on the Beoyens property, which it was possible to connect with Robinson Deep workings, the latter would long ere this have become unworkable, and the mine would have had to be closed down. Surely there has been no lack of enterprise there. From our point of view the amalgamation was an insurance against total loss, and a very useful insurance it has proved to be. The mine is now making good, but as the ultimate results must

naturally depend on the so-called gold premium it is impossible for me to make any definite forecast. The outlook, however, is distinctly hopeful. Now let me follow this up, as it is a fair example of how our revenue has been affected, and of how we have been affected, and of how we have been temporarily hit by market depreciation, and remember that the asset I am speaking of is considered a perfectly good one. At date the Robinson Deep owes us no less than £222,000 by way of cumulative dividends overdue on our holding. We have every reasonable hope that we shall receive this revenue in time, but meanwhile we have, in order to reduce holdings to market prices, had to write down this asset by the appalling amount of £160,000—more than one-third of the total amount of depreciation. That surely must convince some of our critics that we were not without reason when we sought for more baskets than the South African for our investments.

South African Industrials.

As regards our industrial investments in South Africa, we have, of course, had to face the bad times that every other commercial company or house has, and, in certain cases, we have considered it wise to write down our original stake, but except in the case of our coal proposition, there is no reason whatever why these investments should not become remunerative as prosperity returns to the trade of South Africa and the world. As regards the coal property, to which I referred last year, and about which I was at the time rather hopeful, work was started on the property, an incline shaft was sunk to cut the seam of coal previously intersected in boreholes, and some development was accomplished at the bottom of this shaft. There was at this time a serious decrease in the demand for export coal in South Africa, and, in view of the results obtained in the small amount of development done, we considered it advisable to suspend operations until there was evidence of a growing demand for this class of coal. Critics may say that if we had held our hands and left our money in Treasury bills, we should have been better off to-day, and that is essentially the criticism which falls under the category of being wise after the event.

Mr. A. Hyman's Criticism.

Mr. Aubrey Hyman strongly criticised the policy and management of the Company, and Lord Harris replied to him in detail. The matter is summed up in the following letter to Mr. Hyman, quoted by the Chairman:—

"My Dear Sir,—I have informed my colleagues, I hope correctly, if not do not hesitate to put me right, of your views, wishes, and intentions as regards the board of Consolidated Gold Fields. You hold, so I gathered, a very poor opinion of the ability of our management in South Africa, and of the enterprise of the Board, and you are satisfied that you could be of great service to the company if you had a seat on it; of which you are ambitious and ask us to further your wishes, failing which it is your intention by organisation and propaganda, in which you are prepared to go to great expense, to solicit the votes of the shareholders in your own behalf, and also on behalf of such number of your friends as will ensure you, if and when successful, a dominating position. We have given respectful consideration to your proposal, but fail to see how your experience of South African mining can be of much, or perhaps any, assistance to the company, having regard for our diminished and diminishing interests in that country, nor are we aware that you have any such experience in mining and other business in other parts of the world as would be of assistance to us. You will not expect us to agree with you as to your opinion of our having not shown sufficient enterprise, and I am confident I shall be able to show the shareholders at the general meeting that it is due to our foresight as regards the prospects of South African mining and our enterprise elsewhere that we have been able to preserve the very considerable revenue shown in the accounts.—Believe me, faithfully yours,

(Signed) HARRIS."

Mine Surface Officials' Association.

VARIOUS VIEWS ON MINING ECONOMICS.—THE CONTRACT SYSTEM DISCUSSED.

The Mine Surface Officials' Association of South Africa, which has a membership of approximately 2,000, held their third annual general meeting recently in the Scientific and Technical Club, Fox Street.

The President, Mr. J. H. Mader, in the course of his speech, stated that at the last general meeting the Association had been unsuccessful in its endeavour to obtain for its members on certain mines retrospective application in regard to their wages. Persistence and tact, together with good arguments, gradually overcame the Chamber's opposition, and eventually the schedule was adopted with fall retrospectivity to October, 1919.

Reductions in Salaries.

Last December, as they were aware, the cost of living had risen approximately to its highest point—57 per cent. Then the Association, in common with like organisations, requested a review of the position, but was shortly thereafter confronted with the fact that in conformity with the price of gold the cost of living was gradually reflecting the betterment in the world's supply of commodities, and as a consequence the employer was enabled to represent the necessity for a decrease in the cost of living allowance.

It was just at this juncture that the necessity for closer co-operation between the two Officials' Associations became imperative, and although closer relationship between themselves and the Underground Officials' Association had been somewhat attained, nothing very practical had resulted. As a culminating point in the desires of the joint membership the suggested amalgamation was modified, and the existing arrangements, empowering a joint committee to act, were adopted. Meantime the Chamber of Mines had been in negotiation with the workmen's unions, and as a consequence thereof all day's pay employees had their consolidated pay reduced in August.

The M.S.O.A. and U.O.A. were advised by the Chamber that as a sequence of the above, officials' allowances would have to be reviewed, and it was suggested that the application of the reduction should operate as from October 1, 1921. Following this intimation, pourparlers were immediately arranged, and, as illustrating the soundness of a uniform policy, the joint committee satisfactorily negotiated a very difficult position by obtaining a time log of three months in the application of any reduction.

This matter was again under review, and in congratulating the joint committee he trusted their present endeavours would be a matter for further congratulation.

Dismissal of Old Employees.

The Association had at times felt that old employees were sometimes rather arbitrarily dismissed, and as in the majority of cases the individuals are totally unadaptable for other work, such dismissal constitutes a catastrophe, and efforts are being concentrated upon some scheme for the compensation of such officials. It was also not inopportune to refer to the belatedness of service increments, which under ordinary circumstances would have been automatically granted by the employer. He submitted it was now time for the employer to recognise where efficiency had demonstrated itself, and interpret the schedule of wages agreed upon in its natural application, and not by making the minimum wage agreed upon the maximum.

Unfortunately the Association had been unable to rectify the anomalous position created by the management of the Victoria Falls Power Co. This Corporation slavishly followed the policy of the Chamber of Mines in dealing with its employees up to a certain point. Latterly, however, they had been confronted with a complete *volte face* by this Company, which had introduced a scheme, the tendency of

which is the degradation of officials to a workman's basis. This policy must react, and, as a result, inefficiency and dissatisfaction would be the reward.

Even at this late date, he again represented the justice and equity of the arguments put before this management, and trusted that tardy recognition of the same would, to a great extent, remove the difficulties he had forecasted.

Collieries, Hospitals, etc.

Their members employed on the various collieries had benefited very considerably by the Association's activities. The time log in the introduction of the cost of living allowance to colliery employees had been recognised by the employers, and the justice of an equivalent period for the reduction of the allowance had been agreed to.

During the year the Hospital Superintendents' Association decided to throw in their lot with this Association, and several important matters had been dealt with on their behalf.

There had been considerable improvement in organisation among branches, resulting in greater efficiency. Pilgrim's Rest branch had been granted local autonomy on the same lines as granted to the Hospital Superintendents' branch. During the coming year it was probable that the Compound Managers would be constituted as a separate branch of this Association, with local autonomy.

The Contract System.

"It has long since been generally realised that one of the factors responsible for high working costs is the very high rate of earnings under the contract system appertaining on nearly all the mines, and I view with much scepticism the Chamber's proposal to substitute therefor "No-cost" contracts, where the incentive to the miner to do good work is based upon bonuses.

"I believe that the miner is influenced to exercise some measure of economy in the use of stores and labour when he has to pay for them, whilst he would probably give far less consideration to economy if he is only indirectly taxed for extravagance through a possible diminution of his bonus. The bonus-sharing scheme which has been applied in one form or another on several struggling mines in the past, and now in force on the Simmer and Jack and Ferreira mines, offers far more real prospect of economy combined with efficiency than a "no-cost" system.

Profit-sharing Systems.

"There are many varieties of so-called "profit-sharing" systems. I am, however, referring to two sub-divisions only as applied on these fields. The first aims at automatically curtailing the possible abnormal earnings of the contractor by an increasing proportion of excessive profits being paid back to the company; the second provides for a division of portion of the excess over a figure recognised as a good rate of earning among day's pay workers in the mine, thus ensuring the co-operation of the latter in the endeavour to secure greater general efficiency and economy, and it is the latter form which I contend holds the best possibilities for any substantial reduction in working costs."

ANSWERS TO CORRESPONDENTS.

Powdered Fuel, Mount Ngwibi.—The article was written by the editorial staff of this paper and the information was obtained from various technical exchanges. Would you care to approach us further in the matter?

Official Reply to Nurahs.

NO REVERSAL OF POLICY.

THE ECONOMIC NECESSITIES MUST BE FACED.

With reference to the recent interview between the Minister of Railways, the Railway Board and the National Union of Railway and Harbour Services, the following letter has been despatched to the National Union by the Secretary to the Minister for Railways, in reply to the memorandum handed in by the deputation:—

“ With reference to the deputation which waited upon the Minister and the Railway Board on the 28th instant, I am directed to inform you that the Minister and the Board have considered the memorandum handed in, and I am instructed to reply as follows:—

“ To agree to the requests contained in the memorandum would mean the complete reversal of the policy which the Government and the Administration have been compelled to follow during the last six months, and which is entirely due to the financial position of the Railways. At the end of March, 1921, the accumulated deficit in railway working was £2,598,884. During the first six months of the current financial year, *i.e.*, from April 1 to September 30, this loss was further increased by £1,037,000.

Fallacy of Further Rate Increase.

“ To meet increased expenditure rates have been increased during the last four years, and to-day stand at an average of over 40 per cent. above what they were prior to the War. On the basis of the 1920 traffic this means taking a sum of £7,165,000 extra out of the pockets of the users of the railways.

“ It has been suggested that the Administration should again raise rates and fares to meet the deficiency. To do this would not only not bring an increased revenue, but would undoubtedly result in additional falling off in traffic and would also be a grave injustice to the majority of the people in the Union whose earnings and incomes have dropped to or below pre-war level. Take, for instance, the maize grower, the cattle farmers, and others who are to-day selling their products at less than pre-war prices, and at the same time have to pay more for the cost of transportation of such products to the market than they did prior to the War.

“ To meet the position the Administration has consequently been compelled to take steps to reduce working expenses, and with that object has taken off the cost of living allowance, modified the eight-hour day, and reduced the number of staff. But after making these reductions the staff will, taking an average right through, be still in receipt of emoluments some 33 per cent. higher than they were prior to the War. The Administration, however, has not confined its efforts in reducing expenses solely to the staff. It has reduced the train mileage, especially on branch lines, withdrawn many concessions from the public, cut down the cost of supplies, and curtailed services wherever possible.

“ With regard to:

Points of Administration.

“ 1. The question of the so-called double trial, the Administration's attitude in regard to this matter has been explained so frequently both in Parliament and elsewhere that it is unnecessary to deal with the matter again here.

“ 2. The question whether, when the Administration requires additional staff, it will give those retrenched the first chance of re-employment, I am to say that provided their services were satisfactory and their record was good, their applications for re-employment will be the first to receive consideration.

“ 3. The Conciliation Board. The Administration is not aware that its constitution or functions have been in any way interfered with, and so far as its recommendations are concerned, the Minister who is responsible to Parliament for the administration of the railways must reserve the right to accept or reject them, and cannot accept the position that amendments in conditions of service made at the instance of the Conciliation Board or otherwise should necessarily be unalterable.

“ 4. The allegation of grade depreciation, the Administration is not aware that any undertaking in this connection has been departed from.

Rate Reduction.

“ 5. The policy of rate reduction referred to in your memorandum, the Administration presumes that reference is made to the reductions effected recently in coal rates. No reductions have been made in the rates for coal conveyed to the gold mines or for factories, or, in fact, for any local consumption, but the Administration has been compelled to make reductions in the bunker and export rates to enable South African coal to compete against Welsh and English coal which, during the last few months, has dropped to a low figure. Had these reductions not been made, South African coal would have been entirely out of the bunkering and export markets, thereby entailing a loss of traffic to the railways, leading to a further reduction in staff and compelling some of the coal mines to close down. At the same time the coal mine owners materially reduced their prices for similar reasons.

“ The Administration had also made certain reductions in the rates for cements to the ports to enable the locally produced article to compete there against imported cement. When making this reduction the Administration, however, made it a condition that the price of cement at the ports should also be considerably reduced.

“ In so far as the status of European labourers is concerned, it is not possible for the Administration to guarantee permanency in rates of pay and other conditions.

“ Railway servants must admit that during the past few years they have been liberally dealt with, and the Administration feels that under existing conditions it is justified in calling upon them to make sacrifices in common with the rest of the community. It cannot, therefore, hold out any hope of a reversal of the policy which has been forced upon it by the present depression.”

Mining Men and Matters.

Mr. W. W. R. Jago, Secretary of the Mine Managers' Association, has returned from a visit to England.

* * *

Mr. W. Gemmill, Actuary and Labour Adviser to the Chamber of Mines, arrived in Johannesburg from England last night

* * *

After six months in Europe and the United States, Mr. I. W. Schlesinger, Managing Director of the African Theatres and African Life, returned to Johannesburg this week.

* * *

Mr. E. Davidson, Managing Director of the Pretoria Portland Cement Factory, has left for Capetown.

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Letters to the Editor.

TRADE WITH CENTRAL EUROPE.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—As a loyal and patriotic South African, I must agree with the strictures uttered by yourself and many others ancient the Government's choice of a Trades Commissioner for Central Europe. But in all the articles and letters I have read, one most essential and important matter seems overlooked. What advantages are expected and looked for from this appointment, whether it be Mr. S——— or another? I may be labouring under an illusion; if so, I shall be very glad to have it dispelled, but I cannot see any great possibilities of profit to South Africa as a whole from increased trade with Central Europe under present conditions. I certainly see great possibilities of profit to the importers of German manufactures, but as far as the farmer and the ordinary citizen are concerned I see nothing very alluring in the prospect. It is undoubtedly a great chance to be offered to Germany to regain much of the ground lost during the War, but what will be the benefit to South Africa as a whole? I shall be very glad if some of your readers more widely versed in economic problems will explain exactly what is hoped from this appointment. I will state my own point of view in a few sentences:—

(1) Trade was reopened with the Central Powers, so we were told a few months ago, largely because if Germany, etc., could not trade she could not possibly pay her War indemnities.

(2) Although free trading (or almost free trading) has been going on for some time, Germany now declares that she cannot pay the next instalment of the War debt—in other words Germany (official Germany that is) is more or less bankrupt, and the reason for free commerce with that country is no longer valid.

(3) According to newspaper reports (all most of us have to depend upon) commercial Germany is in a highly prosperous condition.

(4) Owing to excellent organisation, docile and industrious workers, and above all to the favourable conditions of exchange, Germany (short for Central Europe) can undersell and is underselling every other manufacturing country in the world, and bids fair to regain all, and more than all, she lost by the War, besides causing wholesale unemployment in other countries.

(5) The person who sells cheap cannot buy dear; if he does he treads the rapid road to ruin. The only South African exports to Germany are mealies, wool, hides and possibly asbestos, copper and other minerals. If the exchange at present allows the German trader to sell cheaply, it will react on him when he attempts to buy, and the German trader is too astute to ruin himself (Germany may be officially bankrupt, but commercial bankruptcy is quite a different matter). What therefore is South Africa to expect from increased trade with Central Europe? Cheap manufactured goods giving a large profit to the importer, but beyond that nothing. We seem to be entering into a very one-sided bargain, in which Germany has everything to gain.

Sir Henry Strakosch proposed that instead of payment in money, Germany should be forced to hand over power plants, railway material and so forth free. His scheme has met with severe criticism, and rightly so. Many people have suggested that the War debts, Germany's and others, should be cancelled. This also seems a one-sided bargain, as the United States would be an enormous loser, while the Central Powers would gain to an almost equal amount. My own suggestion, made with all diffidence, is that instead of boosting German trade by the appointment of an expensive official, is that South Africa erects a tariff wall round German exports, to such an amount as will counteract the artificial rate of exchange; if people wish to trade with

Germany and use German goods they will then have to pay about the same price as for British, American or South African manufactures of the same kind; the whole country will then really benefit by the revenue from these duties instead of a minority only. I do not suggest a prohibitive tariff, but one that will bring the German manufactures just a little below the similar goods from other countries; this will enable the persevering German to continue trading to some extent, but will prevent him swamping the market, and also will prevent profiteering by other manufacturers. The revenue thus derived could be used, if thought desirable, to pay bonuses on exports of wool, hides and other South African produce sent to Germany. I cannot see, as I said before, how under the present exchange rates Germany can buy wool or anything in South Africa at a price that will tempt a seller.)

Perhaps any scheme, like Sir Henry Strakosch's, is more or less visionary and open to fatal objections. At any rate, the South African Customs officials in Johannesburg attempted to enforce something of the kind when they held up consignments of fancy goods from Germany a few weeks ago, on the plea that the duties payable on the absurdly low prices at which the goods were invoiced were not sufficient to warrant their being released. The prices of German goods at present, when changed into British currency, are absurd, there is no gainsaying it. Numberless instances could be given, but one will suffice: the glass apparatus for a certain South African college if bought in England would have cost £240 (two hundred and forty pounds); it was actually bought in Germany for £27 (twenty-seven pounds). South Africa wants money, Germany wants business, my scheme seems to provide for both, without allowing any one section of South African business men to reap undue advantages at the expense of the rest of the community.—I am, yours, etc.,

E. G. B.

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A GEOLOGICAL SURVEY.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—In your journal of 26th November I notice that the age of the carboniferous rocks is given as 550 million years, as measured, according to the lecturer, by the new "radio-active substance" method. This figure, however, must be the maximum one, the medium figure being 340 million years. It is known that the element uranium continually changes or subdivides into other elements according to a definite plan of subdivision. It turns, for instance, into radiouranium, ionium, radium, and further, into emanation, helium, radiolead, polonium and lead. Now, uranium occurs in many minerals of granite, syenite, pegmatite, gadolinite, monazite, and especially pitchblende, its commercial source. Since no link of this uranium chain is durable or constant (the life or existence of each member may be as short as a few seconds, and as much as several thousand years), one has to expect the continual subdivision of new members in minerals containing pitchblende, and the continued appearance of more members to occur. This expectation does actually come to pass. Further, one finds that, in the unchanged mineral between uranium and radium, an equilibrium of weight appears, provided neither can join or disunite, because uranium, on the way over radium, changes into helium and ultimately into lead, and, since the annual mass of helium forming out of uranium is known, one can easily measure or calculate the age of the mineral out of the relationship of the easily measured mass of helium to that of uranium. Of course, it is essential that the helium examined must have come from the uranium only; in other words, that the mineral must not originally have contained helium, and that between the examined substance and its environs, no interchange of uranium and helium must have occurred.

Since one cannot verify the accuracy of these suppositions, especially since one never knows if all of the formed helium remained on the spot, this method of calculation only gives minimum values. If one, however, considers the relationship of uranium to the formed lead which is decidedly more constant and stable than the inert gaseous helium, one gets much higher values—maximum values. The average age of some important geological formations is, according to this lead-reckoning as follows: Pre-Cambrian, 1,100-1,640 million years; Silurian, 430 million years; Devonian, 370 million years; Carboniferous,

340 million years. The corresponding minimum values of the helium-reckoning are: Devonian, 145 million years; Carboniferous, 141 million years; Eocene, 31 million years. The above methods of radio-calculation are by no means beyond debate, but it is on the highway towards more exact methods of measuring our earth's age.—Yours, etc.,

E. E. BUTTNER.

INCOME TAX RELIEF TO RESIDENTS ABROAD.

To the Editor, *S.A. Mining and Engineering Journal*.

Many enquiries have reached me from, or on behalf of, individuals resident abroad, with reference to the reliefs allowed from British Income Tax in the circumstances set out in my letter of September last. As it is apparent that in many cases repayment of tax will be claimable for three years (the limit allowed), may I point out to your readers generally that no claim for the year 1918-19 will be admitted after 5th April, 1922.—Yours, etc.,

W. R. FAIRBROTHER,

Income Tax Specialist.

London, E.C. 2.

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TRADE AND INDUSTRIES SECTION.

Week and Year in the Mining Material and Engineering Trades.

GENERAL OUTLOOK—IRON AND STEEL—TIMBER AND BUILDING MATERIALS.

General.

The topic to-day dominating all else is the attitude of the colliery workers towards the proposed 5s. (roughly) reduction of wages per shift. The exigencies of going to press so early in the week prevent us from dealing with this important matter as fully as we should like in this issue. The gravity of the position is only too apparent in face of the recent ballot of the coal workers in a majority of 18 to 1 in favour of a strike against the proposed cut. The intervention of the services of Mr. Patrick Duncan, the Minister of the Interior (in the absence of the Prime Minister) assures the commercial community that this important key industry will be treated with the respect it deserves, and leads to the hope that this difficulty (like so many previous ones) will eventually be satisfactorily solved. In the meantime the power stations here, Germiston and Vereeniging are augmenting their supplies of coal with a view to carrying out arrangements as per schedule. It would be a parody to speak of business this week as concerning the mining material and engineering trades. At this season nothing is doing nor expected, but the underlying current towards betterment, provided the coal question and other important points are satisfactorily settled, is firm. Given a satisfactory solution of the coal question and that of the underground problem, with increased efficiency on the part of white workers, merchants are looking hopefully to the new year. As regards prices those subjoined are those ruling, but there is a certain resiliency in respect of some lines which is determined of course by size and credit. In retrospect the year which closes to-day has been an unfortunate one for merchants generally; the cutting of prices on Change has been more severe than has been witnessed here for many years, and merchants will only be too glad to close their ledgers with, unhappily, big debit balances, and look forward to better business in the coming year. This notwithstanding, the commercial community is seeing 1921 out without much regret and with liveliest hopes and expectations as to what next year will usher in. The past year has been characterised by a hand-to-mouth policy of buying on the part of the mines, caused by the extreme financial stringency prevailing during that period (and accentuated by the usual end of the year closure) and the continued drop in the price of gold, which, although it has been of incalculable value in restoring the balance of currency in Europe, has proved disastrous to some of our lower grade mines and will, if no counter measures are taken in respect of lower costs of production, give the death blow to many of our struggling propositions. The crucible is now on the fire, and the flux is awaited with mixed feelings. The coal crisis is not a favourable pointer, but even in this key industry a favourable outlook is awaited. The Christmas box looked for on all hands is the inauguration from tomorrow of such a scale of wages on the part of the miners, backed up with a greater efficiency in underground work, as will meet the inevitable downward trend of gold to normal. It is unnecessary to dwell upon the decline during the year of steel plates, which are now pretty nearly at second-hand levels, nor upon other lines which have been sacrificed during the past twelve months. Suffice it to say that the "scalping" sacrifice which has been in progress during the past twelve months, and which in a more or less re-

stricted measure is still in progress, has been productive of one saving clause, that in some lines commodities are getting scarce, with a probably bigger scarcity in the absence of any big indent business on the part of our merchant princes.

Latest quotations.—Dunswart iron, 22s. per 100lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channels and joists, 35s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{2}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lbs.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon, nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish

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Iron and Steel.

Prospects in steel circles in Glasgow, notwithstanding the disarmament agreement which disturbs many current arrangements, are still good. Several thousand tons of plates and sections, it is stated, have been placed at Moss End, where work has been partially resumed. It is expected that early in the coming year half of the normal staffs will be employed there. With a view to enliven the iron trade the Cleveland blast furnacemen have suspended the sliding scale of wages, which have fallen from 170 to 77 per cent. during 1921, and have accepted a reduction as from January 1 to 36 per cent. of the so-called base rates. That the disarmament agreement now being arranged in Washington will have an alarming effect on Sheffield and other large manufacturing centres in Britain is shown by the statement that before the conference ships estimated to cost £32,000,000 were already under contract, which work will of course be cancelled should events in America go as it is generally thought they will go. Of the total cost of the ships £23,000,000 would represent wages, affecting about 5,000 men this year and upwards of 25,000 in the new year. In this connection it is stated that work in the steel department of Messrs. Beardmore's forge at Parkhead, Glasgow, has been closed down. This development will be a big blow to the Clyde, wiping out with one stroke of the pen years' work involving a wage bill of something like £15,000,000, which would have gone a long way towards relieving the unemployment problem. The outlook at Barrow and Wallsend, with decreasing orders, is also said to be very gloomy.

Timber and Building Materials.

Building operations, owing to the building holidays, have been quiescent.

Prices: 3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{1}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{1}{4}$ d.; ceilings, 4 $\frac{1}{2}$ d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 6s. 6d. to 7s. 6d.; corrugated iron, 9d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cubic here for first quality, 16s. 6d. for second at the coast; American oak, 1in. 10 $\frac{1}{2}$ d., 1 $\frac{1}{2}$ in. 11d., 2in. 11 $\frac{1}{2}$ d. at coast; and Japanese oak, 1in. 1s. 1d., 1 $\frac{1}{2}$ in., 2in. 1s. 2d. at coast; West African mahogany, 1in. to 4in. thick, 26s. 9d. to 27s. 6d. per cubic at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelling, 1s. per foot. Prices for bricks, although remaining about the same, have a hardening tendency, and should we have heavy rains the tendency will be

upward. Bricks are about 70s.; mixed, 60s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180lb. bag; 8lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Machinery.

A prominent dealer said that during the current month of December he had dealt with more business than during the previous six months. The mines, he stated, were compelled to purchase, and he looked forward to a good time early in the new year.

Oil.

At the annual meeting of the Anglo-Persian Oil Company the chairman stated that the profits for the past year amounted to about £5,000,000. Prospects for the coming year were very encouraging.

SHELL OIL.—The production, we are given to understand, this year is 60 per cent. over last. We understand that the capital of this company is about to be increased.

Coal.

In Scotland the coal-owners are coping with a rush of orders, unequalled for many years. In South Wales the prices are stiffening on a rush of foreign orders.

Reduction in Ship Wages.

A further reduction of £3 per month has been announced from overseas, affecting sailors and firemen.

FALLING FREIGHTS.—Australian freights have fallen, according to a Wellington cable, from 11 to 25 per cent.

The North German Lloyd S.S. Company have increased their capital from 250,000,000 marks to 600,000,000 marks.

British Shipping.

Some 700 to 800 British ships, representing a tonnage of 3,000,000, are, it is announced, at present lying idle, as it is found less costly to lay them up than to run them, although this is about £15 per ship per day, or a weekly total of some £100. Some 25,000 of the *personnel* are thereby affected.

German Developments.

The annual report of the German Electrical Company shows vast improvements in trading developments during the past financial year. The capital of the company has been increased from 200,000,000 marks to 850,000,000 marks, but, this notwithstanding, has paid a dividend of 16 per cent. The board of directors is asking for a further 250,000,000 marks.

The Mannesmann Tube Works, with a capital of 89,750,000 marks, has increased its dividend from 20 to 30 per cent. This company, it is well observed, is interested in the Rand Water Board undertaking.

The report of Krupps, Ltd., shows a profit of 98,000,000 marks, compared with 97,000,000 last year.

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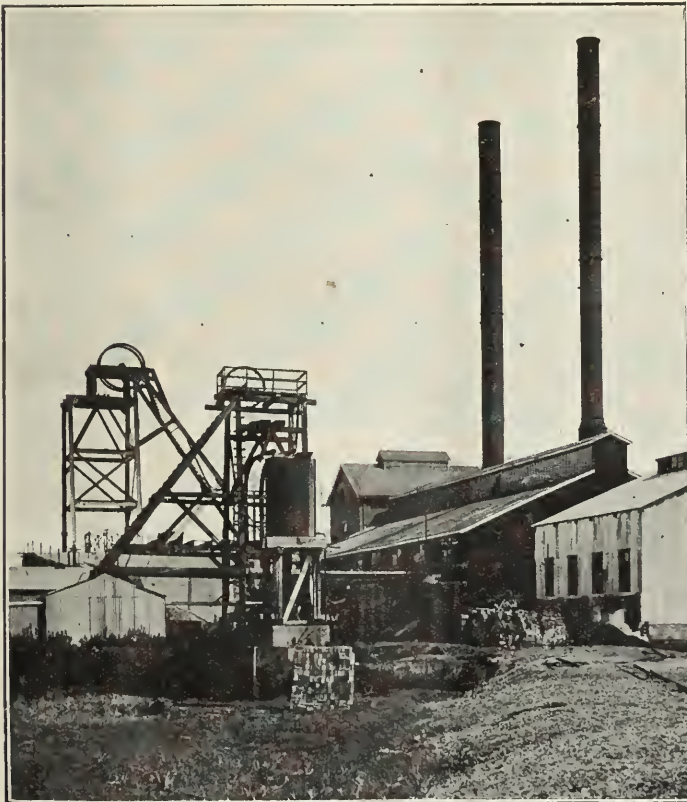
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Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, January 7, 1922.

No. 1580

Scenes on the Transvaal Collieries.



The coal miners employed on the Transvaal Collieries went on strike at the beginning of the week. The photographs reproduced above illustrate: (left hand side) Colliery at Vereeniging, (right hand side, top) a Colliery in the Witbank District, and (bottom) South Rand Colliery, Balfour.

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The Coal Strike.

COLLIERIES AFFECTED—THE ECONOMIC FACTS OF THE CASE—LESSONS OF THE STRIKE IN GREAT BRITAIN.

At the time of writing the Transvaal coal strike is in progress. A fair amount of work is, however, being carried on and at several properties coal winning is being accomplished by the native workers and the mine staffs. At some properties no hauling is being done, but at others a more or less normal output is being maintained. The centre of the strike area is, of course, the Witbank district, but in the outlying areas such as Springs, Vereeniging, Ermelo and Breyten, the colliers are idle. The mines affected are:—

Witbank District: Anglo-French, Clydesdale, Coronation, Transvaal and Delagoa Bay Colliery, Middelburg Steam Colliery, Station Colliery, Tweefontein Colliery, Witbank Colliery, Outspan, Schoongezicht, Oogies, London and Vaalbank.

Kendal District: Kendal Colliery and Kendal United Colliery.

Vereeniging: Cornelia Mine, Vereeniging Estates.
 Springs District: Springs, Largo, Apex and Vischkuil.
 Ermelo District: Bellevue and Grenfell.
 Breyten District: Breyten Colliery.
 Balfour District: South Rand Collieries.

In connection with the economic aspects of the strike the following statistics relating to the coal mines of the Transvaal are taken from the Government Mining Engineer's reports, and show how substantially costs have risen:—

	1914.	1920, over 1914.	Percentage Increase 1920
Output—Tons	5,157,268	7,180,124	
Value of Coal at Pit's Mouth—			
Total	£1,150,746	£2,187,681	
Per ton	4/5.55	6/1.12	36.55
Expenditure—			
Salaries and White Wages—			
Total	£219,954	£474,143	
Per ton	0/10.24	1/3.85	54.79
Native Wages—			
Total	£262,571	£469,145	
Per ton	1/0.22	1/3.69	28.40
Stores—			
Total	£342,895	£841,851	
Per ton	1/3.96	2/4.14	76.32
Total	£825,420	£1,785,139	
Per ton	3/2.42	4/11.68	55.34
Remainder, from which has to be provided Head Office Expenses, Directors' Fees, Government Taxes and Sundry Expenditure, Interest on Debentures and Loans before providing for Dividends	£325,326	£402,542	
Per ton	1/3.13	1/1.14	11.17
DIVIDENDS PAID.*			

	Total.	Per Ton.	Percentage on Issued Capital.
1914	£300,683	1/1.99	7.2
1915	350,449	1/4.16	10.0
1916	362,826	1/2.18	10.7
1917	222,872	8.05	7.5
1918	228,423	8.51	7.2
1919	248,756	9.01	7.0
1920	304,982	10.19	7.2

* Out of Dividends provision must be made for amortisation of capital, a coal mine being a wasting asset.

In connection with the cause of the dispute—the reduction in wages—it is pointed out by the coal owners that the coal miners contend that the 5s. cut is too high as compared with the reduction in the cost of living. But in October, 1920, they accepted an increase of 10s. per shift on pre-War rates, and at that time the percentage increase in the cost of living, according to the figures of the Director of Census, was 57 per cent. The latest figure (November, 1921) is 22.5 per cent. Obviously, as the percentage increase in the cost of living has fallen from 57 per cent. to 22.5 per cent., the cut should have been 6s. per shift instead of 5s. per shift.

Lessons of the British Strike.

At this juncture it may not be amiss if we draw attention to some of the facts and figures concerning the great British coal strike of last year and particularly the lessons which that industrial catastrophe taught the people of Great Britain.

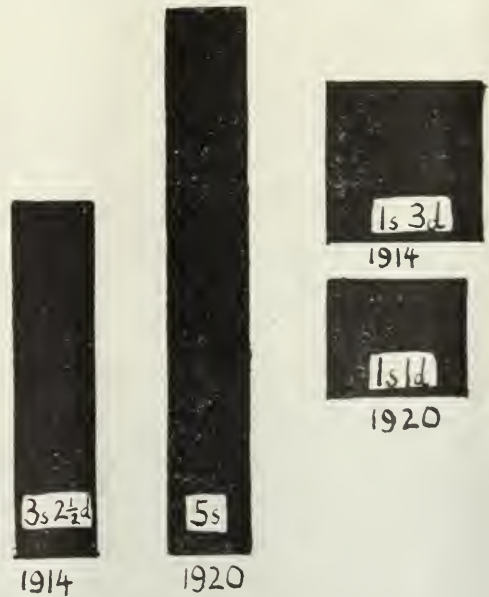
The coal miners of Great Britain, after 13 weeks of ruinous idleness, resumed activities on June 16, 1921. The settlement terms for the reduction of wages were agreed to between the Government, the owners and the miners, as under:—

Broadly speaking, the miners gave up the demand for a national pool and nationalisation of the mines, while the owners, on the other hand, forewent the determination to cut wages in a drastic manner, in some cases amounting to 45 per cent., which originally brought about the dispute.

Peace was secured for a minimum period of eighteen months. The following was the basis of settlement:—

- July: Reduction of 2s. a shift.
- August: Reduction of 2s. 6d. a shift.
- September: Reduction of 3s. a shift.

Afterwards the permanent arrangement came into force for at least a year, and it will then be terminable by three months' notice on either side.



Expenditure per ton on the Collieries. The "Remainder" per ton on the Collieries.

The Debit Side of the Strike.

It is impossible to estimate the damage to British industry during the 88 days' stoppage of the mines, but it

was unquestionably colossal, and its ramification has been felt in every walk of life.

The miners themselves lost 60 million pounds in wages alone, and despite the settlement this is not the full extent of their loss.

British coal production was 140 million tons less last year than during the year before the War.

Unemployment has grown tragically as a result of the stoppage. Other unions have become bankrupt.

The cost of the coal dispute to industry, commerce, and wage-earners could be reckoned, according to some statisticians, at hundreds of millions sterling.

In June Britain produced less than 19,000 tons of steel and pig iron. In May, 1920, the two classes of metal totalled 1,585,000 tons. The failure of the coal supply accounts for the difference in the two totals.

In the month of May, 1921, the steel and pig iron output of the States was 2,720,000 tons, or nearly double the English figure of last year, when the boom was at its height. And this total of nearly three million tons in the States is, so far as the steel figures are concerned, only about 50 per cent. of the steel tonnage for 1920. The pig iron production of the United States was 37 million tons last year.

These figures show how competition from other countries has taken advantage of the British miners' post-War attitude towards capital. The facts and figures here given have their moral for South Africa. We can only hope that the lesson of the British strike will not be lost upon the colliers of this country.

DIVERSION OF SHIPPING.

In consequence of the coal strike the Union is already in danger of losing a considerable portion of its overseas coal trade. As a matter of fact even the shadow of the strike has been highly detrimental to the colliery interests of this country. Weeks ago steamers proceeding to South African ports commenced coaling at Madeira in anticipation of a shortage of fuel on arrival in South Africa.

The first of the serious reactions on trade occasioned by the coal crisis was announced in a statement issued by the Chamber of Mines on Tuesday relative to the case of eleven steamers waiting in Delagoa Bay for 81,000 tons of coal.

The statement is as follows:—

"There are in Delagoa Bay to-day eleven steamers waiting for 81,000 tons of coal. To meet this demand there are at Delagoa Bay and in transit only 21,500 tons. If the strike continues, therefore, there will be a shortage of almost 60,000 tons. Arising out of this matter, a cable message was received this morning from the charterers of these vessels in London to the effect that unless some assurance can be given that the coal will be forthcoming as usual these steamers will be immediately diverted elsewhere. This means an immediate loss of 60,000 tons of shipping trade, and it will certainly be many months before that trade can be recovered. Consequently the colliery representatives desire it to be clearly understood that unless the strike terminates and normal operations are resumed before these ships leave, it will be impossible for the collieries to re-employ the same number of men as hitherto.

"In addition to this, the loss of oversea trade cannot fail to be reflected by the employment of fewer Europeans on the railways and at the ports.

"The oversea trade referred to has been secured against world competition at prices below which the collieries cannot go and continue to pay even the wages offered, against the acceptance of which the men have so unreasonably gone on strike."

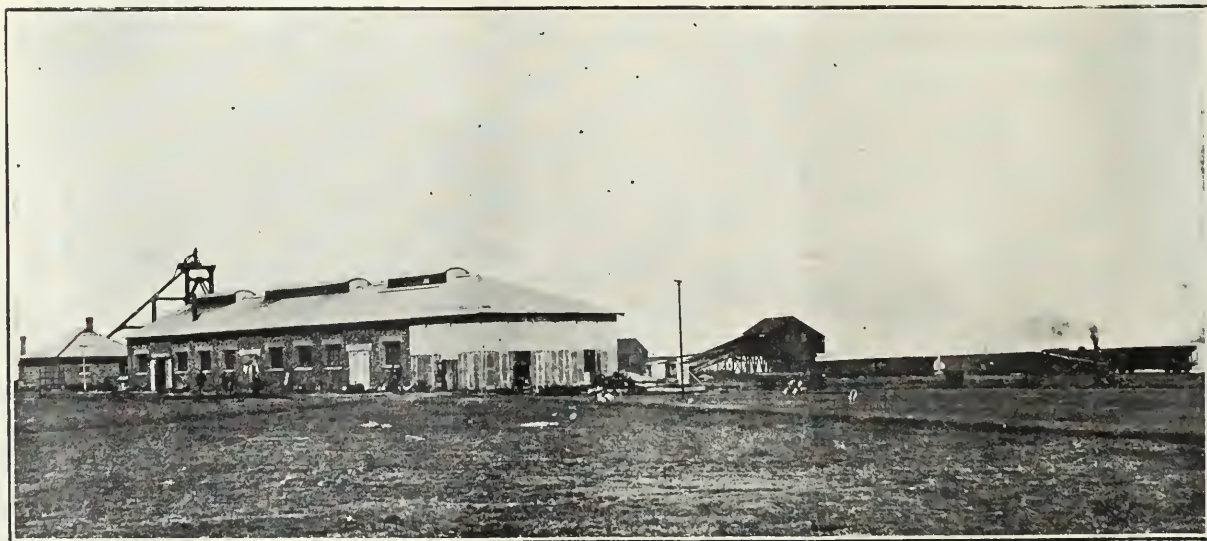
ANSWERS TO CORRESPONDENTS.

R. Fotheringham, Nairobi.—We have passed your letter on to the people concerned, who will, doubtless, reply to you direct.

South-West Transvaal Diamonds.

A Bloemhof correspondent writes:

The October return of the alluvial diggings show that Blesbok heads the whole list with £5,600, and has only 190 registered claimholders. With the present price of diamonds this is very good. Someone must be finding fine diamonds to make up such good returns. Blesbok is a very extensive property, and the whole of it more or less bears diamondiferous gravel. Rich patches may be opened up as the farm is further developed. The correspondent adds: "I met a digger this morning (a Mr. Kruger) who told me he had found and sold a 24½ carat for £505. I heard of another beautiful stone of 29½ carat, and of many smaller ones; so some diggers are doing all right, but, of course, they are in the minority."



Coal Mining in the Transvaal.

Facts and Figures about our Coal Trade.

WHY EXPORTS MUST BE MAINTAINED AND COSTS REDUCED—ECONOMIC ASPECTS OF THE STRIKE.

Although the South African coal industry has shown considerable expansion during the last ten years, and although the value of its produce is, next to gold and diamonds, the third highest amongst the mineral products of the Union, the output of our collieries is very small compared to that of the rest of the world, as the following figures show:—

Country.	Output of Coal (tons of 2,000 lb.).	Latest year for which figures available.
United States of America	556,516,000	1920
United Kingdom	229,295,000	1920
Germany (excluding Ruhr and Upper Silesia)	131,346,000	1920
Ruhr	88,250,000	1920
Japan	33,970,000	1919
Upper Silesia	31,686,000	1920
Belgium	22,413,000	1920
France	21,863,000	1919
India	21,759,000	1919
Canada	14,450,000	1920
Australia	11,790,000	1919
Union of South Africa	11,473,452	1920
Spain	6,135,000	1918
Holland	3,402,000	1919
Italy	1,158,000	1920
Malay States	191,000	1920

South Africa occupies a similarly humble rank when its total coal resources are compared to those of the rest of the world. These are, in fact, only about 1 per cent. of the world's total.

While South Africa may occupy a low position in the list of coal-producing countries, the value of the recent

The relationship in the Railway receipts between coal and other traffic for the year 1920 was as follows:—

	£	%
Goods and Minerals (other than coal)	9,665,913	42.1
Passengers	6,049,916	26.3
Coal	5,201,183	22.6
Livestock	721,409	3.1
Parcels	631,754	2.8
Miscellaneous	623,065	2.7
Other Traffic Receipts	80,182	0.4
	<hr/> 22,973,452	<hr/> 100.0

From this point of view alone it appeared to the Coal Commission that every reasonable step should be taken not only to maintain this important industry, but to strengthen and expand it in every possible way.

The position of South Africa as an exporter of coal relatively to other countries is shown in the following table:—

	(Tons of 2,000 lb.)	
	1912.	1917.
United States of America	19,811,680	—
United Kingdom	67,035,848	37,800,705
Germany	34,321,852	—
Canada	1,583,782	1,954,024
France	—	—
Belgium	5,081,000	—
India	874,199	832,332
Japan	3,470,000	—
Australia	2,152,385	646,552
China	—	—
Union of South Africa	389,410	591,754



At a Transvaal Colliery.

output is of considerable importance to the country, and this production is now being jeopardised by the strike.

The Railway revenue derived from coal during the year 1920 was	£5,201,183
While the income derived by the Collieries from coal sold was	£4,506,572
or a total of	<hr/> £9,707,755

By far and away the greater proportion of this ten millions of money was expended on wages and stores in South Africa.

These figures show that while in 1912 South Africa produced 0.65 per cent. of the world's output, it accounted in that year for 0.3 per cent. of the coal exported from all countries. In 1920 the export of South African coal had risen to 1,394,793 tons, but statistics for other countries are not available. Bunker coal is not included in these figures.

The growth of the South African export and bunker trade, including coal shipped to Union ports during the

past dozen years is shown by the following figures in tons of 2,000 lb.:—

	Transvaal.	Natal.	Total.
1909	4	1,388,596	1,388,600
1910	155,296	1,757,794	1,913,090
1911	113,667	1,808,997	1,922,664
1912	363,270	1,835,297	2,198,567
1913	669,249	1,886,570	2,555,819
1914	579,419	1,594,595	2,174,015
1915	458,996	1,361,970	1,820,966
1916	738,358	1,708,405	2,446,763
1917	861,761	1,555,561	2,417,322
1918	767,146	1,340,440	2,107,586
1919	789,099	1,382,192	2,171,291
1920	1,122,500	1,774,912	2,897,412

This export and bunkering trade is essential to the Collieries, and it is now being imperilled by the strike.

The export and bunkering coal trades of the country have recently been adversely affected by competition overseas, and if the market, or even a portion of it, is to be retained the costs of production will have to come down. In other words, wages must be reduced. Failure on the part of the coal owners to achieve this reduction will mean:—

(1) The complete loss of the value of the cargoes for the eleven steamers waiting at Delagoa Bay.

(2) The loss of future cargoes of coal, for it very soon becomes known that delivery is uncertain at any port, and ships avoid such ports.

(3) The rise in the price of our inland coal for industrial production owing to the fact that the Transvaal industry relies for its profit on export coal and does not make its profit at present out of internal coal.

(4) A reduction in local industry which always follows rising costs of fuel would take place.

(5) In a few months' time, even if the men were able to retain temporarily one or two shillings out of the proposed reduction, there would be a gradual closing of a considerable percentage of the collieries owing to the diminished output.

(6) Loss of Railway revenue.

(7) A generally adverse influence upon finance, commerce, trade and industry.

New Company Registrations.

The following is the list of new companies registered at Pretoria during December:—

Beaufort Mansions, Ltd., Aegis Buildings, 32, Loveday Street, Johannesburg; Capital, £3,000.

Silberman Stores, Ltd., 222, St. Andries Street, Pretoria; Capital, £6,000.

Durban Trust, Ltd., 427, Fourteenth Street, Vrededorp, Johannesburg; Capital £500.

Steyn's Garage, Ltd., 227, Pretorius Street, Pretoria; Capital, £3.

Windsor Hall Company, Ltd., Glynn's Reserve, Sabie, Transvaal; Capital, £600.

The Goch Buildings, Ltd., 94, Cullinan Buildings, Main Street, Johannesburg; Capital, £40,000.

Park Lane Mansions, Ltd., Aegis Buildings, Loveday Street, Johannesburg; Capital, £2,000.

Komnick Impieiment Company, Ltd., 102, President Street, Johannesburg; Capital, £1,000.

Eagle Trading Company, Ltd., 53, Sinmonds Street, Johannesburg; Capital, £10,000.

Star Bakery, Ltd., 30, Beaufort Street, Troyeville, Johannesburg; Capital, £5,000.

American Advertisers (S.A.), Ltd., 2, Sauer's Buildings, corner Market and Loveday Streets, Johannesburg; Capital, £100.

Arton Copper Company, Ltd., 3rd Floor, National Bank Buildings; Capital, £50,000.

Concrete Reinforcement and Fire Hose, Ltd., corner Von Weilligh and Anderson Streets, Johannesburg; Capital, £5,000.

Klipfontein Brickworks, Ltd., 16, Trust Buildings (2nd Floor), 98, Fox Street, Johannesburg; Capital £300.

Bye-Products, Ltd., 15-16, Ascot Building, corner Fraser and Commissioner Streets, Johannesburg; Capital, £10,000.

Noxal Company (South Africa), Ltd., Trust Buildings, Fox Street, Johannesburg; Capital, £3,000.

Sutton, Ltd., corner Church and Boom Streets, Klerksdorp; Capital, £5,000.

Concrete Construction Company, Ltd., 40, Permanent Buildings, Harrison Street, Johannesburg; Capital £300.

Witwatersrand Land and Investment Company, Ltd., 15, New Court Buildings, Market Street, Johannesburg; Capital, £750.

Rietfontein Stores, Ltd., 65, Delarey Street, Vrededorp, Johannesburg; Capital, £1,000.

Natal Investment Company, Ltd., 65, Delarey Street, Vrededorp, Johannesburg; Capital, £400.

The Premier Box and Trunk Factory Company, Ltd., 123a and 125, Market Street, Johannesburg; Capital, £1,500.

Potgietersrust Trading Company, Ltd., Hoofd Street, Potgietersrust, Transvaal; Capital, £500.

Arthur Cooper and Company, Ltd., 25, Exploration Buildings, Commissioner Street, Johannesburg; Capital, £1,000.

Premier Timber Company, Ltd., 128, Main Street, Johannesburg; Capital £5,000.

Union Mining, Finance and Investment, Ltd., 90-4, Exploration Buildings, Commissioner Street, Johannesburg; Capital, £50,000.

New Oil-Gas Burner.

A demonstration was recently given in London, England, of a new type of burner for use with oil. The oil is first converted into gas in a chamber filled with nickel gauze heated by the flame. The oil gas then passes through a regulating valve and issues as a jet which carries with it the air required for combustion. The mixture then passes into another chamber, where it is still further heated; and it issues from orifices arranged according to the services required. No carbon forms in the burner, and it does not require cleaning. This invention can easily be adapted either for heating or for lighting in conjunction with an incandescent mantle.

Tenders are invited by the Kimberley City Council for the supply of steel or cast iron water pipes, valves, and specials. Specifications, schedule of quantities, and form of tender may be obtained at the City Engineer's office upon deposit of £2 2s., which will be refunded upon receipt of a *bona fide* tender and after return of all contract documents provided by the City Engineer. Tenders, enclosed in sealed envelopes, and endorsed "Water pipes and specials contract No. 3," must reach the Town Clerk on or before the 16th January, 1922.

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The Year's Dividends.

RAND GOLD MINING COMPANIES.

The following is a complete list of the Rand gold mining company dividends for the year 1921, compared with those for 1920. The total, it will be seen, shows a decrease of £1,111,663 on the year. The "outside" companies also show a substantial reduction, due to the absence of the T.G.M.E. from the list.

COMPANY.	Capital £	Total for Year.		Total Last Year.	
		Rate p.c.	Amount.	Rate p.c.	Amount.
Brakpan Mines	£850,000	30	£255,000	45	£380,190
City Deep	1,295,000	37½	485,625	32½	415,250
Consolidated Langlaagte	950,000	12½	118,750	12½	118,750
Consolidated Main Reef	1,247,602	8¾	109,165	15	187,140
Crown Mines	940,106	32½	305,536	77½	728,582
Ferreira Deep	980,000	15	147,000	22½	220,500
Geldenhuis Deep	585,753	—	—	15	87,864
Government G.M. Areas	1,400,000	55	770,000	50	700,000
Geduld Proprietary	1,173,687	17½	221,111	17½	205,295
Knight Central	900,000	—	—	7½	67,500
Knights Deep	743,526	—	—	*3¾	27,882
Langlaagte Estate	886,500	12½	110,812	10	88,650
Meyer and Charlton	200,000	100	200,000	120	240,000
Modder B.	700,000	95	665,000	82½	577,500
Modder Deep	500,000	150	750,000	145	725,000
New Kleinfontein	1,151,540	5	57,577	5	57,577
New Modderfontein	1,400,000	92½	1,295,000	102½	1,435,000
New Primrose	325,000	12½	40,625	5	16,250
New Unified	250,000	10	25,000	15	37,500
Nourse Mines	827,821	6¼	51,738	8¾	72,434
Robinson	2,750,000	2	55,000	3	82,500
Robinson Deep	806,807	—	—	—	50,000
Rose Deep	700,000	15	105,000	27½	192,500
Simmer and Jack	3,000,000	2½	75,000	5	150,000
Springs Mines	1,307,236	15	197,500	20	251,372
Van Ryn Estate	500,000	12½	62,500	15	75,000
Van Ryn Deep	1,196,892	60	718,136	65	777,980
Village Deep	1,060,671	10	106,065	10	106,065
Witwatersrand	469,625	25	117,405	20	93,924
Witwatersrand Deep	550,000	10	55,000	—	—
Wolhuter	860,000	7½	64,500	12½	107,500
			£7,164,045		£8,275,708

* 1919 operations.

OUTSIDE DISTRICTS GOLD MINES.

Glynn's Lydenburg	£170,000	8¾	£14,875	10	£17,000
Transvaal Gold Mining Estates	604,225	—	—	10	60,423
Sub Nigel	775,000	8¾	67,813	12½	96,875
			£82,688		£174,298

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The Case of the Rogerston Collieries.

A SHAREHOLDER PRESSES FOR INFORMATION—DORMANT CONCERNS—WHY THEY SHOULD BE LIQUIDATED.

In our issue of November 26th we referred to the remarkable balance sheet of the Rogerston Collieries, Ltd., and asked a number of pertinent questions concerning certain items appearing in the accounts, which items in our opinion called for explanation. We have not been favoured with any official reply to these queries but we are glad to learn that a large, and unfortunate shareholder has been induced to "worry" the Company's office—we use the word advisedly—for information regarding the Company's finances and the date of the last meeting. We refrain from publishing the correspondence which we have been privileged to inspect in the matter, but we would like to supplement our correspondent's queries by asking the Board (a) if it is true that the farm Waterval has been sold for £14,000; (b) how much money the directors of this company have drawn during the past 23 years?; (c) have all fees been drawn from capital account?

The case of the Rogerston Collieries is, we fear, not a solitary example of this sort of thing in South Africa. We have on various occasions pointed out that there are several moribund South African mining and land companies which should be liquidated in the interests of ordinary shareholders. In this connection the following letter which we recently received from a reader of the Journal appears to be worthy of notice.

"Dear Sir,—I notice that there are a great many gold mining and land companies which are now moribund and the shares of which are seldom quoted on the Stock Ex-

change. I happen to be a shareholder in some of these companies. The directors have from time to time informed us (the shareholders) that the companies have closed down for want of sufficient capital to carry on operations. In other instances we are informed that the difficulty of coping with the water trouble is the cause of mining operations ceasing. We receive year in and year out the reports of the directors and the usual speeches made by the various chairmen; in the meantime the cash in hand is gradually dwindling away and being spent on directors' fees and other expenses, and I suppose when all the funds have been frittered away the shareholders will be called together to consider the advisability of liquidation. Now, sir, what I want to know is this: how can shareholders at a distance air their grievances? Is there any body in Johannesburg that would undertake to represent shareholders and bring about a liquidation of these moribund companies before all the cash has been spent? I noticed some time ago that you gave in your issues of the paper the cash balances of various companies, clearly showing that if their assets were realised and added to the cash in the bank that quite a decent amount could be paid out to shareholders. Now if the directors know that it is impossible to raise sufficient money to carry on these mines which are closed down for various reasons, surely it would be wise to call a meeting of shareholders and put the proposition before them and thoroughly explain that by hanging on all the cash assets will gradually be eaten up in fees and expenses. Let it be pointed out that by liquidating the shareholders would be able to receive in cash so much per share.

I notice quite a number of these almost forgotten and closed down mines would pay a decent sum of money to shareholders if all their assets were realised. Any number of them have sufficient cash in the bank to pay 5s. per share, and yet the market quotations probably stand at 1s. to 3s. on the Stock Exchange. Can you make any suggestion to assist the shareholders at a distance?"

We certainly think that something should be done to force liquidation of some of these dormant companies, and we shall be interested to hear from shareholders who find themselves in the position of the correspondents quoted above.

NEW PATENTS.

- Joseph Lewis.—An improved catch for linking the ring of a curtain rod and the curtain pin or curtain.
- Baptist Hogsett and Frank Stephens.—A combined coat and vest.
- William Daly.—Improvements in securing bodies to shafts and the like.
- Charles Edward Manners.—An improved tube mill shell liner.
- Stephanus Isaias Terblanch.—A suction carburettor for motor cars and motor cycles.
- Aidan Nicholas Henderson.—A machine for use in the construction of concrete walls.
- Charles John Wiekee.—Improvements in and relating to the cooling of liquids and solids.
- International General Electric Co., Inc.—Improvements in and relating to dynamo protective systems.
- Walter Krouse.—Improvements in pipe couplings.
- Henry Selby Heleshaw and Ernest Tribe.—Improvements in containing vessels.
- Ivar Juel Moltke Hansen.—Electrical heating arrangements.
- Frank Gillam Bailey.—The Rand patent automatic fly-proof sanitary appliance.

The following certificates have been issued by the Mines Department for the period ending 31st December, 1921:—
 Mine overseers (metalliferous mines): D. Collison, C. H. Kennedy, D. F. J. MacRae, M. N. Smith. Mine surveyors: J. Levieux, M. Ramsay. Assayers: J. Cussons, J. de Villiers, R. R. Falck, D. Naude, G. Ross, H. Thomas, W. Webb.

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Strike Developments.

REPORTS FROM VARIOUS CENTRES— POSITION BECOMING MORE DIFFICULT.

It is impossible in the space at our disposal to deal with all the events concerning the strike which have occurred during the past week, but in the following paragraphs will be found a digest of some of the developments which appear to be conspiring to bring about a general strike in the Transvaal's Industrial areas.

The Big Ballot and the Conference.

Ballot returns from branches of the unions—"Yes" or "No" on the question of strike action—are to be handed in to the central offices by 5 p.m. on Sunday (to-morrow).

After the count, the decision will remain with the executives of the combined unions should a strike be favoured by the majority, as to exactly when it shall come into operation.

The result of the ballot is expected to be known early on Monday.

If a decision to strike is made public on Monday the Union's may still negotiate at Tuesday's conference.

Arbitration Fails.

An attempt to bring the two parties in the collieries dispute together was made on Wednesday by Major Trevor, Chief Inspector of Mines, but the only result achieved was that the strikers definitely allied themselves with the larger issues which are now under consideration on the Reef.

Major Trevor met the Strike Committee just previous to the public meeting at Witbank, and stated that he wanted to put certain propositions before them. He said he wished to know whether they were still agreeable to submit their case to arbitration, and what conditions they wished to impose. He added that he was prepared to present their views on this matter to General Smuts.

Need for Public Services.

Another point he emphasised was the importance to the community of maintaining public utilities, and he asked if the strikers were prepared to agree to allow certain collieries to work for that purpose. The mines which it was suggested should be left working were the Cornelia Colliery (Vereeniging) and the Largo, both of which are associated with the Victoria Falls Power Company's generating stations, and two large mines in the Witbank district.

After the public meeting the colliery workers held an aggregate meeting in the Masonic Hall, which Major Trevor also attended.

He gave the men to understand that he intended rigidly to enforce the Mines, Works and Machinery Regulations, and that as from January 4 he would undertake to punish all offenders against those regulations.

Major Trevor also gave the strikers to understand that he will not issue any temporary tickets during the period of the strike excepting to men whose qualifications are higher than those required for a mining blasting certificate.

Stoppage of Coal Getting.

The enforcement of the regulations in the manner stated is considered by some to be tantamount to closing the mines.

The men considered the proposition put before them by Major Trevor, and came to the decision that they could not sever themselves from the general question involving

the other unions on the Reef, namely, the V.F.P. question, the "ultimatum" to the workers' unions in regard to the *status quo*, wages agreements and underground contracts, and the question of wages to workers in the Reef engineering shops.

Finally a resolution was carried to the effect that they were not at present willing to go to arbitration on the question of the proposed reduction of 5s. per shift on the collieries unless and until all the ultimatums to other workers were withdrawn.

Government Asked to Intervene.

The miners laid their case before a big meeting of residents at the recreation ground at Witbank on Wednesday afternoon. Many of the men came in from the outlying mines to be present at the meeting, and the business section of the community was also well represented.

The Mayor of Witbank (Mr. Norman Scott) presided, and there were with him on the platform Mr. J. Hobson, president of the strike committee, Mr. Davis, Mr. W. Butler of the Engine Drivers, and others.

Eventually the following resolution was carried unanimously:—

"That this mass meeting of citizens of Witbank desires to protest against the action of the Chamber of Mines Colliery Section in refusing to arbitrate on the present dispute and by their action bringing about a strike, and calls upon the Government to bring pressure to bear on these employers to agree to a third party being called in to endeavour to bring about a settlement. Further, that the attitude adopted towards the rank and file by certain members of the Surface and Underground Officials' Association is receiving the serious consideration of the strikers and may result in the employees concerned refusing to work with those officials on the termination of the strike."

At Vereeniging.

The following letter has been sent to the mine manager at the Vereeniging Estates:—"We, the Strike Committee, beg strongly to protest particularly against the action of two members of your clerical staff who are now employed by you driving the loco and in mining operations respectively. We have set ourselves the task of exercising all due restraint on our fellow-workers, and we feel that the action of which we here complain renders our task unduly difficult. We trust, therefore, that you may see it to be your duty to make some modification in this direction."

This letter had the desired effect, and the clerk was withdrawn from the locomotive.

It is reported that the Union Steel Workers came out on Wednesday morning. The bricklayers are out on strike, and the remainder of the workers were locked out owing to lack of coal.

The Strike Committee has agreed to leave the question of working the V.F.P. crushers at the Cornelia battery in abeyance, because it involved public services in Johannesburg.

Underground Officials' Position.

A meeting of the Executive of the Underground Officials' Association was held in Johannesburg on Wednesday night, when two important resolutions were carried.

The first was favouring arbitration in the matter of the collieries' dispute.

The second concerned the present working of the collieries, and it was resolved to issue immediate instructions to all underground officials on collieries not to assist in any "productive" work during the present strike unless the principle of arbitration is accepted.

The Year with the Ferreira Deep.

YIELD MAINTAINED, BUT LOWER TONNAGE CRUSHED—PRICE OF GOLD THE MAIN FACTOR.

From the annual report of the Ferreira Deep, just issued, we learn that the net profit was £200,902.

The consulting engineer, Mr. A. J. Brett writes, *inter alia*:—The working profit earned during the period under review was £13,792 in excess of that of the preceding year, due entirely to the higher price obtained for gold.

The yield per ton of ore treated remained practically constant, but working costs were 7d. higher at 26s. 7d. per ton.

Notwithstanding a reduction of 2 per cent. in the rate of sorting, the tonnage milled represents a further decline, due mainly to the shortage of native labour, particularly in the first quarter of the year; the position improved somewhat in this respect at the beginning of January, but a further set-back was experienced in February when operations were suspended for a week by reason of a strike of white miners.

The yield obtained per ton milled is considerably lower than that to be deduced from the average value of the ore reserves, the reason being that about one-third of the total tonnage mined is drawn from sources not included in the reserves. Apart from the fact that the limited number of points of attack available precludes the possibility of relying to a much greater extent upon the ore reserves proper for the supply of rock to the mill, this "other source" tonnage, although of a lower grade, is mined at a profit, and adds considerably to the life of the mine.

No further payable areas have been discovered on the pyritic lode during the year, but judicious prospecting will be carried out on this body from time to time as circumstances warrant. Apart from this work development in the future will be confined almost entirely to the area recently acquired from the Village Main Reef Gold Mining Company, Limited (in Liquidation), and to that held on tribute from the Village Deep, Limited.

Ore Reserves.—The ore in reserve at 30th September, 1921, was estimated at 780,314 tons of an average value of 7.7 dwts. per ton. This total includes 267,375 tons in pillars not immediately available for stoping, and 168,400 tons of broken ore in the form of packs.

Provided there is a satisfactory supply of native labour available during the ensuing year and that operations are not hampered by accidents or industrial troubles, it should be possible to effect some reduction in operating costs, but the profit to be earned will be determined primarily, as in the year just concluded, by the selling price of gold.

In the course of his annual report, Mr. Paul Selby, the Manager, writes:—The method of supporting stopes by means of reef packs was continued during the year, the combined area of the packs so built being 42 per cent. of the

total area stoped as compared with 41 per cent. for the previous year. The average monthly tonnage reclaimed from packed areas exceeded the tonnage packed by approximately 2,100 tons.

Earth tremors were fewer in number and generally less severe than during previous years.

The work of mining the joint boundary pillar between the Ferreira Deep and Robinson Deep was continued during the year, and approximately 90 per cent. of this pillar had been mined by the end of the year.

The area leased under the tributing agreement with the Robinson Gold Mining Company, entered into in September, 1916, produced a revenue of £256, bringing the total revenue from this source for five years up to £483.

The tributing agreement entered into with the Village Main Reef Gold Mining Company in August, 1918, was cancelled by mutual arrangement and the mining area previously held under tribute was purchased from said company for a consideration of £37,500, the new arrangement took effect from the 31st December, 1920, and in addition certain other mining claims were purchased for a further sum of £2,500. Survey and legal fees brought the total cost of the transactions to £41,041. Satisfactory results have been obtained to date.

A further tributing agreement was entered into with the Village Deep, Limited, in May, 1921, which gives the Ferreira Deep the right to mine certain South Reef adjoining this Company's boundary on a royalty basis of 2s. per ton mined. A small tonnage has already been mined from this area which has resulted in sufficient profit to warrant the further development of the area, which work is now in hand.

The average number of employes working during the year were 344 whites and 2,496 natives as compared with 375 whites and 2,569 natives for the previous year.

Following the policy adopted during the past three years, advantage was taken of good prices obtainable for certain disused machinery and plant, the total sum realised in this way being £9,421.

The miners declared a sympathetic strike early in the morning of the 7th February, which lasted seven working days, and seriously affected the Company's operations and profit for that month. The strikers had no grievance against the Ferreira Deep.

I am pleased to record that during the year I have received able and loyal assistance from the staff and employes.

The great Coal Strike in Britain last year cost the miners more than 60 million pounds in wages. Despite the settlement, this is not the full extent of their loss. Thousands of men will probably never be absorbed at all. Unemployment has grown tragically as a result of the stoppage. Other unions have become bankrupt. The cost of the coal dispute to industry, commerce and wage-earners could be reckoned, according to some statisticians, at hundreds of millions sterling. The moral is clear, don't strike!

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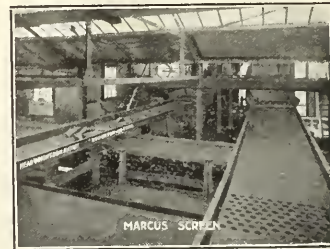
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EDITORIAL.

THE STRIKE.

The strike of colliers in the Transvaal, which commenced at the beginning of the year, is still in progress, and at the moment of writing there is no indication of a speedy settlement. On the contrary, there seems to be every likelihood of the trouble spreading to the gold mines, power stations and engineering shops of the Witwatersrand. As is generally known, the cause of the trouble on the coal mines has been the refusal of the men to accept a reduction of five shillings per shift in their wages. The coalowners contend that such a cut is absolutely essential if the collieries are to retain the small measure of overseas trade left to them in the face of severe competition. Moreover, such a reduction in pay is only in keeping with the tendency towards lower wages which is now practically world wide in its application.

The economic facts and figures of the position are set forth in special articles, statistics and diagrams which appear elsewhere in this issue. So far several of the collieries, particularly those with incline haulages, have managed to more or less maintain outputs by means of officials working in conjunction with the natives, an achievement which has caused considerable indignation amongst the workers, who apparently take no cognisance of the Government's statement, made before the strike started, that in the interests of the whole community every effort would be made to produce an output of coal sufficient to maintain the essential services of the country. The strikers have alleged breaches of the mining regulations, but these statements have been repudiated by the Government. Major Trevor, of the Mines Department, and other inspectors have been placed on special duty in connection with the strike in the Witbank District. Attempts made by Major Trevor on behalf of the Government to refer the matter to arbitration have failed. The strikers decided to refuse any offer of negotiation unless and until all the ultimatums to other workers are withdrawn. Attempts to secure a guarantee of unhampered outputs from certain collieries for the maintenance of public services have likewise proved futile, and the rigorous enforcement of the mining regulations may soon result in some of the mines being brought to a complete standstill. Happily for South Africa our collieries are not deep. They have no difficult pumping problems to cope with, as the British collieries had to deal with in the disastrous coal strike and its aftermath of last year. At several mines coal can be won through incline shafts without white miners or engine-drivers.

In these respects there are encouraging features. But as against this has to be set the facts that several collieries with vertical shafts are unable to hoist coal, and that the overseas coal trade already has been seriously affected. Eleven steamers which have been waiting at Delagoa Bay for coal will be diverted to other ports where fuel can be obtained. As far as the internal consumption is concerned, Vereeniging, with its large power station and numerous industries, is already on short rations, and the strikers are endeavouring to implicate the railways. All coal hauled by non-union men is, in the estimate of the strikers, "scab" coal, and one has only to carry this method of reasoning a little further to regard the power required to operate the gold mines as scab power. It is, however, highly probable that the colliers will not have to terrorise the gold workers into sympathetic action by employment of this dreaded word. The big ballot which is being taken by the S.A.I.F. on the subject of a general reef strike, which will implicate mechanics and engine drivers as well as other workers in addition to miners, is returnable to-morrow. The enlarged executive of the Federation, regardless of the true facts of the case and of the urgent need for a re-organisation of the industry on a basis of economy and efficiency, is making all the capital it can out of the false allegation that the Chamber of Mines is seeking to bring about a wholesale substitution of coloured for European labour. In the meantime the price of gold is still falling. The latest quotation is 97s. 9d., and the problem of keeping the lower grade mines going is becoming more acute each day.

In the estimate of many moderate-minded men who are not prone to prophetic hysteria, the situation is an ugly one, and has all the makings of a general industrial commotion. From our point of view it will be all for the good of the country in the long run if there is a general, instead of a series of sectional strikes in which one branch of labour remains at work and supports those who have downed tools. The atmosphere needs clearing. The clouds have been banking up for a long time past, and if there has yet to be a storm, it is best to get it over as speedily as possible, provided of course that the Government is able to maintain law and order and can prevent sabotage and lawlessness in this industrial volcano of the Southern Transvaal. General Smuts visited Johannesburg on Wednesday in connection with the industrial situation, but what ensued at the discussion at which the Prime Minister was present at the Law Courts is not known. Police are being rushed to the Rand area from all over the country, and doubtless the Government has taken other measures to protect the community in the event of the situation taking an ugly turn.

TWEEFONTEIN UNITED COLLIERIES, LIMITED.

More than usual interest attached to the annual meeting of the Tweefontein United Collieries the other day. Mr. William Pott presided, and in a long and detailed speech dealt with the affairs of that company in particular and of the Transvaal coal industry in general. The Tweefontein, of course, is one of the best managed and most prosperous coal companies in the Transvaal, and its finances are in a flourishing condition. Its coal-bearing area has been augmented during the year, giving it practically an unlimited life. The total dividend for the year is 6 per cent. on both ordinary and preferent shares. The tonnage of coal produced during the year was 1,132,612 as compared with 1,067,415 for the previous year. The plant and mines, both at Oogies and Tweefontein, have been re-organised, and the Oogies and Tweefontein power plants connected up by a high tension power line. Mr. Pott had much of interest to say regarding the coal export trade and the collier's lot, which has a very direct bearing on the strike now in progress. He showed that out of the 37 producing collieries in the Transvaal, the average dividend is not 7 per cent., and he exposed the fallacies of Mr. Moore's statements on the subject. "White workers have never in the world's history been so well paid in colliery work as they have been latterly on Transvaal mines," said Mr. Pott. "The average over all whites employees, excluding managers only, is over £500 per head per annum, and 85 per cent. of them have excellent houses, light, water and sanitary services at less than £50 a year. They can keep fowls, a cow or horse, and grow their own vegetables free of any charge by the company, and in South African sunshine and healthy climate, with free education by Government at their door step, their position is infinitely superior to that of any other colliery workers in the world. Several of their employees left for the Old Country, meaning to settle there, having accumulated considerable means here; they did not stay away long, but were back eager for their old position which we were able to give them. With common sense and co-operation between employers and employees and frank discussion on points of variance, I have no fear, said Mr. Pott, as to Transvaal coal maintaining its position as the cheapest all-round coal obtainable up the East Coast of Africa and round the shores of the Indian Ocean."

Mr. Pott summed up the whole matter by declaring:—"They had thick seams, no gas, little water, good roof, seams are seldom over 200 feet below the surface, and with all these natural advantages and that estimable fellow, Mr. Bantu, who does all the hard work cheerfully for least pay, if we cannot hold the trade it is only due to gross stupidity on someone's part. Economic laws are immutable, and woe betide those who seek to violate them. Shareholders must get reasonable and fair returns on capital invested or that industry will pine and die. Our workers have latterly had more and shareholders less than equity demands. They have cut prices enormously, and the railways in return reduced their prices, too, to enable the trade to be held." Despite this and the many similar warnings issued to the workers during recent weeks, they have, since the date of Mr. Pott's speech, actually gone on strike, and the issues are now therefore being left to the decision of this wasteful method of industrial warfare.

THE YEAR WITH THE MINING INDUSTRY.

II.—Minerals other than Gold.

In so far as minerals other than gold are concerned there has been a general curtailment of production during the year. The coal mines have not of course had to restrict operation to any such marked degree as the diamond and base metal ventures. The gold mines, railways and municipal and industrial power stations constitute a more or less

permanent market for the South African coal so far as internal consumption is concerned. In these directions, however, there is little prospect of colliery expansion, and the prosperity of the coal mines in the main depends on the oversea trade, that is to say, the export and bunkering business at the coast ports of the country. This market is of an essentially evanescent and fluctuating nature. It is dependent on general trade conditions and the influence of competition by other countries. On account of the great British coal strike in the earlier months of the year South African pits reaped a profitable harvest. It is contended by the coal owners that they would have been able to dispose of much more of their produce if railway rates had been lower, and this question of the incidence of freight charges in relation to our oversea coal trade was debated at considerable length in the early portion of the year and resulted in reductions being effected by the S.A.R. and H. Administration. Then for a time the coal mines enjoyed a period of moderate prosperity; but with the settlement of the strike in England and a material reduction in costs of producing, transporting and marketing British and American coal the factor of competition has reasserted itself in the region which South Africa has come to consider as a market for Union colliery produce. For some time past the overseas coal trade of the country has been dwindling and with a view to retaining the small amount which is left the coal owners have been seeking to secure a reduction in costs of working. After protracted negotiations the wages dispute has been brought to a head by the decision of the colliery owners to reduce wages by five shillings per shift and it is in consequence of this decision that the Transvaal colliers decided to down tools as from the first day of the New Year.

The Natal Collieries are not immediately affected by this wages reduction. The agreement between employers and employes in the mines of the Garden Colony does not expire until the end of January.

The past year has witnessed the completion of numerous Colliery installation construction of which had been initiated during the more prosperous and promising periods which prevailed in regard to the South African coal some time ago.

Amongst these new equipments the S.A. Coal Estates plants in the Witbank District call for special remark. In Natal the Navigation Company has opened up new pits and there has been considerable activity in the Vryheid District.

The year has been a sterile one in respect of by-product operations in South Africa. At Witbank a tar plant has been in operation and experimental work has determined data of considerable value. The Natal Ammonium Company at Mount N'Gwibi, in the Vryheid district, on the other hand has ceased operations. Additional coke ovens have been constructed at several propositions, notably by the Dundee Company, which for some time past has been engaged in the erection of a large by-product equipment. The Vryheid Coke Company has continued to sell a product of exceptionally high-grade quality. There are, it must be admitted, signs of a gradual awakening in South Africa in regard to the scientific usages of coal, but the Union has a long way to go yet before it approaches older manufacturing countries in regard to obtaining from coal its varied and exceedingly valuable by-products. Closely wrapped up in this question of the scientific utilisation of coal values is the subject of iron and steel making. In this respect, too, the year has been disappointing. The Union Steel Corporation at Vereeniging has continued to render exceedingly valuable service to the country generally by manufacturing rails and various other requirements of industry from scrap, and at the end of the year there has been additional furnace plant put into operation. At Newcastle, too, a large blast furnace together with all accessory plant has been erected, and if the Government fosters this nascent industry and gives the Newcastle people the same measure of support which was accorded the unfortunate South African Iron and Steel Corporation, there is no reason why an important key industry should not be put on a sound basis in Northern Natal.

Copper and tin mining in South Africa have in consequence of the low prices of metals declined almost to vanishing point in so far as production is concerned. The output of copper for the Union during the first 11 months of 1921, was worth £6,521, and that of tin £134,240. These figures compare with £418,269 for copper, and £435,680 in respect of tin, for the year 1920.

The most encouraging feature of the year in regard to base metals has perhaps been the steady record of progress exhibited by the Transvaal Silver and Base Metals Company in the Pretoria District. This proposition is now smelting. Adjoining this property is the Pretoria Silver and Lead Company's mine, and here, too, fair progress has been made despite difficulties.

Good deposits of asbestos have been opened up in various parts of the Transvaal and Cape Province, and nickel and talc deposits of very promising appearance and extent have been exploited in the Barberton District. The general financial depression has militated against these discoveries being exploited on an adequate basis of development with a view to production, but with a revival in general trade conditions these ventures, or some of them at any rate, should become successful. There has been much activity in regard to the exploitation of bituminous shales in various parts of the country, particularly in the Wakkerstroom and Ermelo Districts of the Transvaal, where the African Oil Corporation and other important interests have been busily engaged in establishing the existence of a large field containing shale of comparatively high oil content. Bituminous shales are also being opened up in Griqualand West and in the Underberg District of Natal. Prospecting operations for oil have been in progress in the Carnarvon District of the Cape Colony and in the Bethlehem District of the Orange Free State.

The diamond industry, second only to gold in respect of gross aggregate value to date, has suffered a most severe set back during the year. Trade depression and world wide financial stringency have brought about an almost unparalleled slump in the price of gem stones, and this condition has been aggravated by the dumping of large quantities of jewels upon the market by the bankrupt aristocracies of Russia, Austria and Central Europe.

Retrenchment at the big mines at Kimberley, the Premier and Jagersfontein, has been carried out on an almost unprecedented scale. Most of the smaller mines and prospecting syndicates have ceased operations, and there has been much distress on the alluvial diggings.

Looking at the year which has just passed into the limbo of yesterday we cannot but experience a feeling almost of relief that it is over. It has been a period of disappointments and setbacks in almost every branch of the mineral industry. In this respect the Union has merely responded to conditions in other mining fields and countries. One cannot, however, resist the conclusion that with better business brains at the helms of State and industry in this country of illimitable resources that the Union would have weathered the storm better than it has done. It is our fervent hope that in the year which has just begun mining in this land without a leader will, after the industrial turmoil which has ushered it in, enter once again upon a period of at least comparative prosperity.

Notes & News.

Transvaal Consolidated Lands.

The Directors of the Transvaal Consolidated Land and Exploration Co., Ltd., at a meeting on December 22nd, 1922, decided to convene a meeting of the shareholders in April, 1922, at which a resolution will be submitted to distribute 2s. 6d. cash per share and reduce the capital of the company by this amount.

The "Young" Case.

A decision, important to trade unionists, was given on Saturday in the Witwatersrand Local Division of the Supreme Court by Mr. Justice Ward, when Elijah Alfred Young was awarded £150 damages against six members of the South African Council of the Amalgamated Engineering Union for wrongful expulsion from the Union. The defendants were T. Matthews, E. E. McGrath, W. S. McQueen, G. W. Walker, S. T. Parker and G. Young.

* * *

Ferreira Deep Inquiry.

The finding of the Court of Inquiry appointed to take evidence relative to the recent disaster at the Ferreira Deep Gold Mine was issued on Saturday by Dr. J. G. Heath (magistrate for inquests) and Mr. J. D. Marquard (inspector of mines, Johannesburg), who conducted the investigation.

It records that on December 11th Henry Bowden was injured, Christoffel Jacobus van Tonder and Augusta S. Parau and a native, Andrea, were killed, and Arthur Clark Logan and George William Johnston were entombed by successive and excessive falls of rock in the neighbourhood of No. 7 and No. 8 stations, No. 1 incline shaft, Ferreira Deep Mine.

"We find," the investigators reported, "that courage and almost continuous attempts to extricate alive Logan and Johnston were made without success, and that they succumbed to shock and exposure on December 14th and 15th respectively.

"Leopold d'Arceir Seeligsohn was also entombed. His body has not been recovered and his death must be presumed.

"The evidence does not show that the occurrence was due to an act of omission of a criminal nature, or contravention of a statute or statutory regulation on the part of any of the deceased or any other person."

* * *

Cape Copper.

The report of the Cape Copper for last year states, *inter alia*:—Report for the year to April 30 last in South Africa, and August 31 last in London and India, states that owing to world-wide disorganisation which so disastrously affected, most industrial and mining concerns, the results of the company's operations for the past year show no improvement over the preceding year's. The deficit shown is attributable to serious losses in realisations and revaluations of copper stocks, to heavy charges for interest, to maintenance expenses connected with the company's establishments in South Africa and Briton Ferry, and to unfavourable conditions in India, resulting in a loss in working Rakha Hills Mines. Mining operations in South Africa have remained suspended during the year. The O'okiep Mine was kept unwatered until March last, when an exceptionally severe thunderstorm occurred, resulting in flooding lower workings. Instructions have recently been issued to discontinue pumping at this centre. Estimated reserves at Nababeep Mine remain at the same total as at the close of the previous year—90,000 tons of 5 per cent. copper, wet assay. Drilling operations at Koperberg West and Carolusberg West were continued. Some sections of core obtained at the latter place indicate large quantities of ore of an estimated value of 4 to 5 per cent. copper. Since the close of the Colonial year, in the same locality, ore has been passed through carrying copper of an average assay of 5.15 per cent. for 87 ft. These discoveries are not far from the surface. Important information has also been gained for guidance in future deeper drilling. At present one drill is being worked. The landing and shipping departments and the necessary railway service to meet the needs of the community have been continued throughout the year.

* * *

Oceana Consolidated and a New Copper Company.

The report of the Oceana Consolidated Company for the year ended 30th June, 1921, states that cash, together with loans and sundry debtors for land sold, etc., amounted at

that date to £341,836, an increase of £13,898. Shares and debentures appear at £367,488, against £340,334 at 30th June, 1920. Net profit is £61,361, plus £31,938 brought forward. Directors have declared a dividend of 10 per cent., less tax, and recommend placing £25,000 to general reserve, bringing the fund to £115,000, and that the balance of £32,405 be carried forward. In addition an interim dividend of 2½ per cent., less tax, has been declared in respect of the current year. The profits arising from the sale of shares of Piccadilly Hotel are not included in the accounts presented (except so far as 40,000 shares are concerned), but since the close of the year the balance of the purchase price has been received. During the year 119,002 acres of land have been sold on deferred payments at satisfactory prices. The working option given to the Anglo-French Exploration Company over the farms Artovilla and Uitenpas for the purpose of exploring the mineral deposits thereon has been exercised, work done during the option period having disclosed copper deposits of a very encouraging character. A company has been registered with a capital of £50,000, in 50,000 shares of £1 each, of which 15,000 shares are to be allotted in consideration of the expenditure already made; 15,000 shares are to be allotted to the Oceana Consolidated Company by way of purchase price for the farms; a further 20,000 shares are available for working capital, of which this company will subscribe £10,000 and the Anglo-French Exploration Company £10,000. It is anticipated that the expenditure of this money in further exploratory work will result in the opening up of payable ore bodies.

* * *

Tuesday's Conference.

As our evening contemporary, *The Star*, very properly points out, there is a danger of forgetting that a conference is to be held on Tuesday next on the points in dispute on the gold mines—namely, the *status quo* agreement, the underground contract system and the rearrangement of underground work. No suggestion has been made on the part of either side to postpone this conference. It ought to have been held this week, but at the request of the South African Industrial Federation it was postponed until next week.

There is no question, we are informed, that at this conference such matters as the classes to be affected by the proposed abolition of the *status quo* agreement and the probable effect of that abolition will not be fully gone into with a view to an agreement being arrived at. That is what the conference is for.

The ballot paper issued by the Federation has been so worded that the impression has been gained that an ultimatum has been thrown at the heads of the men employed on the mines on the question of the employment of white labour. It is contended in employers' circles that there is no question of any ultimatum at all, but that it was the only way the Chamber of Mines had of giving formal notice if it did not want the subject to be kept dragging on month by month.

There is so great a danger of the issues being confused that employers and employees alike are apt to forget that before any strike ballot was issued at all the conference between the Chamber and the Federation had been arranged.

* * *

Industrial Conditions in Great Britain.

We have been privileged to read the following letter, which has just been received by a gentleman in this town from a big industrialist in the North of England:—"With regard to trade here, the coal trade is no worse than last month. Of course, we are now at the season when coal for domestic use is in request. Smalls are all far down in price on account of the iron and steel industry being practically at a standstill, but house coal runs from 27s. or 28s. to 32s. 6d. per ton, and for special qualities up to 40s. per ton at pit, but this last price is rare. The workmen are now more submissive, and I am sorry for the above-ground labourers, who are now broken to 6s. per day or thereabout. With the cost of living as it is, they must have a difficulty in pulling through. There is very little doing in iron or steel

works, and engineering works are finding it hard to keep going, even with depleted staffs and short time. For instance, a firm had a pre-war record of something like 10,000 men working full time. Now there are 5,000, and the management says there must be a long New Year holiday. Another instance—a job quoted for a year ago at £1,080 was not placed then. Enquiries sent out recently for same job was quoted for by same firm at £520. The job is not yet placed. All round the world, including South Africa, seems to be suffering, and according to what you say if a strike should happen with you, the workers may cut up rough. I hope that may be averted. One little company, of which I am a director, made a loss for the year ending 31st August last of £4,500, almost wholly owing to depreciation in values. The wood trade has suffered severely, and chiefly owing to high freights and increased carriage coupled with increase in wages, which have not been reduced in accordance with prices.

* * *

Financial, Colliery and Miscellaneous Dividends.

In addition to the gold mining dividends, the following financial, colliery and miscellaneous dividends are payable for the half-year ended December 31, compared with those for the half-year ended June 30, 1921:—

	FINANCIAL:			December.		June.	
	No.	%	Amount.	No.	Amount	No.	Amount
Anglo-American Corpn. ...	Dividend passed.			3	1/-		
Rand Mines ...	37	35	1/9	36	1/9		
Rand Selection ...	44	12½	2/6	43	3/-		
S.A. Townships ...	22	10	1/-	—	—		
New Era ...	13	10	6d.	—	—		
COLLIERIES:							
Apex ...	31	5	6d.	30	6d.		
Clydesdale ...	24	7½	1/6	23	2/-		
Natal Navigation ...	38	5	1/-	37	1/-		
		2½	*6d.		*1/-		
S.A. Coal Estates ...	1	5	1/-	—	—		
MISCELLANEOUS:							
Pretoria Portland Cements	28	10	2/-	27	2/6		
Swazi Tins ...	Dividend passed.			28	1/6		
			*Bonus.				

* * *

Geduld Development.

We understand that the improvement in the lower levels of the Geduld, disclosed in the last quarterly report of the company, is being fully maintained.

* * *

The December Output.

The mining companies have estimated the price of gold for the December output at 95s. 6d. per fine ounce, less charges, as against 98s. per fine ounce, the price of gold in London on December 30, 1921. In order to avoid any misapprehension, the Chamber of Mines wishes to point out that gold is not finally realised until approximately one month after dispatch from Johannesburg, and as the price of gold is falling, it is desirable to assume a somewhat lower price as being obtainable one month hence than is obtainable now—more especially as the rapid fall in the price of gold that has taken place recently has absorbed any surpluses held by companies from previous under-estimates during a period of rising value of gold. The extent to which actual gold prices have been below recent estimates is shown thus: Estimated price per fine ounce on which output was valued: September, £5 10s.; October, £5 8s.; November, £5 2s. Ruling London price at end of each month: September, £5 11s.; October, £5 14s.; November, £5 2s. 11d. Price realised per fine ounce: September, £5 6s.; October, £5 2s. 5d.; November now estimated at say £4 18s. Amount over-valued per fine ounce: September, 4s.; October, 7d.; November, 4s.

All War is Waste.

Industrial War is the Worst Form of Waste!

Base Minerals.

PRODUCTION IN THE UNION.

1921 FIGURES.

The Union of South Africa's base mineral production for the first eleven months of last year was worth only a little over a quarter of a million sterling, basing figures on the statistics as to sales and shipments issued by the Mines Department. This was made up as follows:—

	Transvaal.		Cape.		Union of S.A.
	Tons.	Value.	Tons.	Value.	Value.
Tin	1,399	£133,222	8.7	£149	£133,371
Copper	45	£1,420	113	£5,104	£6,524
Other minerals					£123,814
					£263,709

The recent break in the prices of tin, copper, lead and zinc—and particularly the first two—creates a serious problem for producers and the shareholders in the various mining companies concerned.

The following comparison of metal prices at the end of February, on the 19th May, 1920, and for a month ago is given to show clearly the enormous depreciation of values, unprecedented in so short a space of time, that has taken place:—

	1920.		1921.	
	End February.	May 19	December 9.	
Copper	£121 0 0	£87 10 0	£68 10 0	
Tin	418 0 0	283 0 0	168 5 0	
Spelter	61 0 0	44 15 0	26 15 0	
Lead	51 0 0	37 5 0	25 10 0	

Such movements cannot occur without causing serious loss in the trades and industries using and dealing in these metals.

If they were confined to metals, the reasons for them might be of little general importance, but similar and even worse demoralisation dominates practically every market in

the world, and the root causes are not far to seek. In so far as England is concerned, a leading authority has stated that these are as follows:—

- (1) Over-speculation.
- (2) Industrial unrest.
- (3) The mere discussion of a levy on capital increment since 1914, however gained, has produced a widespread feeling of alarm that, if it gets beyond discussion, the financial fabric of this country will stagger.
- (4) Acting on the instigation of the Chancellor of the Exchequer, the banks all over the country are stated to have withdrawn certain facilities to their customers, and apprehension, probably unjustified, has been occasioned.

As regards the four metals quoted, it may be confidently stated that the prices to which they have now sunk are below the average cost of production of the world's needs, and the outputs will certainly be affected should they endure for any length of time. This would be unfortunate, as the best opinion appears to be that there is still a large potential demand awaiting satisfaction, and this will be apparent as soon as the wreckage of speculation is cleared and the other causes of anxiety are removed.

Cassel Cyanide.

In the course of its annual report, the Cassel Cyanide Company states, *inter alia*:—"Shipments to South Africa have been on a much smaller scale compared with last year, due mainly to consumers living on their stocks, a policy which can be understood in view of falling prices and the uncertain outlook for the low-grade mines. The Australian market is going from bad to worse, the consumption of cyanide there being only one-third of what it was pre-War. In Northern Ontario there is some activity; but, taken as a whole, the state of the world's gold mining industry is by no means encouraging. Our hope is that there will be some recovery in the near future. The outlook for silver mining, however, is better, and in this direction we expect an improved demand for cyanide."

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THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining

Mines and Minerals Subsidence.—*Iron and Coal Trades Review*, December 9, p. 834.

Scaling Old Gates with the Cement Gun.—*Iron and Coal Trades Review*, December 9, p. 842.

The Less Known Metals.—*The Engineer*, December 9, p. 623.

Coal.

Health and Welfare in the Coal Mining Industry.—*Iron and Coal Trades Review*, December 9, p. 829.

Coal Mining on the Cinematograph.—*Iron and Coal Trades Review*, December 9, p. 836.

Financing the Coal Cutting Machine.—*Colliery Guardian*, December 9, p. 1606.

Iron and Steel.

Improvements in Construction in Open Hearth Steel Furnaces.—*Iron and Coal Trades Review*, December 9, p. 827.

The Relations of the Iron and Steel Industries to the Chemical Industries.—*Iron and Coal Trades Review*, December 9, p. 838.

Engineering.

Boiler House Management.—*Iron and Coal Trades Review*, December 9, p. 830.

Metering of Large Volumes of Air and Gas.—*Iron and Coal Trades Review*, December 9, p. 832.

Large Winding Engine for a South Wales Colliery.—*Colliery Guardian*, December 9, p. 1602.

Developments in Power Station Design.—*The Engineer*, December 9, p. 613.

Reinforced Concrete Constructions on Railways.—*The Engineer*, December 9, p. 628.

Electricity.

An Electric Runabout Crane Truck.—*Iron and Coal Trades Review*, December 9, p. 843.

Oil Engines and Electricity Supply.—*Electrical Review*, December 9, p. 798.

Sir P. Rylands on the British Electrical Industry.—*Electrical Review*, December 9, p. 775.

Economics.

Export of German Wire Ropes.—*Iron and Coal Trades Review*, December 9, p. 832.

The German Locomotive Industry.—*Iron and Coal Trades Review*, December 9, p. 841.

The Paradox of the Mark.—*Iron and Coal Trades Review*, December 9, p. 846.

Industrial Chemistry.

The Claude Ammonia Process.—*Iron and Coal Trades Review*, December 9, p. 838.

Geological Society of South Africa.

The next monthly meeting of members of the Geological Society of South Africa will be held in the Main Hall, 1st Floor, Scientific and Technical Club, 100 Fox Street (between Rissik and Loveday Streets), Johannesburg, on

Monday, 9th January, 1922, at 8.15 p.m. The minutes of the ordinary monthly meeting of members held on 28th November, 1921, will be read. The following papers will be open for discussion:—"On the Asbestos Occurrences near Kaapsche Hoop, in the Barberton District," by A. L. Hall, M.A., F.G.S.; "On a New Occurrence of Steatite, from the Barberton District," by A. L. Hall, M.A., F.G.S.; "The Carboniferous Glaciation of South Africa," by A. L. du Toit, D.Sc., F.G.S.; "The Nepheline Rocks of Sekukuniland," by S. J. Shand, D.Sc., Ph.D.; "The Geology of a Small Area East of Bulawayo," by A. M. Macgregor; "Note on the Rocks from Adriaans Kop, South of Pietersburg," by A. L. Hall, M.A., F.G.S.; "The Igneous Complex of Leeuwfontein, Pretoria District," by S. J. Shand, D.Sc., Ph.D. The following papers will be read:—"Recent Additions to Our Knowledge of the South African Coalfields," by E. T. Mellor, D.Sc. (This paper will be illustrated by lantern slides.) "The Konkop Formation on the Borders of the Namib, North of Aus," by P. F. W. Beetz, Ph.D.

The present industrial trouble in the Transvaal is simply due to the refusal of the workers to face economic facts and to toe the line with employees in other parts of the world.

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Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

The S.A.R. Deficit.

During the first seven months the railways and harbours deficit increased at a very rapid rate. From the beginning of April to the end of October—the period covered by the returns—the ordinary working expenditure of the railways amounted to £9,261,768. To this sum must be added £68,921 for renewals and £972,809 for depreciation, thus bringing the total working expenditure to £10,303,499. The total earnings for the period amounted to £12,584,046, so that the revenue account has a credit balance of £2,280,546. Against this amount must be set £2,252,053 for interest on capital, and various other charges, such as £142,386 for interest on superannuation and other funds and £1,020,341 for the Abnormal Cost of Living Allowance. These charges amount in all to £3,467,496. There thus remains a net railway deficit for the seven months of £982,759. For the same period the harbours account shows a deficit of £63,311. The only credit item in the joint harbours and railways account is in respect of the Government's steamships, the earnings of which, it is satisfactory to record, resulted in a net balance for the seven months of £42,204. The railways deficit, the harbours deficit, £57,750, paid into the Pension Fund to reduce deficiency, and £58,333 for Betterment charges make up the debit items of the joint account, which shows a total deficit for the seven months of £1,119,919. Taking into consideration the accumulated deficit at the close of the last financial year—namely, £2,598,883—the total Railways and Harbours deficit down to the end of October now amounts to £3,718,833.

S.A. Diamond Corporation.

Mr. C. F. Rowsell, presiding at a meeting of the South African Diamond Corporation, Limited, mentioned that the national diamond factories at Brighton were considering a reduction of capital in accordance with the advice of their new technical directors that the work should be concentrated in on the factory at Brighton. The corporation would thus benefit by a return of a portion of the capital invested in the factories.

The Copper Outlook.

American advices state that the outlook for the copper mining industry is now more promising than it has been for the last three years. Sales of refined copper for October

were 140,000,000 lb., which is considerably above any other monthly aggregate this year. Meanwhile, production of the leading mines in the U.S.A. continues restricted to about 25% of normal capacity. The effect of this improvement in sales and of the restriction of production upon surplus stocks should be most pronounced. The surplus in the U.S.A. last spring was estimated at 750,000,000 lb., while there was a further 300,000,000 lb. of scrap metal in England. The latter, as recently announced, has been taken over by the British Metal Corporation for division amongst American, British and German refineries, deliveries to be extended over the greater part of next year. That this indicates the turning of the tide we readily concede, but the price of the metal appears slow to respond, and high costs still obtain. The latter, being chiefly based on wages, fuel and freight, tend to fall, but the irreconcilables hold the field still to a peculiar extent on the world's copper mines—and also on the American railroads. Consequently costs fall slowly and profit margins must remain small on such properties as are being operated. The outlook is, in our opinion, but little brighter for those that have yet to be re-opened.

The Afrikaner.

Commenting on the Afrikaner lease, the Klerksdorp paper says:—"It has been known for some time past that a private Syndicate had been negotiating for the acquisition of the right to mine and work the property of the Afrikaner G.M. Co. at Rietkuil, and that Mr. John Wessels, formerly manager of the Robinson Deep, and other gentlemen connected with the Rand mining industry were concerned in the enterprise. The Company is now an accomplished fact, and the property has been taken over by the lessee Company. Mr. John Wessels is now on the spot as manager of the concern, and preliminary operations have been commenced. It is the intention of the Company to move the ten stamp mill already on the property to the top of the kopje contiguous to the main incline shaft, and add thereto ten additional stamps. The ore, as it is drawn from the mine, will be moved from the shaft to the battery by a belt conveyor to admit of sorting en route. From the mill the sands and slimes will pass into steel cyaniding tanks. The tanks are on order, and already large supplies of coal are being transported to the mine, which will soon present a scene of busy activity. We have had personal knowledge of the property and its possibilities from the time mining operations were first begun over thirty years ago, and we feel very sanguine as to its successful future. We cordially wish Mr. J. Wessels and his partners every success and prosperity in their enterprise."

The Year with the Wankie Colliery.

The annual report of the Wankie Colliery Company shows that Operations for year to August 31st last, after allowing for depreciation, resulted in a profit of £69,986. Further dividend of 5 per cent., making 10 per cent., less tax, for the year. Sales of coal and coke amounted to 314,121 tons and 123,135 tons respectively. During year 574,160 tons of coal were mined and raised to the surface. In addition, 18,570 tons were taken from old dump. Estimated coal reserves proved by development are: Solid coal in pillars, 2,678,000 tons; solid coal in situ, proved by main drives, 3,670,000—6,348,000 tons. Shaft sinking on new colliery is in progress, 789 ft. of driving on incline shaft having been completed during year. The position in regard to native labour continues to improve. Stoppages to screening plant throughout the year due to failure of truck supply represented in times lost five and a-half weeks on day shift and fourteen weeks on night shift. The railway company were, however, able to bring more engines into commission during May of this year, since which the truck supply has considerably improved.

The Outlook.

Speaking at the annual meeting of the East Rand Mining Estates in London, the other day, Mr. C. F. Rowsell said:—World conditions at the present time are so extraordinary that it is impossible for the best-informed to give a forecast of the future with any degree of certainty, and I for one should be loath to attempt to do so. It seems to be absolutely essential that those who control the destinies of the great European States should use all the ability which they possess to formulate some scheme which will eventually stabilise exchanges and make the wheels of the trade in the world once more revolve, and until this is done I for one do not anticipate any prosperity.

Van Ryn Estate.

Further details are now to hand in regard to Van Ryn Estate's operations last year. The report for the year ended June 30th last states that the net profit from all sources amounted to £90,393. To this is added balance brought forward from the previous year, £33,497, making a total available profit of £123,890, which has been appropriated as follows: Written off for depreciation, £11,841; in payment of dividend No. 34, £37,500, and dividend No. 35, £37,500, leaving a balance to be carried forward of £37,049. During the year 381,230 tons of ore were treated, yielding 108,866.97 fine ounces of gold, which realised £604,147, equivalent to a recovery value of 31s. 8.336d. per ton. Working expenditure amounted to £491,292 (25s. 9.288d. per ton), leaving a mining profit of £112,855.

A comparison of these results with those of last year shows material increases in gold recovered of £100,898, in working expenditure of £92,866, and an increase of £8,032 in the profit from mining. The large increase in the value of the gold recovered is due partly to the higher grade of ore crushed and partly to the increased price received on the realisation of the gold. The increase in working costs is due to a variety of causes arising out of the abnormal conditions prevailing during the period. Higher wages, both of white and black employes, the high cost of stores and materials, and heavier taxation are the principal items contributing to this increase. Dividends Nos. 34 and 35 (each of 7½ per cent.), amounting to £75,000, were paid during the year. The dividends paid since the inception of the company total £2,782,000.

Ore Reserve.

The ore reserves at the end of the financial year are calculated upon two bases: (1) On the standard price of gold, 864,583 tons of an average value of 6.1 dwt. over a stopping width of 48 in.; (2) on the price of 112s. 6d. per fine ounce for gold (which was the figure prevailing at the end of the financial year), 1,257,639 tons of an average value of 5.5 dwt. over 48 in. It is difficult to make comparisons in this respect with previous years, as under existing conditions the tonnage is automatically increased or decreased as fluctuations in the price of gold raise or lower the payable limit, and enable large tonnages to be included in, or necessitate their exclusion from, the ore reserves. As heretofore, no credit appears in the balance sheet for these reserves, the cost of which has been met out of past profits.

As the result of the sand-filling scheme inaugurated some time ago, and now in full operation, 165,781 tons of ore, representing 33.31 per cent. of the total ore mined, have been drawn from reclamation in the old workings. The policy of sand-filling is being pursued on a large scale, and is expected to result in further large tonnages being reclaimed from the old workings. The capital expenditure incurred during the year amounted to £11,498 (net), which has been written off mine equipment account to the debit of appropriation account.

Diamond Fields of Africa.

Mr. W. E. Bleloch's latest diamond venture is the Diamond Fields of Africa Exploring Co., Ltd. The company has an authorised capital of £110,000 in shares of 2s. 6d. each, of which 780,000 have been issued. It is intended to increase the capital to £400,000 in shares of

2s. 6d. each, of which 1,000,000 shares will be issued to vendor companies under sale agreements. The company has recently entered into agreements for amalgamation with the Makganyene Diamond Mining Co., Ltd., and the Postmas Diamond Mining Prospect, Ltd., under which it acquires all the assets and liabilities of those two companies. The company's properties will, as a result of the amalgamation, comprise approximately 1,000 acres of freehold land in the Postmasburg district, 18 prospecting areas on the Postmasburg commonage, and contracts confirming the right to purchase further areas of approximately 71,500 acres in the Hay and Kuruman districts.

African and European Investment.

During the year to June 30 last conditions have been anything but favourable for land and investment undertakings in the Transvaal; and they are reflected in the report and accounts of the African and European Investment Co. From the profit and loss account it will be seen that dividends, debenture interest, and sundry profits (less interest charges) amounted to only £22,130, as compared with £32,543 for the preceding period, while rentals and farm revenue are about the same at £16,395. Expenses are higher, but there is a saving under taxation, the profit carried to the balance sheet being thus nearly £10,000 less at £21,684. Turning to the balance sheet, Government stock, shares, and debentures in other companies stand at £553,682, as against £448,898, owing to purchases of Anglo-American Corporation of South Africa, Rhodesia Gold Mining and Investment, and Transvaal Farms and Finance shares, and loans and payments in advance (including loan to East Rand Extension Gold Mining Co.) at £153,578, as compared with £114,805. Money on deposit against security has risen from £265,250 to £283,400. On the debtor side loans and deposits have risen by £147,750, to £493,200, and sundry debtors and receipts in advance have declined by £7,316, to £5,818. Adding the profit (which is subject to corporation profits tax and Union income tax), the credit to profit and loss is raised to £108,483. The usual list of investments is appended to the report, but the auditors point out that the market value of these quoted is £78,602 less than the figure given in the balance sheet, while the unquoted securities stand at £98,376. They are also unable to form an opinion as to the value of the security deposited with the company for a loan of £40,000. With regard to the share interests, good progress is reported by the South African Breweries, the Union Steel Corporation (of South Africa), the Lonely Reef, Vereeniging Estates, and Anglo-American Corporation. The land holdings remain practically the same as a year previously, *i.e.*, about 1,393,734 acres, and it is evident that times have not been propitious for the carrying out of the progressive policy in regard to this asset, which it was announced at the last annual meeting was to be inaugurated.

Cape Electric Trams, Ltd.

The accounts of the Cape Electric Tramways, Limited, for the year ended June 30th last, show a moderate recovery in the profits earned during that period as compared with the preceding twelve months, the total being £81,724 as against £77,280. After providing for Debenture interest, redemption on Debentures, and including the amount brought forward, the net credit balance comes out at £60,046, as against £47,763. The reserve receives £6,000 more on this occasion, namely, £18,000, as against £12,000, leaving a divisible balance of £42,046, which goes against £37,763 a year ago. The dividend on the Ordinary share capital is raised from 5 per cent. to 6 per cent., and after providing for same there remains the sum of £12,573 to be carried forward, as against £11,141. During the year the tramways carried 29,773,587 passengers, giving a return of £397,124, as against 25,921,629 passengers, earning £325,085, in 1919-20. The report adds that after protracted negotiations the Municipality of Capetown at last came to the decision not to proceed with the proposal for their acquisition of the company's Capetown system. The concession will therefore run on until 1925, when the Council can again exercise the right of expropriation.

ENGINEERING SECTION.

Newcastle Iron and Steel.

COMPLETION OF BLAST FURNACE—PROTECTIVE TARIFF REQUIRED TO HELP A YOUNG INDUSTRY —THE AUSTRALIAN EXAMPLE.

The Newcastle Iron and Steel Company's plant is now completed and the accompanying photograph taken the other day depicts the blast furnace as it stands in its finished state.

The directors of the company have had a hard uphill struggle to bring the plant to completion, but by dint of experience and perseverance, equipment has been installed at a remarkably low cost. The plant was visited the other day by the Prime Minister, who was much impressed with the work that had been achieved.

Now that this equipment has been completed, it should be the bounden duty of the Government to encourage by every means in its power the growth of this key industry.

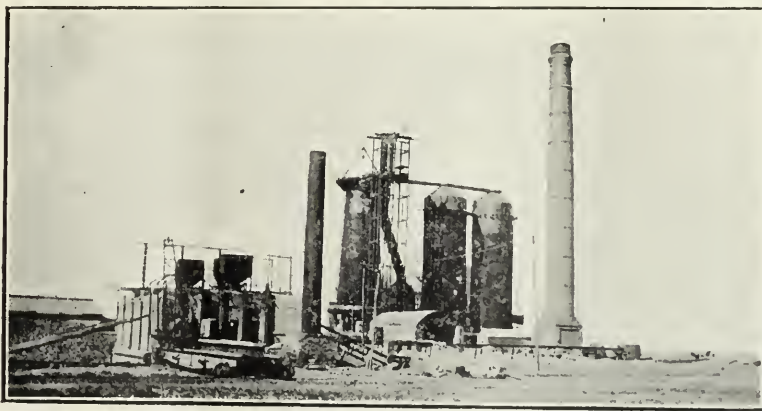
In this respect the example of the Commonwealth Government might well be followed. In Australia protective tariffs have been established to admit of the iron and steel industry being able to compete with overseas competition, and particularly that of Germany. Largely in consequence of this action the industry "down under" has grown to a remarkable degree.

As an indication of the effect of manufacture of iron and steel in Australia, the following tonnages of imports for the years 1913 and 1919-20 (the latter figures in brackets) are given:—Pig-iron, 54,197 (2,681); bars, rods, angles, tees, etc., 131,692 (18,358); ingots, blooms, slabs, etc., 9,497 (956); plates and sheets, corrugated and galvanised, 54,610 (41,951); girders, channels, joists, 47,717 (10,772); plates and sheets, other than above, 111,054 (51,350); wire, 65,785 (19,765).

Items of interest in the Customs Tariff as approved by Parliament early in June, 1921, are:—

	British	
	Preference.	General.
	Per ton.	Per ton.
Pig-iron	20s.	40s.
Ingots, blooms, slabs, etc.	32s.	65s.
Bars, rods, angles, tees, etc.	44s.	80s.
Girders, channels, joists, etc.	48s.	90s.

Heavy duties are imposed on plates and sheets, etc., on and after January 1, 1922, ranging from 48s. to 72s. per ton British Preference and 85s. to 110s. General.



The Blast Furnace at Newcastle.

Automatic Train Control.

Many inventions have been brought out for the purpose of giving the driver of a locomotive an automatic warning that the signals are against him, and also for applying the brakes at the same moment. A new form of train controller was recently tested with success on an important British railway. The apparatus consists of an interceptor placed between the rails and connected with the ordinary signals, together with a set of gear on the locomotive which operates the whistle, puts on the brake, and if desired also

closes the engine regulator. The interceptor takes the form of a curved metal plate hinged near one end and supported at the other end by a weight in such a way that the highest point of the curve is about 5 inches above the rail level. If the signals are clear the interceptor is depressed by the locomotive passing over it, but if the signals are not clear the interceptor remains at danger and gives the signals already mentioned. This and other British inventions are being studied by a special committee of the British Ministry of Transport.

The Economic Operation of Superheater Locomotives.

(By F. W. Brewer, A.I. Loco. E.)

In the very nature of things, the locomotive is at best a compromise between certain known advantages and disadvantages. One outstanding fact is that in a general way we cannot utilise the full power of the engine without coming into conflict with what, from some points of view, may be looked upon as scientifically desirable. In order to save coal the engine must be well linked up—the steam must be used expansively. But this linking up always corresponds, by contrast, with a reduction in power. Even if bigger cylinders or more than two cylinders be employed to give a higher total mean effective pressure, the result is the same; the available power with an early cut-off is utilised in only a comparatively limited degree. Steam and coal are saved at the expense of hauling capacity. For the fact remains that heavier loads per engine could be taken if a greater proportion of the potential power were made use of by employing a later cut off in the cylinders. In the case of goods engines this cut off may be put at from 60 to 65 per cent., and in the case of express engines at from 50 to 55 per cent.

It is obvious, nevertheless, that scientific application, rather than brute force, is decidedly preferable, if not indeed imperative. A compromise between the two policies is necessary. With an unusually late cut-off the terminal pressure is unduly high, while the resultant heavy blast action tends to lift the fire and to cause the fire-box, tubes, and boiler generally to be worn out more quickly than would otherwise be the case. Neither the steam nor the fuel is used in an efficient manner. Although greater power is developed at the draw-bar, yet the steam is exhausted whilst there are still many units of work left in it. Clearly, then, a very late cut-off is inadvisable. A middle course must be adopted.

So far, we have considered the matter only in relation to saturated steam locomotives. When we come to deal with it in connection with superheater engines we shall find that the conditions are somewhat paradoxical. An especially short cut-off can be, and usually is, employed in such engines; yet it is in those same engines that it is possible to have a fairly late cut-off without necessarily sacrificing the economy. In fact, within reasonable limits, the later the cut-off the higher will be the degree of superheat and the greater will be the relative saving in fuel and water. It must be remembered that for equal quantities of steam and at the same cut-off the work done by the expansion of superheated steam is less than that performed by saturated steam. The disparity increases with the degree of superheat and with the shortening of the cut-off. At first sight it might appear that this loss of work militates against superheating. But it does not, for the reason that, while a slightly greater number of cubic feet of superheated steam, as compared with saturated steam, are required to do a given amount of work, yet the weight of the former is very much less than that of the latter, the result being, in the case of high superheating, a large economy in water, which, in turn, means a smaller total heat expenditure. This is accounted for partly by the vaporisation of all the water particles suspended in the steam when passing through the superheater, and partly by the prevention of condensation in the cylinders. Further, as superheated steam has a greater volume than saturated steam of the same weight, the weights of the former is less than that of the latter for the same cut-off. Since the superheated steam falls in temperature from the point of cut-off, its volume then also decreases, and the actual gain in this respect will be approximately one-half that deduced by theoretical calculations, and it is usually taken to be somewhat about 10 per cent. If we add 30 per cent. as the saving due to the elimination of cylinder condensation—the amount varies, of course—we get a total average water economy of approximately 40 per cent. It will be seen, therefore, that although super-

heated steam does less work by expansion than saturated steam at the same cut-off, still there is a considerable economy, as the difference between the quantity and weight of steam used—two very different factors—is entirely in favour of the first-named steam. The saving in coal is less than the economy in water, because it is largely governed by the constantly varying conditions incidental to everyday working. Sometimes it is as much as 25 per cent.

Having regard to the fact that the superheater locomotive gives the greatest relative economy when hard pressed, it may be doubted whether expansion should be carried to the limit dictated by theory alone. Tractive efficiency is the first consideration, and it should not be sacrificed for the sake of direct economy purely and simply. Greater power can only be obtained by getting more steam into the cylinders, not by trying to keep it out. From the economic standpoint it does not signify how much the superheated steam locomotive is forced, since its efficiency increases with the increase in superheat, which follows the augmentation in draught due to working the engine, whether temporarily or generally, with a later cut-off. In the case of a saturated steam locomotive just the opposite takes place. As the quantity of fuel consumed per square foot of grate area increases, so the quantity of water evaporated per pound of coal decreases, and although the total quantity of water converted into steam in a given time is greater, it is obtained by a comparatively wasteful expenditure of the heat generated by the fuel. Moreover, the steam becomes wetter and wetter. Assuming a comparison between a superheated steam locomotive and a saturated steam locomotive on a basis of equal weights, and with cylinders and steam pressure alike in both engines, then, by working the superheater engine with a longer cut-off than in the non-superheater, it could not only be made to develop more power, but it could be made to do so on a much smaller consumption of coal and water than would be possible in the case of the "wet" engine for the same ratio of expansion. The usual practice has been to employ larger cylinders in conjunction with reduced boiler pressures, yet it seems to be out of the question, unless the tractive potentialities of the superheater engine be sacrificed, that a comparatively short cut-off can usefully be adopted in such circumstances. A moderately late cut-off would mean a reduction in the direct saving in coal, but the increased consumption of fuel would, in the case of highly superheated steam, be more than offset by the greater work done at the draw-bar, and it would still be relatively low.

For the foregoing reasons it is manifest that superheating should not be restricted to tender engines or to what may be described as main-line work. As a matter of fact, it should be applied to any class or type of locomotives required for heavy duty, including the running of suburban passenger trains and shunting. Engines engaged in the two latter services may not, owing to the comparatively frequent opening and closing of the regulator, give quite so high a steam temperature as those in which a sustained tractive effort is maintained for longer periods; but, even so, they will show economy in coal and water, and will, besides, be much smarter at their work than saturated steam locomotives. The suburban tank engine cannot be linked up much, and the shunting engine, generally speaking, not at all, and these are the very conditions in which superheating may be taken to show to special advantage. The idea has been held that any work of an intermittent character is inimical to superheating, but practice will probably soon prove such an idea to have no real foundation. At any rate, except in cases where the average horse-power output is insignificant, the use of highly superheated steam is strongly advisable, and in proportion as the output per unit is increased, so will the gains from superheating become more and more evident and substantial. In short, any and every condition which makes for inefficiency in the saturated steam locomotive can, in the superheater engine, be turned to good account.

* From the *Engineer*.

The Week in the Sharemarket.

AWAITING THE LABOUR ISSUES—GOLD AT 97s. 9d.—QUOTATIONS EX-DIVIDEND.

The strike on the Transvaal coal mines from January 1, and the growing prospect of a strike on the gold mines naturally affected the market during the week. Gold, according to the latest cables, stands at 97s. 9d., and London seems content to leave South African shares alone until the outlook clears. Private advices received from the other side are to the effect that dealings in our shares are of the most meagre description and the markings of "business done" represent merely nominal transactions. The dividend declarations for the half-year are, of course, regarded as satisfactory in the present circumstances. The year opens with question of cost reduction on the mines more insistent than ever, and at the time of writing opinion is divided as to whether the men will force the matter to the lengths of a general strike. In the meanwhile local sharemarket dealings are entirely confined to the professionals, who find it difficult to resist the low levels at which so many shares now stand. The next week should see the strike uncertainty cleared up, and it is unnecessary therefore to say more on the subject for the moment. One good factor is the probability that the ex-enemy share question may be settled this month. As regards diamond and base metals, it is opined in well-informed quarters that some improvement may come just when least expected; and in this connection it is pointed out that as gold goes back to normal, reflecting a recovery in world trade conditions, diamonds and base metals may be expected to enjoy a revived demand. Thus the general outlook, dark though it seem for the moment, is not without its reassuring features. The quotations for the short holiday week are given below, being ex-dividend as from January 1.

	Fri. Dec. 30.	Sat. Dec. 31.	Wed. Jan. 4.	Thur. Jan. 5.
New State Areas	19 9	19 9*	19 9*	19 9*
Rouxville Diamonds	1 0*	—	—	1 0*
Springs Mines	32 0*	34 0*	33 0	32 0*
Sub Nigels	10 4*	10 6*	9 3*	9 0*
Southern van Ryn	2 0†	2 0†	—	—
South African Townships	9 3*	9 3*	8 4*	8 9
South African Alkali	12 3*	12 3*	—	—
Transvaal Silver	24 3	24 6*	21 6*	21 3*
Transvaal G.M. Estate	9 0†	7 9*	—	—
Union 5 per cent.	£99*	£99½*	£99½*	£99½*
Van Ryn Deeps	66 3*	66 6*	—	63 0†
Village Deeps	—	7 6*	—	6 0*
Western Rand Estates	2 9b	2 9b	3 0b	3 0†
Witwatersrands	—	13 6*	—	—
Witwatersrand Deeps	7 6*	7 6*	7 6	7 9*
Woluhuters	3 0*	3 0*	3 0*	3 0*
West Springs	7 6*	7 6*	7 6	7 3*
Zaaiplaats Tins	3 0†	3 0†	3 0†	2 6*

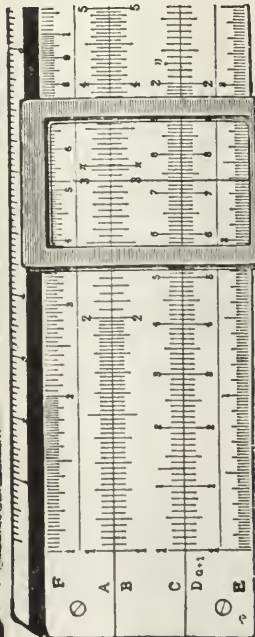
* Buyers. † Sellers. a. Odd lots. b. Ex London.

One E.R.P.M. is worth two New Modders to the community. If the low-grade mines like the East Rand Proprietary and Randfontein close down, it will be a national calamity. These mines pay no dividends, but they give direct and indirect employment to thousands of people. If they closed down the shareholders would not care very much. But every person on the Rand would very quickly begin to feel the draught!

	Fri. Dec. 30.	Sat. Dec. 31.	Wed. Jan. 4.	Thur. Jan. 5.
Anglo Amer. Corp.	16 6	16 9*	16 0*	16 3
Apex Mines	7 6†	7 6†	7 6†	7 0†
Bantjes Consolidated	6 0†	5 9*	5 9*	5 6*
Bushveld Tins	—	0 6*	0 6*	0 6*
City and Suburban	2 6†	2 3*	2 6†	2 6†
City Deeps	—	—	—	42 6†
Consolidated Diamonds	11 6	11 6*	11 9	—
Consolidated Langlaetes	—	14 0†	—	—
Consolidated Main Reefs	8 6*	8 9*	7 9*	—
Consolidated Mines Selection	10 0*	—	—	—
Coronation Collieries	38 0†	38 0†	—	—
Coronation Freeholds	0 6*	0 8*	—	—
Coronation Syndicates	—	—	4 9*	4 3*
Crown Diamonds	3 2*	3 2*	3 0*	3 3*
Daggafontein Mines	2 0*	1 9*	1 9*	1 6*
East Rand Coals	1 6*	1 6*	1 6*	—
East Rand Deeps	—	—	0 8†	0 5*
East Rand Debentures	£85*	£85*	—	—
Eastern Golds	0 6*	—	0 6*	—
Frank Smith Diamonds	2 9*	2 9*	2 9	2 9
Geduld Props.	45 3b	45 6*	46 6	44 9
Geldenhuis Deep	6 0b	—	—	—
Government Areas	82 0*	82 0*	76 0	75 0
Knight Centrals	4 3*	4 3	4 1*	—
Lace Props.	5 6*	—	6 3†	—
Lecuwpoort Tins	—	8 0*	—	—
Lydenburg Farms	—	4 3*	4 6†	4 0*
Meyer and Charltons	—	72 6*	—	—
Middelvel Estate	1 0*	1 0*	—	1 0*
Modder B's	27 0	26 9	23 6*	22 9*
Modder Deep	43 0	42 6	37 9*	37 0
Modder Easts	6 0	5 9*	5 9*	5 9*
National Banks	—	—	£11	£11½
New Era Consolidated	—	6 9*	6 0*	6 0*
New Geduld Deeps	1 4*	—	1 4*	1 4*
New Kleinfonteins	5 6*	5 6*	—	4 6*
New Modderfontein	69 6	69 6*	64 0a	64 0
New Unifields	5 0†	5 0†	—	5 0†
Nigels	4 0*	4 0*	4 3*	4 3*
Nourse Mines	8 9*	—	—	—
Pretoria Coments.	42 9	42 6*	40 0	39 6
Princess Estates	0 11*	0 11*	—	0 9*
Rand Nucleus	1 0*	1 0*	1 0*	1 2†
Rand Select. Corporation	—	55 0*	—	—
Randfontein Central	—	9 0*	9 6†	9 6†
Randfontein Estate	13 6*	13 9*	13 6*	13 6*
Roberts Victors	—	7 0*	—	7 0*
Rooibergs	3 9*	3 9*	3 9*	3 9*
South Africa Lands	4 1*	4 1*	4 0*	4 0*

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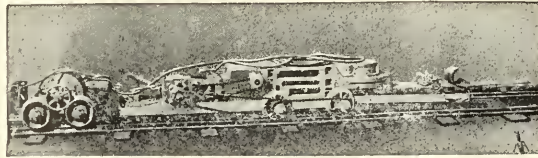
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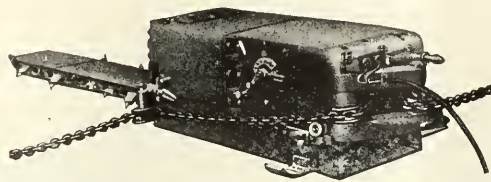
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Letters to the Editor.

Re " Grave Warnings " issued by Government:
See D.F.A., dated 30th instant.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Just as the persons responsible for the diamond control appear to be fighting for their own salvation, so the coal owners, backed by the Government, are fighting for theirs. But in all that two-column statement by the Government no reference is made to the possible existence of a " greater industry " than diamonds or coal ever were. We seem to centralise on things we think we know something about, and do not devote any attention whatever to the more substantial values which can be exploited in this country.

The reduction of wages and the possible stoppage of all payments must affect thousands of men and their families. If wages are to be reduced, then give the men who have produced the millions an interest in the business and a fair working wage, and I am sure all troubles will cease.

All hot air such as was voiced at the meeting of the citizens of Beaconsfield the other night about what has not been done by the Government and what *has* been done by others should be left out, and the greater question of irrigation and railways talked about, and possibly oil.—Yours, etc.,

A. W. WEATHERBY.

THE ORIGIN OF THE DIAMOND.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The Rand Stratigraphist has provided Mr. Lewis Watkins with a source of amusement. A pipe with a lid on, from whence no gas has escaped, must eclipse the Witpoortje break from whence so much " gas " as to render that area of no longer any stratigraphical importance. What a glorious opportunity for the " Callous Sacrifice of Sense on the Altar of Verbosity."

Professor Bonney detected the mineral (diamond) in a fragment of eclogite taken from the Newlands Mine, West Griqualand, which he inferred here to be its parent rock. This fragmentary evidence has been considered of sufficient importance to be quoted in most text-books. In Brazil, itacolumite is the matrix in which diamonds are found. What other evidence can the text-book authorities bring to bear on this important subject? I considered that the discovery of the Complete Crystallisation of the diamond in its true matrix on the alluvial areas to be of sufficient importance to place on record. Possessed with the conviction and courage of my opinion I registered a photograph of one of the specimens in my possession in the Copyright Office, Pretoria, on the 19th of April, 1921. This stands as a record of this discovery and the onus rests upon those whom it may concern to refute the evidence of its integrity and mine.

Vermeul is producing the Synthetic ruby and sapphire through the agency of what is essentially a vertical blow-pipe. Pure alumina constitutes the basis for production. Chromium the colouring agency in the ruby, and in the sapphire, magnetic oxide of iron and titanite acid. If along these lines the constituents of the diamond receives investigation the analysis will become subsidiary. " To tell the truth to others " may be a great thing for the world, but under certain conditions, based on favourable assumption, would it be a " great thing " for the diamond World?

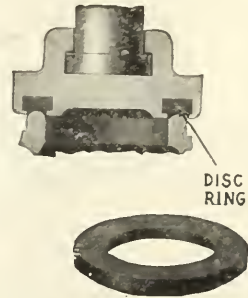
To tax your space, in reply to " Mystified," as to whether the country underlying the quartzite, shale and melaphyre (which enclose the diamond pipe) is quartz porphyry, congruous with the intrusive granite porphyry on the alluvial areas, is side-tracking the issue. These areas are open to investigation. Nature and text-books do not always agree. One of the " weighty considerations " Mr. Watkins would do well to study is the distinctive feature of the diamond in respect to carbon—the cleavage plane.

I am,

Yours, etc.,
JAMES ENNIS

FAIRBANKS

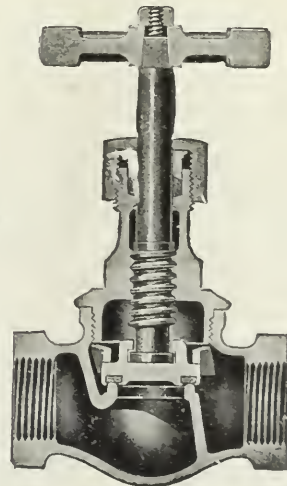
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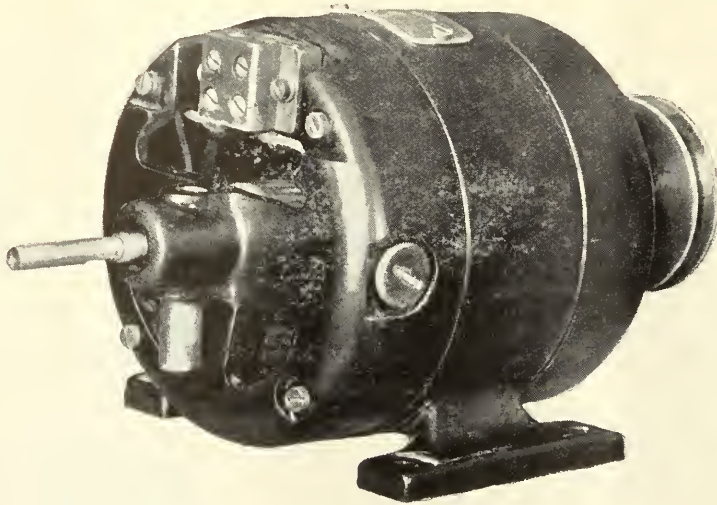
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RHODESIAN SECTION.

The Uranium and Radium of Katanga.

(By M. H. Buttgenbach).

*In 1913, in the course of development work done by the Belgian company known as the Union Minière du Haut Katanga at the Luswishi copper mine, situated a few kilometres north of Elisabethville, an important discovery was made. Several small veins, at the most 30 centimetres wide, filled with a mineral of unusual appearance, were exposed. The vein-filling consisted chiefly of uranium oxide.

Since then I have examined specimens of this ore, which occurs in the form of compact lumps; it has a density of 5.08; it scratches calcite; in colour it is orange-red, and it includes grains of a black mineral several millimetres thick. On the outside these lumps have the appearance of

two days. From this same ore I was able to obtain several decigrammes of barium chloride distinctly radio-active.

The complete analysis of an orange-red lump, as made by M. C. Gillet, on a specimen that had been carefully selected, gave the following results:

Uranium	...	...	68.203%
Lime	...	...	10.360
Lead oxide	...	...	6.388
Barium oxide	...	...	1.655
Copper oxide	...	...	0.145
Silicia	...	...	2.804
Combined water	...	...	9.449
			99.004%



A Trommel Unit in the Belgian Congo. Joplin Jigs under Thatched Roof in Foreground.

being the result of the alteration of cubic crystals that have been agglomerated; however, they are covered with a coating the colour of which shades from yellow to yellowish green; this coating extends occasionally into the minute cracks that traverse the orange-coloured lumps.

By means of photographic tests I ascertained that each of the three substances—the black grains, the orange lumps, and the green coating—were radio-active, but with an intensity varying in the order indicated. The black grains produced an impression on the plate in a few hours only, whereas the green coating required an exposure of nearly

The oxide of uranium indicated is the dioxide, UO_2 , calculated after the precipitation of all the uranium as sodium uranate, but it is probable that the uranium occurs in the ore partly as UO_2 , partly as UO_3 .

In density, colour, hardness, and composition this mineral resembles "gummite," which may be considered as a product of decomposition from pitchblende, and to which Foullon gives the formula



The analyses given for this mineral in textbooks moreover show that its composition is very variable.

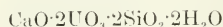
*Translated by the Editor of the *Mining and Scientific Press* from "Le Mouvement Géographique."

The green part that covers the gummite has a composition even more complex. In general, the content in silica increases and in uranium decreases. The following result of an analysis, likewise made by Mr. Gillet, gives an idea of its composition, but I ought to add that it was not possible to collect as pure a sample as in the case of the gummite.

Silica	...	...	15.266
Uranium	...	...	45.515
Lime	...	...	6.340
Lead oxide	...	...	3.897
Copper oxide	...	...	1.386
Cobalt oxide	...	...	2.500
Nickel oxide	...	...	1.520
Oxides of iron, aluminium, and manganese	...	...	8.480
Combined water	...	...	12.103
			97.007

This green matter frequently has a lustre that is greasy or waxy, but occasionally it turns into minute acicular crystals. Under the microscope, these needles, which attain at the most a thickness of five hundredths of a millimetre, show a lovely yellow tint, without appreciable dichroism. These needles give the colours of polarisation below the blue of the second order; they become less bright longitudinally, following the optical axis; a negative section is perpendicular to the face of the plane surface, which appears to be a cleavage plane. Another cleavage, less easy, appears to make an angle of 87° with the direction of length. The crystals are sometimes terminated by one face, not in agreement with the second cleavage, and make an angle of 54° with the line of length.

I consider this mineral to be composed of "uranotil," the chemical composition of which, according to Genth, can be expressed by the formula



The Luswishi ore then is composed chiefly of gummite, resulting from the alteration of pitchblende, of which there still remains intact in the lumps some portions in the shape of black grains. The gummite itself has yielded uranotil.

It is conceded nowadays that the ores of uranium contain radium in the proportion of 320 milligrammes of metallic uranium per ton. One ton of the Luswishi ore, at 60.2% of uranium dioxide, therefore, would contain 601.17 kilogrammes of uranium and 192 milligrammes of radium. It is true it seems that the proportion indicated above of uranium to radium is not exact except for the primary minerals of uranium and that the proportion diminishes in the minerals resulting from their decomposition. However that may be, the Luswishi ore is extremely radio-active, as proved by the experiments I made with the electroscope. One knows that the radio-active power is measured by the velocity of discharge of that instrument when under the influence of the mineral reduced to a powder and compared with that of the black oxide of uranium, UO_2 . The mean of six trials showed a power of 2.969, the standard being based upon 0.202 of uranium oxide.

The investigations conducted at the Luswishi deposit were interrupted by the War. However, in 1915, a similar discovery was made in a deposit at Shikolowe (Kasolo), situated south of Kambove. Whereas at Luswishi the veins containing the uraniferous ore are very narrow, at Shikolowe the vein assumes the shape of a rosary, with swellings and pinchings. The enclosing beds, with a strike N.70°E., are composed of the rocks usual to the copper deposits of that region: talcose schists, dolomites, breccias. These beds are much disordered and cut by faults, and there are found impregnations of ores containing copper, cobalt, and manganese. Generally the beds dip northward, whereas the uraniferous veins dip to the south at an angle ranging from 20° to 45°. In the swellings the vein is almost entirely filled with an orange-red mineral which is referred to gummite; in the pinchings the gummite gives

place to a mineral in micaceous flakes which may be chalcocite or autunite. But, not having as yet received specimens of this deposit, I cannot say what is to be thought of this phosphatic ore, the like of which has not been found at Luswishi.

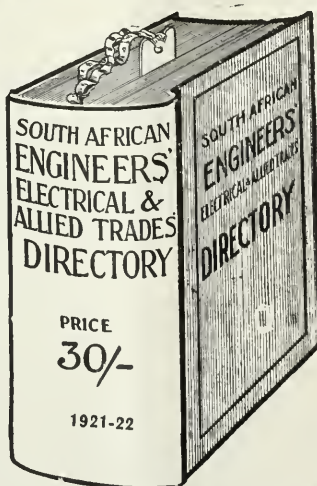
The known deposits of uranium and radium may be classified as follows:

1. Deposits of pitchblende (uranate or uranyl) in the form of veins with a complex filling.
2. Deposits of autunite (hydrous phosphate of uranium and lime) filling crevices in pegmatite.
3. Deposits of carnotite (vanadate of uranium, potash, and lime) consisting of sandstone impregnated with this mineral.
4. Deposits of betafite (niobo-titanate of uranium) consisting of concentrations in pegmatite.

It is very probable that the uraniferous and radio-ferous orebodies of Katanga ought to be referred to the first type. The prospecting operations are being continued. It is unnecessary to direct attention to the importance this discovery may acquire, for the introduction into Belgium of a new chemical industry enabling, by the aid of ores coming from the colonies, the obtaining of a product the use of which is limited by its scarceness, and of which among others medicine, experimental as well as clinical, demands without ceasing larger quantities.

Rhodesian Cement.

At the annual meeting of the Premier Portland Cement Co. (Rhodesia), Ltd., Bulawayo, the Chairman stated that Continental cement was being dumped at the ports of Africa to-day at 15s. 6d. per cask of 400 lb. gross, which meant that so far as the company was concerned, it was entirely out of the market in Portuguese East Africa. It was common knowledge that the German Government, while retaining a high price internally by means of a tariff wall, was subsidising the export of its surplus products. Germany was fully alive to what she had lost in the way of export trade during the War, and was leaving no stone unturned at the present moment to make up leeway. Every factory in British South Africa was feeling the effect of this European policy, and that company, through this process of dumping and the general financial stringency of the times, had also been affected.



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Rhodesia's Mineral Output.

DETAILS FOR NOVEMBER—SMALL DECLINE IN GOLD OUTPUT—BASE MINERAL PRODUCTION DOWN £10,000.

We have received for publication from the office of the Rhodesia Chamber of Mines the following detailed statement of the mineral output for the month of November, 1921, with comparisons and values:—

Gold.

MATABELELAND.

Bulawayo District:

	No. of stamps.	Tons Treated.	Yield Ozs.	Value £
Abercorn (Abercorn G.M. Co., Ltd.)	5	723	612.09	2,571
Do. (sands)	—	350	94.31	396
Aerial (Carson Mines, Ltd.)	5 1 P	725	52.71	221
Do. (sands)	—	450	24.53	103
Antelope (H. Herrington)	5 3 P	900	384.32	1,614
Athi (Berry & Black)	5	156	39.03	164
Do. (sands)	—	110	15.79	66
Bapaume (A. W. Wilson)	3	263	139.98	588
Do. (sands)	—	350	56.64	238
Bill's Luck (Bill's Luck Syn.)	5	300	64.82	272
Blighty (H. Ashburner) (sands)	—	210	33.10	139
Panora (A. Granger)	5	270	48.77	205
Fred and Fred 1W (Trans. and Rho. Estates)	10 4 P	1,610	902.99	3,793
Do. (sands)	—	1,660	355.23	1,492
Freda (Coghlan & Black)	3	504	49.13	206
Golden Oriole (J. H. Byerley)	3	60	28.79	121
Do. (sands)	—	50	—	—
Helen (Koodoo Syn. No. 2)	5	255	150.45	632
Do. (sands)	—	460	—	—
Henriette (T. Berwitz)	2	60	34.79	146
Horn (Horn Reef Synd.)	10	950	157.09	660
Huntsman (Rhodesia G.M. and Investment Co., Ltd.)	5	227	192.68	818
Do. (slimes)	—	394	159.56	676
Ibis (A. J. Ledingham)	3	232	15.42	65
Jessie (Jessie Tributors)	15 4 P	2,000	398.56	1,674
Do. (sands)	—	2,380	246.34	1,035
Do. (slags)	F	—	24.56	103
Kestrel (E. Warren)	5	400	103.85	436
Do. (sands)	—	450	54.86	230
Killarney (F. D. Roscoe)	10	326	135.57	570
Legion (W. H. Robinson)	5	300	112.91	474
Lonely Reef G.M. Co., Ltd.	20 3 T	5,200	1,913.20	8,108
Do. (slimes)	—	5,200	3,095.58	13,129
New Coburg (W. E. Hunt) (Oct.)	2	120	65.99	277
New Eclipse (J. R. Stewart)	5 1 P	919	420.75	1,767
Do. (sands)	—	410	58.39	245
New Start (W. A. Foster)	5	481	51.44	216
Night Hawk (B. J. Chapman)	Dolly	—	6.95	29
Old Nic (Old Nic Slimes, Ltd.) (slimes)	—	2,200	167.71	704
Port (M. D. Synd.)	2	90	34.15	143
Queen's (Bembesi District G.M. Co., Ltd.)	10	900	267.91	1,125
Do. (sands)	—	500	24.44	103
Queen's (E. W. Lannin)	5	500	87.13	366
Do. (sands)	—	600	129.33	543
Red Boy (Red Boy Syn.)	5	530	220.61	927
Red Rose (Rewi Byo. D. Syn.)	10	646	212.60	1,019
Rhodesian King (R. Aserman) (Balance in October)	5	100	57.53	242
Do. (November)	—	390	144.80	608
Do. (sands)	—	240	12.79	54
Sable (R. J. Maidwell)	3	90	33.69	141
Scoveni (W. H. & D. A. Burrows)	2	140	44.24	186
Silver King (J. C. Reed) pannings	—	—	1.70	7
Turk (Hickey & Finlay)	3	165	120.11	504
White Rose (B.B. Syn.)	2	171	89.67	377
Wolley Dog (Mrs. F. Cripwell)	5	56	16.29	68
Premiums: May-July, 1921	—	—	—	27,837
Bulawayo District Total	—	—	11,995.87	£78,433

Gwelo District:

Babs No. 1 (Beach & Boly)	5	412	125.19	526
Do. (sands)	—	350	80.86	340
Bertha B. (H. H. Field) (Oct.)	5	283	26.15	110
B.F. (B. Bertholdi)	5	670	182.17	765
Black Prince (S. Levin) (sands)	5	350	30.28	127
Bonsor (J. Cruikshank)	F	—	62.74	264
Commonage (H. W. Gray)	T	—	36.05	151
Connemara (Connemara Synd.)	5	524	—	—
Do. (sands)	—	1,900	575.89	2,410
Danga (Cribb and Seear)	5 1 P	500	139.78	587
Do. (sands)	—	315	31.97	134
Divide West (J. Jones) (Oct.)	5	300	60.56	254
Do. (November)	—	300	51.61	229

	No. of stamps.	Tons Treated	Yield Ozs.	Value £
Dop (H. K. Havnar) (Oct. sands)	—	420	131.30	551
Easter Egg	4	95	24.54	103
Eva (H. Stocks)	5	195	24.71	104
Falcon Mines, Ltd.	28 N 2 T	15,671	2,882.08	12,105
Do. (copper, £15,398; silver, £526).	—	—	—	—
Fed Up (A. Malcolm) (clean up)	—	—	75.57	317
Gaika G.M. Co., Ltd.	5 1 C 1 T	4,002	945.88	4,011
Do. (sands)	—	4,002	543.49	2,304
Glen Hume (Glen Hume Syn.)	5	800	125.73	528
Globe & Phoenix G.M. Co., Ltd.	40 12 P	6,139	4,075.24	17,116
Do. (sands)	—	9,359	1,448.29	6,062
Do. (slimes)	—	2,101	451.68	1,897
Knights (Knight and Smith)	5	180	202.06	849
Lucerne (J. Wyser)	2	100	18.99	80
Makokoosha (R. Sharkey)	5	240	115.22	484
Moss (James & Worthington)	5	810	282.92	1,188
Do. (sands)	—	1,575	115.14	484
Ranch (Woodger & Murray)	5	260	—	—
Do. (sands)	—	180	81.52	342
Riverlea (G. C. Hooper) (sands)	—	100	—	—
Do. (slimes)	—	241	49.52	208
Shamrock (C. W. Leppington) (Oct.)	5 1 P	650	111.61	469
Do. (November)	—	500	90.77	381
Strike (J. M. Markham)	H	600	83.82	352
Torleven (Torleven Syn.)	5	855	56.00	235
Veracity (L. R. Evans)	5	550	162.77	684
Do. (sands)	—	700	52.51	220
Wonderland (Cribb & Seear)	(5)	50	17.29	73
Premiums: May-July, 1921	—	—	—	5,185
Gwelo District Total	—	—	13,569.90	£62,229

Lomagundi District:

Alhviai (P. H. McDonald)	—	—	3.72	16
Anghian (F. L. Standen)	5	134	97.45	409
Eldorado (Austen & Eaton)	5 1 T	950	247.44	1,039
Enreka (F. K. Brown)	5	318	22.18	93
Maggiemac (J. McMurdon)	10	780	163.37	686
Do. (sands)	—	544	44.50	187
Noxid (C. K. Dixon)	1	35	3.45	14
Ventura (Ventura Syn.)	5	200	28.11	118
Lomagundi District Total	—	—	610.22	£2,562

Mazoe District:

Alice (Bernheim Tribute)	10	45	32.70	137
Kit (J. M. Laing)	5	78	33.55	141
Slam (Slam Synd.)	10	501	63.43	266
Mazoe District Total	—	—	129.68	£544

Salisbury District:

Alliance No. 2 (Alliance Tribute Syn.)	5	300	92.10	387
Arcturus-Slate (Goldfields Rhodesia Dev. Co., Ltd.)	20 2 C	5,900	1,085.23	4,603
Do. (sands)	—	5,900	1,660.81	7,045
Do. (concentrates)	F	—	16.12	68
Bridge (D. H. Curry) (October sands)	—	295	—	—
Do. (sands) (November)	—	380	119.43	502
Downton (J. A. Moore)	5	293	39.34	165
Fiona (Jensen & Townsend)	5	700	72.97	306
Joking (W. C. Harrison)	8	480	489.60	2,056
Do. (sands)	—	230	44.54	187
Joyce (B. Ellsmoor) (sands)	—	448	57.79	243
New Full Back (W. B. Maris)	2	15	19.77	83
New Umbrella (J. A. Moore)	5	710	129.88	545
Old Home (E. H. Walsh)	2	175	58.09	244
Shamva Mines, Ltd.	64 N 12 T	60,100	2,307.12	9,789
Do. (sands)	—	32,069	5,847.40	24,793
Do. (slimes)	—	27,963	—	—
Do. (concentrates)	F	—	88.67	372
Tip Top (Jumbo G.M. Co., Ltd.)	10	1,450	458.34	1,925
Do. (sands)	—	600	41.78	175
Top (Harrison & Rooke)	5	300	127.04	534
Trio (Trio Syn.)	5	416	212.96	894
Do. (sands)	—	290	32.77	138
Viking (J. Meikle)	10	480	41.63	175
Premiums: May-July, 1921	—	—	—	43,265
Salisbury District Total	—	—	13,043.38	£98,494

	No. of stamps. Treated.	Tons	Yield Ozs.	Value £
Victoria District:				
Empress (D. & J. Lang) ...	C	1,800	141-96	618
Do. (sands) ...	—	900	143-25	602
Ruby (T. J. Tilbury), scaling plate ...	—	—	5-59	22
Victoria District Total			293-80	£1,242

MASHONALAND.

	No. of stamps. Treated.	Tons	Yield Ozs.	Value £
Hartley District:				
Aurora (Aurora Syndicate) ...	5	220	23-81	100
Big Boulder (Pope & Baker) ...	5	520	304-41	1,279
Brilliant (Eureka Synd.) (October) (sands) ...	—	600	29-84	125
Do. (November) (sands) ...	—	600	29-85	125
Cam & Motor G.M. Co., Ltd. ... RP 5 BM	14,200	762-55	3,234	
Do. (concentrates) ...	—	1,487	4,010-82	17,009
Colne (H. F. Wilson) ...	5	200	21-42	90
Do. (sands) ...	—	130	10-96	46
Cricket (F. C. Luxat) ...	H	450	121-75	511
Do. (sands) ...	—	360	44-54	187
Eiffel Blue (Blyth & Moore) (slimes) ...	—	1,000	73-66	309
Eileen Alannah Mining Co., Ltd. ... 6 N	920	165-88	697	
Do. (sands) ...	—	953	146-10	614
Do. (slags) ...	F	—	—	10
Esta (A. Attilis) ... (10)	39	24-59	103	
Flora (Sarnos Syndicate) ...	3	70	23-85	100
Glendarra W. Ext. (C. S. Marks) ...	2	25	3-61	15
Golden Valley (J. Mack & Co.) ... 10 1 P	1,189	458-15	1,924	
Do. (sands) ...	—	627	323-58	1,359
Do. (slimes) ...	—	351	—	33
Do. (slags) ...	F	—	7-92	33
Grandeur (Grandeur G.M. Co.) ...	5	278	48-25	203
Hepworth No. 2 (J. W. Banner) ...	5	420	99-86	419
Do. (sands) ...	—	220	10-62	45
Hero (R. A. Smith) ...	10	1,400	80-48	338
Do. (sands) ...	—	650	16-27	68
Hope (Hope Syndicate) ...	5	500	90-72	381
Do. (sands) ...	—	380	17-87	75
Inez (Mrs. Sarah Smith) ...	2	35	14-56	61
Invincible (I. J. Minaar) ... (5)	210	51-61	217	
Do. (sands) ...	—	183	15-11	63
Kenyemba (J. W. Banner) ...	10	640	184-55	775
Do. (sands) ...	—	480	46-68	196
Mali (J. Thornet) (sands) ...	—	1,000	18-30	77
Newington 2 (J. M. Kerr) (Oct.) (sands) ...	—	180	18-48	78
New Invincible (I. J. Minaar) (slimes) ...	—	580	98-60	414
New Topaz (F. C. Luxat) ...	5	420	108-99	458
Do. (sands) ...	—	300	42-22	177
Do. (concentrates) ...	F	—	16-62	70
Nut (J. Aronowitz), (October) (sands) ...	—	420	9-49	40
Do. (November) (sands) ...	—	892	30-54	128
Do. (clean up) ...	—	—	24-45	103
One Step (W. Miller) ...	2	390	60-83	255
Do. (sands) ...	—	400	25-44	107
Owl (A. Rolfe) ...	10	810	143-96	605
Do. (sands) ...	—	651	133-86	562
Do. (slimes) ...	—	135	—	173
Peerless (Recovery Syn.) (Oct.) (sands) ...	—	900	41-20	173
Princess (Trixie, Ltd.) ...	5	90	37-80	159
Do. (sands) ...	—	400	6-89	29
Profiteer (T. McGarry), (Oct.) clean-up	5	200	23-51	99
Shepherds (Begie & Jackson) ... 10 1 T	705	60-16	253	
Do. (sands) ...	—	600	73-65	309
Do. (slimes) ...	—	170	—	173
Sid (W. How) ...	3	250	41-23	173
Try Me (Est. R. R. Aitken, dec.) ...	5	680	173-59	729
Tsessebe 2 E. Ext. (Ullyett, Cribb and Seear) ...	10	1,400	370-69	1,557
Do. (sands) ...	—	1,500	164-62	691
Do. (concentrates) ...	F	—	16-61	70
Turkoi (J. Mack & Co.) ... 10 2 P	1,337	418-06	1,756	
Do. (sands) ...	—	1,337	—	217
Washington (I. J. Minaar) ...	5	210	51-61	217
Do. (sands) ...	—	182	15-11	63
What Cheer (H. Moser) ...	10	453	176-75	742
Do. (sands) ...	—	968	46-12	191
Zurich (Crobbs & Seear) ...	5	135	—	4,000
Premiums ...				
Hartley District Total			9,713-25	£44,999

Umtali District:

Kent (B.M.S. Synd.) ...	15	850	258-56	1,086
Do. (sands) ...	—	700	97-33	409
Liverpool (H. and H. D. Norris) ...	5	380	55-64	231
Do. (sands) ...	—	200	45-13	190
P.M.L. (A. W. Rose) (October) ...	5	40	14-17	59
Rezende DBI (R. P. Synd.) (October) ...	15	2,300	197-28	828
Do. (sands) ...	—	450	33-97	143
Do. (November) ...	—	2,400	176-06	739
Do. (November) (sands) ...	—	450	16-36	69

	No. of stamps. Treated.	Tons	Yield Ozs.	Value £
Rezende Mines, Ltd. ...	50	5,850	1,838-92	7,802
Do. (sands) ...	—	3,237	226-22	960
Do. (slimes) ...	—	2,115	192-27	816
Do. (concentrates) ...	—	198	515-89	2,189
Do. (base bar) ...	—	—	72-18	306
Premiums ...	—	—	—	2,300
Umtali District Total			3,739-98	£18,130

(P) Grinding Pan. (BM) Ball Mill. (T) Tube Mill. (H) Huntington Mill. (GR) Gates Rolls. (Pu) Pneumatic Stamp. (N) Nissen Stamp. (C) Chilean Mill. (RP) Roasting Plant. (F) Treated at Falcon Mine. (WM) Waterfall Mill. (LM) Lane Hill. (EP) Experimental Plant.

ASBESTOS.—NOVEMBER, 1921.

	Tons.	£	s.	d.
Bulawayo District:				
Nil Desperandum (African Asbestos Mining Co., Ltd.) ...	68-48	1,711	17	6
Pangani (J. S. Hancock) ...	12-56	276	4	3
Shabanie (Rhod. & Gen. Asbestos Corp., Ltd.) ...	267-69	6,692	3	3
Slip C. (Slip Syndicate) ...	36-00	900	0	0
Lomagundi District:				
Ethel (Brit. Asb.-Chrome Co., Ltd.) ...	45-00	562	10	0
Victoria District:				
Gath's (Rhod. and Gen. Asbestos Corp., Ltd.) ...	150-58	3,764	10	0
King (R. King Asb. Co., Ltd.) ...	9-18	151	9	5
Total	589-49	£14,058	14	5

SUMMARY OF MINERAL PRODUCTION. NOVEMBER, 1921.

	Value. £
Gold (fine ozs.) ...	53,096-08 *306,636
Silver (fine ozs.) ...	13,870-01 1,519
Coal (raised, 17,779 tons)—sales ...	14,284
Coal (used for coke) ...	5,631
Copper (Blister) (tons) ...	256-63 15,398
Chrome Ore (tons) ...	47-00 210
Asbestos (tons) ...	589-49 14,059
Arsenic (tons) ...	11-80 293
Mica ... 1 ton 832 lbs.	354
Diamonds (carats) ...	16-5 72
Total	£358,456

* Includes £82,587 gold premiums.

COMPARISONS.—NOVEMBER, 1921.

Gold—		
October, 1921 (fine ozs.) ...	53,424-39	
November, 1921 (fine ozs.) ...	53,096-08	
Decrease	328-31	
Base Mineral Production—		
October, 1921 ...	£60,267	
November, 1921 ...	50,301	
Decrease	£9,966	
Total Mineral Production—		
October, 1921 ...	£425,353b	
November, 1921 ...	358,456a	
Decrease	£66,897	

a—Includes £82,587 gold premiums.

b—Includes £137,207 gold premiums.



ON A MATABELELAND GOLD MINE.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

STRIKE TENSION RETARDS BUSINESS THIS WEEK—IRON AND STEEL—BUILDING AND TIMBER MATERIALS—AMERICAN NOTES—OIL NOTES—REDUCTION IN DETONATORS AND FUSE—BREVITIES.

General.

Business, of course, has not yet got into its stride, the recent holidays having thrown things considerably out of gear. On the official resumption of business in the early part of the week merchants and employers appeared somewhat disinclined to settle down, and it will not be before the commencement of next week that serious work will be generally tackled. Added to the lethargy caused by practically a fortnight's lull in wholesale trading is of course the present crisis in the gold and coal industries. Mining circles appear to be pretty unanimous that the long and short of it will be the acceptance by the workers of such a radical reduction in the cost of production as will enable the industry to exploit the many millions of tons of ore awaiting treatment on a reasonably fair extraction basis, and thus ensure employment to many workers for years to come. The gold premium is at present 98s., but a further fall of 10s. would bring it perilously near to normal. Nor need we be surprised if in face of the big international questions now being settled on the other side and the undoubtedly better trend of business universally, the price of gold declines shortly and perhaps at no distant date, the workers may then appreciate at its full value the satisfaction of half a loaf instead of no bread. In the meantime the resumption of the Conference between the miners and the Chamber of Mines next Tuesday is eagerly awaited, as upon the result of the workmen's decision will probably depend the future of something like the half of our industry. It is, of course, unwise to attempt to prophecy, but gauging the opinions of the mining community and others, the vote plumped for is that after some kicking against the pricks, the miners will eventually look the facts in the face and accept terms which alone can keep a lot of our mines alive and provide employment for the workers at the same time. The ballot returnable on Sunday next will, it is generally thought, be overwhelmingly in favour of a strike. An unfortunate feature, which is of the very greatest importance, has been the withdrawal on the part of the Central Strike Committee of all workers on pumping, lighting and public utility purposes, which means of course that all Union men are now withdrawn from the mines. This disquieting factor is more or less safeguarded by the Government's determination to enforce the mining regulations, and it is satisfactory to note that the Prime Minister has postponed his departure for Capetown and, together with Mr. Warrington Smyth, Secretary for Mines and Industries, and Mr. Trevor, Chief Inspector of Mines for the Pretoria District, is in touch with the Unions. What the present coal crisis means to Union trade is brought home very forcibly to us by the announcement that 11 steamers are now waiting in Delagoa Bay for 81,000 tons of coal. Of this quantity not more than about 22,000 tons are available at that port, and unless some immediate settlement is arrived at in the coal dispute, some 60,000 tons will be lost to the Union shipping trade, as the charterers of these vessels will be obliged to divert them to other suppliers. A market like this, so difficult to secure, so easy to lose, is extremely difficult to regain.

A very shrewd and canny merchant, in the course of a chat this week, said as far as he could gather the feeling amongst workmen generally was that they must come down to proper levels in respect of wages to meet the altered

circumstances. He gave it as his opinion that even at a much lower wage level, taking the lower living costs which must sooner or later prevail, the workman would eventually be better off than to-day. But that lower production costs must operate now and at once there was no gainsaying.

Given this desideratum, he thought that about March or April next we might see a big improvement in business conditions. Many big contracts, he said, had been held back for many months in view of the present big wage-cut decision, particularly in the building trade and reconstruction work along the Reef. Latest accounts from London as to demands on manufacturers are very favourable; money is easier, and day-to-day loans have been as low as $1\frac{1}{2}$ per cent. The $5\frac{1}{2}$ per cent. Treasury Bonds have been successful, the price having been raised from 97 to 99. Treasury Bills, on the other hand, on reduced offers, have steadily declined to $3\frac{1}{4}$ per cent., resulting in ordinary discount rates receding from 3.5-16 to $3\frac{3}{4}$ per cent. A further reduction in the Bank of England rate early this month to $4\frac{1}{2}$ per cent. is generally anticipated. The recent increase in the American

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Exchange is attributed to investments of American funds abroad, which is bound to assist in the rehabilitation of business. Generally, gilt-edged English securities have recently enhanced in price.

Iron and Steel.

Business is practically at a standstill after the holidays, and nothing of consequence is expected to occur for the next few days. In other words, merchants are awaiting the result of the present coal strike and the decision of the gold miners in regard to lower wages.

Latest quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{3}{8}$ in., $\frac{1}{2}$ in. and $\frac{3}{4}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. er lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; $\frac{1}{2}$ in., 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; hammer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., exceedingly scarce, 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 21s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb. (wire has touched bottom and is firming); screening, 3s. to 9s. 6d. per square yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb. Asbestos, white, $\frac{3}{8}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton. Recently there has been a slight revival in inquiries in this market. Copper is steady at about £66 15s. per ton cash, £67 15s. per ton three months. Tin has had an upward move to £174 10s. cash, but it is generally expected that the present price, which has receded to £173 3s., will shortly be exceeded.

I.C. Steel Coke Tin Plates.—The market is steady. I.C. 14 x 20, 112s., 108 lb.; coke quality, 21s. per box. I.C., 28 x 20, 112s., 216 lb.; coke quality, 42s. per box.

The end of the year saw the following prices in the Metal Market.—Electrolytic copper, £74 cash; £75 forward; lead (foreign), £24 7s. 6d. cash, £24 2s. 6d. forward; quicksilver, £10 7s. 6d.; bar silver, 34 $\frac{1}{2}$ d., and bar gold, 98s. per ounce.

Timber and Building Materials.

Pending resumption of business next Monday, the building trade is quiescent. Prices remain much about the same. Speculation is rife as to the upshot of the present labour disputes.

Prices.—3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; ceilings,

4 $\frac{3}{4}$ d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 6s. 6d. to 7s. 6d.; corrugated iron, 9d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1 $\frac{1}{2}$ in., 11d.; 2 in., 11 $\frac{1}{2}$ d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1 $\frac{1}{2}$ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks remain the same, with, however, a hardening tendency, viz.: mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaker, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

American Notes.

With the fourth quarter of 1921 well started, the tone prevalent was much better than at the end of 1920. Though production and other activities had not materially increased as compared with a year ago, an undercurrent of optimism is appreciable, a realisation that the worst of the current depression has passed. It is felt, however, that recovery will be slow. A factor of no small importance in this connection, and very applicable to South Africa, is the willingness of labour to give a fair day's work for a fair day's pay. A tendency to radicalism, which appeared to increase as wages went up to the peak of two years ago, has waned to nothing but a shadow. Though wages have not been readjusted to the pre-war basis, the improvement in quantity and quality of work delivered has been most marked. There has also been a willingness on the part of common labour to make an effort to become skilled.

That the mere possession of gold does not bring prosperity to the holder is well illustrated by the present position of the United States. More gold lies in the vaults of the Federal Reserve Banks of the United States and the Treasury than has ever been accumulated in one country—over 40 per cent., it has been estimated, of the total stocks in the world. Economists and bankers are puzzled over the benefit to be derived from the possession of so much precious metal, and it is held to be a foregone conclusion that a good measure of this accumulation ultimately will be and can be released without harm to America's financial structure.

The iron trade in America is on the whole rather dull. One important improvement is noted in railroad buying. Steel production is ranging 40 to 45 per cent. of capacity, but prices are somewhat lower. Black sheets and galvanised sheets have declined. Bars, shapes and plates are a trifle firmer. The market in pig iron is dull and prices have yielded a little.

American Motor Car Revival.

Latest reports are to the effect that the automobile business, helped thereto by steadily increasing sales of motor trucks, is progressing very satisfactorily, and that business is advancing well from bed-rock figures. Gains in sales made during the second quarter show increases of from 40 to 100 per cent., and in respect of the heavier vehicles as much in some cases as 500 per cent. over the first quarter was registered.

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WRIGHT'S ROPES

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The Standard Oil Company is busy developing oil prospects in the Elk Hills oil field of California. During 1921 twenty-five wells in that district were contributing 50,000 barrels daily to the production of the State.

Latest American metal reports show that copper has been the feature, the price advancing continuously. The zinc market has eased off, showing a slight decline; lead continues steady, and tin has continued to advance. The market for forward copper continues very firm, very little metal for prompt shipment being sold.

Oil prospects in Australia, apart from the oil shales being worked in a perfunctory manner, are not very brilliant. The Commonwealth Oil Refineries, Ltd., in which the Anglo-Persian Oil Co. and the Commonwealth Government are associated, is proceeding with the erection of reservoirs for the storage of crude oil in Sydney and Melbourne, and refineries will probably be installed this year. The crude oil will be imported from Persia until local sources are developed.

Japan Importing Persian Oil.

A contract for 50,000 tons of crude oil per annum has been made by the Teikohn Oil Company of Japan with the Anglo-Persian Oil Company. For the transportation of this oil two ships of 8,800 tons each have been constructed.

Hume Pipe Industry.

There are signs of recrudescence of business in the shape of more inquiries. It would appear that several public bodies are contemplating works which will involve the use of this company's products.

The British South African Explosives Co., Ltd., advise the reduction of the price of detonators as from the 1st January, as follows:—No. 6D detonators, in case lots of 10,000, from 55s. to 53s. 4d., less 2½ per cent. per 1,000 delivered to the mines on the Witwatersrand; and of Nobel's safety fuse by one penny per coil, viz., from 10d. to 9d. per coil, less 2½ per cent. delivered on the mines of the Witwatersrand.

Electrical Goods.

Dealers report that December was a very fair month as regards business, but not comparing advantageously with the similar period of recent years. There are no alterations to record in prices, materials are arriving regularly from Britain and the Continent, and also from America rather slowly. German stuff is firming up, as they are now having to pay for raw materials, which are more or less controlled by the Allies.

Kenya Timber Resources.

Professor Troupe, a Colonial office expert, reports very favourably upon Kenya timber resources:—Kenya timber was unsurpassed and in large quantities, and some of the indigenous timber of Kenya ranked with the finest in the world. Its possibilities for pencil cedar were, in view of the world's present dwindling supplies, tremendous, and large profits from the development of Kenya timber were certain.

Raw Rubber.

The Times announces an invention for utilising the raw rubber surplus in a permanent liquid form. This liquid rubber, it is stated, is a splendid non-conductor, and can be used for cold storage purposes.

Imperial Wireless Chain.

It is expected that the first link in the Imperial wireless chain between Britain and Cairo will be completed this month.

S.A. Coal Estates.

The finances of the S.A. Coal Estates — the Bailey £1,000,000 merger of last year—are of unusual interest to-day because of the unexpectedly trying times the coal companies are experiencing. Of the globular registered capital £702,000 was issued in fully-paid shares as purchase consideration to the selling companies, £140,407 was subscribed as working capital, leaving a further £140,400, an option over which at 20s. per share is held by the subscribers of the initial working capital. Of this, options over 83,093 shares have been exercised, and the balance are under option at the same price. The prospects of the company are, of course, bound up with the prospects of the coal trade of the Province, and these are now on the knees of the gods!

Synthetic Gold.

Professor Irving Fisher—who ought to know better—has been making our flesh creep by talking darkly of a German professor's solution of the age-old problem of transmuting base metals into gold. Even eminent American economists, who set out to solve the world's monetary problems, are doubtless not to be taken too seriously in what are meant to be humorous asides in otherwise dry-as-dust lectures, but we do protest against the staple products of this country, viz., gold and diamonds, so often being singled out for the attention of these ponderous jokers. Perhaps, after all, there is an element of jealousy behind these attempts to belittle the natural monopolies with which Nature has endowed South Africa.

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Dr. BALANCE SHEET as at 30th September, 1921. Cr.

To Capital Account—		By Property and Development	£251,374 12 8
Authorised, Ordinary Shares	£500,500 0 0	Shafts and Permanent Works	24,187 17 7
Authorised, Preference and Participating Shares	150,000 0 0	Buildings	81,103 1 7
	650,500 0 0	Machinery and Plant	195,430 19 6
Less Reserve Shares:		Railway Sidings	23,633 8 5
Ordinary Shares, £66,750; Preference Shares, £43,676	110,426 0 0	Live Stock and Vehicles	1,568 12 0
	£510,074 0 0	Furniture	925 10 0
Debentures Convertible into Reserve Shares at par	66,750 0 0	Shares	5,584 2 1
Sundry Creditors	23,786 4 1	Stores	33,353 7 10
Profit and Loss Account	28,636 2 9	Sundry Debtors	33,915 10 6
	£659,246 6 10	Cash at Mine	1,220 18 7
		Cash at Bank	6,918 6 1
			£659,246 6 10

PROFIT AND LOSS ACCOUNT for Year ending 30th September, 1921.

To Interest Account	£5,344 19 3	By Profit on Coal	£62,612 16 6
Dividend and Income Taxes	5,372 15 9	Rents Received	1,997 2 5
Directors' Fees	950 0 0	Interest Received	9 8 0
Debenture Expenses	499 12 3	Profit on Property Realisation	1,755 9 0
Balance to Appropriation Account	54,237 8 8		
	£66,404 15 11		£66,404 15 11

APPROPRIATION ACCOUNT.

To Dividend Account—		By Balance brought forward	£30,467 11 10
1920. December 22, 5 per cent. on Ordinary Shares	£21,687 10 0	Balance from Profit and Loss Account	54,237 8 8
December 31, 3 per cent. on Preference Shares	3,145 6 4		
December 31, 2½ per cent. on Ordinary Shares	10,843 15 0		
1921. June 30, 3 per cent. on Preference Shares	3,189 14 6		
Depreciation—			
Shafts and Permanent Works	1,273 0 11		
Buildings	4,268 11 9		
Machinery and Plant	10,285 16 6		
Railway Sidings	1,243 17 4		
Live Stock and Vehicles	82 11 3		
Furniture	48 14 2		
Balance to Balance Sheet	28,636 2 9		
	£84,705 0 6		£84,705 0 6

For HENDERSON'S TRANSVAAL ESTATES, LTD.
Secretaries,
H. St. J. WILLIAMS.

WM. POTT, Chairman.
J. DAVIDSON,
SAM'L THOMSON.

Directors.

To the Shareholders,

We have examined the above Balance Sheet with the books and vouchers of the Company, and have received all the information and explanations we have required. In our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us and as shown by the books of the Company.

Johannesburg,

12th November, 1921.

ALEX. AIKEN & CARTER,

Auditors.



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NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Twentieth Ordinary General Meeting of Shareholders for the year ended 30th September, 1921, will be held in the Board Room, Second Floor, The Corner House, Johannesburg, on THURSDAY, THE 2nd MARCH, 1922, at 11 a.m., for the following business:—

1. To receive and consider the Balance Sheet and Accounts for the year ended 30th September, 1921, and the Reports of the Directors and Auditors.
2. To elect Directors in the place of those retiring by rotation or otherwise, in accordance with the provisions of the Company's Articles of Association.
3. To determine the remuneration of the Auditors for the past audit and to appoint Auditors for the ensuing year.
4. To transact any other business which ought to be transacted at an Ordinary General Meeting, or which is brought under consideration by the Report of the Directors.

The Share Transfer Books of the Company will be closed from the 24th February, 1922, to the 2nd March, 1922, both days inclusive.

Holders of Share Warrants who desire to be present or represented at the Meeting shall produce their Share Warrants (or may at their option deposit same), at the places and within the times following:—

- (a) At the Head Office of the Company in Johannesburg, at least 24 hours before the time appointed for the holding of the Meeting;
- (b) At the London Office of the Company, No. 1, London Wall Buildings, London, E.C.2, at least 30 days before the date appointed for the holding of the Meeting;
- (c) At the Office of the Credit Mobilier Francais, 30 and 32 Rue Taitbout, Paris, at least 30 days before the date appointed for the holding of the Meeting;

and shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such production or deposit a Certificate, with Proxy Form, will be issued, under which such Share Warrant holders may attend the Meeting either in person or by proxy.

By Order of the Board,

RAND MINES, LIMITED,
Secretaries.

Head Office: S. C. STELL, Secretary.
The Corner House, Johannesburg, Transvaal,
3rd January, 1922.



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THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, JANUARY 14, 1922

No. 1581.

A Strike Scene in Johannesburg.



The Reef is once again in a state of industrial chaos. On Monday morning the employees of the Gold Mines, the Victoria Falls Power Company, engineering shops and kindred enterprises ceased work, and at the moment of writing there seems little prospect of an settlement. On Monday the mines will commence the repatriation of mine boys. The coal strike, which has been in progress for two weeks now, continues. The effects of this industrial impasse are lamentable in the extreme, and are fully commented on in this issue. The photograph given above shows the New Law Courts, Johannesburg, where the last conference before the breaking off of negotiations, was held during the early part of this week.

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P.O. Box 7404 JOHANNESBURG. Telephone 408 Central.

Telegrams : "SIEMENS"

THE GREAT STRIKE.

THE WHOLE REEF INVOLVED—HOW THE MEN BALLOTTED—FEDERATION AND THE GOVERNMENT—THE QUESTION OF THE NATIVES—MR. CRAWFORD'S RETURN AND RE-ELECTION.

All the mines from Randfontein to Springs, all save one of the Victoria Falls and Transvaal Power Company's stations, and the private engineering shops ceased work at seven o'clock on Monday morning under the operation of the S.A.I.F. general strike notice.

The Ballot.

The full official return of the ballot has now been issued; the figures of the various unions being as follow:—

	For.	Against.
Engine Drivers' and Firemen's Association	914	159
Ironmoulders' Society	123	37
S.A. Boilermakers' Society	262	9
S.A. Reduction and Surface Workers' Association	1,525	273
A.S. Woodworkers, Witbank	29	2
A.S. Woodworkers, Head Office	434	107
S.A. Mine Workers' Union	7,554	375
A.E.U.	1,282	375
B.W.I.U.	69	18
Total	12,192	1,336

Spoilt papers: S.A. Mine Workers' Union, 27; B.W.I.U., 2.

22,000 Men Out.

Over 22,000 men went on strike, comprising miners, reduction workers, engineers, engine drivers, moulders, woodworkers and builders employed in the affected industries. The colliers, of course, went on strike some days previously.

The Chamber has given notice of its intention, if the strike continues, to start repatriating the natives next Monday, and to discharge all workmen not required for essential services.

The pumpmen on the Village Deep were called out in consequence of a dispute regarding the employment of two change house attendants.

Endeavours to Extend the Dispute.

On Wednesday, too, the following resolution was unanimously adopted by the Executive Committee of the South African Industrial Federation at its morning sitting:—

"The Executive of the S.A.I.F. requests all organisations of labour throughout South Africa to take the necessary constitutional steps to enable them, if called upon, on Monday, January 16, at 7 a.m., to strike; but "under no circumstances shall anybody take action until advised by the Executive Committee of the S.A.I.F."

The Federation and the Premier.

The one move on the part of the Federation Executive during Tuesday was to write to General Smuts suggesting a conference. The Federation wrote:—

January 10, 1922

The Right Hon. J. C. Smuts,
Prime Minister, Pretoria.

Dear Sir,—Enclosed please find copy of the basis on which my Executive are prepared to discuss with employers



Idle Days on the South African Mines.

Essential services were at the beginning of the week maintained, the Rosherville station of the V.F.P. being allowed to run on reduced load to give power for pumping and lighting. On Wednesday there was an indication that the essential services on the mines might not be allowed to continue.

The Federation on Tuesday wrote to General Smuts and asked him to call a joint meeting of the employers concerned and the S.A.I.F.

the terms of settlement. I am further directed to request that you call a joint meeting of employers concerned and the S.A.I.F. for the purpose of going into the questions involved in this dispute.—Yours faithfully,

J. GEDDES,

Acting General Secretary

The enclosure stating the terms was as follows:—

SOUTH AFRICAN INDUSTRIAL FEDERATION.

The basis on which the Unions are prepared to discuss terms of settlement:—

1. Coal Mines.—Withdrawal of the ultimatum and an adjustment of wages on the basis of no greater reduction than half the amount proposed by the employers, and no further reductions until the margin between the assumed and actual increase in cost of living has disappeared, or alternative arbitration.

2. Gold Mines.—The withdrawal of the notices issued by the Chamber of Mines regarding underground contracts, status quo agreement, and re-arrangement of underground work. The question of contracts and re-arrangement of underground work to be decided by agreement between the Chamber and the Unions concerned.

The policy of eliminating white workers and replacing them by cheap coloured labour be departed from and a definite ratio of coloured to white in the industry be fixed.

3. V.F.P.—The withdrawal of the letter intimating that the company was not prepared to meet representatives of the Unions for the purpose of discussing the question of basic rates, and an adjustment to be made in the basic rates as fixed by agreement between the V.F.P. Co. and the S.A.I.F., plus the 21 per cent., an increase equivalent to the increase in cost of living.

4. Engineering Shops.—The withdrawal of the notice issued by the employers re reduction in wages, and any adjustment of wages to be a matter for discussion and mutual agreement between the employers and the Unions concerned. Further, a guarantee to be given by the employers that the terms of the agreement will be strictly observed.

5. In each case there are to be no further reductions in wages until the margin between the assumed increase in cost of living and the actual increase in cost of living has disappeared.

The Industry and the Natives.

That the native question is one of the serious aspects of the strike was brought home on Tuesday by the issue of a statement by the Chamber of Mines in reference to the repatriation of the boys. The Chamber says:—

"It is intimated for public information that it is the intention of the mines to retain on pay as many natives as possible until Monday, the 16th instant, after which, if the strike continues, it will be necessary immediately to commence repatriating the natives and to discharge all workmen who are not required for essential services."

Further, the Director of Native Labour and all Native Commissioners have been informed by the Government that native labourers who wish to offer themselves for employment on the mines should not be sent forward at the present time, either from Portuguese East Africa or the Transkei or within the Union. The Director (Colonel Pritchard) has instructed all centres not to furnish travelling passes, and has requested the Portuguese officials to co-operate in this direction.

The Premier's Message.

The Prime Minister has issued a message to the natives in the strike areas in the following terms:—

"Greeting.

"You are aware that there is a strike on the coal mines, gold mines, and in certain other industries, and that work has consequently ceased at present. A great many of you cannot, therefore, be employed on your ordinary work. Other work may be found for some and others may have to remain idle for some time.

"I am sending this message to you to assure you that you need in no way be alarmed or disturbed about these conditions. The matter in dispute between the white workers and their employers will be settled without any necessity for anxiety on your part. Remain quietly in your compounds and obey the orders of the Government given you through the Director of Native Labour and compound

managers. By so doing you will receive the necessary protection. On the other hand, any disobedience or disorder will be promptly and severely dealt with.

"I feel sure that this message will find you ready listeners and that your conduct will remain law-abiding and obedient until work is resumed on the mines.—(Sgd.) J. C. SMUTS, Prime Minister and Minister of Native Affairs."

Mr. Crawford.

One somewhat encouraging feature of the position is that Mr. Crawford has been re-elected Secretary of the Federation. The following is the result of the ballot for the secretaryship of the South African Industrial Federation:—

FIRST COUNT.	
Crawford	1,141
Price	643
Kendall	638
Spoilt papers	45
	2,467
SECOND COUNT	
Crawford	1,327
Price	1,072
Exhausted and spoilt papers	68
	2,467
Majority for Crawford	255

Mr. Crawford has just arrived in Johannesburg after a prolonged stay in Europe, due to his attendance at Geneva at the League of Nations Conference, where he represented some sixty thousand workers. A man of moderate views, his influence has in the past been appreciably felt in conflicts between employer and employee, and his timely return may assist to ease the present tense situation.

Oil Shale Resources.

A valuable monograph on oil shales has recently been issued by the Imperial Institute. The survey treats of the oil-shale resources of the world. Estimates are given of crude-oil extraction per ton, which are substantially the result of the laboratory analysis of samples. Needless to say, the figures do not admit of arbitrary inference—the extent, thickness, uniform quality and accessibility of the deposits are factors that have also to be considered. Some of the areas in Canada, Australia, and elsewhere are now in process of development. A summary statement of the yield of oil and ammonium sulphate per ton of shale in some of the chief British deposits is annexed:—

	Oil. Gals. per ton.	Ammonium Sulphate. Lb. per ton.
Scottish Oil Shale Deposits	19.0—20.0*	—
Kimmeridge (Dorset)	22.3—40.6	20.4—32.4
Corton (Dorset)	13.4—29.9	11.8—28.5
Norfolk	45.0—55.0	60.0
Donington Station (Lincoln)	1.3—16.4†	—
Ballycastle (Ireland)	23.0—31.0	—
South Africa—		
Wakkerstroom	14.0—30.0	—
Kiekvorschfontein	60	—
Ernelo	30.0—32.5	64 (max.)
Utrecht (Natal)—		
Winderplaats	24.5‡	—
Spruitfontein	20.0‡	—
Unkomaas (Natal)	27.1	—
Matatiele (Griqualand)	25.0	—

* Estimated average yield of whole shales.

† Per ton of dry shale.

‡ Estimated average yield over an area.

Mr. A. S. Rome, manager of the Rezende Mines, is taking over the management of the Cam and Mctor from Mr. E. H. Buluan.

New State Areas.

DESIGN OF THE NEW PLANT—SUBSTANTIAL SAVING IN CAPITAL EXPENDITURE.

We understand that good progress is being made in connection with the preparation of plans and diagrams for the construction of the 50,000 tons per month plant of the New State Areas mine. It will be recalled that this company contributed to the cost of experiments at Springs Mines which were initiated with the hope that the stamp battery could be eliminated and a cheaper form of reduction plant adopted. The experiments were so successful that it was decided to adopt the all-sliming method of ore treatment, and it is hoped that in this way a considerable saving in capital expenditure will be effected. The plant is being designed for a capacity of 50,000 tons per month, with the possibility of extension for a larger tonnage. It is hoped that the plant will be running early in 1923.

In reply to queries from correspondents in regard to this company, the following data may be of interest: Capital (issued), £1,051,000 in £1 shares; (2s. paid) 494,000 £1 shares. Cash at December 31, 1920, £346,800. Property: 2,049 claims, adjoining Brakpan, Government Areas, Geduld, Springs, and West Springs. Two shafts have been sunk to the reef. The north shaft struck on December 22, 1920, at 3,578 feet, 1 dwt. over 6 inches in faulted and disturbed ground; while the south shaft struck on October 19, 1920, at 3,676 feet, 89.9 dwt. over 18.9 inches, or 1,697 inch dwt.

From the position of the mine it is reasonable to anticipate that enriched areas will be encountered, as the technical opinion is that the rich shoots from Brakpan,

Government Areas and Geduld enter this property at various points. Taking this opinion into consideration, it is advisable when making a calculation of the future possibilities of the mine to allow a generous basis of, say, two-thirds of the profits to the Government and one-third to

750

shareholders. The formula used is $Y = 80 \frac{X}{750}$, X being

the ratio of profit to recovery and Y the Government's share. Unlike the Government Gold Mining Areas lease, this company's profits are subject to mining taxation; therefore the approximate one-third to shareholders will be modified accordingly. Present price of shares about 19s. 6d.—20s.

It is estimated that the direct and indirect loss daily sustained by workers and the community during the first week of the strike will be as follows:—

Employees: Loss of wages, £35,000 per day.

Employers' direct loss: Standing charges and native expenses for first week, £35,000 per day.

Community's direct loss: Amount expended by mines in wages, stores, etc., £90,000 per day.

If the strike continues after the first week the amount under the heading "employers' direct loss" will be reduced by reason of the repatriation of the natives.

Precarious Plight of the Low Grade Mines.

TWENTY-ONE MINES IN JEOPARDY.

The following mines would all cease operations if gold fell to normal and costs remained as at present:—

MINE.	December, 1921, Actual Working Costs.	December, 1921, Output at normal price of gold (85% per fine oz.	Loss.	In December, 1914, these Mines made the modernized Profits.
Aurora West ...	£13,273	£12,391	£882	£4,534
Durban Roodepoort...	43,185	36,951	6,234	5,213
E.R.P.M. ...	151,143	137,503	13,640	56,267
Geldenhuis Deep ...	66,375	56,631	9,744	9,591
Knight Central ...	31,390	29,237	2,153	3,272
Luipaardsvlei ...	23,265	17,832	5,433	1,327
New Goch ...	18,839	16,600	2,239	10,583
New Kleinfontein ...	62,764	56,890	5,874	23,738
New Primrose ...	21,265	21,757	508	8,250
New Unified ...	11,055	10,810	245	5,035
Nourse Mines ...	68,757	63,117	5,640	11,960
Randfontein Central	162,665	143,522	19,143	66,000
Robinson ...	40,866	37,261	3,605	41,505
Roodepoort U.M.R...	16,914	15,585	1,329	2,489
Rose Deep ...	58,081	55,683	2,398	21,261
Simmer and Jack ...	67,380	60,331	7,049	34,194
Village Deep ...	73,796	65,513	8,283	26,777
West Rand Cons. ...	43,319	39,886	3,433	6,076
Witwatersrand ...	48,745	47,315	1,430	23,792
Witwatersrand Deep	44,843	44,147	696	20,062
Wolhuter ...	35,988	32,950	2,988	12,263

The S.A.R. and H. Administration is now engaged upon the construction of a new line in South-West Africa, viz., from Windhuk to Gobabis. In connection with this undertaking Tenders are invited for: (a) The Earthworks required for a section of 2½ miles in length—comprising about 65,000 cubic yards of Excavation, together with Pipe Laying and Concrete in Pipe Faces and Culverts on this section—the work to be divided into Three Contracts; (b) for Pipe Laying and Concrete (some 400 cubic yards) in Pipe Faces and Culverts required for other section of 2½ miles.

On and after 28th December, 1921, the conditions of contract, specifications and drawings can be inspected, and upon payment of a deposit of £3 3s. a copy of tender forms can be obtained at the office of the Chief Civil Engineer, Johannesburg; the Assistant General Manager, Capetown; and at the Construction Office of the Acting Director of Railways, Windhuk.

No tender will be considered unless the Tenderer has inspected the sites of the works.

On receipt of a bona-fide tender the Contractors will be entitled to a refund of the deposit, also a refund of one-half of the fare paid for the return journey over the railways owned by the South African Railways Administration in connection with the inspection which intending contractors are required to undertake.

If the Chamber's proposals are not accepted and a really big effort is not made to save the low-grade mines, what will be the result? As things have been going for some time past, the day is not far distant when nearly half the mines of the Rand will have to be closed down because they do not pay, and 10,000 men will be thrown out of work.

The Farmers and the Strike.

HOW THE WAGES DISPUTE ON THE MINES AFFECTS THE AGRICULTURIST.

THE MINERS TRYING TO RAISE THEIR STANDARD OF LIVING AT THE EXPENSE OF THE FARMERS.

"The plea of the Labour leaders against a reduction of wages would be sound if wages were being reduced below the level of prices ruling for the product of labour, or below the general compensation of the great body of workers outside of their own organisations. The trouble at the present time is that what the labour leaders are protesting against has already happened to more than one-half the workers of the world. These leaders are trying to maintain the pay of a minority, at the expense of the majority. The farmers and producers of practically all primary products and raw materials have taken reductions of approximately one-half the value of their products. The prices of their products are back to the pre-war level. They have lost a great proportion of the purchasing power they have been using in recent years, and the market for the services of all the workers who have been supplying them has been curtailed accordingly. This is the fundamental cause of the unemployment which has spread over practically the whole world in the last year, since cotton, corn, oats; livestock, rice, wool, hides, dairy products, flax seed, the principal metals and other primary products began to fall. It is true that as factory-workers and others were thus forced out of employment the evil effects have been increased, but the original impulse and the main influence comes from this great body of people who extract wealth directly from nature and who are largely dependent upon world markets. Moreover, there is no prospect of a recovery of farm products to the levels of war time. Doubtless they are now unduly depressed and will swing back to a normal level with improvements in general conditions, but any expectation that they will recover to the war level, or to the present general level of wages and manufactured goods, is wholly unwarranted. *The sooner war-time prices and wages are forgotten the better. They are not normal in times of peace.*

The Equilibrium in Industry.

"Moreover, the essential thing is not the general level of all wages and prices, but right relations between wages and prices, and between the different groups of producers, so that they can trade with each other. The farmers have nothing but the products of their labour and of the soil with which to buy the products of the other industries. They will give their products as far as they will go, but there their buying ends. Whatever affects any great group of consumers and throws industry out of balance, so that the normal exchanges are disturbed, and normal consumption is curtailed, is bound to affect trade, industry, transportation, banking and every kind of business unfavourably. Nobody gains by it; everybody loses by it. The Labour leaders overlook another fact, which is that the aggregate of wage-payments has been reduced already, and the loss in consuming power on the side of the wage-earners which they wish to avoid has already taken place. The problem now is to equalise it, and find compensation for it in lower prices for what the wage-earners consume. The wage-earners as a class are interested in the restoration of the normal state of balance, in which all of them can be steadily employed. It is not to their advantage to have wage rates so high that large numbers cannot have employment, or can have it only part of the time. It is unfair and oppressive to the consumers who are obliged to curtail their purchases, and without benefits to the wage-earners as a whole. It is not even beneficial to those who are so fortunate as to have employment, for it keeps the cost of living to them above the natural level. It is an artificial situation which cannot be permanently maintained.

The Public the Real Employer.

"There are several misconceptions of the wage question which appear persistently in everyday discussion. One is the common assumption that wages are an issue between employers and employees, with nobody else involved.

Of course, the public is the real paymaster, and in the last analysis the public is composed chiefly of the wage-earners themselves. Whatever they do to the public they do to themselves. The employer is simply an intermediary who plays a useful part by organising industry and undertaking to pay a fixed wage, but unless he gets full reimbursement from the public he is soon out of business. Another common mistake is that which lays all emphasis upon money wages. The value of money is in what it will buy. The standard of living is not fixed in the wage scale; it consists of a certain standard of comfort, certain supplies of consumable goods. The real compensation of the worker for his own labour comes in the products and services of others. While prices were advancing the Labour leaders were quick to claim that money was nothing but a medium of exchange and did not represent their real compensation. They insisted upon wage increases to compensate for loss of purchasing power, and got them. Now the situation is reversed. The farmer is in the same situation that they were then. His purchasing power has fallen off, and his standard of living has been lowered. The labour leaders are not fighting to defend their own standard of living, but to raise it permanently at the expense of the farmer. That may not be their deliberate intention, but it is the effect of what they are trying to do. Moreover, the full effect is not beneficial even to the wage-earners, for it disrupts the exchanges and paralyses industry."

The foregoing is taken from an American exchange, but it fairly accurately defines the state of affairs prevailing in South Africa as well as in other parts of the world.

Agriculturists would do well to ponder on the irrefutable argument which is contained in the foregoing. Farmers may think that this industrial convulsion on the Rand bears no relation to them, and that they can survey the situation from afar with equanimity. They, in common with all other members of the community, are bound to feel the evil effects of a curtailment of the Rand's spending capacity, and if the unsound conditions which have existed on the mines for months past are perpetuated, the farmer will suffer thereby, for the Labour leaders are fighting to raise the standard of the miner's living at the expense of the farmer.

Agriculturists all over the Union have therefore a large and distinct interest in having this calamitous strike settled in a manner which will be advantageous to the mining industry.

The Chamber of Mines proposes to retrench rather less than 1,400 of the semi-skilled redundant and border-line occupation workers in the near future and, over a lengthy period, to dispense with, perhaps, 2,000 men. By this means the mining industry of the Rand will be very largely helped. It may indeed be that, in consequence of this and other needed adjustments in regard to underground work, the Rand will once again enter upon a period of prosperity which will so benefit South Africa that a large number of those men whom it is now intended to gradually lay off will in the near future be absorbed into other channels of trade and commerce.

The Chamber's proposals in no way affect the status of the skilled craftsman. His position can be very adequately safeguarded by the application of a system of ratios to the number of European and coloured employees of the mines.

The Chamber of Mines has no intention of assailing the positions occupied by men who by apprenticeship, experience or diligence, have acquired proficiency in their work. What it objects to and intends to oppose is the fastening upon the industry of redundant persons who, having failed in other occupations, now seek to shelter behind the "status quo" agreement and certain of the mining regulations, to the detriment of the mines and the country generally.

The Case of the E.R.P.M.

COMMITTEE'S REPORT.

The second interim report of the committee of inquiry concerned with the East Rand Proprietary Mines (issued by the Department of Mines and Industries) is as follows:—

The results up to date of this voluntary inquiry confirm the information gathered at previous inquiries and from our official reports extending over a considerable period. It should be impressed upon the persons or associations who asked for this inquiry that the whole matter of retrenchment has been inquired into and reviewed by neutral parties more than once during the current year. The mine owners, through their agents, have submitted details of retrenchment and these details on the whole have not been challenged. It has been shown that:—

(1) The original proposed reduction in the number of white workers was modified owing to an agreement between the management and men for longer hours underground and the relaxation of certain union rules.

(2) Retrenchment, however modified, still continues due largely to the fall in the price of gold.

(3) Late in October 2.2 per cent. of the total whites in the service were marked for retrenchment. This 2.2 per cent. included both officials and men as under: Clerical 7, mechanical 13, mining 10, reduction 3.

Below the Pay Limit.

(4) Further retrenchments of white workmen will follow any fall in the price of gold, and the exhaustion of the Hercules and Comet is considered the pay-limit of the East

Rand Proprietary Mines and the ore reserves of the Hercules and Comet sections are on the point of exhaustion and will shortly be relegated to the position of purely reclamation areas.

(5) The workmen have full access to the management re retrenchment discussions, sub-committees of the shop stewards committee meeting their manager in the company's time. The official mine staff or their representatives have also full access to the management to discuss any retrenchment proposals.

Overhead Charges.

I am of opinion that the white employees of the East Rand Proprietary Mines recognise the need for retrenchment and do not cavil at the general principles now being carried out, recognising their necessity. The men and their unions, however, consider that too little is being done to make the more highly paid consulting engineers and general managers share in the general depression and that a cut in the number of white employees should start from the top grades and not only affect workmen and junior officials. The representative of the South African Industrial Federation on this inquiry clearly intimated that the Federation accused the East Rand Proprietary Mines of excessive overhead charges and extravagant management, while admitting that an investigation into its charge would be far beyond the scope of the present inquiry. The Low Grade Mines Commission inquired into what practically amounts to the same charge and was of opinion (see pages 8 and 9 of the report) that these overhead charges could not possibly affect the position of the low grade mines.

(Signed)

U. P. SWINBURNE.

Chairman.



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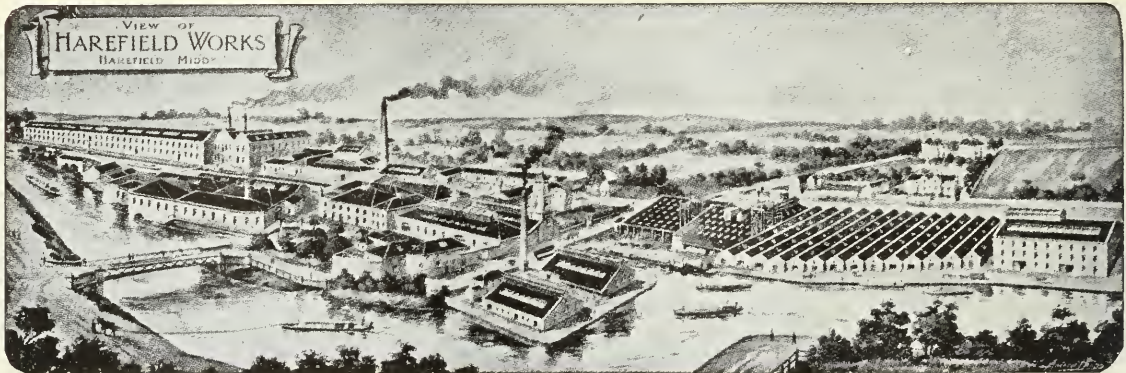
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New Transvaal Coal Fields.

EXTENDING OUR KNOWLEDGE OF RESOURCES—EXTENSIVE DRILLINGS IN THE AREA S.-E. OF WITBANK—A THOUSAND MILLION TONS OF GOOD COAL ADDED TO OUR RESERVES—VALUABLE LECTURE BY DR. MELLOR.

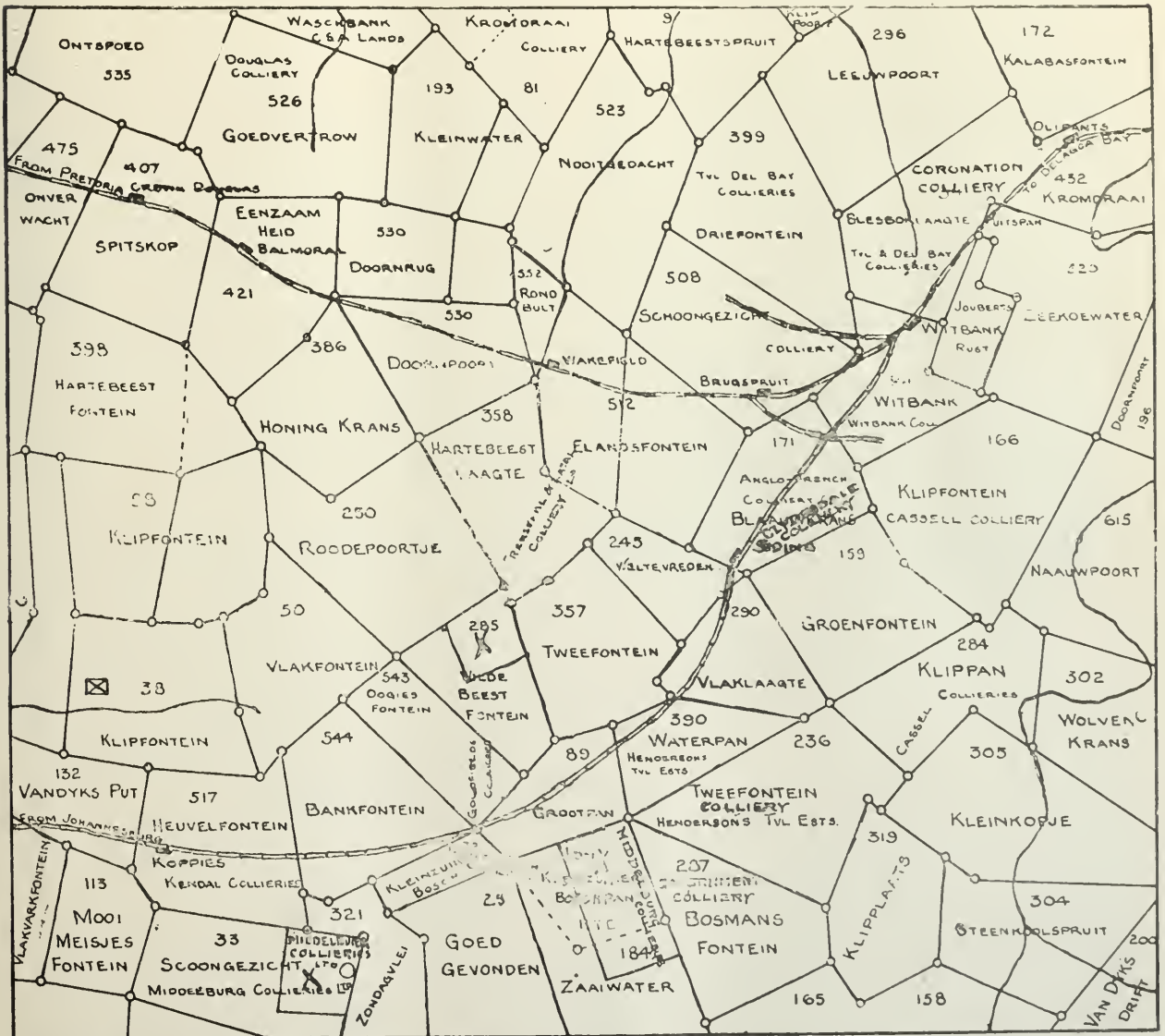
On Monday night Dr. E. T. Mellor read a paper on the Coal Fields of South Africa, in which he referred at length to the data recently secured in the district to the south-east of Witbank. He concluded his valuable and instructive lecture by making a timely reference to the prospects of expanding the Transvaal's coal trade by building up a larger export business through a new port in British territory and with a new railway or railway lines to feed such a port.

Dr. Mellor's lecture was delivered before a large and interested audience, and it is probable that had the atmosphere not been so electrified by the tension of the strike, it would have elicited discussion. We feel certain, however,

that when the paper is reproduced in its final form and circulated amongst the members of the S.A. Geological Society, before whom it was read, that the many interesting and extremely valuable points contained in the lecture will receive a very full measure of debate and appreciation.

Natal and Transvaal Conditions.

In the course of his lecture Dr. Mellor gave a brief outline of the geology of the South African coal fields and repudiated the idea that our coal measures owe their origin to drift agencies. He contrasted the coal fields of Natal with those of the Transvaal, and laid particular stress on the fact



Coal Mines of the Witbank District, Steenkoolspruit, and Van Dyk's Drift, referred to by Dr. Mellor, are in the lower right hand corner of the map.

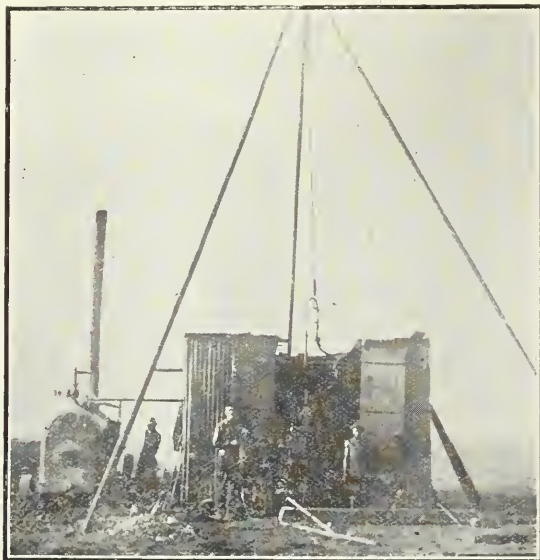
that the coal beds of the middle and Eastern Transvaal are not nearly so fractured by dykes and igneous intrusions as are those of the Garden Colony.

The New Fields.

The most important part of his lecture dealt with the exploratory work which recently has been carried out in the district lying to the south-east of Witbank by several of the large mining corporations of South Africa. Dr. Mellor stated that the results of this work had greatly added to our knowledge of the coal measures of the Transvaal, and that in the light of the data obtained by extensive borings in this region the extent of our coal reserves must be reckoned at considerably more than they hitherto have been assessed at. This view, it may be recalled, was expressed in the second Special Coal Number of the *S.A. Mining and Engineering Journal*, issued a few months ago.

Many Acquisitions.

It has been known for some time past that the Corner House people have been actively engaged in examining coal



Proving Coal Seams in the Witbank District by means of drilling.

occurrences in various parts of the Transvaal and Natal, and particularly in the region of Witbank. Dr. Mellor and able engineers have investigated the possibilities of numerous properties in this district, and many scores of analyses and steaming and by-product value determinations have been made on the coal of these localities.

At the Rand mines meeting held at the end of May last Sir Harry Ross Skinner, who presided, made some interesting reference to recent activities of the Corner House in regard to coal. He said investigations in conjunction with the Central Mining and Investment Corporation, Ltd., for the acquisition of coal mining interests have progressed satisfactorily. "Up to the present over 270 separate farms in the Transvaal and Natal have been inspected. As a result an area of approximately 8,500 acres in the Witbank district has been acquired on the farm Wolvekrantz, and extensive drilling has disclosed the existence on this area of wide seams of coal easily worked and of excellent quality. Two other areas in the Witbank-Middelburg district, totalling approximately 13,000 acres, have also been acquired under satisfactory lease arrangements, and when conditions become more stable, consideration will be given to opening up one or more of these three areas as coal producers."

Adding to Our Reserves.

Dr. Mellor referred to the farm Van Dyk's Drift of the T.C.L. Company, and Steenkoolspruit of the Iron and Steel Corporation. He said that extensive and systematic borings by means of shot drills in the coal field to the south-east of Witbank had resulted in not less than one thousand million tons of good grade coal being added to our known fuel resources. Dr. Mellor said that 300 shot drills had been sunk in this district and that data of most valuable nature had been secured thereby.

New Railways and Harbours.

He made a reference to the possibility of new railways to serve these extended fields (particularly a railway from Minnaar towards Carolina) being constructed in the near future. Dr. Mellor dwelt, too, on the value to the Transvaal's future coal trade of Kosi Bay. The lecture was illustrated by many excellent lantern slides depicting drilling operations, stratigraphical sections, etc.

[Since writing the foregoing we have received an abstract of Dr. Mellor's paper, and we propose to deal with this at some length in our next issue.]

Labour in Australia.

That the extortionate demands being made by labour unions is the worst advertisement for Australia, and is preventing the best class of people from immigrating to the Commonwealth, is the opinion of Mr. J. M. Niall, who returned to Melbourne after a tour of Great Britain and Europe. Mr. Niall said that trade was bad in Great Britain, there being a scarcity of orders, and a good deal of unemployment, more particularly in coal centres, such as Durham. Shipbuilding in Great Britain was practically suspended, the only work in hand at the time of his visit being Government contracts, which, he understood, had since been cancelled. Ships could now be bought in Great Britain at much less than the cost of construction. "A great deal of interest was displayed in Great Britain," added Mr. Niall, "at the visit of Lord Northcliffe to Australia, and the articles which Lord Northcliffe had contributed to 'The Times' on the need for immigration in Australia were widely read. Everyone knows that Australia is in need of population, but the trouble is to get the right kind of population. We do not require people who want to live in the cities, but people who will settle in the country and help to produce. The wrong kind of immigrant is easy to get in Great Britain, but it is hard to obtain the right kind, as the people realise that labour conditions in Australia are very unsettled. For instance, the announcement that the Coal Miners' Federation was seeking a 27½-hour week at the face was regarded by the people in Great Britain as disastrous, and beyond the bounds of reason. The better class of workmen in Great Britain realise that the world has got to get back to hard work, and there will be great difficulty in getting the class of immigrant Australia needs, in view of the turmoil and industrial strife that have been rampant in Australia in the last few years."

GOVERNMENT EXAMINATIONS.

MINE MANAGERS' EXAMINATION

Total certificates (metal) granted to date 1921 — 36
Secured by students of Messrs. Lucas & Wolfe — 21
Balance for S.A. — 15

In addition to above we obtained 5 coal certificates last two examinations

OVERSEERS' EXAMINATION

During 1918 and 1919 we secured the majority of the certificates granted. 21 certificates in 1920, and 23 certificates to date 1921 (metal and coal)

SURVEY EXAMINATION

We have obtained practically all the certificates granted by the Mines Dept. during recent years and have secured 62 certificates to date

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A Memorial to the Tunnellers.

FIELD MARSHALL HAIG'S ELOQUENT TRIBUTE—SOME LINES THAT WILL LIVE.

So many South African mining men played big parts in the tunnellers during the Great War that the following complete account of a memorable ceremony in London will doubtless be read with deep interest.

On November 24, Field-Marshal Earl Haig unveiled the memorials erected in the honour of the members, associates, and students of the Institution of Mining and Metallurgy, and of the members of the Institution of Mining Engineers who fell in the Great War.

After brief introductory remarks by Mr. F. W. Harbord, president of the Institution of Mining and Metallurgy, and by Colonel W. C. Blackett, president of the Institution of Mining Engineers, Earl Haig said:—

“Two good reasons urged me to accept your invitation to come here to-day to unveil these two memorials to your gallant dead.

“The first, and more general one, is that on all such occasions I am able to pay personal tribute to a section of those many thousands of brave men who fought under my command in France, and under my command paid the last and greatest sacrifice that love of King and Country can demand of true and loyal citizens.

“The least that I can do, I, who acting myself in the execution of my duty, asked and obtained so much from them in the execution of theirs, is to join with those who knew and loved them in honouring their names.

“My second and more particular reason for wishing to come here is that you afford me the opportunity to say a few words of especial thanks to a body of men whose work in France seldom drew upon itself much notice or glory at the time; but was surpassed by none in the demands it made upon the skill, courage, and resolution of the individual concerned or in the service it rendered to the Army as a whole.

“One thinks naturally of the battle of Messines, and of the mighty series of explosions that tore great gaps in the German line on June 7, 1917, and gave the signal for one of our most successful attacks. That was the work of the special services to which you sent so many gallant men; and it was indeed a signal triumph of British mining in war. Yet few, I think, outside those who took part in the work or saw and benefited by its results, realise the immense amount of steady and persistent toil, in every circumstance of peril, surrounded by danger in a form that might well appal the stoutest-hearted, that went to the preparation of that triumph. Few, I know, realise how vast and how important to the safety, comfort, and success of our troops, was the other work of our miners; work that was little commented upon in the Press, but yet went on steadily and continuously day after day and year after year all along the British front.

“There was no trace at any time to the warfare that went on underground; no respite from the toil that the needs of the Army imposed upon those who were the masters of the art of digging underground. Only, there were periods of redoubled activity, or more than common strain. Every offensive undertaken by us, right up to the days of the last great series of advances, meant a fresh call upon the energy, industry, and courage of these special services upon whom the due preparation of those offensives so largely depended. Tunnelled approaches had to be constructed for great distances, dug-outs built for headquarters, dressing-stations, and shelter generally. Every big offensive made

demands of this kind. An immense amount of work was done for the Somme. The preparations for the battle of Arras attracted little attention compared with those for the Messines battle, but were no less valuable. Then, later, when the day of the elaborately mounted attack was over, the tunnelling companies found a new work, hardly less arduous or dangerous, in the discovery and removal of many thousands of German mines.

“I am talking to those who themselves know something of these things; but it is right that others should know, too, and here where you are met to pay a last honour to comrades, members of your Institutions who actually accomplished these things and died nobly in the doing of them. I



The Memorial erected by the Institution of Mining and Metallurgy.

am glad to thank anew—not for myself only, but on behalf of the whole Army—a most gallant body of men.

“This is an occasion for deep sympathy with those who have lost so much and see in these memorials the commemoration of their private sorrow. It is an occasion, too, for admiration and gratitude towards men who gave so much, all that men could give, for the liberty and honour of their fellow-countrymen. It is more even than that. It is an occasion for us who remain to take courage from the example of those who have so bravely gone before us. The cause for which these honoured dead gave the last full measure of their devotion is still ours to uphold. The task to which they gave their lives is laid upon us and our children to complete.

"Therefore as days go by we should look upon these memorials with quiet sorrow, but with lasting pride. They should be to us lessons not only of what men have done, but of what true men can do. Then shall we and generations to come after us draw hope and inspiration from the memory of what these men accomplished in the strength of their faith and patriotism. So that in the days of difficulty, now and hereafter, the great commonwealth of nations to which we all belong, which we all love, shall never lack for men who will—as did these whose names are here written—count their own lives as nothing in their country's service."

The memorials are installed in the library of the new house of the two institutions in City Road. That of the Institution of Mining Engineers consists of a mural plaque of marble, on which is a draped female figure in bronze. Underneath is a bronze plate bearing the dedicatory inscription, and on the marble are carved the names of the fallen. The rising sun about the base of the figure is done in gold mosaic. The sculptor was Mr. Alan G. Wyon. The memorial erected by the Institution of Mining and Metallurgy was designed and executed by Colonel Peter N. Nissen, a member of the Council of the Institution. The main figure in Colonel Nissen's design is a second lieutenant in the act of exploding a mine. The best description of the memorial is contained in the following verses written by a visitor who was present at the unveiling ceremony:—

THE MEMORIAL

erected by the

INSTITUTION OF MINING AND METALLURGY

To their Glorious Dead.

Would they, the brave ones early dead and gone,
Desire that we should carve their names in stone,
Erect memorials in their honour, and
Inscribe their deeds upon the roll of fame?
With humble self-effacement they might say
That they did not regret the sacrifice,
They only fought for duty, not for praise,
That those who fought and lived deserve
An equal recognition; or they might
Prefer the glory to be given to Him
Who sent them strength and heart to lay the foe
And so preserve the freedom of the world.
Thus is the monument designed to show
The work the miners did throughout the War,
That both their friends and those who follow on
Shall look on it with thankfulness and pride.
To render glory unto God we need
No sculptured figure with symbolic aim;
Sufficient is the record of good deeds,
Portrayed by deft and reverential hands.
But best of all to please both dead and quick
Is that the monument should be designed
By one who was himself upon the field
And could present the actual scenes of war.
High on a pedestal of malachite
Stands a young officer of engineers,
With strained attention ready to explode
The charge and force the climax of attack;
The boots, the mud, the sandbags, and the tins
Show the environment in which he worked.
The sculptor has recorded other scenes,
Familiar to the miner in the War,
In bas-relief in panels 'neath the plinth;
Field and machine guns, scouting aeroplanes,
A Flanders road with all its trees destroyed,
A bridge to span a Belgian waterway,
A tunneller listening with the geophone,
A warship, and a poison chemist's den;
The habitations on the firing line
In which the men took cover or sought rest;
The unseen hut, the dug-out and the house
Battered by shell and falling to the ground.
On silver plates are cut the names of those
Who died, with glowing words of true regret.

The bronze, the malachite, the silver, all
Suggest the missions of the fallen men
Before the battle called them to the front.
Complete it stands upon a base of oak,
Oak, British oak, that still denotes the strength
And steadfastness of Britain's sons.
Farewell! Yet not farewell, ye noble dead,
Your name shall surely live for evermore!

THE WORLD'S COAL INDUSTRY.

In the course of a report on the world's coal industry the German Coal Association states:—With regard to the future developments of the world's coal markets, a matter of great importance is not the actual output at the moment, but the capacity of output of the chief coal-producing countries. For England the output attained in December, viz., 23.6 million tons, is of significance. It represents an output for one year of 283.2 million tons, a quantity which exceeds the 1920 output by 50 million tons, and is only smaller by 8.8 million tons than that of 1913. The U.S.A., taking the average of the months September to December, had an output of 53.2 million tons; this corresponds to an annual output of 638.4 million tons, which exceeds the actual 1920 output by 53.1 million tons. Germany, since from the middle of March last the extra shifts in the Ruhr district were discontinued, has to reckon on a diminished output. Taken as a whole the world's output capacity for the current year may be estimated at about 100 million tons greater than the actual 1920 output, a quantity which exceeds the highest output yet attained, viz., in 1913, by about 40 million tons of pit coal. The effect of this increased supply was interrupted by the English coal strike, which broke out in April and lasted until the beginning of July last; that this effect has been most marked is seen by the fact that in spite of the great loss of output owing to the strike, American prices for export coal only slightly increased.

The chief rivals in the world's coal market at the present time are England and the United States, whose coal export has been as follows, in million tons:—

	Great Britain.	U.S.A.
Average 1910-1914	68,030 ...	15,758
1915	46,321 ...	18,782
1916	42,013 ...	21,631
1917	38,501 ...	25,349
1918	34,634 ...	23,053
1919	39,302 ...	23,051
1920	29,752 ...	40,036












England's export accordingly is less than half that of pre-war years. The export of the United States has more than doubled, and in 1920 exceeded that of England by more than 10 million tons. American coal has penetrated in large quantities into England's most profitable markets. Before the war America sold 434,000 tons of coal in Europe, but in 1920 12.9 million tons, or thirty times as much. The South American market, which before the war was dominated almost exclusively by England, is now almost entirely supplied by the United States.

Arising out of a demand by the Unions in September, 1918, for the dismissal of coloured drill sharpeners, the Chamber, while refusing the demand, offered to recommend to its members that the "status quo" as existing on each mine with regard to the relative scope of employment of European and coloured employees should be maintained: that is to say, that no billets which are held by European workmen should be given to coloured workmen, and vice versa. This offer was accepted by the Unions. The men affected by this agreement are engaged on semi-skilled work and are on what are known as border-line occupations.

In seeking to repudiate this status quo agreement, the Chamber does not wish to break down what is known as the Colour Bar. The Chamber of Mines could not dispense with many of its European employees even if it wished to.

What Mining Means to the Country.

OUTPUT OF THE MINES AND WHAT IT COSTS IN WAGES, STORES AND TAXATION.

<u>1915.</u>	<u>1920.</u>
<p>GOLD. £38,639,095.</p>	<p>GOLD. £34,654,922.</p>
<p><u>DIAMONDS.</u></p> <p style="text-align: center;">◆</p> <p>£ 399,810.</p>	<p><u>DIAMONDS.</u></p> <p style="text-align: center;"></p> <p>£ 14,762,899.</p>
<p style="text-align: center;"></p> <p>£ 2,142,479.</p>	<p style="text-align: center;"></p> <p>£ 4,534,670.</p>
<p><u>OTHER MINERALS.</u></p> <p style="text-align: center;"></p> <p>£ 2,349,625.</p>	<p><u>OTHER MINERALS.</u></p> <p style="text-align: center;"></p> <p>£ 1,428,644.</p>
<p><u>SALARIES & WAGES.</u></p> <p style="text-align: center;"></p> <p>£ 15,413,27</p>	<p><u>SALARIES & WAGES.</u></p> <p style="text-align: center;"></p> <p>£ 22,933,975</p>
<p><u>STORES.</u></p> <p style="text-align: center;"></p> <p>£ 11,834,48.</p>	<p><u>STORES.</u></p> <p style="text-align: center;"></p> <p>£ 17,843,310.</p>
<p><u>DIRECT TAXATION.</u></p> <p style="text-align: center;"></p> <p>£ 1,853,553.</p>	<p><u>DIRECT TAXATION.</u></p> <p style="text-align: center;"></p> <p>£ 5,196,856.</p>

As the gold and coal mining industries were up to this week practically carrying the Union on their backs, the above graphic illustration of the actual figures involved may be of interest at this juncture.

Gold Output for 1921.

DECREASE OF £1,090,734 ON 1920.

TOTAL VALUE OF TRANSSVAAL OUTPUT TO DATE,
£709,467,217.

During 1921 the Transvaal mines produced 8,114,586 oz. of fine gold valued at £42,017,350, as against the total of 8,154,172 oz., value £43,108,084, declared for 1920. This is a decrease of 39,586 oz. in weight and of £1,090,734 in value. The total gold output of the Transvaal since the commencement of the fields in 1884 is 163,251,210 oz., value £709,467,217, which includes the receipts from the gold "premium."

The following are the total gold outputs of the Transvaal since the commencement of fields, in ounces. The figures are compiled from Government blue books and Chamber of Mines' returns.

Year.	Oz.	Year.	Oz.
1884	2,376	1904	3,773,517
1885	1,414	1905	4,909,541
1886	8,171	1906	5,792,823
1887	39,880	1907	6,450,740
1888	227,749	1908	7,056,266
1889	350,909	1909	7,295,108
1890	440,152	1910	7,527,108
1891	688,439	1911	8,249,461
1892	1,069,058	1912	9,107,512
1893	1,290,218	1913	8,798,336
1894	1,805,000	1914	8,394,322
1895	2,017,443	1915	9,093,902
1896	2,025,510	1916	9,296,618
1897	2,743,518	1917	9,018,084
1898	3,823,367	1918	8,418,292
1899	3,637,713	1919	8,331,294
1900	348,761	1920	8,154,172
1901	258,032	1921	8,114,586
1902	1,718,921		
1903	2,972,897	Total	163,251,210

Including the "premium," the following are the Transvaal totals for the past ten years:—

	Oz.	Value.
1912	9,107,512	£38,686,250
1913	8,798,336	37,372,949
1914	8,394,322	35,656,814
1915	9,093,902	38,628,437
1916	9,296,618	39,489,522
1917	9,018,084	38,306,381
1918	8,418,292	35,758,636
1919	8,331,294	35,383,974
1920	8,154,172	43,108,084
1921	8,114,586	42,017,350

Union Minière Record Output.

Formal meetings of the Tanganyika Concessions and Zaubesia Exploring Co. were held in mail week in London to ratify certain matters in connection with the extension of the concession. Mr. Tyndale White, who presided, mentioned the interesting fact that the Union Minière production should reach over 30,000 tons this year, which will be a record output.

The status quo agreement was entered into by the Chamber of Mines and the Unions during the abnormal period of the War. It was a provision suitable to a wholly unusual period, and its perpetuation to-day, more than three years after War ended, is helping to bring ruin to the poorer mines of the Rand, which in large degree keep Johannesburg, the Reef and the country at large from bankruptcy.

To Encourage Commercial Research.

During the last few years much has been done in Great Britain to encourage scientific and industrial research in one form or another. The latest and in some ways the most original scheme is in connection with the British Empire Exhibition to be held in London, England, during 1923. The British Chambers of Commerce are offering Commercial Research Fellowships of the value of not less than £500 and including a first-class return ticket to a Dominion or Crown Colony. Winners of these fellowships (in open competition) will proceed to a selected Imperial region overseas and report upon the best means by which its trade can be stimulated and its raw materials and other resources developed. The best method of representing these resources at the British Empire Exhibition will also be considered.



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Railway Revenue Falling.

BIG LOSS FOR SEVEN MONTHS—THE COAL TRADE—GENERAL MANAGER'S BULLETIN.

The latest bulletin of Sir William Hoy, general manager of the S.A. Railways, shows that during the first seven months of the present financial year the total losses on the railways amounted to £982,759, and on the harbours £63,312.

The railway losses ranged from £268,827 in May to £69,312 in October. The harbours returned a profit in April and August; otherwise losses varying from £32,596 to £5,575. The steamships were run at a profit except in September, when there was a balance on the wrong side of £13,791.

The total loss on railways, harbours and ships, after providing for contributions to betterment and pension funds, was £1,119,950.

Railway earnings showed a slight advance for the week ended December 10, totalling £425,953, which is the highest figure reached since the week ended October 1. They were, however, still £9,249 below the estimate and £78,777 lower than for the corresponding week of last year. Passenger traffic accounted for the improvement, the revenue from which has not been exceeded since the first week of July last.

Revenue and Expenditure.

From April 1 to October 31, railway earnings came to £12,584,046, a decrease compared with the corresponding period of the previous financial year of £764,465, or 5.8 per cent. During the same period the working expenditure of the railways was £10,303,500, a decrease of £263,245, or 2.5 per cent. Expenditure has been reduced, adds Sir William, but it has been impossible to bring it down sufficiently to compensate for the heavy falling off in revenue.

Reference is made to the fact that the railway rate for coal shipped by vessels sailing on and after December 1 was reduced by 6d. per 2,000 lb., this being in addition to the decrease of 1s. 3d. per 2,000 lb., which operated from November 1.

Wool continues to be forwarded in increasing quantities. The following shows the number of bales received at Durban during the months of October for the last six years, viz.: 1916, 7,086 bales; 1917, 16,263; 1918, 6,763; 1919, 7,293; 1920, 2,387; 1921, 12,530.

Bales received at East London during the three months ended October 31 since 1916 are as follows: 1916, 19,609 bales; 1917, 27,598; 1918, 13,794; 1919, 18,264; 1920, 9,000;

1921, 38,770. If not a record, the number of bales received at East London during the three months ended October 31, 1921, is the highest since 1916.

The estimated revenue from railway sleeper plantations for the next financial year is 58 per cent. of the expenditure. Revenue from these plantations is steadily increasing, and in a few years should more than balance expenditure. The



A Scene on the S.A.R.

trees which are left after the thinning and lopping process is completed will still be available for meeting part of the Administration's sleeper requirements.

During the three months August to September 884,620 tons of coal were bunkered, exported overseas and shipped to other Union ports of S.W.A., as against 856,132 for the corresponding months of 1920. The purely coastal trade was an insignificant item, the vast bulk being bunkered or exported overseas. In October the total was 247,808 tons against 306,148 in October, 1920.

If this strike is prolonged there will be a general collapse of the Rand mining industry. Unemployment, both here and throughout the country, will grow enormously, the State will be face to face with national insolvency, property will fall enormously in value, the farmer will be unable to sell his produce, and the merchant his goods. There will be widespread distress and suffering. Everyone will be poorer; no one will be richer.

Reviews.

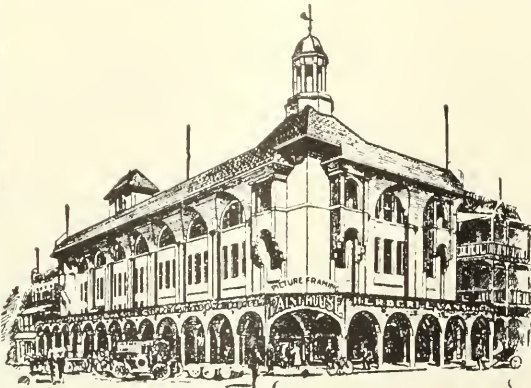
EMPIRE MINERALS MAP.

We have received from the Imperial Institute a map exhibiting the chief sources of metals in the British Empire, with diagrams of production for 1918. This valuable chart has been prepared under the direction of the Mineral Resources Committee of the Imperial Institute. The following metals and ores are dealt with and their sources within the Empire located upon the map: Gold, silver, platinum, copper, tin, lead, zinc, antimony, aluminium ore, bismuth ore, iron ore, manganese ore, chromium ore, nickel, tungsten ore, molybdenum, vanadium ore, mercury. The key is printed in grey, which gives greater prominence to the symbols and initials, which are in black, vermilion and green. The size is 35½ x 44 inches. Prices: Paper, 5s. 6d. (postage 4d. extra); mounted on cloth, rollers and varnished, 12s. 6d. net (carriage extra).

The map consists of three sections—a general map of the world on Gall's Projection, a series of inset maps of British countries, and a separate set of diagrams of metal

production. On both general and inset maps British possessions are shown in red, mandated territories in light red, and foreign countries in yellow. Deposits of metals are indicated by special letters, and their approximate localities by symbols of different colours; worked deposits being distinguished from unworked. The letters are sufficiently large to be visible several feet from the map. In the general map are tabular lists of the principal metallic deposits in each part of the Empire. The inset maps, all drawn to a uniform scale of 160 miles to the inch, include South Africa, British Columbia and Yukon, Eastern Canada, the British Isles, Southern India and Ceylon, Burma, British Malaya, Eastern Australia and New Zealand. The diagrams of production give the outputs of 18 principal metals in each country of the Empire for the year 1918, the amounts being illustrated by red coloured rectangular strips. The outputs of the world are similarly shown, the proportion of total British production being indicated.

The map, which is invaluable for purposes of reference, and also for educational purposes in connection with the teaching of the commercial geography of the Empire, is procurable from George Philip & Son, Ltd., 32, Fleet Street, London, or from the Imperial Institute.



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EDITORIAL.

THE STRIKE AND ITS CONSEQUENCES.

All other events and incidents in the local mining world during the past week have, of course, been completely eclipsed by the big strike which commenced on Monday and which involves 22,000 men employed by the gold mines, the Victoria Falls Power Company, the engineering shops and associated industries. Even the coal strike and the efforts of the coal mines in the Witbank, Vereeniging, and Far East Rand coalfields to maintain a supply of fuel for essential services have sunk into insignificance by comparison with the much bigger issue of the strike on the Reef. And this in turn may possibly be overshadowed by the greater effort of the Federation to engineer a sympathetic strike all over the country. But we are not inclined to the view that the Federation will succeed in this design.

The mines have given notice that the repatriation of natives will commence on Monday, and to counteract this move the Federation would no doubt like to see the railways idle. The problem of repatriation of natives would then become more difficult, though not insuperable. But, as a matter of fact, we do not think that there is much disposition on the part of the Nurbas to throw in their lot with the men now on strike on the Rand and on the coalfields of the Transvaal. The railwaymen in any case could certainly not complete a ballot by Monday—it would take at least a fortnight to canvas all the scattered employees of the railway, and the Federation in its appeal to all other "workers" makes a point of it that "constitutional steps" should be taken to enable all organisations of labour throughout South Africa to strike if called upon on Monday next at 7 a.m. We do not think, then, that the Federation will succeed in its endeavours to widen the front of the present industrial battle. During the past week many speeches, some of them of an excited nature, have been made along the Reef, but so far, although there have been interferences with essential services at the Village Deep, Kleinfontein, and Springs Mines, there has been nothing in the nature of rioting or violence. The Rand is now well policed, and it is generally believed that there can be no repetition of anything approaching the calamitous events of 1913. It is difficult to foresee the next move of the Federation. The men's leaders must know that they cannot stand a protracted struggle, and rather than allow themselves to be starved into submission an attempt may be made to create some kind of a diversion in the quiet but grim battle which is being fought out. But it is difficult to see in what direction a useful move can be made unless the Federation is prepared to admit that the economic facts are against them and that the Chamber's proposals for saving a waning industry are the best that are possible having regard to all the facts of the case.

The Federation is not prepared—not yet prepared at any rate—to endeavour to effect a settlement on the facts of the case. The appeal of the Federation to the Prime Minister to re-open discussion was not worded in a manner which suggests that the Strike Committee are in a mood to admit the urgent and immediate requirements of the industry. The Chamber of Mines has offered to postpone operation of the action contemplated by the managements, of which due notice was given for a week, but after the final meeting on Monday, when the unreasonable attitude of the men's representatives was clearly defined, hope of a settlement before the strike could do an immense amount of damage to the mines and irreparable damage to some mines, dwindled to vanishing point.

It is calculated the Rand is losing directly £160,000 per day. Of this £35,000 represents the men's wages, and cessation of amount expended in wages and the purchase of stores means £90,000 to the community. The natives' pay for the first week of the strike is £200,000, but this item will, of course, decrease as the repatriation of the mine boys proceeds. The position, therefore, is anything but satisfactory. The effects of this strike will not only greatly increase unemployment and distress on the Rand, but they will have a calamitous effect on the whole country.

The action taken by the Chamber of Mines on behalf of the struggling gold mines principally objected to by the men's leaders has undoubtedly been the Chamber's notice given "without prejudice to discussion" to terminate what is known as "the Status Quo Agreement." This agreement entered into by the Chamber of Mines and the Unions during the abnormal period of the War was a provision suitable for a wholly unusual period, and its perpetuation to-day, more than three years after the War ended, is helping to bring ruin to the poorer mines of the Rand, which in large degree keep Johannesburg, the Reef, and the country at large from bankruptcy.

It may be recalled that, arising out of a demand by the Unions in September, 1918, for the dismissal of coloured drill sharpeners, the Chamber, while refusing the demand, offered to recommend to its members that the "Status Quo" as existing on each mine with regard to the relative

scope of employment of European and coloured employees should be maintained; that is to say, that no billets which are held by European workmen should be given to coloured workmen, and *vice versa*. This offer was accepted by the Unions. The men affected by this agreement are engaged on semi-skilled work, and are on what are known as border-line occupations. In seeking to abolish this "Status Quo" Agreement, the Chamber does not wish to break down what is known as the Colour Bar. The Chamber of Mines could not dispense with many of its European employees even if it wished to.

What the Chamber of Mines has proposed is to retrench rather less than 1,400 of these semi-skilled redundant and border-line occupation workers in the near future, and, over a lengthy period, to dispense with a maximum total of 2,000 men in all. By this means the mining industry of the Rand will be very largely helped.

The Chamber's proposals in no way affect the status of the skilled craftsman. His position can be very adequately safeguarded by the application of a system of ratios to the number of European and Coloured employees of the mines, and the Chamber has given guarantees to this effect. The Chamber of Mines has no intention of assailing the positions occupied by men who, by apprenticeship, experience or diligence, have acquired proficiency in their work. What it objects to and intends to oppose is the fastening upon the industry of redundant persons who, having failed in other occupations, now seek to shelter behind the "Status Quo" Agreement and certain of the Mining Regulations, to the detriment of the mines and the country generally.

In the interests of all concerned, it is essential that some way out of the existing deadlock should be found. But it can only be found if the men will be prepared to frankly face the economic facts and toe the line with employees in other parts of the world. Everywhere wages are being reduced and economies effected, and in the face of the falling selling price of the product of the mines it is absolutely imperative that the mines of the Witwatersrand should be retrieved from the impossible position into which they have fallen.

Notes & News.

Monteleo Diamonds.

The secretary of the Monteleo Diamonds, Limited, reports the following results of washing operations of the company for the month of December, 1921:—Blue ground washed nett, 3,821 loads; diamonds recovered, 631½ carats, equal to 16.52 carats per 100 loads.

West Rand Developments.

Mr. Harry Graumann, M.L.A., has left England for South Africa. He stated to Reuter, before sailing, that negotiations had now been completed for the acquisition by the Coronation Syndicate of the mineral rights on the farm Luipaardsvlei No. 10 and that the requisite capital for the development of the Randfontein series, recently located on the property, had been provided. It appears from this statement that new and important interests are about to take a hand in the development of the West Rand.

The Rhodesian Mining Outlook.

The Bulawayo correspondent of the *Pretoria News* says: The mining outlook is disturbing. The chrome and asbestos mines are shut down, and some of the lower grade gold mines are threatened. It is held that wages generally are too high to permit of economic work. The opinion is current that the owners are contemplating a general reduction of wages, especially as the recent enquiry into the cost of living has shown that costs are but 23 per cent. dearer than before the war. According to a very guarded forecast in the local *Chronicle*, the owners intend to give long notice of the contemplated reduction.

A Colliery Plant for Sale.

Attention is directed to an advertisement appearing in this issue regarding the sale of the plant of the Uitkyk coal mine, which is to take place on the property on January 27. The Uitkyk plant is extensive and in perfect order and comprises engines, boilers, smoke stack, air compressor plant, coal bunkers, conveyors, screening plant, haulage machines, pumps, rock drills, rails, workshop tools, etc. A list of the principal items for sale appears in our advertising columns.

The Grain Elevator Contract.

According to a Reuter cable, the Industrial Correspondent of the *Daily News* announces that the contracts for the thirty-six grain elevators in South Africa, the construction of which will shortly be begun by Messrs. A. W. Menkens & Co., of New York, have been placed with English firms. Messrs. Spencer & Co., Ltd., of Melksham, have received the order for the whole plant for the terminal elevator at Durban, which will have a capacity of 42,000 tons and a loading capacity of a thousand tons per hour, and also for smaller collecting elevators in different parts of the country, which will feed the terminals at Durban and Capetown. Messrs. Henry Simon & Co., of Manchester, will equip the big elevator at Capetown with machinery. The whole of the steelwork required for the construction of the elevator will be supplied by the Furness Shipbuilding Co., Middlesbrough. We are informed that Mr. W. Littlejohn Philip, the Consulting Engineer to the S.A.R. Administration in regard to the installation of these elevators, is—or was—a director of Messrs. Spencer & Co., Ltd. Perhaps some of our readers will enlighten us on the point. While we all rejoice that the sub-contracts should have gone to English firms, we would welcome some further details of the original tendering, and the reasons why the American firm was successful.

Indian Gold Mines.

As bearing on the article in our last issue on gold mining in India, it may be noted that at a recent meeting of the Champion Reef Mr. Edgar Taylor gave a detailed description of the underground position, especially mentioning a new ore shoot which is being opened up in Carmichael's secondary shaft, showing high values but somewhat narrow widths. "This," he said, "is satisfactory so far as it goes, but we look to the further new development revealing a lode to correspond more with the widths we have been accustomed to in this property, and such as we are now opening up in the adjoining Ooregum mine at similar depths." In this connection, Mr. Taylor mentioned that quite recently in what is known as Oakley's No. 2 vertical shaft of the Ooregum mine (immediately to the north of Champion Reef) and at a depth of close upon 6,000 ft., there has been intersected a run of ore 2 ft. wide assaying over 1 oz. to the ton, and to the north again of this point, in the same mine from the 57th level downwards to the 64th, they have been opening up a shoot of quartz from 450 to 550 ft. in length of good workable width and highly payable values. It has been remarked by a mining engineer of wide experience that there is no mining field where the policy of continued development in the face of adverse results has been so consistently adhered to as in the Kolar field—a policy which has been amply rewarded and justified in the past. It is this feeling that inspires the Champion Reef Co.'s technical advisers to urge that development should be carried on at the lower levels with the maximum of effort consistent with economy in cost. The deepest point in the Champion Reef mine is a little over 6,000 ft. vertical.

The Flotation Process in South Africa.

An interesting sidelight on the progress of flotation in South Africa was afforded by the chairman of Minerals Separation, Ltd., in the course of his speech at the annual meeting of that company. *Inter alia*, he said: As regards our business in South Africa, flotation has for some months been in commercial operation at the Cam and Motor gold mine, and we have already received our first royalty pay-

ment therefrom. We have also recently concluded a license agreement with the Transvaal Silver and Base Metals, Ltd., an important base metal producer, and our plant is now on the point of commencing operations. I told you last year that we intended to organise a laboratory in South Africa and to establish our own representative there. He only arrived at Johannesburg at the end of February in the current year, but since that date a fully equipped modern laboratory has been installed in that city, and has been for some time in working commission; a great number of ores have been examined, and as the result of tests carried out an increasing number of inquiries are being received for the installation of our plants. Our representative informs us that the keenest interest in our processes is being displayed by the gold mining companies on the Rand. Preliminary negotiations have already taken place relative to the erection of flotation installations, while arrangements have been discussed with two leading undertakings for the carrying out of detailed examination of their ores, with a view to the installation of flotation on a large scale. I anticipate that we shall soon have a number of plants, large and small, operating in South Africa.

* * *

Bwana M'Kubwa Reconstruction.

The Secretary of the Bwana M'Kubwa Copper Mining Company, Ltd., says in a circular the successful further development of the mine in depth will enable arrangements to be made to provide the necessary reduction plant for the production of copper on a large scale. A well-known group recently had the company's property reported on by an eminent engineer, Mr. A. B. Emery, who has presented a most satisfactory report. He was accompanied there by an experienced staff of his own selection, and he subjected not only the mine as now developed, but also the country rocks within which the ore bodies occur to an investigation which the directors believe to have been of the most searching character. The following information is extracted from the report: The primary ore (that is, the unaltered ore from which the oxidised ores found on the upper levels of the mine have been derived) is of deep-seated origin. The tonnage of ore estimated and classed as assured and reasonably to be expected, counting down only to the 450 ft. level, is 3,000,000 tons. It is assumed that 1,000,000 tons will be developed for each 150 ft. in depth below the 450 ft. level. The average grade of the ore is 4 per cent. copper. After the provision of the necessary plant an output of 20,000 to 30,000 tons of ore monthly can be maintained. Mr. Emery had also the opportunity of subjecting the ore to a working scale test on the plant of Minerals Separation, Ltd., installed at the mine, and reports highly favourable results confirming those previously obtained. In this connection it is also satisfactory to know Minerals Separation, Ltd., after their own tests on the ore and with their world-wide experience in such matters, are strong supporters of the reorganisation of the company on the lines set out below. The directors have now succeeded in arranging for the reconstruction, and an agreement will be submitted for the approval of the shareholders. A new company to acquire the assets and undertaking is to be formed with a capital of £400,000, divided into 1,600,000 shares of 5s. each, holders of the present issued 925,053 shares being entitled to receive one share of 5s., credited with 2s. 6d. paid up in the new company for each fully-paid 10s. share held, the remaining liability of 2s. 6d. per share to be paid in five instalments, viz., 6d. on allotment and 6d. every four months thereafter, thus spreading the amount over sixteen months. Arrangements have been completed for the underwriting of the issue of the 925,053 shares of 5s. each credited 2s. 6d. per share paid up, the underwriters of such issue being entitled by way of commission to 15 per cent. on the amount of the cash assessment and a call at par for two years on one share for every six shares underwritten, and a call at par for four years on one share for every six shares underwritten, the subscribers of the 925,053 shares having similar calls, and the group that sent Mr. Emery to report on the property to have similar calls on a total of 58,245 shares. The

directors have approached the largest shareholders, and have been promised their support. They now recommend the scheme to the favourable consideration of all shareholders.

Drilling Speeds and Air Pressures.

In a recent issue of the "Colliery Guardian" Mr. H. M. Seamon gives data collected during a series of tests made at the property of the United Verde Copper Co. to determine the most economical air pressure for the operation of hammer drills under the varying conditions of use, and to investigate the variation in drilling speed at different air pressures. About 1-500 tests were made on 12 models of drills, at gauge pressures ranging from 40 lb. to 130 lb. No effort was made to bring theory and practice into accord; but rather to formulate sundry empirical rules covering the average variation of the results obtained. However, these rules on the performance of hammer drills, based on the air pressures as in the main variable are not necessarily of universal application; they apparently satisfy the results obtained in this particular series of tests.

The drilling conditions at this property vary widely. An average of 21 machine shifts to a 3 ft. round is necessary in some of the development work; while an advance of 56 ft. has been made in seven shifts in the "oxide" ground. This wide range of conditions precludes the adoption of one type of drill as a standard; consequently almost every kind of hammer drill sold in the country has been tested during the past few years. At the present time 16 different models of drills are in use, of which two types of the heavy (150 lb. to 160 lb.) mounted drills, one of the light mounted drill, one stopper and two hand-plugging drills are considered as standard.

Inspection of the several tabulated results shows that:—

- (1) There is little or no increase in mechanical efficiency of the drills above 90 lb. pressure.
- (2) The distance drilled per air indicated horse-power is a maximum for the jackhammer type at 90 lb. and increase at a slow rate for the other machines at the higher pressures.
- (3) The average thermal efficiency is a maximum at about 95 lb.
- (4) The factor of desirability, while increasing as the pressure, shows a comparatively slow rate of increase for pressures above 100 lb.
- (5) The average drill is made to be used at a pressure of 80 lb. or less, and the use of pressures much exceeding this would invalidate the present replacement agreements with the manufacturers, thereby increasing the unkeep cost.
- (6) The increased breakage at the higher pressures, with the consequent greater loss of time of the drill runner in changing or repairing the machine, would tend to reduce the factor of desirability.
- (7) The increased breakage of drill steel would tend to limit the pressure, although there are not sufficient data on this point to determine the maximum.

From the foregoing, it would seem that under the conditions obtaining at this property, about 95 lb. is the most economical gauge pressure.

We regret to record the death of Mr. Alexander Heymann of this town, which occurred on Wednesday. Mr. Heymann, who was 54 years of age, was educated at the Moscow University and had practised as an analytical chemist on the Reef for thirty years. He was a prominent Mason and at one time a member of the Council of the Chemical Mining and Metallurgical Society. Mr. Heymann took a prominent part in discussions on miners' phthisis, and was a member of the commission that was appointed to deal with mining regulations and ventilation. He was an occasional contributor to the technical columns of this journal.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgy.

Ventilation Problems in Mining.—*Iron and Coal Trades Review*, December 16, p. 867.

Water in Mines.—*Australian Chemical Engineer*, December 5, p. 75.

The Design of Flotation Plants.—*Mining and Scientific Press*, December 3, p. 773.

Concentrating Magnetic Ore.—*Mining and Scientific Press*, December 3, p. 769.

Coal.

Fuel Research Board's Views on Low Temperature Carbonisation.—*Iron and Coal Trades Review*, December 16, p. 866.

Notes on Coal Washing.—*Iron and Coal Trades Review*, December 16, p. 870.

The Limitations of Coal Cutters.—*Colliery Guardian*, December 16, p. 1659.

Pulverised Coal.—*The Engineer*, December 16, p. 655.

Engineering.

The Metering of Air and Gas.—*Iron and Coal Trades Review*, December 16, p. 869.

The Empire Water Power Resources.—*Iron and Coal Trades Review*, December 16, p. 871.

The Turbo-Pulveriser.—*Iron and Coal Trades Review*, December 16, p. 877.

Stanton-Hume Pipes.—*Iron and Coal Trades Review*, December 16, p. 879.

Progress in Welding and Cutting with Acetylene.—*Mining and Scientific Press*, December 10, p. 825.

A Detachable Rock Drill Bit.—*Mining and Scientific Press*, December 10, p. 806.

Iron and Steel.

Research in the Steel Industry.—*Mining and Metallurgy*, December, p. 11.

NOW READY.

THE S.A. MINING YEAR BOOK

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Electricity.

Electricity in Mining.—*Mining and Scientific Press*, December 3, p. 785.

Review of Extra High Pressure Transmission.—*Electrical Review*, December 16, p. 806.

Electrically Driven Fire Fighting Appliances.—*Electrical Review*, December 26, p. 849.

Electricity in Mines.—*Electrical Review*, December 26, p. 847.

Economics.

American Competition.—*Iron and Coal Trades Review*, December 16, p. 885.

Trade Union Funds.—*Iron and Coal Trades Review*, December 16, p. 883.

German Reparations in Kind.—*The Engineer*, December 16, p. 651.

The Arbitration Court.—*Australian Chemical Engineering*, December 5, p. 75.

Trade Union Finance.—*Colliery Guardian*, December 16, p. 1671.

Relation of Labour to Business Improvement.—*Mining and Metallurgy*, December, p. 21.

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PORTO RICO—San Juan, Mayaguez & Ponce. HAITI—Port-au-Prince, &c.

DOMINICAN REPUBLIC—S. Domingo, La Romana, Puerto Plata, Sanchez, S. Pedro de Macoris and Santiago de los Caballeros.

MARTINIQUE—Fort de France.

QUADELOUPE—Pointe-à-Pitre and Basse Terre.

BRITISH WEST INDIES—Antigua, Bahamas, Barbados, Dominica, Grenada, Jamaica, Montserrat, Nevis, St. Kitts, St. Lucia, Trinidad and Tobago.

BRITISH GUIANA—Georgetown, New Amsterdam, &c.

BRITISH HONDURAS—Belize.

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December Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of December, 1921:—

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit	Estimated Working Costs per Ton.
City Deep	82,500	34,288	£160,725	£42,718	28/7
Cons. Mn. Reef ...	49,800	17,788	83,382	7,208	30/7
Crown Mines ...	152,000	44,118	206,802	31,109	23/1
Dur. Road. Dp. ...	26,000	8,699	40,778	2,407*	33/2
E.R.P.M.	129,000	32,371	151,702	559	23/5
Ferreira Deep... ..	18,300	7,148	33,508	5,017*	42/1
Geldenhuis Dp. ...	50,662	13,331	62,317	4,058*	26/2
Knight Central ...	30,000	6,883	32,265	875	20/11
Modder B... ..	56,000	28,640	136,566	59,802	27/5
Modder East ...	24,200	10,499	49,215	7,829	34/2
New Modder ...	105,000	48,441	227,067	114,195	21/6
Nurse Mines... ..	45,800	14,858	69,650	893	30/0
Robinson G.M. ...	38,600	8,772	41,037	171	21/2
Rose Deep	52,600	13,109	61,396	3,315	22/1
Wolhuter G.M. ...	32,500	7,757	36,166	228	22/1
Village Deep ...	48,100	15,422	72,294	1,502*	30/8
Tls. & averages	941,062	312,124	1,464,870	255,918	25/8

* Loss.

Ferreira Deep, Limited.—Loss due to a fire which occurred underground on December 7, followed by a fall of rock in No. 1 Shaft four days later. Mining operations were suspended on December 9, and were resumed on a restricted scale on December 21. The tonnage milled was in consequence 14,800 tons lower than that of the preceding month, and working costs per ton were abnormally high.

Crown Mines, Limited.—Results again abnormal on account of continuation of strike of underground employees, which terminated on December 5.

General Note.—The results are affected generally by loss of tonnage occasioned by the December holidays and the decrease of 7s. per ounce in the valuation of gold, which has been taken at £4 13s. 9d. nett.

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of December, 1921:—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.			
			s.	d.		
Brakpan Mines	120	53,000	28/5	3/00		
Springs Mines	80	42,000	28/7	8/05		
Totals and averages	200	95,000	28/6	4/09		
	Value of Gold declared.	Yield per Ton.	Working Profit based on stand-ard value of Gold.	Working Profit per Ton.		
		s.	d.	s.	d.	
Brakpan Mines	£95,186	35/11	029	£19,915	7/5	729
Springs Mines	£79,319	37/9	249	£19,153	9/1	444
Totals & averages	£174,505	36/8	854	£38,968	8/2	445
	Estimated Premium taking Gold at £4 15s 6d. per fine oz. less exchange on remittances.		Total Estimated Profit.			
Brakpan Mines	£10,372		£30,187			
Springs Mines	8,684		27,837			
Totals and averages	£19,056		£58,024			

Note.—Brakpan: Placed to gold reserve, 2,528 fine ounces; total reserve at date, 19,116 fine ounces.

UNION CORPORATION GROUP.

Particulars of operations on the producing mines of this group for the month of December, 1921:—

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Revenue	
				(Including Sundry Rev.) Total	Per ton s. d.
Geduld Proprietary	100	46,000	17,065	£81,849	35/7
Modder Deep	70	41,600	22,997	110,209	53/0
Totals and averages	170	87,600	40,062	£192,058	43/10
Company.	Total.	Costs Per Ton.	(Incl. Sundry Rev.) Total.	Profit Per ton.	
Geduld Proprietary...	£50,222	21/10	£31,627	13/9	
Modder Deep	45,424	21/10	64,785	31/2	
Totals and averages	£95,646	21/10	£96,412	22/0	

The above results are arrived at by calculating the gold produced at £4 15s. 6d. per fine ounce. Realisation charges in excess of normal are debited direct to Revenue.

CONSOLIDATED GOLD FIELDS.

The following are particulars in regard to the outputs for the month of December, 1921, of the undermentioned Companies of the Consolidated Gold Fields Group:—

Company.	Stamps Running.	Tube Mills.	Tons Crushed.	Gold declared. Fine ozs.	Total Profit declared including Sundry Revenue.
Simmer and Jack ...	320	7	59,200	14,203	£1,432
Robinson Deep... ..	165	10	62,000	18,897	9,407
Sub Nigel	30	2	10,700	6,511	6,756
Totals	515	19	131,900	39,611	£17,595

Total gold in reserve (fine ounces): Simmer and Jack, 1,200; Robinson Deep, 1,495; Sub Nigel, 2,108; total, 4,803.

The revenue derived from gold for the month of December is calculated at the rate of £4 15s. 6d. per fine ounce, less estimated gold realisation and exchange charges of 1s. 6d., or a net figure of £4 14s. per fine ounce.

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GENERAL MINING & FINANCE GROUP.

The following information regarding the December operations of the producing mines of this group has been supplied:—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West ...	10,550	£13,273	25.16	£13,785	£512
Meyer & Charl. ...	14,500	18,302	25.24	40,709	22,407
New Goch ...	15,700	18,839	24.00	18,409	Loss 430
Rood. United ...	17,100	16,914	19.78	17,392	478
Van Ryn Est. ...	32,750	41,562	25.38	46,581	5,019
West Rand Con. ...	33,000	43,319	26.24	44,403	1,084
	123,600	£152,209	24.63	£181,279	£29,500
				Less loss	430
					£29,070

In calculating the revenue, gold has been taken at a value of £4 15s. 6d. per fine ounce, less estimated realisation charges.

BARNATO GROUP.

Operations for the month of December, 1921:—

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte ...	43,000	£60,624
Government G.M. Areas ...	141,000	286,488
Langlaagte Estate ...	45,000	64,702
New Primrose ...	22,200	24,459
New Unified ...	11,900	12,151
Randfontein Central ...	118,500	161,339
Van Ryn Deep ...	54,000	132,174
Witwatersrand ...	15,200	53,187
Totals and averages ...	480,800	£795,124
November totals ...	483,300	£878,908

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte...	£51,931	24.153	£9,236
Government G.M. Areas...	147,149	20.799	110,093
Langlaagte Estate ...	55,635	24.727	9,477
New Primrose ...	21,265	19.157	3,412
New Unified ...	11,055	18.579	1,202
Randfontein Central...	162,665	27.454	Loss 105
Van Ryn Deep ...	67,915	25.154	65,620
Witwatersrand ...	48,745	21.569	5,485
Totals and averages ...	566,360	23.559	£234,420
November totals ...	569,830	23.580	£315,424

Note.—The above results are arrived at by calculating the gold at £4 15s. 6d. per fine ounce.

TRANSVAAL GOLD MINING ESTATES, LTD.

The following are the particulars of the output for the month of December, 1921, in respect of the above company:—

	Tons crushed.	Yielding fine ozs.
Central Mines ...	12,200	3,181
Elandsdrift Mine ...	1,640	990
Vaalhoek Mine ...	2,250	602

Estimated value of month's output, £22,876; estimated loss for month, £2,264.

Note.—Loss mainly due to low grade at Central Mines and Vaalhoek Mine, also to fall in price of gold and certain abnormal expenditure. The gold output for the month is valued at £4 13s. 6d. per fine ounce net, after allowing for exchange and realisation charges.

GLYNNS LYDENBURG.

The following are the particulars of the output for the month of December, 1921, in respect of the above company:—Tons crushed, 3,920; yielding 1,468 fine ounces; estimated value of month's output, £7,038; estimated profit for month, £1,179.

Note.—The above figures are exclusive of expenditure for the month upon shaft sinking, special development and capital expenditure amounting to £2,017. The gold output for the month is valued at £4 13s. 6d. per fine ounce net after allowing for exchange and realisation charges.

WITWATERSRAND DEEP, LIMITED.

The estimate of results for the month of December, 1921, is as under:—

Tons milled ...	35,380
Gold recovered ...	10392.795 ozs.
Average of stamps running ...	180
Stamps running time ...	21.075 days
Tube mills ...	5

The working expenditure, including head office charges, for the month is £44,813 or 25s. 4d. per ton. The estimated working revenue based on an estimate of £4 15s. 6d. per fine ounce (less 1s. 9d. realisation charges) is £48,716 or 27s. 6d. per ton. The estimated working profit is £3,903 or 2s. 2d. per ton, from which is to be deducted the capital expenditure for the month of £1,384, leaving a surplus of £2,519.

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Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

New Debenture Issues.

London advises market report that the Union-Castle and Clan lines are contemplating debenture issues, and that that of the former will probably be about £3,000,000 sterling.

American Trade with South Africa.

American exports to South Africa during the month of November were \$1,700,000, the highest figure during the past half-year, according to cable advice from the Department of Commerce in Washington to the American Trade Commissioner, Mr. P. J. Stevenson. The November total was about 14 per cent. above that for October, and almost 100 per cent. above the low point that was reached in September.

American imports during November were \$200,000, which is about 25 per cent. higher than the October figure. As imports generally are increasing, it is to be expected that the American demand for local products will increase.

On the other hand, domestic conditions in the United States are not as favourable as they have been in recent months. Production, which has been on the increase, is slackening. Commercial failures are more numerous, although the money market is reported as being easier. Prices which last month were reported as irregular are now declining. Experts are also falling off, the improved exchange rates not yet having had time to effect an upward tendency as is expected.

Decimal Coinage for the Union.

It is understood that during the ensuing Parliamentary session the Government will introduce a Bill to establish the decimal coinage system in the Union. A sovereign now represents 240 pennies, or 960 farthings. In the new system the sovereign will represent 1,000 farthings (or cents). The florin, or 2s., will be continued; but the half-crown will disappear. A florin will be worth 100 cents, and will be divided into a half-florin (50 cents) and a quarter-florin (25 cents)—roughly representing our present shillings and sixpences. This secures the decimal system with little deviation from the present. Instead of silver ticeys there will be nickel coins worth 10 and 5 cents. These will, of course, differ slightly from our pennies and half-pennies, since 1,000 cents will equal in value 960 farthings.

A Loan for South-West Africa.

The most absorbing topic at the moment is the report that the Administrator has succeeded in negotiating a loan of £300,000 from a more or less private source, and that this sum will be expended on the erection of a cold storage plant at Walfish Bay and on harbour improvements (states the Windhoek paper). The matter was considered by the farmers at a meeting on Thursday, and a committee has been formed which will discuss the scheme with Mr. Hofmeyr. At the moment it is difficult to grasp what is involved in the scheme, though it is clear from the Admin-

istrator's circular that certain concessions are expected by the lenders of the money. No doubt in due course the matter will be thoroughly thrashed out, and it is to be trusted that the project will materialise into something of benefit to the country. It may not be out of place at this stage to utter a word of warning. The country is in the grip of depression, and any scheme for the betterment of conditions should not lightly be discarded. It may be in the interests of the country to make concessions of a strictly temporary nature in return for the benefits which will be derived. We trust that the greatest caution will be exercised, and that the authorities will not allow their natural anxieties to stampede them into concessions of a sweeping nature, which will hamper the country's future growth. In the meantime, we think a word of congratulation is most certainly due to the Administrator for the success which has attended his negotiations.

The Finances of the Union.

At a time like this it may be opportune to review the finances of the Union. The report of the Commissioners appointed under the Public Debt Commissioners Act, 1911, for the financial year ended March 31st, 1921, gives the following statement of liabilities showing the amounts and different classes of funds dealt with by the Commissioners, the investments held and the increase or decrease that has taken place during the year: Sinking funds and other sums for redemption of debt, £11,284,200, increase £1,306,164; general Government deposits (including reserves, etc.), £16,242,153, increase £1,565,350; Railway and Harbour Administration deposits, £5,460,506, decrease £878,538; other funds, £123,304, decrease £3,496; totals, £33,110,164, increase, £1,989,480.

The increase in Sinking Funds, etc., is due to interest on investments and contributions from revenue. It includes £460,425 17s. 10d., the balance of the surplus for 1920-21, which has since been repaid to revenue. The increase in general Government deposits is mainly due to pension fund contributions, additions to Guardian's Fund, and deposits of diamond revenue on account of the South-West Protectorate. The decrease in Railway and Harbour deposits is due to heavy withdrawals during the year. The decrease in other funds is due to repayments of advances made from Arme Burger, Amortisation, and Onder steuning Funds. The amount invested in British Government securities was £1,441,082, a decrease of £285,998, due to the realisation of national war bonds to meet railway withdrawals, and to the redemption of £50,000 Exchequer bonds on maturity. Union Government securities domiciled in London amounted to £17,162,667, an increase of £1,303,521. The increase was due principally to the purchase of Transvaal stocks for sinking funds. Securities domiciled in South Africa totalled £10,938,572, the increase of £2,096,000 being due to subscription to the further issue in February, 1920, of 4½ per cent. and 5 per cent. local stock, 1920-39, to the purchase of 5 per cent. local stock, 1921-36, and to temporary investments in Union Treasury Bills.

Other assets were: Securities of other Colonies and Dominions, £2,545,466; S.A. municipal stocks and loans, £190,197; other stocks and shares, £156,653; mortgages, £547,735; properties, £12,957; cash, £80,179; other items, £234,051. The total investments amounted to £33,110,164, an increase of £1,989,480 compared with the previous year. The average rate of interest earned over all the funds administered by the Commissioners as invested at March 31st, 1921, is 4 3s. 8d. This may seem unduly low compared with the rate which can be obtained now on prescribed investments, but the explanation is that advantage can only be taken of the higher rate as funds become available for investment. Moreover, the amount of fresh money available annually for investment is small

compared with the total amount already invested, so that the higher rate now obtainable has to be averaged with the lower rate from the greater proportion of investments which were made at a time when all investments yielded a much lower return. The investments and cash held for sinking funds and redemption of debt at the end of the year amounted to £11,284,200 13s. 7d. Of this sum, £2,366,730 0s. 1d. is held by the Commissioners, and £8,917,470 13s. 6d. by other trustees, chiefly in connection with the Transvaal Guaranteed Loans. The public debt of the Union on March 31st last was £178,607,938.

The Value of Chartereded.

Should Rhodesia come into the Union, the question would arise, what is the value of Chartereded shares? "It would mean to the Chartered Company," says the circular of a well-known stockbroker, in attempting an estimate, "the payment of the Cave Award of about £4,500,000, less land sales of £835,000, £3,665,000; public work, building, etc., in last balance sheet at £2,400,175; total, £6,065,175, equal to about 13s. 6d. a share. The large assets of the company are: Cash in hand (about), £250,000; first-class investments, about £1,200,000; other investments, about £2,500,000; movable assets, about £500,000; livestock (including 88,487 cattle), about £550,000; sundry accounts and advances to Rhodesia Land Bank, about £650,000; Northern Rhodesia, £1,250,000; ranches and farm lands, about 4,000,000 acres having been cultivated and developed, ought to be worth quite £1 per acre, £4,000,000; total, £16,965,175; less debentures at price of redemption, £1,312,500; leaving a net total of £15,652,675, equal to about 34s. 6d. per share. Mining shares, debentures, mineral rights and many assets not valued."

Cam and Motor Gold Mining (1919).

The report to June 30 last states that no profit and loss account is included in the present accounts. The reorganised plant was only started up towards the end of 1920, the first declaration being made in January last, so that the period to June 30 covered approximately six months' working. During this initial period, owing to unusual difficulties encountered in starting up the treatment plant, a comparatively small tonnage was put through. Since June 30 the financial position has improved, and repayments have been made on account of the loan referred to in the last report. Development results at depth have been particularly satisfactory. No. 11 level, Motor mine (1,260 ft. from surface), has been extended to the south since June 30 a further 337 ft. Widths and values for the last 206 ft. driven to the end of November, as advised by cable, were: August, 85 ft., average value 86s. over 57 in., reduced to 40s.; September, 53 ft., average value 43s. over 53 in., reduced to 68s.; October, 33 ft., average value 65s. over 57 in., reduced to 55s.; November, 36 ft., average value 154s. over 68 in., reduced to 68s. A crosscut put in to the east at 553 ft.

south has exposed a total width at that point of 15 ft. with average values of 68s. per ton (the first 14 ft. averaged 602s., reduced to 68s.), and a winze at 528 ft. south sunk 7 ft. averaged 494s. at 5 ft. over 52 in., reduced to 68s. The main shaft, Motor mine, is now down 1,381 ft., or 121 ft. below No. 11 level. The consulting engineer, in his report, states that the returns from the mine for the period under review are: Tons milled, 58,010; total yield, £57,519; from premium reserve, £3,000; total revenue, £60,518; working costs (including depreciation), £98,409. In addition to revenue as above, gold premium reserve account stood at £13,512 and gold reserve account at £2,054 at June 30. Cost of working per ton has been higher than anticipated, but such is due to an increased rate of wages to artisans, increased railway rates (33½ per cent.), and the high cost of ball mill spares. Arrangements are in progress for certain structural alterations to the ball mills, which will reduce milling costs effectively. Ore reserve, 600,000 tons; average value, 38·21s.; against 653,000 tons, average value 37s. per ton. With the completion of structural alterations to the ball mills, as well as the completion of drying arrangements for flotation concentrates, it is expected that during the coming year the company will show profitable operations. In view of the decrease in the cost of living, it is advisable that the wage question should be revised at an early date.

British Concrete Machinery.

At a recent exhibition held in London, a remarkable display of concrete machinery of various kinds was made by a large number of British firms. One of these machines was a concrete block maker capable of turning out 1,000 blocks in an 8-hours' working day, or 130 partition slabs per hour. When used on a house building contract two of these machines turned out on the average 2,400 blocks per day of 8 hours for a period of two months. On one day the two machines actually produced 3,320 blocks in 8 hours. Another machine designed for making concrete slabs for paving purposes averaged between 40 and 50 slabs in the hour, and has produced as many as 60 per hour under service conditions. A third machine is capable of producing everything in the way of material that a builder or anyone undertaking repairs to property may require. Blocks of various sizes, bricks, window-sills, steps, hearths, mantelpieces, wall-coursing, and so on, can all be produced by this machine.

Successful Mauss Invention.

Amongst the new patents registered in the United Kingdom are: The Mauss Continuous Clarifying Centrifugal for sugar juices. Experiments have been carried out by Messrs. Reynolds Bros., Ltd., at their Sezela factory, Natal, with the Mauss continuous juice clarifying machine; and Mr. E. Camden-Smith, manager of the mill, has reported favourably on the results obtained. He states that, using this machine, 35-40 h.p. should be ample to operate the clarification department of a mill producing 100 tons of sugar per day. It is unnecessary here to emphasise the advantages such a system of operating (if economical and efficient) would have in comparison with the present mode of subsiding in tanks and filter-pressing the mud. Production of glycerine from sugar products, by fermenting sugar solutions containing a mixture of about equal weights of alkali bisulphite and sulphite. Evaporation utilising thermo-compression. A new filter, consisting of thin plates with elongated slots, adjacent plates being arranged so that the slots of one are at right angles to those of the other. Manufacture of invert sugar syrup from dates, etc. Recovery of potassium salts from distillery slops. The following are amongst the new patents registered in the United States: Filter for sugar liquors; an apparatus for reducing the adhesion of any slimy sedimentary matter to the cloth sufficient to form an obstructing layer. Simultaneous clarification and evaporation apparatus, the use of settling tanks being eliminated. Activation of carbon by treating the charcoal in a long inclined cylinder lined with fire-brick and mounted on rollers.

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**SOUTH AFRICAN MINING AND
ENGINEERING JOURNAL.**

December Output.

REDUCED RETURNS.

More than usual interest attaches to the returns from the gold mines for December. In the month 681,847 ozs. of gold were produced, which is 22,389 ozs. less than the total for November, while the value of the product shows a decrease of £335,784 owing to the estimated fall of 7s. per ounce in the premium. The price of gold for December has been calculated at £4 15s. 6d. per ounce as against £5 2s. in November. The milling results were affected by the holidays, the strike on the Crown Mines and the fire and fall of rock in the Ferreira Deep.

Native Labour.

The number of natives employed on the gold mines in December was 177,836, an increase of 2,505 compared with the previous month. The following figures show the native labour position during the past three months:—

	October.	November.	December.
On gold mines	175,331	176,410	177,836
On coal mines	13,936	13,465	13,230
On diamond mines	1,223	1,217.	1,224
Totals	190,490	191,092	192,290

Individual Returns.

	Increase. Decrease.	
	oz.	oz.
Aurora West	2,917	81
Brakpan	22,594	—
Con. Langlaagte	12,686	—
City Deeps	34,288	—
Crown Mines	44,440	—
Con. Main Reef	17,788	—
Durban Deep	8,699	—
E. R.P.M.	32,371	2,128
Ferreira Deep	7,219	—
Geduld	17,065	—
Geldenhuis Deep	13,332	391
Government Areas	59,998	—
Knight Central	6,883	176
Langlaagte Estate	13,550	—
Luipaardsvlei	4,198	162
Meyer and Charlton	8,618	3
Modder B.	28,640	—
Modder Deep	22,997	—
Modder East	10,499	133
New Kleinfontein	13,393	270
New Modder	48,441	—
New Primrose	5,122	294
New Unified	2,545	—
New Goch	3,908	191
Nourse Mines	14,859	—
Randfontein	33,788	—
Roodpoort United	3,669	—
Rose Deep	13,109	—
Robinson Deep	18,897	—
Robinson	8,772	660
Simmer and Jack	14,203	—
Springs	18,813	—
Van Ryn Estate	9,851	464
Van Ryn Deep	27,680	—
Village Deep	15,423	—
West Rand Consolidated	9,390	410
Witwatersrand	11,139	308
Wolhuter	7,757	84
Wit. Deep	10,393	357
Miscellaneous	4,991	1,338

Outside Districts.

	oz.	Increase.	Decrease.
	oz.	oz.	oz.
Sub Nigel	6,511	517	—
Glynn's Lydenburg	1,468	119	—
T.G.M. Estates	4,776	406	—
Miscellaneous	4,157	—	183

Group Profits.

	October.	November.	December.
Central Mining	£113,619	£406,088	£255,918
Barnato	306,797	315,424	234,120
Gold Fields	36,375	37,161	17,595
General Mining	36,603	36,734	29,070
Mines Selection	69,427	72,775	58,024
Union Corporation	114,081	112,302	96,412
Totals	£976,902	£980,484	£691,439

RESULTS FOR THIRTEEN MONTHS.

The following table gives the results for the past thirteen months:—

	Output.	Daily average.	Estimated price.
	oz.	oz.	per oz.
1920.			
December	632,215	20,394	£5 15 0
1921.			
January	651,593	21,029	5 5 0
February	558,137	19,933	5 3 9
March	671,123	21,649	5 3 9
April	681,382	22,713	5 3 3
May	687,776	22,186	5 2 6
June	678,490	22,616	5 7 6
July	689,555	22,244	5 12 0
August	711,526	22,952	5 10 0
September	691,096	23,036	5 8 6
October	707,825	22,838	5 1 6
November	704,236	23,474	5 2 0
December	681,847	21,995	4 15 0

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ENGINEERING SECTION.

A Novel Application of the Cementation Process.

The following valuable notes on a novel application of the cementation process to a battery foundation were contributed by Mr. B. Schlesinger to a recent meeting of the C.M. and M. Society of South Africa.

When starting up a new stamp battery in the Heidelberg District it was found after 48 hours' work that the foundation, and with it the whole of the superimposed construction, began to rock so dangerously that operations had to be suspended. An inspection pit was sunk to the underlying shale-foot, and by washing the face of the concrete block so exposed, the writer found that a thin horizontal crack had developed, completely severing the top three feet from the lower nine feet portion of the block. The cause of the mishap was badly prepared and badly stamped concrete. Stones, the size of a man's fist, were seen lying loose in large cavities in the body of the foundation. For further investigation the writer had the mill re-started, with the result that portions of the concrete began dropping out of the block into the inspection pit, in much the same fashion as if the stamps were pounding on tightly packed rubble. Repairs seemed quite out of the question and it appeared at first sight that the whole of the plant would have to be dismantled and again re-erected upon an entirely new foundation, at a cost prohibitive to the mine owners. Before dealing this death-blow to his Board the writer decided to attempt saving the foundation by pumping pure cement into it under high pressure. He entrusted the work to the Francois Cementation Syndicate of this town, who lost no time in despatching to the property the necessary plant. This consisted of a steam pressure-pump with a nine-inch diameter steam cylinder and a two-inch water delivery, a small wooden mixing barrel for cement, which served as an intake for the pump, and an all-important pressure gauge capable of registering pressure up to 10,000 lb. to the square inch. The pump was served by a boiler delivering steam at 100 lb. pressure.

The Process: Nine holes of 7-8th in. diameter, and 5 ft. depth, were drilled into the foundation. The top 9 in. of each hole were enlarged to take a 2-inch pipe 24 in. long, and screwed at one end. Such pipe was cemented into each of the holes and the cement allowed to bind over night.

The next morning hole No. 1 was connected to the delivery-end of the pump, and clean water forced through before the actual cementing operations was commenced. Thereupon a thin mixture of pure cement and water was pumped into the foundation. At first the liquid entered the concrete block without encountering any resistance whatever, and 17 bags of cement were absorbed before the pressure-gauge on the pump began to show signs of life. The indicator then gradually rose to 100 lb. and 200 lb. per square inch. Simultaneously, with the increasing pressure a tiny stream of water and cement could be observed oozing out of the thin crack previously referred to.

At this stage pumping was discontinued to allow the cement to settle, and hole No. 2 was put into commission and subjected to the same treatment as hole No. 1. After allowing a practically free passage to five bags of cement, the pressure rose rapidly to 800 lb. when pumping was stopped for 12 hours. Before injecting the remaining seven holes, hole No. 1 was re-treated after freeing it from partially solidified cement by drilling. Two bags of cement sufficed to send the pressure up to 1,000 lb., this being considered the dangerous limit above which the block may have burst. While it required 26 bags of cement and 22 hours of work to complete the first two holes, the remaining seven holes absorbed only fifteen bags of cement and eighteen hours' work. After completion of the foundation proper the writer decided, as a matter of safety, to solidify the ground surrounding the block. For this purpose six eight-foot holes were drilled about eighteen inches from the foundation, and injected in turn by a mixture of one to one cement and slimes. Some interesting phenomena could be noticed. When the pressure on the first outside hole rose to 150 lb. the gauge indicator suddenly dropped to nil, and it was found that the cement solution had broken through to the surface about ten yards from the position of the hole.

One bearing-block of the line shaft, which was only 24 inches in the ground, became injected from one of the outside holes twelve feet away. In proof of this, cement solution forced its way six inches above the surface through a tiny crack in the block. It took six days to complete the whole of the process, and 48 bags of cement were used up. The total costs amounted to roughly £200, inclusive of the charges of the Cementation Syndicate. After allowing ten days for the injected cement to harden the stamps were again dropped, with entirely satisfactory results. The plant has now been in full swing for some time, and the foundation is as firm as can be desired.



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The Week in the Sharemarket.

STAGNANT—AWAITING STRIKE ISSUES—DEALING PURELY PROFESSIONAL.

The end of the first week of the strike on the gold mines and of the second week of the coal strike sees the sharemarket stagnant, dealing being purely professional. Quotations have remained quietly firm, and up to the time of writing there has been no pressure to sell. What may happen next week remains to be seen, and the market will, of course, be governed by the issue of events. London is naturally also "waiting to see," and in financial circles, the cables tell us, the progress of events on this side is being carefully watched. It is recognised that, in the words of one City authority, "the great hope of the Rand mines is a reduction of working costs, which is likely to be permanent, whereas the gold premium must always be evanescent." Apart from our troubles, the general world conditions, as reflected in the London market, are much more favourable. The settlement of the Irish trouble and the postponement for ten years at least of the menacing question of the Pacific are "bull" factors of no mean order. In addition, the Cannes conference seems likely to result in restoring the *Entente* to that position which is desirable from the point of view of both France and Britain. Given an early return to sanity on the part of our people now on strike, there would be reason to hope for an all-round revival in the sharemarket. The diamond market remains featureless, but the outlook for base metals seems a little brighter. According to the latest mail advices from London, "the feature in the metal markets has been the substantial rise in tin, on strong buying. The statistical position showed a slight diminution in stocks, owing to heavier deliveries. This is indicative of an improved trade demand, which, coupled with reduced production, should gradually result in remunerative prices being obtained. Copper has been somewhat affected by the rise in the American exchange, which has prevented quotations advancing. There is, however, a healthy sentiment in the metal, and higher values are anticipated in the New Year. Lead has also advanced slightly, the demand for spot and near positions being particularly keen. Spelter came in for a good deal of attention and advanced appreciably. The general tone of the markets is hopeful."

	Fri. 6th.	Sat. 7th.	Mon. 9th.	Tues. 10th.	Wed. 11th.	Thurs. 12th.
Anglo-Amer. Corp.	16 3*	16 6	16 0*	16 3	16 0*	16 3*
Apex Mines	7 0†	7 0†	7 0†	—	7 0†	6 0*
Bantjes Consolidated	5 9*	5 6*	5 7*	5 9*	5 9*	6 3*
Brakpan Mines	43 6*	—	—	—	44 0	45 6†
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
City and Suburban	2 0*	2 0*	2 0*	2 0*	2 2*	2 2*
City Deeps	40 0*	40 0*	—	41 0*	40 0	41 0†
Con. Main Refs	7 6*	7 6*	7 9	7 6	7 3*	7 3*
Coronation F'holds	0 6*	0 6*	0 6*	0 7*	0 7*	0 6*
Do. Syndicates	5 0†	4 0*	4 9*	1 9*	5 0	5 0*
Crown Diamonds	3 3*	3 3	3 0*	3 0*	3 0*	3 0*
Daggafont. Mines	1 9*	1 6*	1 9*	2 1*	2 0*	2 0*
East Rand Coals	1 6*	1 6*	1 6*	1 8	1 6*	1 6*
East Rand Deeps	0 5*	0 5*	0 5*	0 5*	0 5*	0 5*
East Rand Dels.	—	—	—	—	—	£85†
Eastern Golds	0 5*	0 5*	0 5*	0 5*	0 6*	0 6*
F. Smith Diams.	2 10*	3 0	2 9*	2 9*	3 0	2 10*
Geduld Props.	44 0	41 6	44 0	43 9	41 3	44 6*
Geldenhuis Deep	6 3*	—	—	—	—	5 10*
Government Areas	71 6*	75 0*	75 0	74 6	75 0*	75 0*
Knight Centrals	4 1*	4 1*	4 1‡	4 0*	4 1‡	4 2*
Lace Props.	—	6 0†	6 0†	5 0*	5 0*	5 3*
Leeuwpoot Tins	—	8 0†	8 0†	7 3*	7 6†	—
Lydenburg Farms	1 0*	4 0*	4 0*	4 0*	4 0*	—
Meyer & Charltons	—	61 3*	60 0*	63 0*	—	—
Middelvel Est.	—	1 0*	1 0*	1 0*	1 0*	1 0*
Modder B.'s	23 9	23 9	23 0*	23 0*	23 0*	23 6*
Modder Deep	37 6	37 6*	37 6*	37 0	37 3	37 3
Modder Easts	5 7	5 7*	5 10	5 9*	6 0	5 6*
Hume Pipes	13 9†	13 9†	13 9†	13 9†	13 6†	13 6†
Natal Nav. Col.	—	—	—	23 0*	26 0†	—
New Eland Diams.	—	—	—	—	—	24 0†
New Era Cons.	6 3*	—	6 0*	6 0*	6 0*	6 0*
New Geduld Deeps	1 4*	—	1 1*	1 4*	1 4*	1 4*
New Kleinfonteins	4 3*	4 3*	4 3*	4 3*	4 3*	—
New Modderfontun	63 0	63 0	62 9*	62 6	62 6	63 3
New Primrose	—	—	4 0*	—	4 3*	4 3*

	6th. Fri.	7th. Sat.	9th. Mon.	10th. Tues.	11th. Wed.	12th. Thurs.
New Unifeds	3 0*	—	3 6*	—	3 6*	—
Nigels	4 3*	—	4 0*	—	1 6*	4 0*
Nourse Mines	7 0*	—	7 0*	7 0*	7 0*	7 6*
Pretoria Cements	39 0	38 9*	39 0*	40 0†	—	35 6*
Princess Estates	0 11*	0 11*	0 11*	0 11*	0 11*	1 0*
Rand Nucleus	1 2*	—	—	—	1 2†	1 0*
Randfontn. Central	9 0*	9 6*	—	10 0†	10 0†	—
Do. Estate	14 4‡	14 4‡a	11 0	14 0	13 9*	13 9*
Roberts Victors	3 0*	7 0*	7 0*	7 0*	7 0*	7 6*
Rooibergs	7 4*	4 0†	—	4 0†	4 0†	4 0†
Simmer and Jacks.	—	—	—	2 0*	—	—
S.A. Lands	4 0*	4 0*	4 0*	3 11*	4 0*	3 10*
Springs Mines	32 0*	33 0	32 0*	32 3	32 6*	32 3*
Sub Nigels	9 0*	9 0*	9 0*	—	9 0*	—
Transvaal Lands	—	13 6*	—	14 0*	—	—
Van Ryn Deeps	60 0	60 0a	60 0	58 0*	58 0*	57 6*
Village Deeps	—	—	7 9†	7 9†	7 9†	—
W. Rand Estates	2 9†	2 9†	2 3	2 3*	2 3*	2 6*
Witwatersrands	11 0*	11 0*	—	—	11 0*	—
Do. Deeps	7 6*	—	—	7 6†	7 3†	—
Woluhuters	3 0*	3 0*	—	3 0*	3 0*	3 0*
Zaaiplaats Tins	2 6*	3 0†	2 9	3 0†	2 9*	2 5*
Union 5 per cent.	£99‡	£99‡*	£99‡	£99‡	£99‡*	£99‡
New State Areas	19 0*	19 10*	19 9*	19 6*	19 9	19 6*
Rouxville Diams.	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
S.A. Townships	8 6*	8 6*	8 0*	8 3*	8 3*	8 3*
S.A. Alkali	11 3*	11 0*	11 3*	11 6*	11 9*	11 6*
Transvaal Silver	24 6*	24 9*	24 3*	24 3*	24 3*	25 0
West Springs	7 0*	7 2*	—	7 3	7 3	7 1*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

The Successful Motor Lorry.

One of the reasons for the pre-eminence of British motor wagons is that open competitions are held between the different makers every year. A trophy is awarded annually for the most successful performance in any certified trial for a total distance of over 1,000 miles. The successful vehicle at the last trial gave an average running speed of nearly 16 miles per hour, with a consumption of motor spirit of 13 miles to the gallon. The lorry was fully loaded, its total running weight being 5 tons 6½ cwt. The oil consumption worked out at 504 miles per gallon, and throughout the whole of the 10 days' trial no adjustments were effected except the cleaning of a choked petrol cock.

New Form of Stainless Steel.

The early forms of stainless steel were not such as could be easily worked, but a British firm of steel makers has been carrying on a series of experiments with a view to producing a steel which will retain rust resisting properties and can be worked without difficulty both in the hot and in the cold state. These experiments have been successful. The new plastic rustless steel can be stamped, punched, pressed, chased, or engraved cold; and it can be bent cold to a diameter equalling its own thickness without showing any signs of fracture. It may be polished silver bright, and this polish will remain in any atmosphere. In many cases a piece of this steel has less than half the weight of a brass or nickel piece of the same strength.

Regulations for Water-tube Boilers.

The voluntary work done in Great Britain in connection with standardisation is known all over the world, and it has been supplemented by a considerable amount of enterprise in arranging rules and regulations in connection with the proper use of engineering equipment. One of the most recent examples is the set of rules prepared by a British committee governing the installation of water-tube boilers in merchant vessels. These rules have received official approval, and will therefore become standard practice. This committee intends to continue its labours in other directions where unified rules are likely to be of advantage.

Letters to the Editor.

MR. SCOTT ALEXANDER HITS OUT!

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—It pleases me to think that my short letter to your esteemed journal of December 3, on "the genesis of the diamond," and my tip how to make them with human ingenuity, has, according to a correspondent, Mr. James Ennis, in your last issue, caused some amusement on account of my unscientific language in describing a "sub-crustaceous" diamond pipe as "a pipe with a lid on."

I am afraid I am too old now to change my style of writing to suit certain would-be scientists, or the educated ignorant either, by peppering my stratigraphical effusions with geological 'ites, 'tites, and 'dotes, etc., from text-books, in order to impress the layman with one's great ability, when, as a matter of fact, I long ago discovered that most men who do so do so to camouflage their lack of it.

What "the Witpoortje-break," which Mr. Ennis inappropriately drags into his letter, has to do with the diamondiferous subject under discussion, I fail to perceive. Nevertheless, I thank him for the opportunity he has given me of again informing those whom it may concern, in spite of all that so-called orthodox geologists have written to the contrary, that there is no such break in existence; and that Main Reef Series, such as it is out west, trends in quite a different direction to that adhered to by them. For miles and miles it is very cunningly covered by our highly auriferous Black Reef age, which nature built up and completed millions of years later to spoof the inexactitudinarians who came hither from Europe after these fields had been discovered with only one object in view—! which object, thank goodness, has never been mine, even though I may be heading for an unfamed grave by "telling the truth to others," which "Ennis" appears to regard as criminal. "Taut mieux," sir, for "truth carries its own conviction," whether it comes off in my time or after.—I am, etc.,

SCOTT ALEXANDER,
Rand Stratigraphist.

Johannesburg,
January 8th, 1922.

UNITED STATES PATENTS.

REPLY TO MR. E. J. WAY'S LETTER.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—We have read Mr. E. J. Way's letter of the 30th ult. To avoid misunderstanding, it must be clearly understood that our criticisms have nothing whatever to do with the merits of his invention, as such. We are concerned merely with the two erroneous and very misleading statements made in the published report of his company, that:—

- (a) It "forms a record" to have secured the grant of a patent in the United States within a period of approximately 11 months;
- (b) "usually United States patents have taken from two to five years before issue";

and with the inferences suggested or to be drawn therefrom.

As Mr. Way no longer refers to (a), we assume that he admits its incorrectness. With regard to (b), he is sceptical of the harm the statement may do, if left unchallenged, and thinks he was justified in making it because the average time which elapsed between the date of application and the date of grant, as disclosed by 100 United States specifications in his possession, was three years eight months. Your readers will probably have gained from this statement the impression that his 100 cases, which he says are "not selected in any way," are cases actually lodged and prosecuted by himself, or with the prosecution of which he has been in some way associated; and that they may, therefore, fairly be compared with the figures we gave concerning the

last 50 accepted U.S.A. cases lodged and prosecuted by us. We are sure it was not Mr. Way's intention to convey this impression, but as a fact his letter has been so interpreted by various persons who have spoken to us on the subject. We suggest, however, that he was alluding, not to 100 U.S.A. applications of his own, but merely to 100 specifications cited by the U.S. examiners and sent to him, in response to one or more applications made by himself, to indicate the state of the art—which is a very different thing. It is quite true that such specifications are not selected by him, but they certainly are selected by the examiner; they usually embrace a wide period of years and they form an utterly fallacious basis for estimating the average time required to obtain a grant. When, as is presumably the case here, they deal with a somewhat complicated art, the result is more misleading than ever.

Another Table.

As, however, Mr. Way refuses to be convinced by our own experience, we give below another table prepared from the monthly journal published officially by the U.S. Patent Office. The date given by the journal is that of the actual grant, which is anything from one to seven months later than that of acceptance, upon which our previous table was based.

We have taken 100 consecutive cases from the beginning of the journal (a recent one, taken at random from our files), and 100 consecutive cases from the end, and the amalgamated result is as follows:—

Granted within 6 months	20
Granted under 12 and over 6 months	47
Granted under 18 and over 12 months	48
Granted under 24 and over 18 months	42
Granted under 30 and over 24 months	18
Granted under 36 and over 30 months	10
Granted under 42 and over 36 months	1
Granted under 48 and over 42 months	5
Granted under 54 and over 48 months	5
Granted under 60 and over 54 months	3
Granted over 60 months	1

200

It will be seen that 57.5 per cent. of all these cases were granted within anything from six to eighteen months and no less than 78.5 per cent. within two years from date of application, while, as our experience has proved, there are isolated instances of grants occurring within two or three months. The average time for the whole 200 is 21 months. The journal from which this table has been prepared can be seen at our office by anyone interested.

Your readers can now decide for themselves whether an unchallenged public statement, to the effect that it is likely to take from two to five years to obtain a grant for a patentable invention in the U.S.A., is or is not disturbing to interested parties, from the fact that, owing to the nature of the examination carried out in that country, before allowance takes place, the patent, when issued, is generally regarded as presumptive evidence of novelty. Mr. Way himself, has derived great satisfaction from the knowledge that his U.S. application has been allowed, and yet he thinks it strange that other inventors, and those who are jointly concerned with them in exploiting their ideas, should be upset at hearing that instead of the comparatively reasonable time of 12 to 18 months which they have been assured is likely to elapse before they know the fate of their U.S. application—which is somewhat in the nature of a test case—they are likely to have to wait from two to five years, and that a grant within a year is "a record."

Further Comment.

We have one further comment to offer. In referring to the time taken to secure the acceptance of an application, the intention seems to have been clearly to suggest that rapid allowance in a country like the United States of America may be taken as an indication that the official search has failed to disclose any serious obstacle. We have already stated that we are not concerned with the merits

or demerits of any particular case, and nothing we say must be interpreted as a reflection in the slightest degree upon the value of Mr. Way's invention or the efficiency with which his application has been prosecuted. But here also it is utterly fallacious to convey—even if unintentionally—the impression that the time occupied by the proceedings can be regarded with any degree of accuracy, as an index of novelty except where there have been no citations at all and the patent issues at once. It is the practice of the examiners in all "searching" countries to cite such prior specifications as are held to suggest or anticipate, wholly or in part, the idea sought to be patented, and it stands to reason that the surest way to expedite the grant is to surrender, in the face of official opposition, claims which by proper argument could and should be maintained; in other words, that a patent which has taken two years to secure may be much more valuable than one which has taken, say, nine months to secure, because, in the one case, you have got what you set out to get, and in the other you may not have done so. There is no general rule applicable to such cases. Each must be considered entirely on its own merits and the acid test of value is, and always must be, the margin of novel and patentable subject-matter left in the claims, as finally granted, and the practical relation of that matter to the art. This will be better understood when it is added that any valuable and patentable feature omitted or eliminated from the claims becomes dedicated to the public; while, on the other hand, claims drawn too wide are a serious menace to the patentee's security. An example of the latter evil occurred in the case of The Cassel Gold Extracting Co., Ltd., v. The Cyanide Gold Recovery Co., *e.a.*, decided in England, but well known here; and of the former in a case concerning the Welsbach mantle, decided in Germany, where it was found that a really novel and valuable feature was contained in a claim which had been abandoned in the face of the examiner's objections and thus lost for ever.—We are, etc.,

D. M. KISCH & CO.,
Chartered Patent Agents.

SCRAP THE GOLD LAW. LESSONS FROM RHODESIA.

To the Editor, *S. A. Mining and Engineering Journal*.

Sir,—The President of the Chamber of Mines has stated that "in order to save the low-grade mines a drastic reduction in the present number of semi-skilled white underground workers is inevitable." He further states that in any case some of the mines must close very shortly as a result of the lowering of the gold premium and that the result will be to render a number of skilled mineworkers idle. It has been suggested that doubtless a number of the retrenched workers will migrate to the farms and resume their former occupations as agriculturists. It is also a possibility that they may elect to stay in the towns and add considerably to the problem of the "poor whites." One might enlarge *en passant* on the effect of such a foreshortening of white labour on the prosperity of the trading community, and indeed of its ultimate effect on the economic progress of the Union. Ministers have not hesitated to state deliberately that the economic welfare of the Union hangs on the mining industry of the Witwatersrand. While not subscribing *in toto* to that enunciation, one may admit that the maintenance of the gold mining industry is a vital present factor in our progress, and any measure which promises a continuation of its activities is worth the serious attention of all men.

It would seem as though the industrial welfare of the Rand can only be secured by the centralisation of the gold production within a well-defined area and subject to the equipment of huge plants dealing with immense tonnages of gold-bearing ore. Doubtless the present basis of the Rand mining industry demands all these appliances as essential factors in gold production, and carrying in their train

expensive administrations and all the heavy overhead charges incidental to such. Assuming the correctness of present-day assumptions, we may as well face the facts and declare that the days of the Rand gold mining industry are numbered and that unless other industries are brought to fruition the Reef will in a comparatively short time return practically to the state of the Kimberley or the Barberton of to-day. Our deposits of high-grade gold bearing ores are extremely limited. On a basis of 84 shillings and sixpence an ounce gold, and with working costs reduced to 20s. per ton, we require approximately 5 dwt. ore to cover expenses. Gold ore above 5 dwts. must then be exclusively mined to enable the industry to subsist. A large number of our mines cannot mine this grade on present costs nor even on the 20s. per ton basis. Must we then lay it down that all reef under 5 dwts. is economically worthless? It may be answered that cheaper processes of extraction will some day make them profitable, but can we afford to wait for such a consummation? One cannot calmly consider such a possibility, and a better way ought to be and must be found to deal with low-grade ores. After all, the term low grade is purely arbitrary and relative. It is so far from being a fixed quantity that, out of the 15 mines declared unpayable under the present system, about 12 of them are again at work by means of syndicates or small companies with strictly limited capital.

It is evident therefore that, given relief from excessive overhead charges of all kinds, it is possible, even under our present obstructive gold law, to make ore of less than 5 dwts. grade a payable proposition. Here then is a glimmer of hope for our low-grade mines, and consideration of the new possibilities of intelligent mining combined with severe economy will afford food for much thought on the ways of mining on the Rand. But this is not enough, while proving that our big mines are extravagantly and uneconomically mismanaged, despite high salaries for technical knowledge applied to mining problems, and organisation presumed to be up to date in all departments, the small ventures are limited in extent and in scope for further expansion by reason of the circumscribed areas allotted to them and because they can only mine derelict ground. Why, if under difficult conditions these small syndicates can produce gold at a profit, cannot other ventures be encouraged to enter the field and exploit the untold wealth of the Rand? Even the veriest tyro in geology knows that we have not one but a series of gold-bearing blanket ore bodies running north and south of the Main Reef series and practically parallel with them. Except in a minor degree no effort has been made to exploit these gold carriers.

Attention has been concentrated on the one series which from its inception offered the maximum profit to the adventurers. No blame attaches to them for this restrictive policy. The Main Reef series of the Witwatersrand has become a household word over the whole of the civilised world, and the pioneers of the industry, together with their successors, have earned a large debt of gratitude from mankind for their successful creation of the stupendous gold mining industry of the Rand. The Union of South Africa, the British Empire, and the world are all their debtors; all honour to them. But we are entering upon a new era, *autre temps autre travailleurs*, to alter somewhat an apt phrase. The present day calls for drastic alterations in mining matters, and the way must be paved for the exploitation of all the gold reefs without let or hindrance, hence the necessity for scrapping the present gold law. The minerals of South Africa are inherently vested in the State as trustees for the people of the Union. Under various pretexts the mineral wealth of the country has been filched from its rightful owners and has become attached to the land. One pernicious result of this betrayal of the public good by the trustees—to wit, the Government—is that a considerable proportion of the wealth of the country is only accessible to citizens, under heavy fines and penalties, and is only to be exploited at the whim and pleasure of the owners of surface titles, Government licences, and onerous dues of many kinds. Payments for options, leases, or purchase of the minerals made to private individuals, and

the right—freely exercised—of such persons to absolutely prohibit the winning of minerals on lands belonging to them:—this arbitrary power vested in individuals is altogether detrimental to progress and paralyses the energies of those who would venture monies and labour in the hope of discovery of workable minerals.

In this way practically all the gold bearing Rand ores are withheld from public exploitation. The surface owners, being in most cases the mine owners, absolutely refuse individuals the right to mine gold on such areas, alleging interference with present-day mining operations and such like trivialities to prohibit ventures of any kind. Wayleaves, royalties, licences and right of prohibition all together make mining in such areas impossible. While sufficiently close to us here to constitute a grave injustice to the people of the Rand and elsewhere, exactly similar conditions militate against mining progress throughout the Union.

In Britain the minerals have reverted to the State because it has been found impossible to correlate private avariciousness with the public interests. It is only a matter of time before the same paramount necessity for the protection of the national rights of the people of the Union will also lead to a restoration of the mineral wealth of South Africa to their rightful owners. In this, as in many other ways, the extremely liberal mining law of Rhodesia gives us a lead which we would do well to follow. It is there enacted that "any white person resident in the territory may apply for a prospecting licence at any mining commissioner's office and that such licence will be granted on payment of one pound sterling." Armed with this document, the prospector can enter upon any land, public or private, in the territory, and seek therein for minerals and such like natural deposits. Provision is made for the homestead and for cultivated lands in that pegging is prohibited at any point nearer than 300 yards of such places. Outside these limits the miner is free to act as he wishes. If he locates a reef or deposit, he safeguards himself by putting up a temporary discoverer's notice, and under cover of this he is given 31 days wherewith to prospect his area of 1,000 square yards. He is also allowed free grazing for his cattle and access to water and timber, etc. Should he desire to locate a block of claims, he is allowed ten claims, each 150 x 600, for any one licence; he can make his own survey—a rough measurement is accepted, together with a rough plan of the claims, and on payment of an additional 5s. this block of ten claims becomes vested in himself with right of transfer.

It will be seen therefore that for a payment of one pound, plus 5s. registration fee, anyone may secure a block of ten claims, which in most cases will suffice for a five-stamp mill or a Tremayne mill. To ensure working the property the law provides for a minimum development yearly under pain of a fine, and if unworked after three years for forfeiture. This ensures adequate exploitation of the property and prevents locking up of minerals for private greed. A small royalty is further charged by the Government on all minerals won by the mineowner. It will be seen then that under such a law a great impetus is given to mining by small syndicates or by individuals. It is this method which has dotted the northern territory with a large number of small mines and has made Rhodesia a factor in the world's gold producers, ranking to-day fifth or sixth in the list. Apart from the liberal provisions of the gold law, another factor figures prominently in the successful mining of gold, etc., in the north. Most prospectors are poor men, who of themselves are quite unable to provide for the equipment of their properties. The Government assists them liberally with technical advice and will sometimes advance small sums of money. The mainstays, however, of the small miner are the various traders and mining machinery houses, who render enormous assistance to the miner in this direction.

Given that the prospector is a decent citizen and fairly credible, he need have no hesitation in approaching a trader or machinery merchant for help in making his mine a success. Literally hundreds of men have been provided with the necessary plant to produce gold, and with the credit needed to tide over the preparatory period before milling

operations commence. A pre-arranged monthly repayment of such sums as may be advanced is sufficient to ensure support. It says much for the high standard of honesty amongst Rhodesians that less than 1 per cent. of the beneficiaries fail to meet their obligations.

Here then is the way out. The prospectors of Rhodesia are recruited from all ranks and professions, and a very large majority have made good despite the limitations due to lack of mining knowledge of such men. The writer has in mind the case of an ex-storekeeper who twenty years ago started as a mineowner on a 2 dwt. rubble and quartz proposition in Mashonaland. He has prospered exceedingly, and he himself with his wife and a family of twelve daughters have made good and to-day possess a splendid farm well stocked with cattle, an excellent motor car, and a large measure of the amenities of modern civilised life, and he is only one out of many who started penniless and have "arrived."

What is being done in Rhodesia can be equally well done here. Give men a chance to make good, open up the mineral wealth of the country, dot the Rand and elsewhere with small mines, and prosperity will continue to smile upon us for generations to come. We can afford to be optimists. We only need a constructive policy on the part of the Government to transform the Union and to make it the home of countless contented workers who, unharassed by vexatious mining restrictions from Government, controlling houses or unions, will work out their own destinies themselves, and in the end build up a contented and industrious white nation in South Africa.—Yours faithfully,

W. H. JONES.

Railway Extension in the South-West.

Since March of last year the railway line connecting Windhuk with Otjiwarongo has been in process of construction. Despite unforeseen difficulties and the practical cessation of work for nearly six weeks, when the natives employed on the work were laid down by influenza, the work was steadily pushed on.

The length of the track now completed is 45 miles, and over this a bi-weekly train service will be run. This extension will open up the vast hinterland, as planned in pre-war days. The present scheme of construction has followed very closely upon the plan originally made. From Otjiwarongo to Kilo 44 a light type of rail has been used, and from thence forward a heavy gauge track has been laid.

During the course of building the line two large bridges were erected over the rivers (which are not always dry at present). One bridge is found at Kilo 9 and the other crosses the Ugab River. Water is found in abundance at Kilo 9 and again from wells in Outjo, but efforts to locate water by boring elsewhere have, so far, proved unsuccessful. The nature of the land does not hold out much prospect of finding a supply rapidly or easily.

The country simply teems with game. The herds of gemsbok, koodoo and flocks of guinea fowl bear witness to the solitude of the place. Jackals, of course, are found in abundance. The spoor of lions have been seen quite close to the new line, and a story was circulated of a lioness which attacked a group of native labourers who had ventured into the bush on one occasion.

During the building operations 17 white men were employed on the work, together with close upon 350 natives. In round figures the cost of building the extension runs to £30,000. The work of building was done during the dry season, and fortunately the heavy rains have held off so that the task has come to a successful end.

The station at Outjo and the various public buildings were sumptuously decorated for the opening ceremony by His Honour the Administrator (Mr. Hofmeyr).

The mining industry contributes about 60 per cent. of the revenue of the country. The mines have been paying in wages alone, before this disastrous strike commenced, at the rate of ten millions sterling per annum.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

STRIKE POSITION—IRON AND STEEL—UNION'S GRAIN ELEVATORS — TIMBER AND BUILDING MATERIALS—OILS AND COLOURS—ELECTRICAL GOODS—AMERICAN NOTES—PROPOSED WIRELESS STATION IN UNION—METAL MARKET.

General.

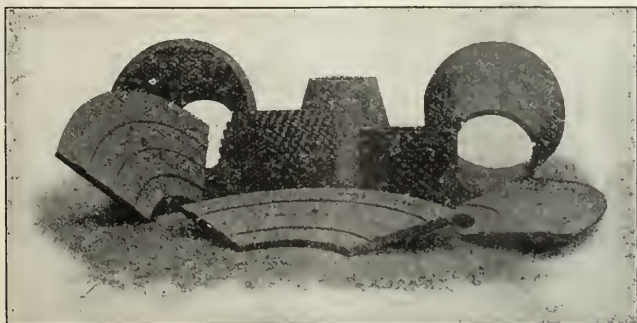
In view of the Chamber of Mines' decision to grant the S.A.I.F. a month from 9th inst. for further negotiations, despite the overwhelming majority of the miners' ballot, the strike which commenced on Tuesday last came somewhat as a surprise to the community. At the moment all the mines from Randfontein to Springs are closed down, and, in the opinion of some people, one or two of them may never re-open. The Rosherville station of the Victoria Falls and Transvaal Power Co. is alone working to supply essential services. Over 22,000 men are on strike, comprising miners, reduction workers, engineers, engine drivers, moulders, wood workers and builders employed in the affected industries. The Chamber of Mines has given notice of its intention, if the strike continues, to start repatriating the natives next Monday and to discharge all workmen not required for essential services. The Federation has submitted to General Smuts the basis on which the Unions are prepared to discuss terms of settlement. In some circles the hope is expressed that even now a solution of the dispute may yet be arrived at, while in others, seeing the determined stand taken up by both parties, it is feared that the trouble may become more acute and last longer than is generally expected. Is the strike this time to be fought out to the bitter end—as inevitable as it is obvious—or are we again going to justify our name as being a land of compromises? There are not wanting those who think that a compromise of some sort will eventually be adopted, and that any reductions imposed upon the rank and file of the miners should also be shared by those in higher places. In the meantime we can rest assured that the Government will leave no stone unturned in endeavouring to bring the dispute to as speedy an end as possible, bearing always in mind the present grave state of the mining industry and the absolute necessity of effecting lower working costs. Evidence is apparent on all sides that as soon as the present labour dispute shall have been satisfactorily settled and a proper level of production cost reached, a lot of work held back pending such a decision will be given out. Along the reef there are many contracts

in suspense, and as soon as the atmosphere clears, it is expected that building operations on a very large scale will be commenced, as building materials, which have dropped considerably during past months, are, in the opinion of most, about as low as we are likely to see them for some time to come. Timber is inclined to harden slightly, while mining material shows a somewhat sagging tendency.

Iron and Steel.

The New Year has belied expectations in regard to mining requirements; business there is practically none, and no improvement can be looked for until the labour dispute has been settled. One prominent importer said the only thing for mining material merchants to do now was to send their representatives to outlying districts—Cape Colony, Natal, etc.—to do business, as during the strike there would be nothing doing here. The following prices are as approximately correct as can be given, but the tendency in some lines, especially heavier, is slightly easier.

Latest quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d.



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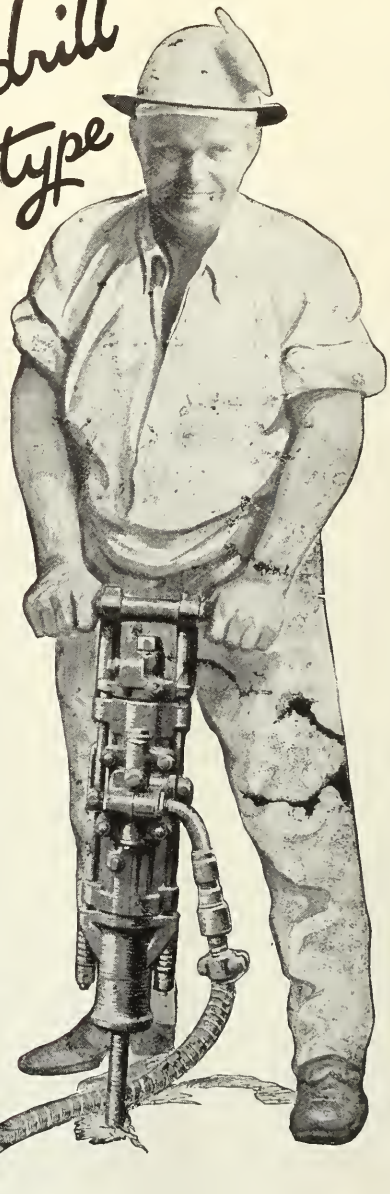
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Liners, etc., and for all parts subjected to
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per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ in. to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{3}{4}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; hammer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., exceedingly scarce, 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 21s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening, 3s. to 9s. 6d. per sq. yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{4}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton.

I.C. Steel Coke Tin Plates.—The market is steady. I.C. 14 x 20, 112s., 108 lb.; coke quality, 21s. per box. I.C. 28 x 20, 112s., 216 lb.; coke quality, 42s. per box.

Union's Grain Elevators.

The *Daily News* announces that the contracts for the thirty-six grain elevators in South Africa, whose construction will shortly be begun by Messrs. A. W. Menkins & Co., have been placed with English firms. The order for the terminal elevator at Durban, which will have a capacity of 42,000 tons and a loading capacity of a thousand tons per hour, and also for smaller collecting elevators in different parts of the country, which will feed the terminals at Durban and Capetown, has been given to Messrs. Spencer & Co., of Melksham. Messrs. Henry Simon & Co., of Manchester, will equip the big elevator at Capetown with machinery. The whole of the steelwork required for the construction of the elevator will be supplied by the Furness Shipbuilding Co., Middlesbrough.

Timber and Building Materials.

Business in these is practically at a standstill; there is a little work going on in the building trade, but during the strike nothing much will or can be done.

Prices.—3 x 9 deals, 1s. to 1s. 1d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; ceilings, 4 $\frac{1}{2}$ d. to 5d.; Oregon, 6s. to 7s.; pitch pine, 6s. 6d. to 7s. 6d.; corrugated iron, 9d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1 $\frac{1}{2}$ in., 11d.; 2 in., 11 $\frac{1}{2}$ d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1 $\frac{1}{2}$ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 5s. to 55s. for 1 to 3-ply.

The building trade artisans at the Cape are much perturbed by the announcement that the master builders have given notice to reduce, after the expiration of three months, the new wage scale which has just come into force.

Blue Building and Plaster Lime.

Trade in this section has fallen off somewhat, due mainly to the builders' holiday and also to the state of business in general. With the advent of the strike, sales are bound to drop further, as for the present we cannot expect an expansion in the building trade.

Standard quality building lime is being sold at 3s. 9d. bag, whilst the plaster lime is fetching 4s. 9d. bag. There is still a certain amount of inferior lime to be had at cheaper prices, but contractors are not anxious to purchase products of doubtful quality.

A new company about to be formed called the Union Lime-Sand Brick Manufacturing Co., Ltd., has issued a prospectus for private circulation. One of the main objects of the company is to manufacture a lime-sand brick. The sand can be obtained from any mine dump and the process only takes about ten hours to produce the finished article. In America and Germany this brick has met with much success and has proved itself more efficient than the ordinary clay brick. When this company is producing it will mean greater business for the blue lime producers, who are therefore awaiting the result of their venture with much interest.

Second-hand Iron and Timber Yards.

There is little or nothing doing in these, awaiting the result of the strike. Prices remain at 6d. to 7d. for iron, 9d. to 10d. for timber.

Oils and Colours.

White lead in oil, 10 $\frac{1}{2}$ d. lb., 39s. per 50 lb. kegs; red lead, 10d. lb., 9d. lb. in 50 lb. kegs; dry white lead, 1s. 6d. per lb.; linseed oils, raw or boiled, small bottles, 1s. 6d. each; 7 lb. tins, 8s. each; 4 Imperial gallons, 37s. 6d.; spirits of turpentine, small bottle, 2s. each, 10s. 6d. per 83 Imperial gallon; turpentine substitute, 5s. 6d. per tin, each 5-6lbs Imperial gallon; putty, finest linseed oil, 4 $\frac{1}{2}$ d. lb. in 100 lb. drum bulk; English putty, in bladders, 6d. lb.; colours, ground, in oil, 1s. 6d. to 4s. 6d. lb.; dry colours, 6d. to 10s. 6d. lb.; colours, ground, in water, 1s. to 2s. lb.; in turpentine, 3s. to 10s. 6d. lb.; in gold size, 2s. 9d. to 6s. lb.; ready mixed paints, 1s. 6d. lb.; roof paints, 16s. 6d. 14 lb. tin, 75s. per 70 lb. drum; varnishes, 30s. to 47s. per Imperial gallon; alum, in powder, 9d. lb.; creosote, 4s. 6d. per 5-6lbs Imperial gallon tin; gum arabic, 3s. 6d. lb.; resin, 8d. lb.; coal tar, 17s. 6d. per 4 Imperial gallons; Stockholm tar, 47s. 6d. per 5 Imperial gallons; common glue, 10 $\frac{1}{2}$ d. lb.; good quality, 1s. 3d.; finest Russian, 1s. 6d.; gold leaf, 3s. 9d. per book; transferred, 4s. 3d. per book; aluminium leaf, plain, 1s. 9d.; transferred, 2s. per book.

Electrical Goods.

Dealers report that during the past fortnight there have been scarcely any orders from the country. Until quite recently it was quite common to receive, say, from Kimberley daily orders, but there is nothing doing now. From Brakpan, Springs, etc., a few orders trickle in, but not of much importance, and inquiries are very scarce. Town orders at the moment are of an insignificant character and do not keep importers warm. There are no alterations in prices to report. Electrical materials are arriving freely and full stocks in nearly all lines are held.

MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A. 17			

OVERSEERS' CERTIFICATES (Metal).
 So far as we know we have only had 6 failures this year (1921)

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prot. Yates),
St. James' Mansions, Eloff St. Johannesburg

American Notes.

Oil shares in America have recently been in demand, the taking up of stocks of those transportation companies that have demonstrated their ability to earn their dividends through the recent period of depression having caused revived interest in these concerns. The probabilities of enhanced values on market prices are considered very good, as the outlook for the American oil industry is very bright. Prominent oil men look for an advance soon in the price of Mid-Continent crude oil of about 25 cents a barrel. A cable from New York reports the receipt of advices from Sahara, Asiatic Turkey, that oil concessions in Northern Persia have been granted to the Standard Oil Co. for 50 years, the Persian Government receiving 12 per cent. of the gross profits.

The American Steamship Owners' Association reports immediate reductions in the wages to crews, amounting to 15 per cent. and upwards, in order to meet foreign competition; officers' pay will be reduced by a similar amount.

Exports and Imports—America, Britain and Germany.

Washington reports that the values of merchandise exported to the various quarters of the world during October fell to fractional parts of the totals for the same month last year, while decided drops in imports were noted by the Commerce Department in its monthly summary of foreign trade.

Exports to Europe during October aggregated \$196,000,000 compared with \$423,000,000 in the same month last year, while imports amounted to \$67,000,000 against \$88,000,000. During 10 months ended with October exports to Europe were \$2,056,000,000 against \$3,720,000,000 for the corresponding months of 1920, while imports for the same period aggregated \$622,000,000 compared with \$1,078,000,000.

Great Britain exported \$85,000,000 against \$160,000,000; imports, \$19,000,000 against \$34,000,000.

Germany exported \$26,000,000 against \$32,000,000; imports, \$7,600,000 against \$7,900,000.

Wireless Station in the Union.

The Marconi Wireless Telegraph Co. have made a proposal to erect in the Union at their own cost, at an expenditure of not less than £400,000, a wireless telegraph station capable of conducting messages to Britain and elsewhere if required, the same to be completed within eighteen months. Alternatively, they offer to build stations and conduct same on joint account for the S.A. Government, on a basis similar to that approved by the Australian Parliament. These schemes open up big possibilities.

British Coal Wage Cuts.

The Times states that in the Northumberland coal field the reductions on October rates range from 5s. 2d. to 2s. 9d. a shift. In Scotland the daily wage has dropped from 13s. 10d. to 9s. 8d.; in South Wales a decline of 3s. 5d. a day has been registered, the daily wage of labourers falling to 6s. 5d. In Cumberland wages are reduced from 48 to 30 per cent. upon base rates. Few miners, however, are working a full week. Despite reductions of from 1s. 6d. to over 3s. per shift, many of the West Yorkshire pits are not yet on an economic basis; and many thousand coal miners in the United Kingdom are idle.

The Great Western Railway Co. has recently announced a reduction of 10s. in the charge for conveying motor cars through the Severn Tunnel.

A proposal has been made to extend the City and London Railway beyond Clapham Common terminus to Tooting, Streatham and Southfields.

South African Reserve Bank.

According to the statement of this bank for the week ended January 7, the ratio of cash reserve and liabilities to the public was 72.7.

Metals Market.

Latest London advices: Standard copper, £65 17s. 6d. cash and £66 15s. forward; electrolytic copper, £73 10s. cash and £74 10s. forward; standard tin, £166 17s. 6d. cash and £168 17s. 6d. forward; foreign lead, £24 7s. 6d. cash and £24 7s. 6d. forward; quicksilver, £10 7s. 6d.; bar silver, 35½d.; and bar gold, 97s. 6d. per ounce.

The mines cannot retain their large complements of native labour in idleness for more than a few days if the European workers do not return to their jobs. In the interests of the public peace and safety, and because of the inability of the mines to keep on paying idle boys, they will have to repatriate the "boys." Many of the natives so repatriated will take months to procure again, even if they ever return.

A Neat Gas Engine Accessory.

It often happens that when the spark apparatus of a gas engine fails the magneto is alleged to be at fault, whereas the trouble is due really to imperfect insulation. A British firm has brought out a simple appliance for testing the insulation without dismantling. This appliance consists of a handle carrying a stem on which an insulator plug and a pivoted lever are united by means of simple connections. The magneto may be tested for spark and the pole-piece for leakage.

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The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

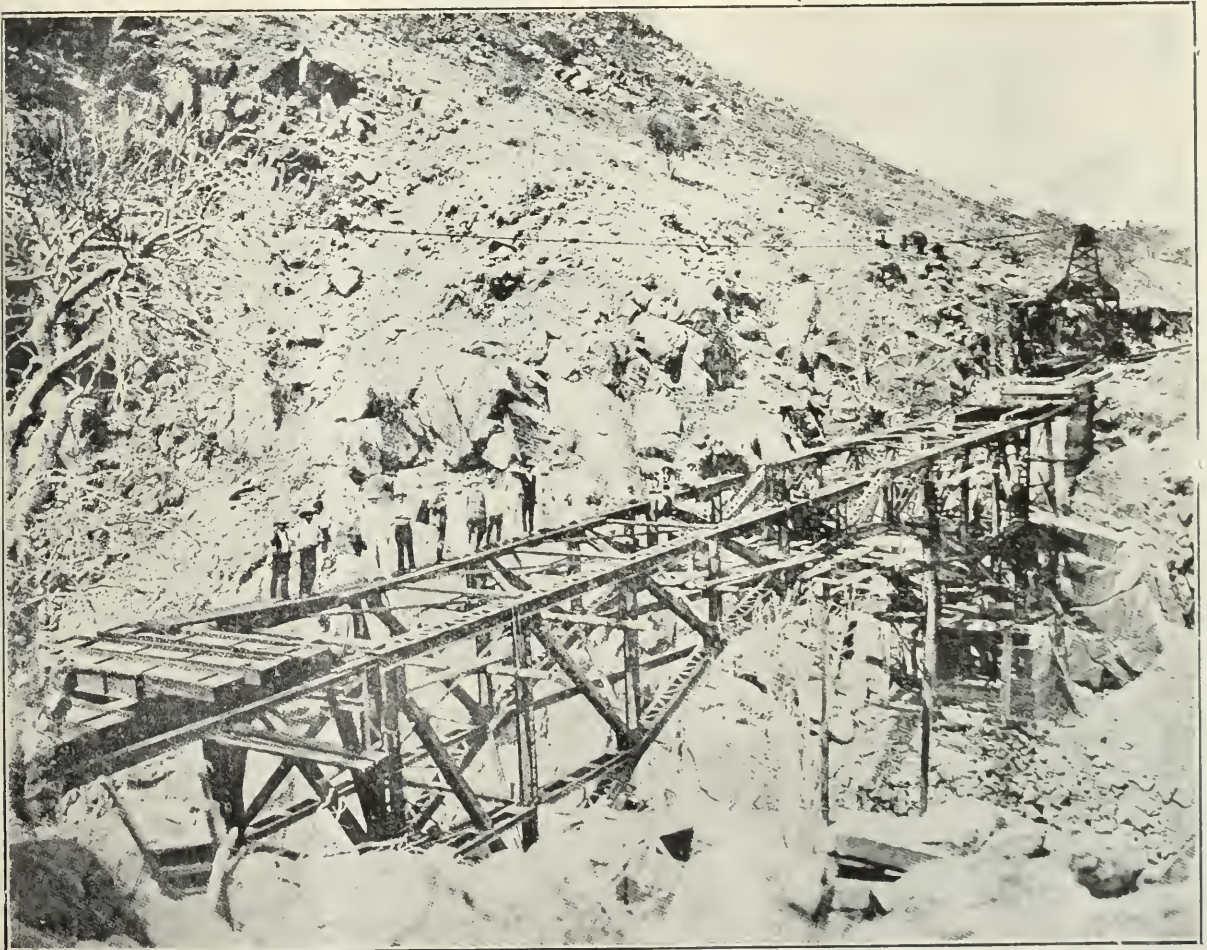
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, JANUARY 21, 1922.

No. 1582.

ON THE BENGUELLA RAILWAY.



Constructional work on one of the bridges on the Lobito Bay Railway, the "Open Sesame" to Central Africa. The eventual destination of this line is the great copper field of Katanga. Constructional work has been at a standstill for some years, but there is a prospect of a resumption of work in the near future. The matter is discussed in an article appearing in this issue.

SIEMENS BROTHERS

AND
COMPANY, LIMITED.

MAGNETO MINING TELEPHONES

Hermetically sealed DIAPHRAGM behind extra strong GRID.

Gold plated DIAPHRAGM.

Very strong Dampproof CORD.

Powerful (160 Ohm) Watertight SIEMENS BELL.

Very powerful hand GENERATOR.

Bare, tinned, copper internal CONNECTIONS.

Loud speaking RECEIVER

CORD specially reinforced here

Highest quality dry-cells.

Very efficient renewable CAP-SULE TRANSMITTER.

Wide, Machine-faced joints, damp, dust and flame proof

3 separate compartments for:—
 (1) Telephone.
 (2) Line terminals.
 (3) Battery.

Increases strength. Decreases maintenance.

Closed.

DEFIES { Damp
Dust
Inflammable Gas
Rough usage
Noise

Open.

The above is pattern No. 10. Another—No. 10a—is equipped with two receivers.

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9-10, Cotts Buildings, Rissik and Fox Sts.
JOHANNESBURG.

P.O. Box 239 Capetown.

Telephone : 1202 Central.

P.O. Box 7404 Johannesburg.

Telephone : 408 Central

Telegrams : "SIEMENS."

THE GREAT STRIKE.

NEGOTIATIONS RESUMED—DELIBERATIONS OF THE CONFERENCE—COAL DISPUTE FIRST—
A DIARY OF PROCEEDINGS DAY BY DAY—

STOPPAGE OF ESSENTIAL SERVICES—FLOODING OF THE MINES.

An important and favourable development took place in the strike situation on Friday night, the Federation agreeing to the Government's suggestion of a conference with the employers "untrammelled by conditions." A conference on the Federation's conditions was rejected by all the employers' organisations concerned. The new proposal of a conference of five representatives of each side was first made by Mr. H. L. Lindsay, Chairman of the Unemployment Commission, and was accepted by the Federation. Mr. Warrington Smyth, Secretary for Mines and Industries, wrote to all parties to the dispute later, making the same suggestion on behalf of the Government. The Federation replied at 11 o'clock on Friday night agreeing to the conference, and hoping for "early progress towards a settlement." The Chamber expressed its willingness to participate in a conference without conditions. All essential services on the mines were stopped by the Federation as from 7 a.m. on Monday. The V.F.P., however, opened two more power stations—Brakpan and Vereeniging being run by officials. Essential services are at certain mines being carried on by the staff, but at one or two properties the position is that in consequence of the withdrawal of pumpmen and engine drivers the workings are being flooded.

Modder East Flooding.

The livelihood of the 200 white men employed on the Modder East Mine has, for instance, been jeopardised by the action of the Strike Committee at Benoni in pulling out the employees of the Kleinfontein power station. This action has prevented necessary pumping from being carried out on the mine, with the result that it is now flooding. The water is up to the 23rd level, and when it reaches the 22nd, the electric hoists will be flooded out. The financial position of this company is such that if the mine continues to flood, it is doubtful if the property will ever be able to restart again. It is stated that even if the six engine drivers on the property had been allowed to continue work, which they were willing to do, the mine could have been saved by baling in place of pumping. These men, however, were not permitted to carry on.

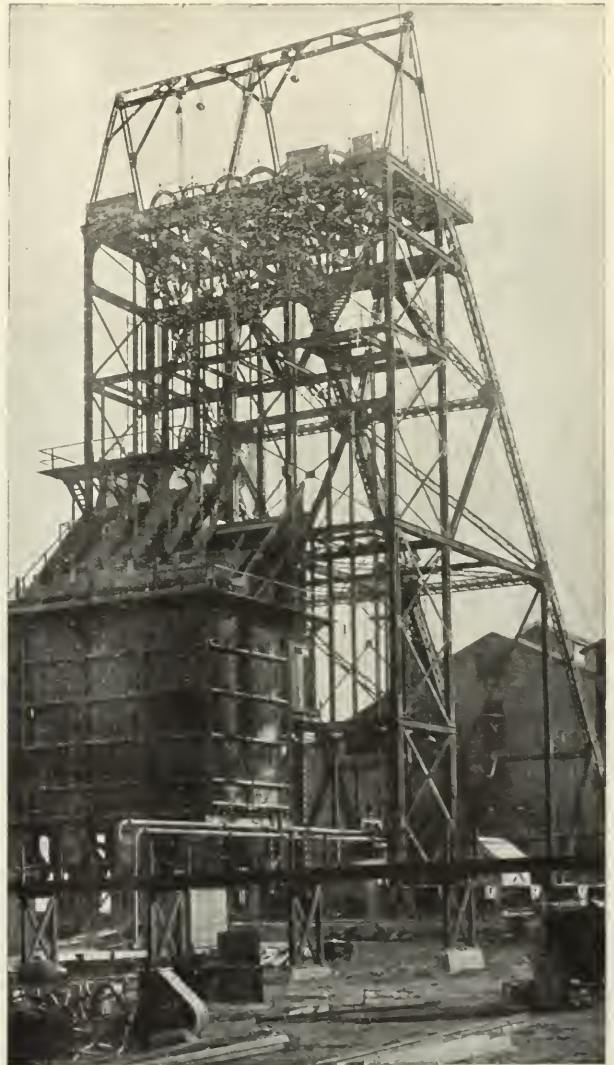
The water in the Village Deep is steadily rising, but it is not expected that it will reach the main pumps for several days. The pumps are of a somewhat elaborate and complicated design and are not easy to handle, excepting to those engineers thoroughly accustomed to the plant. Three levels in the mine are now flooded. Water is rising, too, in the E.R.P.M.

Position of Underground Officials.

With reference to the maintenance of essential services on the mines, it may be pointed out that two important resolutions were carried at a largely attended meeting of members of the Underground Officials' Association held in the Selborne Hall on Saturday evening. They were as follows: (1) That this meeting endorses the action of the Executive Committee in sending forward to the Government the following resolutions: (a) Favourable consideration from the two sides to the dispute on the coal mines having been gained by the Association for an impartial inquiry into the causes of the strike on the coal mines, that the Government be pressed for such an inquiry. (b) That pending the decision of the inquiry, underground officials on the collieries be permitted to respond to the Prime Minister's appeal, with a view to maintaining essential services. Essential services will be defined by a special committee as early as possible. In the meantime the Government's definition will be accepted, but services considered unessential will be eliminated in consultation with others concerned. The second resolution read: (2) That the action of the Executive as set forth in the letter dated January 10 to the

Government be endorsed, and that the interpretation of the Council resolution to cover all essential services on the gold mines be recommended to members by this meeting.

The Conference between the S.A.I.F. and the representatives of all the industries concerned in the present strike—gold, coal, power and engineering—commenced its work at the New Law Courts on Monday morning, and sat until five o'clock in the afternoon. The Conference con-



The Turf Shaft of the Village Deep, where the water is steadily rising.

sists of seven representatives of the employers and an equal number of the workers. After the conclusion of Monday's sitting the following official report was handed to the Press: The Conference opened this morning under the chairmanship of Mr. Justice Curlewis, and immediately got down to business. On the question of procedure, it was decided that the Conference should sit from 10 a.m. until 12.45 p.m., and from 2.30 to 5 p.m. The representatives of the Federation proposed to deal with the points in dispute in the

following order: (1) Proposed reduction of wages on the coal mines; (2) V.F.P. dispute; (3) Town shops dispute, which embraces the employees of the Engineers' and Founders' Association and the Motor Traders' Association; (4) (a) contract system on the gold mines; (b) status quo agreement, including colour bar questions and the re-arrangement of underground work. The representatives of the Chamber of Mines wished to deal with the gold mining questions first, but did not press the point, and ultimately it was agreed to follow the course proposed by the Federation. Having dealt with the question of procedure, and agreed upon the order in which the various points in dispute should be dealt with, the Conference proceeded to deal with the dispute on the coal mines. Mr. Thompson put forward the case on behalf of the workers, and was supported by Messrs. Butler, Curran and others. Mr. John Roy, in reply, set out the position from the employers' side, and dealt largely with the economic position of the coal industry. Considerable discussion followed which was participated in by members representing both parties to the Conference. At the afternoon sitting the Conference resumed on the coal mines dispute, but no agreement was arrived at before the Conference adjourned at five p.m.

Tuesday's Meeting.

The Chairman (Mr. Justice Curlewis), in opening the proceedings on Tuesday, asked whether either side had any progress to report. Mr. Roy opened the discussion by submitting statements regarding various aspects of the economic position of the coal industry. Mr. Buekle urged submission of the dispute to a Conciliation Board, pointing out that arbitration was impossible from the employers' point of view on this question, as it was a vital matter for the industry, whereas conciliation held no vital objection from the workers' point of view. Mr. Thompson replied on behalf

of the workers, pointing out that the workers had volunteered to accept a reduction of 2s. 6d. per day. He further stated that if the employers would agree to arbitration the workers would be prepared to accept the decision of the arbitrator even if it meant a reduction of more than 5s. per day. The Conference adjourned for fifteen minutes to allow the workers' representatives to consider the question of referring the coal dispute to a Conciliation Board. On the Conference resuming, the workers submitted a proposal which was under discussion when the Conference resumed at 3 p.m., and discussion was continued throughout the afternoon session. The possibility of arriving at an agreement appeared still hopeful.

The Conference resumed at 10 a.m. on Wednesday and discussions were continued on the subjects which were being discussed when the Conference adjourned the previous afternoon. The afternoon session of the Conference resumed at 2.30, and adjourned at 5.35. No agreement has as yet been arrived at. It is anticipated, however, that a decision will be arrived at on the coal question to-morrow.

It is understood unofficially that on Wednesday the coal question was still under discussion, and the point seems to have emerged in the discussions that whatever settlement was arrived at, it would be impossible for all the men at once to be re-employed.

February 16 was suggested as the date up to which the managers of the coal mines should have the right to employ either a portion of the men who went on strike or to take on the whole of them. The workers' representatives, it is understood, wanted full payment for any men taken on under the second alternative, and that the Federation should be consulted as to which men should be taken on or put off. The Chamber of Mines representatives could not agree to either suggestion.



A SCENE AT THE MODDER EAST.

Owing to the absence of power to run the pumps the water is steadily rising in this mine. This is a most serious business in view of the Modder East's financial position.

Repatriation of Mine Boys.

A SERIOUS DECISION TO WHICH THERE IS NO ALTERNATIVE.

On Wednesday there was a further drain on the native labour force of the Reef, some half-dozen special trains conveying over 3,000 boys back to their homes. The dispersal was continued apace each day this week. On Thursday there were at least five trains; and as far as can be ascertained their complements were:—

East Coast	900
Umtata (morning train)	1,000
Swaziland	450
North Transvaal (Pietersburg)	700
Umtata (second train)	1,100

"We are not pressing the boys to go," said an official concerned in the matter. "We can't keep them back. They have no work and no pay, and I think more of them would be going if the trains were provided." At the present rate of dispersal it is calculated that 35,000 boys will have left the Reef by next Wednesday.

The boys who are being repatriated are time-expired labourers who have latterly been working on the mines on a voluntary basis. A week's notice was given to 65,000 such boys at the beginning of last week, and now they are free to go as they choose.

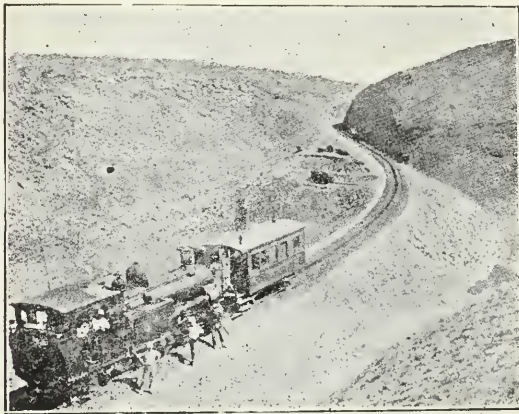
The position of the contract boys has been a little obscure—at least to the native mind—during the last few days; but the matter seems to have been cleared up by the communication of Mr. H. M. Taberer (of the Native Recruiting Corporation) to the Knights Central boys that for the present they were to be paid.

So, for the time being, the contract boys are in the happy position of receiving "skoff" and wages for nothing. The position is probably an admirable one—for the natives—but the financial considerations involved form a grave problem to a number of mines which are only just able to keep their heads above water in times when they are in full operation.

which will unlock the sealed store-house of the heart of the Dark Continent, and will pour millions in copper, lead, zinc, tin, coal, meat, rubber and tropical produce upon the West Coast—a good five days nearer England than Capetown. But it has been so long in building, and its effects have been talked of for so many years, that the world has grown weary of waiting for the consummation. To most people the Lobito Bay line is like the Channel Tunnel, the generation of electric power at the Victoria Falls, or the sounding of the Last Trumpet—something that may happen some day, but is a powerful long time coming. And yet it is a fact that a goodly portion of this line has been completed. Within ten years it is safe to say that the new route to England will well nigh revolutionise the trade of a great deal of Africa south of the Equator. It will bring Northern Rhodesia and the Congo five days nearer the markets of Europe, and its competitive influence cannot fail to be felt by all parts of Southern Africa from Beira to Table Bay.

Chingura to the Atlantic.

At present the railhead of this line is at Chingura (see map). From Chingura the line runs to Lobito Bay, a steep descent for a greater part. From the plateau, 1,808 metres above sea-level at Chingura, to the coast, a portion of the distance is covered by a rack rail. Beyond Chingura on the eastern side the rails are laid. Four or five kilometres from the station they terminate abruptly on the veld, as if workmen had left bolting the last section on hearing the dinner bell, and grass is growing between the sleepers. Some day (perhaps in the near future) the line will be continued to the border, and then on to join the Chemin de Fer du Katanga. The chief engineering feat has been done in the rail climbing upwards from Benguella. No trifling feat was this. The iron road takes bends of hairpin shape as it creeps and turns on the steep mountain face. From its present ending to beyond Portuguese territory it will be almost level lying. From the top of



Steep Gradient on the Benguella Railway.

the great divide on the south-eastern side the land slopes downwards gently. On one side of the plateau is the watershed of the Congo, on the other of the Zambesi. Dividing Angola from the Congo Belge is the Kasai, which empties into the Congo, after running northwards for miles, by a bend in the direction of the big stream. The railway is five hundred and nineteen kilometres in length, and drops into Lobito Bay alongside the big ships in that marvellous harbour, built by nature with a view to accommodating the largest vessel man may build. There is a long arm of sand and reef outstretched to protect a fleet as large as the largest naval Power has yet budgeted for, and for ten years past, an inhabitant declares, there has been no storm outside that arm that has disturbed the peace of that vast sheet of water inside the harbour.

At present Lobito Bay is merely a clearing station. Goods come from other parts of the world, are transhipped to the railway, and carried 300 miles into the interior, thus

finishing the work of the Bay. When the railway joins the Belgian line, who can foresee the limit of Lobito's expansion of trade? To-day there are good houses for the railway employees, a few stores and warehouses, a large one in course of erection, plenty of sand lying around, and that is all. Living is cheap, judging from the hotel tariff. There is a Railway Hotel, and the charge is five shillings per day.

When enough money is found to continue the well-made road to the border of Portuguese territory and the Belgians make the 150 miles from the Angola border to Musonoi, there will be one continuous motor road right from the post office, Elisabethville, to the ship-side in Lobito Bay, the last three hundred miles being open for traffic on the railway.

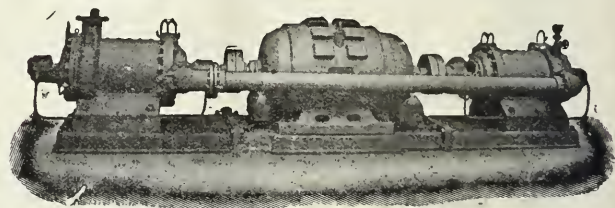
The following facts and figures regarding Lobito Bay and the line should prove of interest here:—

Lobito Bay is 4,930 miles from Southampton, and has deep water to within a few feet of the shore. The harbour, the best on the West African Coast, is protected by a sand spit some $1\frac{3}{4}$ miles in length, running parallel with the shore and about $1\frac{1}{2}$ miles out. A wooden jetty about 170 yards long has been built, alongside of which ocean-going vessels are able to discharge direct into railway trucks at any state of the tide. This harbour enjoys the great advantage over its future eastern rivals that goods passing through it will be free from Suez Canal charges.

The Benguella Railway; Lobito Bay to Katanga.—This railway of standard 3 ft. 6 in. gauge, due to the enterprise of Mr. R. Williams, working under a concession granted by the Portuguese Government in November, 1902, is under construction from Lobito Bay to Katanga, a distance of about 1,100 miles. The line cannot fail to play an import-

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ant part in the economic future of Central Southern Africa, not only as a means of communication with the great mineral district of Katanga, but also as a portion of a transcontinental railway of which the centre is already connected by radiating lines with all parts of South Africa. Its importance was not overlooked by Germany, whose efforts to obtain financial control were successfully met by the concessionaire.

On the line are: Lengue, 31 miles 361 feet, at the foot of a picturesque gorge, up which a rack railway is laid to S. Pedro (34 miles 820 feet). The line now passes through

cultivation, carried on almost entirely by natives, continues as far as the line has been constructed.

At Longonge, 214 miles (4,651 feet), the ascent of the Lepi Mountains commences and at 241 miles the line attains an altitude of 6,180 feet, the highest so far included in the survey. The line, which follows the old Boer road across undulating country, proceeds to Huambe, 266 miles (5,566 feet), which has grown up since the advent of the railway and is now an important administrative, trading and railway centre.



In the Wonderful Harbour of Lobito Bay.

barren, waterless scrub, known as the "Thirsty Country," which, prior to the construction of the railway, was a serious interruption to trade and intercourse with the interior. At 59 miles (2,950 feet) it crosses the first watershed, and at 84 miles (2,585 feet) a second, from both of which there are fine views of mountainous, inhospitable country. Between the coast and Sapa River, 100 miles (2,930 feet), there are no less than 38 bridges and viaducts.

After Cubal, 123 miles (2,976 feet) there is more moisture and native cultivation commences. At 158 miles (4,100 feet) the upper waters of the Catumbella River are crossed, which, even here, is quite a large body of water. Cuma, 198 miles (4,708 feet), is a considerable trading centre, beyond which

Chingura, 324 miles (5,930 feet), lying well within the Bibé Plateau, is the terminus (1,921), but earthworks have been completed for another 60 miles to Belmont, whence to the Congo Border, the work will be considerably lighter. To effect a junction with the Katanga railway system, a further 799 miles from Chinguro remains to be constructed.

The completion of the line to Katanga, which was due in 1917, has naturally been delayed by the War, but the receipts (except for 1915) have continued to show a steady increase.

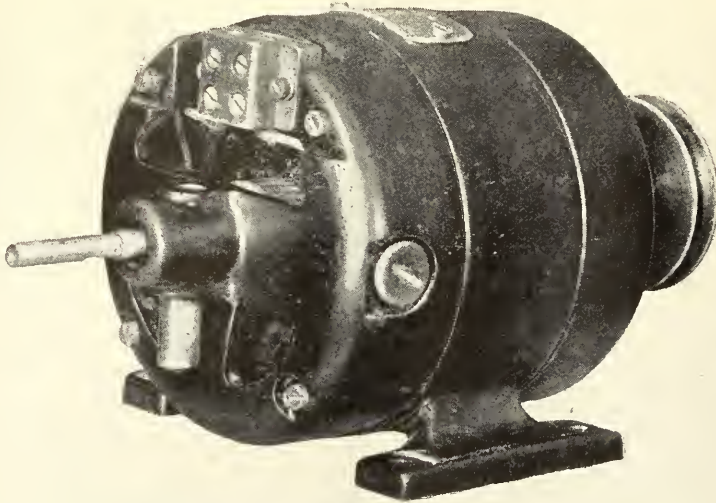
Since 1920, construction has been commenced from a point on the Capetown-Bukama line, Tchilonga, where the section to Ruwe, 52 miles, is in hand.

Electric Cable.

An interesting sidelight was thrown on the market in electric cable by the tenders received recently by the Johannesburg Municipality in response to its inquiry for cable required to meet the increasing traction load, and the 550 '6 x '6 sq. in. concentric cable are for the completion of the Central Sub-Station Scheme. The matter was reported to the Tramway and Lighting Committee as follows:—" '6 S.C. Traction: The lowest tender is that of Messrs. The Griffin Engineering Co. for cable manufactured by the A.E.G., Germany, at 13s. per yard, delivery in three months. A covering letter has been submitted, stating that the cable offered is strictly in accordance with the British engineering standards, as called for in the specification. The second lowest tender is that of The Metropolitan-Vickers for cable manufactured by Messrs. W. T. Glover & Co., England, at 13'96s. per yard. Delivery in three to four weeks at works, British engineering standards are guaranteed, but prices are subject to confirmation. The third lowest tender is that of Messrs. Henley's S.A. Telegraph Works for cable manufactured by Henley's, England, at 14s. 7½d. per yard. Delivery four weeks at works, subject to prompt acceptance, failing which tenderers reserve the right of adjustment in accordance with market fluctuations of copper and lead." As a final result the Town Council, on the recommendation of the Tramway and Lighting Committee, accepted the following tenders: (a) Metro-

politan-Vickers Electrical Co., Ltd. (most suitable): 2,000 yards '6 sq. in. single-core traction cable, at 13'96s. per yard, £1,396 (firm price, but subject to confirmation), and in the event of the Metropolitan-Vickers Co. failing to get confirmation, that the next lowest tender be accepted, viz., Messrs. Henley's S.A. Telegraph Works, Ltd.: 2,000 yards '6 sq. in. single-core traction cable, at 14s. 7½d. per yard, £1,462 10s. (b) Henley's S.A. Telegraph Works Co. (lowest): 550 yards '6 x '6 sq. in. concentric H.T. cable, at 23s. 9d. per yard, £653 2s. 6d. (firm price, subject to confirmation; penalty clause deleted).

According to the decrees of the labour organisations a rock-drill worker who can't get on with his job because the air or water pipes are broken must not dare touch those pipes. That is the pipe fitter's job, and therefore according to the senseless and tyrannical edicts of organised labour the machine-man must do nothing until the pipe fitter is disposed to put in an appearance. Similarly the pipe fitter, although he may be working under a dangerous piece of hanging, must on no account attempt to trim down the loose rock or to usurp the functions of the timberman whose particular job is to put a prop or stick under the dangerous ground. But what of that? What does it matter if the pipe fitter is killed so long as there is no departure from the great fiat of "Every man to his own job and one job only"?



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Recent Additions to Our Knowledge of the South African Coal Fields.

The following is from the lengthy and detailed paper read last week by Dr. E. T. Mellor on the subject of the South African Coalfields.

In introducing his subject, Dr. Mellor said:—During the past few years, probably more exploratory work has been done on the South African coalfields, especially those of the Transvaal, than in any similar preceding period. Several causes contributed towards this activity. Conditions during the War, and perhaps still more those of industrial unrest which succeeded it, opened up, temporarily at least, new markets for South African coals, particularly for bunker and export trade, which had not previously been available. A further stimulus to investigation was the widespread interest which has been aroused throughout the world in fuel questions in general, and also in the many avenues of development connected with by-product industries.

The coal exploration work of the past few years in South Africa has resulted in a very great extension of our knowledge of our coalfields, not so much perhaps with regard to the general geology, which was already fairly well known, but more particularly with respect to the extent and character of the coal seams in some of our principal fields and of the quantity and quality of the coal of which those seams are composed.

This exploratory work has now reached a stage when a definite review of the important results obtained can be made, and it is the object of the present paper to indicate the extent of such exploratory work, to summarise its results, and briefly review the present position of our coal resources. My paper will deal more particularly with the Transvaal, where perhaps activity during recent years has been greatest, and where the greatest additions to our known coal reserves have been made.

Through the courtesy of the various mining houses by which the exploratory work has been carried on, I have been able to inspect nearly all the results of recent boring operations, including the analyses of the coal seams; so that the conclusions given in the present paper, as to the quality and quantity of the coal which has been proved, are based upon direct evidence of a positive kind afforded by the very large number of boreholes recently put down all over the area dealt with.

Data from Three Hundred Boreholes.

The projected extension of the railways in the Middelburg district by the addition of a line from Minaar, eastwards, to Carolina, across the extensive coalfield lying to the south-east of Witbank, and by a line crossing the eastern portion of the same area from Middelburg, southwards, to Bethal, has stimulated the exploration of this extensive tract of known coal-bearing country. During the past two or three years, boring on a very large scale has been undertaken, and the more promising areas, near the anticipated routes of the railways, have been systematically prospected. In the course of this work, which has been carried on by several large mining corporations, some 300 boreholes have been sunk, the results have been carefully recorded, and the possibilities of the field worked out in great detail by the engineers concerned.

As a result of this exploratory activity, the known area of good coal-bearing country in the Witbank field has been greatly extended, and the proved coal reserves enormously increased. While, however, this is generally realised, anything in the nature of a definite estimate of the quantity and quality of these additions to our known coal reserves has not yet been put forward.

A Thousand Million Tons.

The extent of the boring operations in the Witbank-Middelburg area is shown by a plan on which are indicated the majority of the holes recently put down. As a result of the operations, several extensive areas of high-grade coal have been definitely proved. At a conservative estimate, these areas contain an aggregate of 1,000,000,000 tons of export grade, taking primary extraction alone, while the tonnage of coal of lower quality, but of considerable economic value, is still greater.

Dr. Mellor concluded his paper with a consideration of the best means of utilisation of these coal reserves as follows:—

It will be clear from the foregoing sections of this paper that the exploratory work of the past two or three years has definitely proved the existence in extensions of the Witbank coalfield of great reserves of coal of a grade equal to or better than the present standard of export coal. Compared with the position a few years ago, the proved supplies of first grade have been enormously increased.

Owing to the comparative variability of the South African seams as compared with those of the British type, it was not advisable, without actually proving the seams, to make any but the most conservative estimates of the coal reserves in untried areas, and there is no doubt that the estimates which have been made from time to time of the country's coal reserves can, in the light of recent developments, be very greatly increased. As a result of recent operations, it is probably well within the mark to say that, in the Witbank district alone, 1,000,000,000 tons of coal of a calorific value of 12.5 and over have been proved, of which at least 50 per cent. has a value in the near neighbourhood of 13.0. These figures refer to primary extraction alone, apart from further reclamation work. With the previously known supplies, this would be sufficient to maintain the present Transvaal output from the Witbank district alone for a period of a hundred years or more, leaving out of account enormous quantities of coal of somewhat lower grade already proved, as well as the coal contained in the large tracts of coal-bearing country which remain untouched. Moreover, the proved reserves referred to are not buried under great thicknesses of overlying rocks which would make their recovery a slow and costly operation, as is the case with the reef in many of our gold mines, but are extremely accessible, and lie ready to be opened up from many points of attack with an ease unknown in most other coal-producing countries.

The Export Trade.

Bearing these facts in mind, the question naturally arises as to the best means of utilising these huge reserves of proved coal of high quality. The history of nearly every young country shows that its development has been greatly aided in the early stages of its history by the exploitation of its mineral resources, which have materially helped to provide the means for developing the country until the more permanent industries could become established. South Africa has been no exception to this rule, and the full extent of the indebtedness of the whole country to the mining industry is probably realised by only a very small proportion even of those directly connected with mining pursuits. Compared with the gold mines, particularly those of the Rand, the part played by the great coal reserves of the country as a source of profit has been comparatively insignificant and largely indirect. With the diminution in the production of gold, which appears likely to occur in the near future, there is no reason why our coal resources should not be turned to better account in the employment of labour and the production of revenue derived from sources outside the Union.

South African coals, in respect of cost of production and many other conditions, are very favourably circumstanced as regards an export trade in certain markets. The internal consumption of coal is not likely to increase materially for some time to come. At the present time indeed the two principal consumers—the railways and the gold mines—show no signs of making substantial increases in their demands. Indeed the present day tendency towards the establishment of large central power-stations, and the electrification of sections of the railways, will probably result in the consumption of a larger proportion of medium grade coal which does not figure in the estimates given above, thus leaving a proportionately greater quantity of

the higher grades free for other purposes, including export. It would, therefore, be greatly to the advantage of the country if additional outlets could be created for our coal, since, under existing conditions, the abundant reserves already definitely proved must lie dormant for many years, and the aid which they might otherwise afford in the general development of the country as a whole will be lost.

It is difficult to foresee the developments which may take place in the use of fuels in the future. For many years to come, however, our higher grade coals are likely to be in good demand for export purposes, and it would, therefore, appear wise, if our large resources are to be used to the best advantage of the country, to at once endeavour to establish an export trade on a scale commensurate with the large supplies which await easy exploitation.

The position to-day is that we have practically unlimited quantities of coal of proved quality and good commercial value, which lies ready to hand, and which can be opened up and worked under conditions as favourable as those prevailing in any other country in the world. There are, however, two main obstacles to the proper development of an export trade—inadequate and uncertain means of transport to the coast, and still more inadequate and uncertain provision for the handling of the coal between rail and ship.

Question of a New Port.

At present the Transvaal coalfields are connected with their main outlet for export by the slender thread of a single line of rails, while at Delagoa Bay the loading arrangements are outside the control of the people principally concerned in maintaining their efficiency. Besides being quite inadequate to deal with the existing export trade, these port arrangements have been a frequent source of delay from other causes.

With an additional railway free from the many disabilities of the existing line, and with a port under Union control properly equipped to deal rapidly with large quantities of coal, the situation would be very different, and there

would be a fair prospect of great expansion in the present export and bunker trade, which, without such facilities, can never attain the dimensions which we might reasonably expect. With something like 1,000,000,000 tons practically awaiting removal as soon as a suitable outlet is found, one, at least, of the conditions necessary to provide our railways with an abundance of traffic for a great many years to come may be regarded as fully assured.

Of suggested new routes to the coast, that to Kosi Bay, in the extreme north of Natal, appears to be the most favoured. It has been examined and found to present no serious engineering difficulties, while its situation in British territory would remove many of the uncertainties and disabilities attaching to a foreign port. The opening of such a route appears to be the best means of providing a suitable outlet for our surplus coal reserves, and of establishing on a firm basis an export trade which would be an important factor in the future development of this country.

The Chamber's proposals, which involve the greater utilisation of more experienced native labour on semi-skilled and partially skilled jobs, contemplate the gradual retrenchment of 2,000 men, and perhaps less. The insistence by the S.A.I.F. on the maintenance of the "status quo" conditions means that if gold continues to fall and costs remain as at present, 24 out of 39 mines must shut down permanently and 10,000 men be thrown out of employment. The real question for the worker, therefore, to decide is this: In view of the fact that the white worker will be safeguarded under the ratio plan, which is the better scheme, that of the leaders of the industry, which contemplates the gradual retrenchment of 2,000 men, or that which means the dismissal of 10,000?

A New Rock Drill.

A new rock drill has been invented and patented by Messrs. W. E. Nettle, P. Selby, J. Blythe, and J. H. Holman, of Ferreira Deep, Ltd., Johannesburg, South Africa. In a percussive rock drill, in which water is fed through the piston-rod and tool by a tube, leakage of the water into the cylinder is prevented by a small compressed-air chamber arranged in the interior of the piston and closed by a bush which is a loose fit on the feed tube. Compressed air is supplied to the chamber from the front of the piston during its backward stroke by means of a port, and from behind the piston during its forward stroke by passing between the bush and the feed tube.

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South Africa's Trade and Gold.

Some valuable statistics relative to the trade and financial conditions of British South Africa are contained in the Monthly Review of the Standard Bank of South Africa, dated 31st December, 1921. The carefully compiled statistics contained in this report show that our exports during the nine months ended with September 30th of last year and for the same period of 1920 were as under:—

	Nine months ending Sept. 30.	
	Value 1921.	Value 1920.
Total South African Produce	£43,460,498	£61,915,725
Imported Goods Re-exported	2,958,852	3,574,050
	£46,419,350	£68,489,775

The value of raw gold exported in these two periods was

1921	£27,338,607
1920	29,223,828

Gold Contributing 62 per cent.

In other words, the proportion of gold to total South African produce was as follows:—

1921 period	62 per cent.
1920 period	45 per cent.

This means that, whereas in 1920 industries other than the gold mining industry were able to contribute eleven shillings out of every pound's worth of South Africa's produce, they were, on account of trade depression, only able to produce less than eight shillings worth in the pound of total produce during the first nine months of last year. During this latter period our gold yielded more than 12s worth in each pound of total production.

Carrying the Country on its Back.

These figures clearly show how absolutely dependent we are for our national livelihood upon gold. They indisputably demonstrate the truth of the statement that the gold industry is carrying the whole country upon its back, and they show that whilst all other branches of South African produce have fallen enormously, the Rand, despite its heavy burdens and difficulties, has managed to keep its head above water and to save South Africa from insolvency. And this is putting no exaggerated construction upon the case.

A good many people in various parts of South Africa think they have no direct or indirect interests in the gold mining industry of the Witwatersrand. It may therefore be worth while pointing out that the revenue of the Union benefited directly to the extent of over £800,000 last year from one gold mining lease alone. The direct revenue from other mines in respect of profits tax was, of course, infinitely more, but just consider this one item only—£800,000 from one Government Gold Mining Lease! This is nearly 10s. per head of white population, and if this sum had not been provided by the Government Gold Mining Lease it would have had to come out of the pockets of the taxpayers of the country. In the tax year 1918-1919 79,000 individuals paid income tax, and this sum of £800,000, if not contributed from a Gold Mining Lease, would represent an additional payment of over £10 per head by the taxpayers. The whole of this large sum of £800,000 was paid by one mine—the Government Gold Mining Areas (Mcderfontein), Ltd., which, in addition to contributing this huge sum directly to the coffers of the State, has been distributing £150,000 per month, or £1,800,000 per annum, in working costs. The Government's share of profits of the Government Gold Mining Areas in 1920 was £882,975; in addition income tax was £18,369 and Provincial gold profits tax £15,085, or a total of £916,429.

Telegrams :
"NIVONIA," Johannesburg.

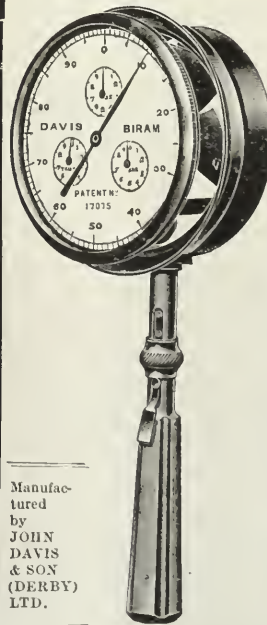
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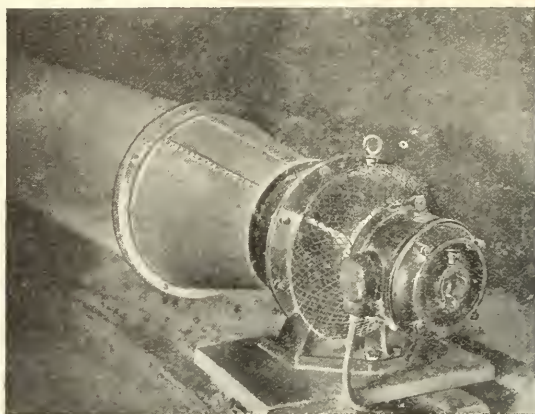


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EDITORIAL.

THE STRIKE.

The strike of Rand mine workers, employees of the Victoria Falls Power Company, and engineering shops, which commenced on January 8th, just one week after all the Transvaal colliers had downed tools, has dragged on with a weary and destructive monotony throughout the past week. Contrary to the expectation of many people, and contrary to the hopes and desires of what may be termed the North-West Frontier tribes, that is to say, the hooligan element who inhabit a portion of the north-western area of Johannesburg and who were responsible for much of the looting and bloodshed of 1913, there has up to the time of writing been no violence or sabotage.

The Government appears to have taken the precautions necessary to protect property and prevent lawlessness, and so far the strike has been a grim economic struggle enlivened by outbursts of bitter and misleading eloquence on the part of the Labour leaders and by a firm and steady stand on the unassailable position of facts and figures taken up by the Chamber of Mines. As we fore-shadowed in our last issue, the call to arms issued by the Federation has met with a half-hearted response from the other trade unions, and particularly so from the "Nurabs," the Railway and Harbour employees, who may truly be said to hold the keys to the situation in their hands.

The men involved in this calamitous dispute are clearly fighting a losing battle, in which the strongest weapon of their opponents is not the firmness and strength of purpose at last exhibited by the Chamber of Mines, but the impregnability of the economic facts upon which the case for the mines is based. The Federation's forces of deception have been mainly engaged upon the propagation of the false assertion that the leaders of the industry are intent upon destroying that artificial social distinction which is termed the colour bar. It cannot be too strongly emphasised that the Chamber of Mines has no intention of removing the colour bar, and could not do so even if it desired its removal. But the Chamber very rightly wishes to save the low-grade mines and proposes to retrench a limited number of redundant and semi-skilled employees, at the same time guaranteeing to safeguard the position of the skilled workmen by the application of a system of ratios to the European and native employees of the mines. And the Chamber, too, desires to modify certain other features of underground work which will assist in the reduction of working costs, an absolutely imperative essential if numerous mines are not to be shut down, several of them for ever, simply because they can no longer carry on at a loss.

The Federation, no doubt because of its failure to bring about a general strike throughout the country, and realising that the funds of the union are not sufficient to stand a long and protracted struggle, has endeavoured to intensify the ruin which this struggle is causing by curtailing the essential services on and in the mines and power stations. Although the Underground Officials' Association has undertaken to assist in carrying on these services, the Village Deep and Modder East mines are fast being flooded. Benoni has been in darkness since the beginning of the week, and Johannesburg itself will probably be in a similar plight to-morrow. The direct loss, not only to the employees and the employers, but to the Government and the community at large, has been estimated at £630,000 per week; the direct and indirect losses combined are far greater, and continuation of the present dispute cannot fail to do almost irreparable damage to the whole country.

The hopes raised during last week-end at the announcement of a renewal of negotiations between the two parties and also during the week as a result of the deliberations of the Conference over which Judge Curlewis has presided appear to have been based on an unduly optimistic view of the ability of this Conference to find a way satisfactory to both disputants out of the present deadlock. To our way of thinking, the men's leaders are in the wrong, and the only solution of the trouble is to be found in the direction of accepting the Chamber of Mines' proposals with a guarantee that will adequately protect the status of the skilled craftsman. There must be no patched-up peace, no postponement of a frank and candid acknowledgment of the truth, and the verifiable truth, of the economic facts of the situation. Whilst we are about it let us get this long-standing bitterness of controversy over once and for all. The Rand can no longer continue to exist under a regime of industrial Red terror.

Meanwhile large batches of natives are being repatriated, and the outlook at the moment of writing is black indeed. It may, of course, take a change for the better at any moment, but it requires a considerable degree of optimism to see sunshine in the clouds which are banked up all round us.

THE FALLING PRICE OF GOLD.

A point which it appears is being lost sight of in the present calamitous industrial dispute is the probability that before this struggle is brought to a conclusion the price of gold will be less than when the strike started. Commenting on this, the Standard Bank of South Africa in its monthly Review issued from Capetown at the end of the year says: "The price of gold, which was over 115s. per ounce in July last, has fallen below 100s., and future movements are difficult to forecast. The exchange value of British sterling in relation to the United States dollar, which mainly governs the price of gold, has steadily appreciated and is now well over the 4 dollar mark, the usual downward movement at this time of the year, through Britain's seasonal produce importations from America, being on this occasion more than counteracted by other influences.

"It is interesting to note that while the index numbers of wholesale prices in Great Britain continue to decline, an opposite tendency is in evidence in the United States, and if there should be an expansion of credit in the latter country, for which the gold reserves held there afford an ample base, the resulting inflation should tend to further improvement in sterling exchange quotations." In other words, this means that there is a considerable likelihood of gold falling still further in price."

The latest quotation is about 97s. 6d. per oz., and if this strike is protracted it may well be that the mines which are able to survive the staggering blows which are being dealt the industry by the present dislocation of work will have to consider the question of re-starting work on the basis of a substantially less sales price for their product than when they shut down. This is an important point, and should not be lost sight of. The Standard Bank in its monthly review calmly and dispassionately reviews the industrial position on the Rand in the following words:

"Some of the mines already report a loss on working, and it is stated that if gold returns to its normal price of 85s. per fine ounce, 24 out of the 39 mines on the Witwatersrand at present producing will, failing material reduction in working costs, have to close down. The consequences would be far-reaching, as the resulting unemployment and curtailment of expenditure on wages and stores would react on all sections of the community. The proposals put forward by the Chamber of Mines as a basis for discussion are: (1) An alteration in the system of underground contracts; (2) a modification of the *status quo* agreement; (3) a re-arrangement of the underground work. It is stated that the proposed changes might result in a reduction, over a period of months, of about 2,000 in the number of unskilled and semi-skilled white workers, and the saving in this and other directions would bring within the margin of payability large quantities of ores which cannot be worked on the present basis of costs. The position as it now stands is recognised as being very unsatisfactory, largely depending as it does on the uncertain factor of the gold premium, and if disaster is to be averted some modification of existing arrangements is essential."

And we might add immediate modification is essential. The conference has now been sitting for four days, and at the time of writing may or may not have settled the first item on the agenda—the coal dispute. The Chamber of Mines wanted to tackle the bigger item of the gold mines dispute first, but to this the Federation objected. Meanwhile the Rand is drifting into a position which it will take many months to recover from.

Notes & News.

Our Busy Man's Page.

Owing to the unexplained delay in the arrival of the mail boat at Capetown this week, our Busy Man's Page feature must be again omitted. The mail is not expected to arrive

here till next Monday, and it will be necessary, therefore, to hold over our compilation for the Busy Man's Page till our next issue.

* * *

New Companies.

Among the new companies registered in December we note the *Afriander Lease, Ltd.*, with a capital of £25,000; the *Kaapsche Hoop Chrysolite, Ltd.*, with a capital of £8,000; *C. Kleudgen, Ltd.*, with a capital of £50,000; *Lancaster Central G.M. Co., Ltd.*, with a capital of £15,000; and *Platinum Explorations, Ltd.*, with a capital of £20,000.

* * *

The Bantjes to Close.

The following circular dated Johannesburg, January 16th, has been sent to shareholders:—

Dear Sir or Madam,

The work accomplished in the 11th level west drive by the Consolidated Main Reef Mines & Estate, Ltd., during the quarter ended 31st December, 1921, was as follows:—

Reef	Footage Advanced.	Footage Sampled.	Reef Width Inches.	Reef Value Dwts.
Main Reef Leader	193	110	8	28.4

Shareholders were notified in the report of directors for the year ended 31st December, 1920, and also at the last annual meeting held on the 27th May, 1921, of the Board's intention, notwithstanding the poor values previously encountered, to continue the driving of the 11th level drive from the Consolidated Main Reef Mines & Estate, Limited, boundary for a further distance of 500 ft. beyond the dyke encountered at about that time, and that should the results obtained prove unsatisfactory, and the Board be of the opinion there is no hope of procuring payable values, shareholders would be called together to consider the question of placing the company in voluntary liquidation. The 500 ft. of driving west of the dyke has now been accomplished without any tangible result. In all 2,271 ft. of driving have been done from the company's eastern boundary; the average reef disclosures over 1,195 ft. on reef being 20.8 dwts. over 6 inches, or 125 inch-dwts.

In view of the very small percentage of payability disclosed throughout this drive, the consulting engineer, Mr. H. Stuart Martin, has recommended to the Board that the work should cease. Having given the matter full consideration, the directors are satisfied that there is no hope of discovering payable values. They are also of opinion that any attempt to re-open the mine (which was closed down at the end of 1918) for the purpose of working the small remaining ore reserve is not warranted, by reason of the heavy expenditure involved in dewatering the mine and the general re-conditioning of plant. Accordingly they have now decided to discontinue the drive referred to and to call meetings of shareholders to consider resolutions for placing the company in voluntary liquidation. The notices convening such meetings will be issued to shareholders at an early date.

* * *

The late Mr. Charles Marx.

With deep regret we have to record the death, early in the week, of Mr. Charles Marx, the well-known and highly-respected director of the "J.C.I." Co., Ltd., and its associated group of companies. Mr. Marx was one of the pioneers of the Rand, and had long occupied a foremost position in the mining, social and sporting world. In addition to being a director of the Barnato group of companies, he was chairman of the Argus Company, and for many years had been chairman of the Johannesburg Turf Club. A large and representative gathering at the graveside on Tuesday testified to the widespread esteem in which the late Mr. Marx was held.

Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

The Union's Budget.

The actual deficit of the Union of South Africa on last year's operations will, it appears, be a million and three-quarters. The public debt and provincial expenditure are very heavy in the early part of each year, but lighter in the latter part, and instead of the expenditure reaching 32 millions sterling it will be quite two millions less. In the nine months interest on the public debt amounted to £6,300,000, which, according to the estimate for the year, leaves £1,363,000 still to be paid. On the revenue side the receipts from income tax are expected to be very heavy in the last quarter. The revenue from the gold mining leases, which will be taken into ordinary revenue account this year instead of going into the loan account, will exceed the estimate of £600,000 by £200,000. This revenue is expected to be paid in February. The excess profits duty has led to another windfall for the Government. So far a million and a half have been recovered. The estimate, in fact, has been exceeded under this heading by a quarter of a million. The revenue from the Customs is a long way short of the estimate, but the deficit will to a large extent be set off by the unexpected increases in excess profits duty and in the revenue from mining leases. A forecast of the financial position at the close of the year is: Estimated revenue, £29,150,000; balance, 1920 surplus, £460,000; total, £29,610,000. Original estimate of expenditure, £29,544,000; surplus for current year, £56,000; deficit from 1920-21, £400,000; on original estimate deficit at March 31, 1922, £344,000; probable additional expenditure, £750,000; probable drop on estimates of revenue, £900,000. The total probable deficit is therefore £1,794,000, as compared with the estimated deficit of only £344,000.

Gold and the Exchange Problem.

A recent issue of the *London Mining Journal* contains an article by Mr. H. Abbati advocating a free market in gold as a solution of the exchange problem. This would reduce the national debt in terms of gold, and increase revenue in terms of paper. Conditions for export would be much increased. Mr. Abbati argues that the reason why the value of gold has been subject to such wide fluctuation since the War is solely because it has been diluted with paper and credit as a substitute. Owing to the exigencies of the situation brought about by the War, huge gold debts have been contracted, to an extent far exceeding the amount of gold in the world. In fact, were there such a quantity of gold in the world, gold would then be so diminished in value as to be unsuitable as a standard. As it is, to cover up the insolvency of the debtors, legal restrictions have been put in the gold market, which practically means that it can only be handled by Governments; and the Governments, again, only handle it in such a manner as to cause them the least possible embarrassment towards their respective electors. The value of gold would very soon return to pre-war if there were a free market in gold, and if the various peoples of Europe, including England, realised how

little, ultimately, the paper currencies will be worth. A return to a sound basis for currency would make a demand for gold in England and pave the way for marketing goods in America. There being no market now in England for gold, the metal, instead of goods, is exported. Commenting on Mr. Abbati's statements, the *Mining Journal* says editorially: "We take it that the main distinction between conditions to-day and before the War is largely the absence of any international basis of values. Gold stocks are entirely immobilised. The world, being heavily in debt to the United States, cannot afford to buy gold from her, while Great Britain has set the fashion to the rest of the world by refusing to allow gold to be exported. As the gold is not used for currency here, this means that for the time being gold in the country is of no practical value. We have by this embargo on export, therefore, reversed what has been the trade policy of the country at any rate from the beginning of industrial times, and in doing so have for the time being stopped the operation of what was always described before the War as the automatic check on inflation or deflation—the 'governor,' as it was frequently termed, of fluctuating trade loads. Why, it may be asked, do we not revert to it? We have little doubt that Mr. Abbati is right when he attributes the cause to the reluctance of the authorities, Governmental and financial, to face the fact that for the purposes of the War we depreciated our currency. In the old days the Sovereigns of England and other European countries were wont to do this by debasing the metallic currency; in these days we have given up the metallic currency, and have produced the same result by diminishing the gold reserve against paper. What the real value of gold should be to-day it is impossible to say, the only standard we have is that of American currency. That, however, would appear to be too low, because gold mining in the United States cannot be carried on at a profit, while here the relation of the paper pound to the gold pound is a fluctuating one."

Rhodesia Consolidated.

The accounts of this company for the year to March 31 last show loss of £5,155, as compared with a profit of £2,185 in previous year. This debt is more than accounted for by loss on book values realised by sale of some of the company's shareholdings. In accordance with resolutions passed in December last year, the company's capital has been changed from shares of 10s. each into ordinary shares of 4s. each and deferred shares of 6s. each. The issued capital is now 1,948,800 ordinary shares of 4s. each, £238,960; 1,194,800 deferred shares of 6s. each, £358,440; total, £597,400; 513,000 ordinary shares of 4s. each are available for issue, but, on account of the depressed condition of the mining market during the whole of the year, it has not been possible to proceed with the issue of further capital as foreshadowed by the Board at the last general meeting. The Nevada Mine, which was leased on tribute, was given up during the year, and efforts are being made to find another tributer as well as for leasing the company's other claims. Several inquiries have been made, and when the present high cost of mining makes working reasonably profitable, the company should be able to find tributers for several of its properties. Asp Mine, in which this company holds a substantial interest, has been let on tribute to responsible parties, and it is anticipated crushing operations will be commenced by the end of this year. Recent reports and development work indicate that previous reports as to asbestos deposits covering a very large area of ground were in no way exaggerated. At present, however, demand for both asbestos and chrome has much fallen off, due to the stagnant condition of trade, and the company must await a general revival before the anticipated profits from this business can be realised. East Rand Mining Claims.—The

results of the joint borehole at the junction of farm Grootfontein and this company's Vogelstruisbult claims were communicated to the shareholders from time to time as received. The striking of the reef has proved the great potential value of the company's Vogelstruisbult claims. It is anticipated that when mining costs are reduced to something approaching a normal figure, there will be a considerable revival in mining activity, and it will be possible to make satisfactory arrangements with owners of adjoining claims for a comprehensive scheme of development of combined property.

South African Diamond Corporation.

The report for the year to June 30 last, presented at the meeting, states that the accounts show a loss of £144,360, and deducting credit balance of £20,927 brought in, a debit of £123,433 is carried forward. The great depression in the diamond trade and the heavy fall in share values which took place during the last six months of the year under review have seriously affected the financial position of the company. Conditions have not been favourable for share dealings, and the operations in diamonds resulted in a loss for the whole year. It became necessary, in order to reduce the company's liabilities, to realise a substantial portion of the company's holdings, particularly on the Far East Rand, with the result that although a heavy loss had to be faced, the liabilities of the company, which at the date of the last balance-sheet stood at £296,488, were reduced to £203,204.

National Diamond Factories (Bernard Oppenheimer), Ltd.—The depression in the diamond industry also considerably affected this business. Owing to the death of Sir Bernard Oppenheimer, Bart., the managing director of the company, the Board considered it advisable to obtain the advice of one of the leading firms of continental cutters, and accordingly Messrs. Rozelaar and Zonen were approached. After going closely into the position at the works they recommended that the cutting of diamonds and all other work in connection therewith should be concentrated in one building, in order to enable the work to be carried out on the most economical lines. After very careful consideration this advice was accepted by the Board of the National Diamond Factories, and Messrs. Roselaar and Zonen have been appointed managers of the works, and in pursuance of their recommendations the work is being concentrated in one factory, and the number of workmen employed has been considerably reduced. There is, however, ample accommodation in the large factory for again increasing the number of workmen employed so soon as the demand for diamonds again becomes normal.

British South-West Africa.—Reference was made by the chairman at the last general meeting to the acquisition of certain interests, which he anticipated would be of great value to the company. These interests, some of which have now been definitely acquired, and others which are still under option, consist of a very large number of diamond claims in British South-West Africa. The properties have recently been visited by Mr. C. B. Kingston, the well-known consulting engineer, who has formed a very high opinion of their possibilities.

London and Rhodesian Mining and Land.

The directors' report states that accounts for the year to June 30 last show, after meeting all working expenses and other charges, a credit balance of £718, which has been added to balance brought forward, making £22,948. As against this a loss of £7,752 made on forced realisation of certain securities, has been dealt with through the appropriation account. After dealing with the company's various interests the directors state that mining interests since the date of the accounts have been considerably increased as a result of the taking over of the assets of Rhodesia, Ltd. The property is the Sabiwa mine, on which there are some 150,000 tons of ore of an average value of 11 dwt. opened up. A considerable amount of plant and equipment is situated on the property, but the whole plant will require reorganising and a new main shaft sunk before the mine can be brought to a producing stage. A number of other properties were also taken over, some of which have been tributed, and now produce a steady revenue from royalties.

Progress of the Mozambique Cement Industry.

In the course of a communication to the Press, the Secretary to the Mozambique Portland Cement Co. writes:

The activities of the company up to date have resulted in the following constructions, viz.: The construction of a railway siding connecting the works with the main line to Lourenço Marques, which is approximately one mile in length, as well as two lines on the property. A private telephone line is constructed connecting the company's works with the Central Exchange at Lourenço Marques. Very fine staff quarters, consisting of bedrooms, a large dining hall, kitchen with range and hot and cold water installation, three bathrooms, pantry, and mosquito-proof verandah, built on the most hygienic and up-to-date methods. Offices—a building consisting of three rooms, with verandah and mosquito-proof netting, containing engineer's office, secretary's office and drawing office. A huge construction shed of corrugated iron has been erected, which is, in the meantime, being used for the storage of material as well as temporary workshops. Kiln foundations are completed and consist of four blocks of Ferro concrete, measuring 27,000 cubic feet. Raw solo mill foundation is completed and consists of 12,000 cubic feet of Ferro concrete. Coal pulverising mill foundation—This is completed and consists of 9,000 cubic feet of Ferro concrete. Chimney stack—This is nearly completed and is constructed in Ferro concrete, measuring 164 feet in height and 11 feet in diameter at the base. Cement mill foundations—The excavations for this are completed and the foundation is now in course of completion, and consists of 12,000 cubic feet of Ferro concrete. Cement plant—The whole of the cement plant is on the property except a small consignment which is now being discharged per s.s. Reitfontein. This completes the whole of the cement plant. The power plant has been purchased from the Brush Electrical Engineering Company, and consists of 1,100 kilowatt set "Ljungstrom Turbine," with 30 odd motors, condensers, switch gear, cables, etc. The boiler plant is manufactured by the firm of Babcock and Wilcox, and will be fitted with mechanical stokers, superheaters, economisers, water softeners, etc. The steel structure for the housing of the plant, measuring about 513 feet by 112, complete with glass and corrugated iron sheeting, is being supplied by the Glasgow Steel Roofing Co., Ltd., and shipment will commence this month and will be completed by the end of April. The erection engineer of Messrs. Polysius (the manufacturers of the cement-plant) is sailing during this month for Lourenço Marques, and the erection of the cement plant will not take longer than four months, whilst the power plant will be completed and erected under the supervision of the manufacturers' erection engineers. The company has secured the services of a well-known and experienced cement maker, who is sailing for Lourenço Marques during April. Dr. Watson, a member of the firm of Messrs. W. A. Brown and Pooley, Ltd., London, our consulting engineers, will be sailing for South Africa towards the end of March or beginning of April, and this gentleman, who has had world-wide experience in the starting up of cement factories, will be giving the company his extensive experience in the constructing and starting up of the factory. This will prove that the company has, right from its commencement, employed the best brains in the world to construct and equip its factory in order to eliminate the period usually occupied in experimenting. The work done so far has been in charge of our resident engineer and Captain Pooley, of London, who visited Lourenço Marques during the latter part of September and checked all work done up to that date, approved of same, and complimented the staff on the work done, and we have the assurance of our consulting engineers that, nothing unforeseen happening, the factory should be started up during August of this year. The cement produced by the company will be of the highest quality and the selling price such as to eliminate any outside competition, due to the fact that the factory, when completed, will be the most up-to-date cement factory in the world. It must be borne in mind that the Mozambique Portland Cement Company's works will be one of the largest industrial undertakings in the Province of Mozambique, and will prove a great source of revenue to the Government and the people of the Province in general, and Lourenço Marques in particular.

The Week in the Sharemarket.

FIRM ON LONDON SUPPORT—SPECIALITIES BETTER—DIAMONDS IMPROVE.

After an uncertain start, the market firmed up at the middle of the week on some support from London. Special lines like New Modders, Gedulds and States were in demand, and in face of the uncertainties of the situation it is surprising how steady quotations have remained. Of course, the volume of business is very small, but there is no pressure to sell, and holders seem now content to see things through to a finish. The immediate future is obviously bound up with the fate of the Conference now sitting, and at the time of writing nothing definite is known in regard to the results of its deliberations. In the diamond market things seem to be looking a trifle brighter, and all diamond shares seem a little firmer as a consequence. We must be careful, of course, not to exaggerate the importance of every little flicker of life in the diamond market, but at a time like the present we must be thankful for small mercies. Transvaal Silvers have been a firm feature during the week, the latest news from the property being that the plant is giving us utmost satisfaction. In other lines there is practically nothing to report for the week.

	Fri. 13th.	Sat. 14th.	Mon. 16th.	Tues. 17th.	Wed. 18th.	Thurs. 19th.
Anglo-Am. Corp.	16 9*	17 6	17 6	17 6*	17 3*	17 3*
Apex Mines	7 0†	7 0†	—	—	7 0†	—
Bantjes Cons.	6 6*	6 6*	6 6*	6 9	6 9*	6 10*
Braikpan Mines	—	—	—	—	—	45 0
Bushveld Tins	—	0 6*	—	0 6*	0 6*	0 6*
Cinderella Cons.	—	1 6*	—	—	1 6*	1 6*
City and Subs.	—	2 2*	2 2*	2 0*	2 2*	2 3*
City Deeps	39 0	40 0	39 6*	40 0*	40 0*	40 0*
Con. Diamonds	12 6*	13 0	13 3*	13 9	13 9	14 0*
Con. Investments	—	20 0*	—	20 0*	20 0*	20 0*
Con. Main Reefs	7 6*	7 6*	7 9*	7 9*	7 9*	7 9*
Con. Mines Select.	—	—	—	—	10 0*	—
Coronation Freeholds	0 7*	0 7*	0 7*	0 7*	0 7*	0 7*
Do. Syndicates	5 0	4 6*	5 0*	5 3*	5 3*	5 3*
Crown Diamonds	3 0*	3 3*	3 3	3 0*	3 0*	3 1*
Dagga. Mines	2 0*	2 0*	2 9	2 9	2 6*	2 3*
East Rand Coals	1 6*	1 7	1 7	1 6*	1 6*	1 6*
East Rand Deeps	0 5*	0 5*	—	0 6*	0 6*	0 6*
East Rand Minings	4 6*	4 6*	4 6*	—	—	—
East Rand Props.	—	4 9*	4 6*	5 0	4 9*	4 9*
East Rand Debs.	—	£85†	£85†	£85†	£85†	£85†
Eastern Golds	0 5*	0 6*	0 6*	0 6*	0 5*	0 7*
Frank Smith Dmds.	2 10*	3 1*	3 0*	3 0*	3 0	3 0*
Geduld Props.	45 9	47 0	46 0	45 6	45 6	45 6*
Geldenhuis Deeps	5 11	6 3*	6 0*	6 0*	—	—
Glynn's Lydenburgs	7 0*	—	—	—	—	—
Govt. Areas	75 0*	76 0*	77 0	76 6	75 6*	75 6*
Hume Pipes	13 0†	12 6†	—	12 6†	12 6†	11 0*
Knight Centrals	4 4½*	—	4 3*	4 3	4 1½*	4 1½*
Lace Props.	5 3*	5 9*	6 6	7 0	6 0*	7 0
Leeuwoort Tins	—	—	—	7 6*	7 6*	7 6*
Luipaardsvlei Est.	—	—	7 3*	—	—	—
Lydenburg Farms	3 9*	—	4 3*	4 0*	4 2*	4 3*
Meyer & Charltons	63 6†	—	—	—	60 0*	—
Middelvlei Estates	1 0*	1 1*	1 0*	1 0*	—	1 0*
Modder West	—	—	—	—	1 0*	1 0*
Modder B.'s	23 6*	25 0*	25 0*	24 9	24 0	24 0
Modder Deeps	37 6	38 6	38 3	38 0*	38 3	38 0*
Modder Easts	5 10*	6 0	6 4	5 11	5 8	5 11
New Era Cons.	6 0*	—	6 6*	6 3*	5 6*	6 6*
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfont.	4 3*	4 3*	4 3*	4 6*	4 9*	4 6*
New Modderfont.	63 6	64 0*	64 9	64 9	64 6	64 6*
New Primrose	4 3*	—	4 3*	—	4 9*	—
New Unifeds	3 6*	—	—	—	3 9*	—
New State Areas	19 9*	20 0	20 6	21 0	20 6	20 6
Nigels	4 0*	—	4 0*	—	4 7*	4 0*
Nourse Mines	7 4*	8 0*	9 0	8 0*	8 0	8 0*
Pretoria Cements	39 3*	39 3*	39 3*	39 3*	40 0†	39 0*
Princess Estates	0 11*	0 11*	—	0 11*	1 0*	1 0*
Rand Nucleus	—	—	1 0*	1 0*	1 2†	1 0*
Randfont. Central	10 0†	9 6*	10 0†	9 0*	9 9†	9 9†
Do. Estates	14 0*	15 3	15 3	15 0	14 9*	14 9*
Rouxville Diams.	1 0*	1 0*	1 1½	1 3*	1 1½*	1 6*
Roberts Victors	7 0*	7 3*	7 0*	7 0*	8 0	—
Rooibergs	4 0†	—	3 3*	3 7*	3 6*	3 6*
S.A. Lands	3 11*	4 0*	4 1	4 0*	4 0*	4 0*
Springs Mines	32 9*	34 0	34 6	34 3	34 0	34 0
Sub-Nigels	9 0*	9 3*	9 3*	9 3*	9 6	9 3*
S.A. Alkali	12 3*	12 3*	12 0*	13 0	13 6	13 0*
S.A. Townships	8 3*	8 3*	8 3*	8 6*	8 6*	8 6*
Trans. G.M. Ests.	—	—	—	—	—	5 6*

	Fri. 13th.	Sat. 14th.	Mon. 16th.	Tues. 17th.	Wed. 18th.	Thurs. 19th.
Transvaal Silvers	—	26 0	25 9	25 6*	25 3	25 3*
Tudors	0 5*	0 4*	0 6*	0 6*	0 8	0 7*
Van Dyk	1 6*	1 6†	1 6*	—	—	—
Van Ryn Deeps	58 6*	59 9	59 0*	59 6*	58 0*	59 3*
Village Deeps	—	7 9†	7 9†	5 9*	5 6*	—
West Springs	7 1*	7 0*	7 3*	7 1½	7 0*	7 0*
W. Rand Ests.	2 6*	2 9	—	2 9*	3 0*	2 9*
Witbank Colls.	—	32 6†	—	—	—	31 3*
Witwatersands	—	11 0*	11 0*	—	11 6*	11 6*
Do. Deeps	7 3	7 9†	—	7 3*	7 3*	7 3*
Zaaiplaats Tins	2 9*	2 9*	2 9*	2 9*	3 6†	3 0*
Union 5 per cent.	£99½*	£99½*	£99½*	£99½*	£99½*	£99½*
Wolluter	3 0*	3 0*	3 0	3 2*	3 2*	3 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Owing to the possibility of there being a shortage of power at the printing works on account of the industrial position, this issue of the "Mining Journal" has to go to press several hours earlier than usual.

ANSWERS TO CORRESPONDENTS.

"Rosemead."—We think the shares will prove a good investment at the price you paid for them. See an article on this mine which appeared in our last issue.

We understand that Mr. W. Ingham, M.Inst.C.E., M.I.Mech.E., Chief Engineer, Rand Water Board, has been elected Chairman of the Civil Engineering Section of the British Engineering Standards Association (S.A. Branch), with Mr. M. Udwin, B.Sc., as honorary secretary.

Speaking at the conference over which the Prime Minister presided on November 11 at the New Law Courts, Johannesburg, when both sides discussed the industrial position fully, Sir Evelyn Wallers remarked: "I think the term 'colour bar' is applied much too loosely, and it conveys the impression that the whole of the white workmen are to be swept out. That is quite wrong, but to meet that point we would be prepared to consider—if it is agreed that we are to proceed on the lines I have indicated—we would be prepared to consider some ratio as between the number of natives and Europeans throughout the industry, in order that a considerable measure of protection should be afforded to efficient white workmen."



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ENGINEERING SECTION.

High Voltage Switchgear.

(By W. A. Coates).

The Metropolitan-Vickers Electrical Company, Ltd., are manufacturing a complete line of high voltage switchgear which they are prepared to build for all voltages now in commercial use. As is well-known, the majority of really high voltage equipments installed to-day are of the outdoor type. Even on the Continent, outdoor switching stations have been installed, despite the official veto of the V.D.E., which does not recommend outdoor apparatus for pressures exceeding 30,000 volts. Stations in France, Italy and Spain are all operating with outdoor equipment, on systems over 100,000 volts, and in Norway similar equipment is in use on 50,000 volt systems, this being the highest pressure on which extensions have been made in Norway during the

terminals are of the well-known condenser type, which are both mechanically strong and are easily protected from the weather. Owing to the introduction of the condenser principle the dielectric in these terminals is worked at maximum efficiency throughout its depth, and the terminals are consequently of unusually small diameter. This being so, ring type transformers mounted over these terminals will give a very much better ratio curve than those used with the more usual oil filled or bitumen filled porcelain insulators. A further point of great value with the condenser type terminal is, that with this design the voltage distribution is definitely controlled over the whole length of the terminal, thus giving an exceptionally high flash-over value as com-

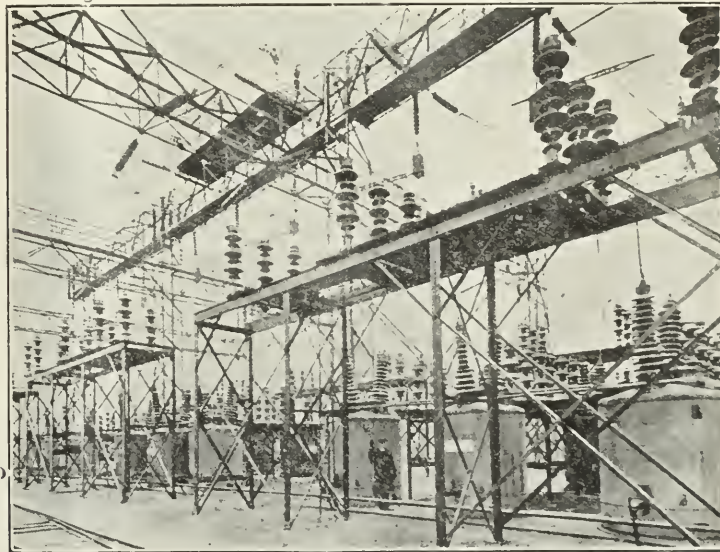


Fig. 1.—General View of Colfax Station, Duquesne Power Company, Pittsburg, Pa., U.S.A.

last few years. The majority of these European equipments employ the same type of apparatus as is now made by the Metropolitan-Vickers Company.

The principal feature of an outdoor switching installation is, of course, the oil switch, and here the Metropolitan-Vickers Company have adopted a design which is in successful operation in all parts of the world. The essential feature in such switches is to house the equipment in such a way that it is at once thoroughly protected from the weather, while being readily accessible for maintenance purposes. The switch mechanism is assembled on a removable bracket which can be lifted "en bloc" from the switch frame. All link-work and operating rods are carried through heavy steel piping and the operating solenoid is within a cast-iron case. In the illustration (Fig. 2) is shown a completely assembled 73,000-volt oil switch of this type. The

pared with terminals of the filled porcelain type. For pressures over 73,000 volts the switch tank is of such size as to make it preferable to stand it on the floor. In this case it is customary to arrange an oil piping system serving all switch tanks from a central storage tank and filter equipment, so as to minimise the amount of handling in the course of maintenance. Manholes are provided to permit of ready access to the contacts in position.

In conjunction with the oil switches, complete series of accessory apparatus such as isolating switches, choke coils, bus-bar supports, etc., have been developed, thus giving the possibility for the first time of securing an All-British extra high voltage installation.

An illustration is given of a very recent installation in America—132,000-volt switching equipment at the Colfax Station of the Duquesne Power Company, Pittsburg (Fig. 1)

This gives a very good idea of the construction which is adopted in outdoor switching stations. As will be seen, the whole of the apparatus is carried on light steel framework, which seldom costs more than would the steelwork for a building of sufficient size to enclose the switchgear in accordance with the older practice. The Colfax Station is perhaps

American power companies have discovered that a very valuable source of revenue lies in the numerous farms over which their transmission lines pass. To serve such isolated consumers they have developed transformer stations having extremely simple and efficient control gear. For this purpose, and indeed for the control of power circuits up to

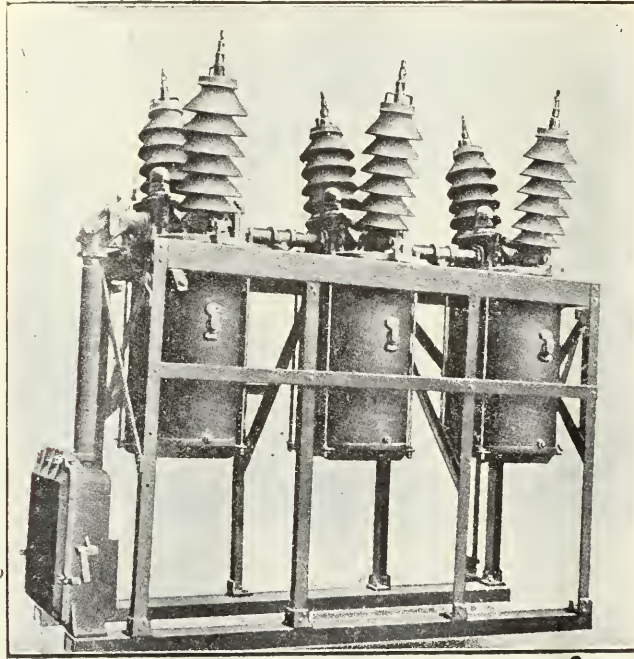


Fig. 2.—73,000-volt Outdoor Type G.11 Circuit Breaker.

of particular interest as indicating the entire reliability of service with outdoor switches. The climatic conditions in Pittsburg are probably unequalled in any city in Great Britain, except perhaps in Sheffield or Manchester.

The ground space occupied by outdoor switching equipments can very often be kept down to the same area as would be required for a building to house corresponding indoor equipment. In some power stations it has even been found possible to reduce the area by locating the high voltage apparatus on the flat roof.

2,000-kVA. normal capacity, it is now common practice to employ horn break switches and fuses to control the high tension circuits. Such apparatus is commonly mounted either on the top of a special tower inserted in the run of the transmission line or on a light steelwork structure placed to one side of the line on to which tap connections are taken.

The Metropolitan-Vickers Company are prepared to build the well-known Burke type of horn switch with its accessory apparatus, in the form of fuses, lightning arresters, etc. These devices are commercially and widely used on systems

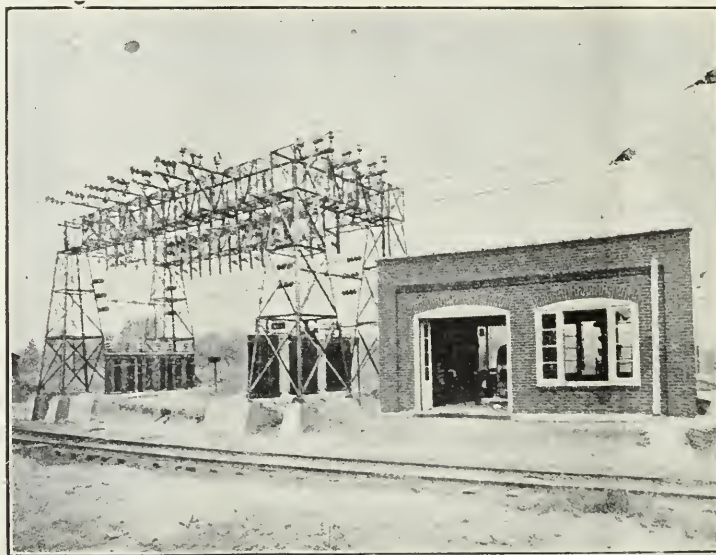


Fig. 3.—Railway Sub-station with Outdoor Hornbreak H.T. Switchgear.

up to 66,000 volts and for special conditions have been applied on circuits up to 110,000 volts. It is probably safe to say that the Burke type equipment is more widely used than any other of the numerous competitive types now on the market. In the Colonies there is already a considerable demand for equipment of this type, and with our own rapidly developing high voltage transmission systems there is little doubt that the day of the outdoor sub-station in Great Britain has arrived.

There is a popular but entirely inaccurate impression that the operation of horn switches sets up violent surges on the line. If anything, an oil switch is more likely to do this, since the arcing time is so much less. In a horn switch the break is gradually lengthened, inserting more and more resistance, until finally rupture occurs.

The Burke switch embodies a novel principle in that the main contact arm is jointed, so as to obtain a toggle action, pressing home the main contact brush. When opening, this toggle exerts a wrenching movement on the contact, breaking any ice which may have formed thereon. The horns, which have a fixed angular relation to each other at all times, lead the main contacts when closing and thus take all arcing.

An illustration is given of a railway automatic sub-station (Fig. 3), in which it will be noticed that the transformers controlled by Burke type switches and protected by lightning arresters with the typical triangular choke coils, are all placed on a very simple structure out of doors, and the small building is used to house only the rotary converter and its switchboard. Equipments such as these can often be employed in positions where more expensive equipment would not be commercially justified.

The Metropolitan-Vickers Company are approaching the task of development to meet the high voltage switchgear market in the British Empire. They are peculiarly well situated in having access to the working experience of associated companies abroad so that the purchaser is relieved of the fear that he is being used as a "laboratory" for the development of an experimental apparatus. The engineering staff in charge of this development includes several men who have been concerned for many years in the design and application of very high voltage apparatus in America and on the Continent.—From "The Metropolitan Vickers Gazette."

A MILLION POUNDS ORDER.

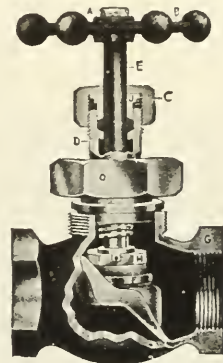
Big S.A.R. Electrification Contract.

We understand that the contract for eighty electric locomotives, amounting to £880,000, has been placed by the S.A.R. with the Metropolitan-Vickers Electrical Co., Ltd. Messrs. Dowson and Dobson, Ltd., are the managers in South Africa for this company, which, it will be remembered, absorbed the British Westinghouse Co. some time ago; and they are to be congratulated on their success in securing this important order in connection with the electrification of the South African Railways.

In round figures the value of the contract may be placed at £1,000,000. The locomotives will each weigh from 70 to 80 tons, and they will all be manufactured in England. The names of the successful tenderers for the other portions of the contract will probably be made known in a few days.

The S.A.R. Administration has accepted the following tenders:—No. 324, incandescent lamps, Hubert Davies & Co., Ltd., Johannesburg; British General Electrical Co., Johannesburg. No. 328, brass piping, Hubert Davies & Co., Ltd., Johannesburg; brass sheet, Wm. Hosken & Co., Ltd., Johannesburg; copper sheet, Reunert & Lenz, Ltd., Johannesburg. No. 329, electrical cables and wires, Rice, Wilson & Herd, Johannesburg; Telegraph Manufacturing Co., Johannesburg; Henley's (S.A.) Telegraph Works Co., Ltd., Johannesburg. No. 332, glass (plate and sheet), H. Evans & Co., Johannesburg; R. Wood Glass Co., Durban; The Plate Glass Beveling and Silvering Co., Capetown. No. 342, antifriiction grease, Union Chemical Works, Ltd., Johannesburg.

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A NEW TYPE OF SCREW BLOWER PARTICULARLY ADAPTED TO LOCAL CONDITIONS.

In putting through long-distance development drives with a single heading, and in all cross-cutting and raising, the efficiency of the miner and his natives undoubtedly falls off before the limits imposed by the Mining Regulations are reached, unless special means are adopted for ventilation.

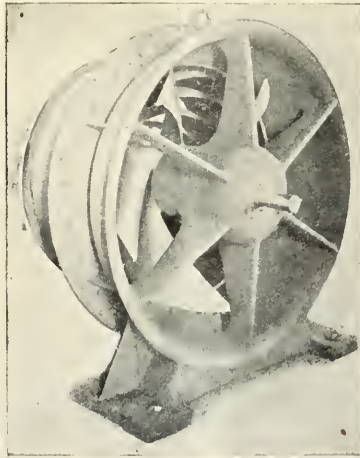


Fig. 1.—Schlotter-blower with a free shaft-end. View of the fan or air propeller.

We have in mind a case in point, where, on a flat reef, mostly in soft picking ground, the monthly footage was trebled with the same labour force, due solely and entirely to the provision of a fan and pipe line.

In the case of blasting ground the exhaust from the machines cannot compensate for a supply of fresh air, and it is established by test that the most efficient means of supplying this necessary air is by means of an electrically-driven fan. Setting aside therefore both air and water jet blowers, we have two types, from which to choose, namely, screw-blowers and centrifugal blowers.

As screw-blowers can only furnish a low working pressure, in comparatively long conduits, it would be necessary to arrange several fans in series at definite distances apart.



Fig. 2.—Schlotter-blower with free shaft-end. View of the guide blades.

If the permissible length per blower is exceeded the volume of air moved drops considerably and the drive becomes overloaded—probably resulting in a burn-out of the motor.

For long conduits, and where comparatively large volumes of air have to be moved, centrifugal blowers have hitherto generally been employed. Blowers of this type have a characteristic curve the converse of the screw-blower. When the back pressure falls the energy consumption increases, as for instance when the conduit is too short. Thus to follow a face with ventilation from a blower of this type, several changes of speed are necessary.

A blower which avoids the above disadvantages has been developed by the firm of Siemens-Schuckert, and it has recently been adapted to the special requirements of mining. The "Schlotter" blower is a screw-blower with air-guiding apparatus, combining with the usual advantages of its type (*i.e.*, axial propulsion of the air and a high number of revolutions) an extraordinarily high efficiency, 80 per cent.; and the production of comparatively high pressures, 7½ in. water gauge and over.

The blower consists essentially of a propeller of five blades and a stationary guide-drum with eight or ten blades, both of which can be seen in Figs. 1 and 2. The blades are shaped to a true helix and their essential characteristics are:

- (1) That the development of the edge of the vane at the circumference is approximately equal to the plan projection of the generating line; and
- (2) That the elevation development of the generating line forms with the axis an acute angle.

The novel feature of the guide vanes is that the edges at the inlet side do not coincide with the outlet edges of the propeller vanes as usual, but that the two intersect one another at right angles throughout their length. The current of air issuing from the propeller will thus be radially subdivided by the individual guide-vanes, and received by them without shock.

The curvature of the guide vanes increases in the direction of rotation of the propeller, which feature results in a further acceleration of the air in the stationary guides, so that a considerable portion of the axial thrust is developed in these, a very favourable point as far as the construction is concerned. Owing to inertia the threads of air issue

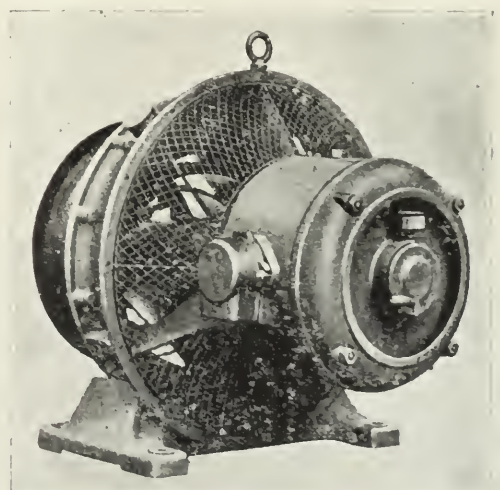


Fig. 3.—Schlotter-blower type SGOR 42.5/3000. View of the motor.

slowly revolving and convergent to the axis, so that assuming unobstructed motion of the air, the smallest jet area will be situated beyond the guide vanes at a distance equal to about half the diameter. With increasing counter-pressure, the rotation naturally increases and with it the radial com-

ponent, while the axial component becomes smaller, so that, beginning at a certain counter-pressure the further concentration past the guide-vanes ceases completely.

This design of blower is distinguished from all centrifugal and the hitherto known screw blowers by an unapproached high degree of efficiency, which remains uniform over a wide load range. At the same time, the consumption of energy at a definite speed remains the same over almost the entire load range. Thus where the counter pressure cannot be exactly predetermined or where the length of the delivery conduit is varying, as the drive progresses, an adequate volume of air can be continuously relied upon without any danger of overloading or burning out the driving motor.

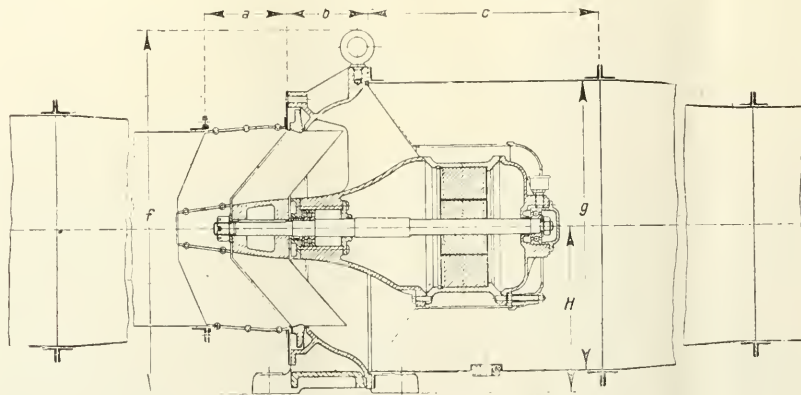


Fig. 4.—Schlotter-blower inserted into a conduit.

As shown in Fig. 3, the blower is combined into a single compact and light unit with a motor running at 3,000 r.p.m. The motor is usually a three-phase squirrel cage unit, totally enclosed, and thus effectively protected from the deposits so common at the inlet of a blower. The fan inlet is protected by coarse meshed screening, preventing the entry of foreign bodies likely to damage the machine. Ball bearings with grease lubrication are fitted, ensuring absolute safety of working, combined with a minimum of attention, and permitting the unit to work in an inclined position, up to an angle of about 10 deg. without any detrimental effect.

The blower may be used either for pressure supply to, or to exhaust from, a conduit, or it may be arranged within the conduit, so as to exhaust and compress simultaneously. For the latter arrangement see Fig. 4. In every case the delivery must be fitted with a converging branch of definite shape wherein the kinetic energy of the air is converted into static pressure. If the blower is set at the inlet end of a pressure conduit, the latter must not contain a bend near the blower, but should be straight for about 30 feet beyond the blower.

When using galvanised sheet piping with inserted joints, air leakage become a very serious source of loss in a long line. A considerable reduction in leakage loss can be effected by using the type of blower illustrated in Fig. 4, and, given the total length of pipe line through which it can deliver its rated volume of air, by arranging it, for pressure working up to half this length, and then carrying the pipe line the remainder of the distance as a suction. If the ultimate distance over which ventilation is required exceeds the capabilities of the blower, a similar set may be inserted in the pipe line, thereby doubling the range of the installation.

Summarising, the advantages of this type of blower are briefly as follows:—

- (1) Compact axial construction, permitting placing the unit in a straight line with and at one end of the pipe line, or alternatively inserting it in the line.
- (2) High speed, resulting in a small driving motor.
- (3) High Efficiency (80 per cent.), whence low energy consumption.
- (4) Uniform energy consumption, with any conduit length (with varying delivery), whence no danger of overloading the motor whether the line be too short or too long.

Fig. 5 shows an actual installation ventilating a mine heading, and illustrates clearly how conveniently the unit may be mounted, on a bracket high up on the site of the drive. Both blower and pipe line are clear of tramping and travelling and consequent damage.

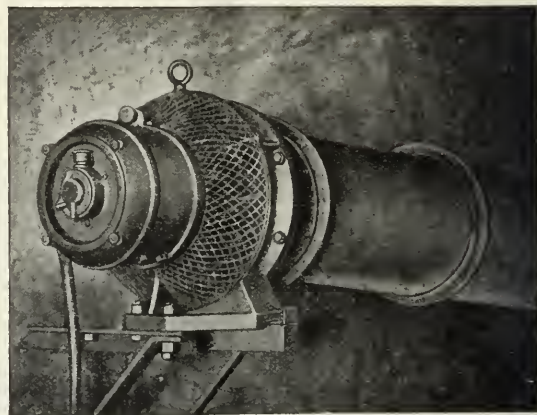


Fig. 5.

The smallest size blower of this type will deliver 400 cf. m. through a 10 in. pipe 750 feet long with 0.5 h.p. electrical input, and the largest size will give 3,200 cf. m. through 3,600 feet of 24 in. pipe, or twice this quantity through 850 feet of the same pipe with an electrical input of 7.5 h.p.

J. B. B.

British Ocean Records.

The conversion of the "Aquitania" from coal-burning to oil-burning has resulted in an appreciable increase of speed, and on a recent eastward voyage the vessel touched

the speed of 26.66 knots, a figure previously reached by the "Mauretania." Now that the "Mauretania" itself is undergoing conversion to oil-burning, a still higher record is expected to be achieved.

Railway Electrification Advantages.

MANY AND GREAT—SAVING IN WORKING COSTS—MECHANICAL DEMERITS OF STEAM.

By Sir Vincent L. Raven, K.B.E.

The following valuable article by the Chief Mechanical Engineer of the North-Eastern Railway, who has had considerable experience of electric traction, is of peculiar interest to South Africa to-day on the eve of railway electrification. The North-Eastern's passenger service around some of the busiest suburban districts of Newcastle has been worked electrically for the past 17 years.

The steam locomotive is a machine with which we find it difficult to part, but, outside sentiment, our principal reason for adhering to it is the comparatively great cost in changing from one system to another. Before this can be put down as insurmountable, it is right that the savings and disadvantages of electricity should be clearly stated against the expense involved in the substitution of electric for steam operation. Taken as a whole, it will be seen that the advantages can all show a definite financial economy in operating expenses.

One essential difference in operation between an electric and steam locomotive, where the former can show a very definite advantage, lies in the preparation and setting by of the locomotive. An electric locomotive is always available for service at a moment's notice, since the electric motors only require that they should be kept clean, lubricated and provided with brushes in order that they may be always ready for immediate use by simply connecting them to the distribution line. When the day's work is over nothing has to be done except ordinary examination, oiling and cleaning for next trip.

Hours of Service.

On the other hand, the process of preparing a steam engine for duty involves considerable time and labour. About three hours before the driver and fireman come on duty the steam raiser has to make up and light the fire and attend to it until the driver takes charge, after which it takes the driver and fireman about 60 minutes to complete the preparation of the engine for its day's work. After the day's work is finished the fire has to be thrown out and fire-bars cleaned, smoke-box ashes to be thrown out of the smoke-box, and the tubes have to be cleaned by compressed air. About every sixth trip the boiler washer has to clean the boiler to keep it fit for producing steam. The boiler-smith has to examine and renew many of the other small repairs to the boiler in order to enable the engine to run its stipulated mileage. The shed fitters have a large number of working parts to keep in order which have no corresponding part on an electric locomotive.

Then, again, when the electric locomotive has been put into service it can remain at work continuously for at least 20 hours in every 24, as the lubrication and the small amount of cleaning that is necessary for the electrical equipment can be given by the crew at wayside stops during running and between trips. Therefore, an electric locomotive need only go into the sheds in the ordinary way for cleaning and inspection of certain of the less accessible parts between the frame. On the steam engine the boiler, fire and smoke-box, in addition to the much larger number of mechanical parts such as cylinders, valves, link motions, etc., are responsible for a considerable amount of time taken up in examination and attention which might otherwise be utilised for hauling traffic.

On Driving Skill.

Due to preparation for service and ordinary service attention, the electric locomotive can be longer in revenue earning service than the steam locomotive; thus, provided traffic conditions will permit, the electric on these two counts alone is capable of dealing with a considerably larger ton mileage than the steam locomotive.

The fundamental difference between an electric locomotive and a steam engine lies in the fact that while the latter generates its own power, the former is only a transformer of the power which is generated at the power station or stations into haulage power on the track. One consequence of this difference is that the working of a steam engine depends to a large extent on the skill of the crew in generally nursing the engine so as to get the best out of it. The working and condition of an electric locomotive is not nearly so dependent upon the skill of the driver and his assistant. Full power is always available, and the power and speed which can be developed at any moment are only limited by the initial design of the electrical equipment and by the mechanical construction.

The driver of an electric locomotive need never hesitate to exert the full power for the sake of nursing the locomotive, and all trains within the limit of load for which the locomotive is designed can be hauled up the maximum gradient at full speed.

Boiler Capacity.

The limitation of boiler capacity in the case of a steam engine combined with the different characteristics of steam and electric locomotives gives the latter an additional advantage in the question of speed on gradients. As the governing factor in the power of a steam engine is the capacity of the boiler, which is practically a fixed quantity, the horse power output of the locomotive is approximately constant over a wide range of speed. In other words, the maximum pull of an electric locomotive can be maintained until a certain definite prearranged speed is attained; whereas a steam locomotive can only exert its maximum pull at the moment of starting, after which the pull is reduced as the speed increases, and the speed of the train falls to a marked extent whenever the train has to climb a gradient.

This reduction of speed on a gradient is not nearly so marked in the case of the electric locomotive, for there being no similar limitation to the amount of power available, the relation between speed and tractive effort is quite different, and the demand for greater tractive effort is supplied by a higher output from the power supply system. In comparison with the steam engine working, where the speed is

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greatly reduced on a gradient, this enables a much higher average speed to be maintained over the whole line, which is equivalent to saying that with electric working the general average speed can be considerably increased without any increase in the maximum speed.

Better Traffic Working.

If other factors permit, this characteristic of electric locomotive operation would allow goods trains to travel at an average speed more nearly approaching that of passenger traffic. The result of this would be a more regular flow of traffic over the line, and the necessity for side tracking of the goods trains to allow passenger trains to pass would be reduced. It is a fact that a higher general average speed of travel increases the total capacity of the line.

A further advantage which can be obtained owing to this increased average speed of travel is better traffic working. In dealing with the traffic carried a greater number of trains can be run, and these trains complete their journeys in less time than with steam working, thus enabling better use to be made of the available rolling stock. This is particularly true in the case of goods wagons.

Mr. Becukes, the electrical engineer to the Chicago Milwaukee and St. Paul Railway, has estimated from actual records that electrification has enabled about 30 per cent. more tonnage to be dealt with in about 80 per cent. of the time formerly required under steam operation, which means an effective increase in the capacity of the line due to electrification of 32.5 per cent.

Saving in Fuel.

A very serious disadvantage of steam operation is that the steam engine radiates heat and uses coal all the time that steam is up—that is, during many hours when it is doing no work, and either standing by or coasting. On the other hand, the electric locomotive uses no power unless actually running and doing work. It is quite evident that for this reason electric operation makes possible a very considerable saving in fuel as compared with steam operation. This saving is all the more important in proportion as the duty performed by the engine is the more intermittent, especially since the electric locomotive has a much higher efficiency, when only partly loaded, than the steam engine.

This saving in fuel is one of the greatest advantages to be obtained by electrification, and a number of comparisons have been made in the United States between the coal consumed for a certain service as worked by steam and electric locomotives. With electric operation, a much

smaller tonnage of coal has to be carried over any line—for the same traffic—and this quantity is carried to fewer unloading points—namely, the power stations. This results in the clearing from the line of a number of local trains. A number of wagons will also be set free which, with steam operation, would have to be employed in carrying coal.

Maintenance Economies.

Resulting from the experience which has been obtained in America, it can be definitely stated that electric locomotives show a considerable advantage over steam engines in the cost of repairs and maintenance. One reason for this saving in maintenance cost lies in the simplicity and robustness of the electric locomotives. Spare parts can be substituted so easily that heavy repair work is practically confined to cases of serious breakdown or accident—if tyre turning is not included. The shops required for maintaining a given number of engines need be much less elaborate than would be required for an equal number of steam engines.

I believe that supply companies should be able to generate electric power much cheaper than a railway company, as they ought to be able, generally, to get a much better load factor; and the desire should be that electric current will be produced at such a cost as to ensure that the price for current, plus the maintenance of the railway equipment, shall not exceed the present coal and water bill. If this is done, undoubtedly electrification should proceed rapidly.

A Simple "Hydrohoist."

One of the simplest forms of pump consists of an endless chain in the links of which, owing to their peculiar shape, the water is trapped and raised. The mechanism, in fact, operates as a water hoist. In order to make it more efficient a British firm has introduced a very ingenious modification. A wire rope is used, and on this rope are threaded a series of small steel cups, each with a thimble at its centre to keep it at the right distance from its neighbours. When the rope runs at 600 feet per minute this hoist will deliver 3,500 gallons per hour. Curiously enough, this delivery represents more than a solid column of water of the diameter of the cups. The cups rise full of water, and there is in addition a large quantity carried on the outside. No fixing is needed beyond the casing at the well-head, and on this and the grounds of simplicity and ease in maintenance the "hydrohoist," as it is called, appeals particularly to agriculturists. It can be worked by hand on lifts as high as 150 feet. Power drive can easily be arranged, and the capacity can be increased by running two or more ropes alongside each other.

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RHODESIAN SECTION.

Labour Problems in Rhodesia.

MINES AND RAILWAYS—REDUCTIONS FORESHADOWED.

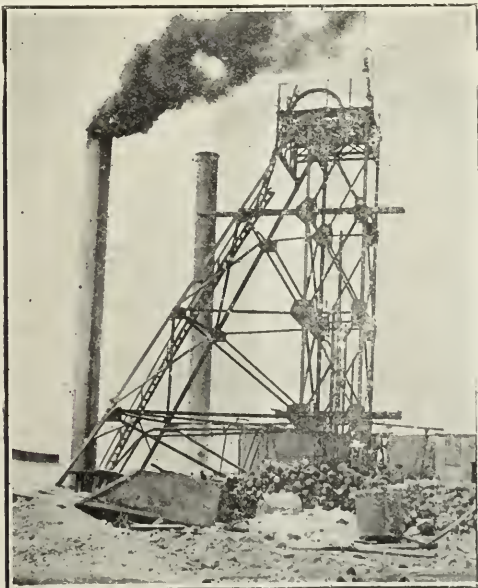
It is natural that the Rhodesian Labour unions should be watching with the keenest interest the progress of the present crisis on the Rand, says the latest issue of the *Bulawayo Chronicle*.

It happens that in Rhodesia also, and for reasons similar to those in the Transvaal, a reduction of wages is imminent. Notice to this effect has been given in the case of the miners, to take effect from April 1. We understand that the actual amount of the proposed reduction will shortly be decided. As we have stated, they will be based on the recently issued official figures as to the reduction in the cost of living; but it is not to be expected that wages will be lowered to anything like the proportion represented by the fall in prices. This, it will be remembered, is stated by the recently issued supplementary report of the Cost of Living Committee as showing a fall of 13.18 per cent. within the past year, the average figures in December being 23 per cent. above pre-

a grave injustice to the Rhodesian miners, as to whom the individual members must admit the logic and justice of the argument that when wages are put up to meet the added cost of living, there may legitimately be some decrease when living costs fall, especially when such a thing is necessary to preserve employment. Owing to our smaller population, the unemployment problem has not got outside the bounds of treatment in this territory, but it would do so immediately if our general industries flagged, or if any local Labour troubles arose.

We have no official information regarding railway wages, but it is understood that in this service also there will have to be early proposals based on the same reduction in living costs, the increase of which was the basis of well-remembered wage increases that had to be largely passed on to the revenue-earning machinery in the shape of surcharges on freights and fares.

There are reports and indications of much activity in the Rhodesian Labour organisations, and we earnestly hope that these efforts are being directed to the avoidance in this territory of any such disputes as now afflict the Rand, whence, however, the news is that the mine-owners, replying to the unions, have expressed their readiness to negotiate, though not in the terms of the strike-leaders' ultimatum. It is understood that one or two emissaries from the Transvaal have arrived in Rhodesia during the past few days, and local Labour feeling expresses the hope that they have come to advise us to "keep out of the troubles down below."



The Lonely Mine, Matabeleland.

war prices, on the basis of a typical family budget. Nor is it likely that the proportionate reduction will be the same for all classes of pay, and it will certainly be found that the men at lower rates escape very lightly indeed.

So far as we can see, there will not be the slightest excuse for associating the necessary Rhodesian economies with the present dispute in the South, though the same need for cheaper production exists in the case of both branches of the mining industry. Any attempt to create such an association would not help the Rand trouble, and would be

In face of the recorded assurances of the Chamber of Mines that there is no intention to remove the colour bar, the men's leaders are incurring a grave responsibility to their fellow men in telling them that the colour bar is to be abolished and that they are fighting a just cause. What is actually happening? (a) No gold has been won along the Rand for a week, and the mines have thus obtained no revenue, no earnings to place against their accumulating bills. In the case of some properties, the week's idleness has plunged them into financial difficulties from which it is questionable whether they can recover. Their closure, further, will mean hardship for the men, women and children whose daily bread has hitherto been won in their stopes. (b) The loss in wages to mine employees alone—reckoning seven days at £35,000 per day up to Monday—amounted to £245,000. (c) The community itself has lost £600,000 directly in the expenditure of the mines for the same period (already mentioned). This sum was augmented to £1,000,000 on Thursday. (d) Some 65,000 natives who have completed their contracts and who are, therefore, free, are returning home. As the mines have been shut down by the S.A.I.F., and no work is offering the boys, the leaders of the industry have no alternative but to allow these natives to go. If they leave in huge numbers, as seems not unlikely, there will be a grave restriction of white employment. The action of the S.A.I.F., in other words, is likely to enhance unemployment.

Rhodesian Arsenic.

THE CHAMPION MINE.

The second annual general meeting of the shareholders of the Standard Arsenic (South Africa), Limited, was held in Bulawayo the other day.

The Chairman, Captain L. Ludlow, in moving the adoption of the report, stated: The report and accounts having been in the shareholders' hands for some time, I therefore, with your permission, take the same as read and proceed to deal briefly with the accounts and general affairs of the company.

Capital.—The authorised capital remains the same as last year, but since then negotiations for the issue of a further 15,325 shares have been concluded, and the issued capital now stands at £40,325 in £1 shares, all of which are fully paid.

Mining operations have been carried out continuously throughout the year with very satisfactory results, whilst the position in the mine has improved very greatly since the date of our last meeting, and we are now in the gratifying position of having sufficient ore in sight to provide enough white arsenic to last us for several years, in addition to which we have already mined and dumped on the surface 2,039 tons of ore from which our arsenic requirements can readily be obtained at short notice.

The question as to the future policy to be adopted in connection with the mine is having the serious consideration of the Board, and after a large proportion of the ore already in sight has been brought to the surface it may be decided to close down mining operations temporarily, thus reducing our expenditure to the lowest limit, but before any decision is arrived at in this connection several important factors have to be carefully weighed, and we shall, of course, be guided very largely by the recommendation of our engineers as to the policy which will be adopted.

The fact that our dip is manufactured in Rhodesia, from Rhodesian arsenic, should, we think, weigh with cattle owners when deciding as to which dip they should use, but in asking them for their support we can safely claim that Champion is as effective and reliable as any dip that can be offered them, and as nearly half-a-million head of stock in Rhodesia are dipped weekly with Champion Dip, there is little need to give further evidence as to the freedom from risk in using it.

Rhodesian Railway Finances.

GENERAL MANAGER'S FIGURES.
DEFICIT OF £35,000.

Working Expenditure Increased by £363,000.

In his "Bulletin No. 2," Colonel Birney (General Manager of Rhodesian Railways) gives the approximate figures for the financial year ended September 30, 1921, which may be taken as a rough estimate of the principal items of interest connected with the year's working for all sections, including the Vryburg-Bulawayo line and the Rhodesia Katanga junction railway. For the purpose of comparison the figures for the corresponding period in 1920 are also shown (in brackets).

Revenue in South Africa, £3,075,000 (£2,507,420); expenditure in South Africa, including provision for depreciation, £2,085,000 (£1,722,078); surplus earnings over expenditure in South Africa, £990,000 (£785,342); fixed charges payable out of surplus earnings, i.e., debenture interest, in-

terest on income debenture stock (1921 only), interest on 6 per cent. notes (1921 only), interest on loans, income and Corporation Tax, and sundry payments, £1,025,000 (£820,798); deficit, £35,000 (£35,456).

The increased revenue may be accounted for as under:—
(a) Surcharge on goods, minerals, etc., traffic: In 1921 the surcharge was in operation for two months at 25 per cent., and for 10 months at 33½ per cent., as against—1920 for six months only at 25 per cent. (b) Surcharge on coaching traffic: In 1921 the surcharge was in operation for two months at 10 per cent. and for 10 months at 16⅔ per cent., as against—In 1920 for six months only at 10 per cent. (c) Increased receipts, from additional tonnage of goods, mineral, etc., traffic hauled, and the increased number of passengers carried.

The increase in the working expenditure of £362,922 may be broadly set out under seven headings, viz.:—(a) Increase in the remuneration of the staff; (b) the introduction of shorter working hours; (c) increase in payments for overtime and for travelling and booking-off expenses; (d) additional leave to staff; (e) increased cost of material; (f) cost of working additional traffic; (g) increased contribution to Depreciation Fund. In 1921 there is a full year's cost of items (a), (b), (c) and (d), whilst the 1920 expenditure includes 7½ months only.

The increase of £204,202 in the fixed charges represents interest and income tax on the 6 per cent. notes issued on various dates during the year, interest on Beira Railway 6 per cent. income debenture stock (not earned and therefore not paid in 1920), and to increases in sundry payments during the year.

The figures for the financial year ended September 30, 1921, do not include a full year's interest and income tax on the 6 per cent. notes as the issue was made at varying dates throughout the year as the money was required.



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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

PROMINENT MERCHANTS' VIEWS ON STRIKE POSITION—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—COAL INDUSTRY IN BRITAIN AND UNION—RHODESIAN MINERS' WAGE REDUCTION—BOARD OF TRADE RETURNS FOR DECEMBER MONTH AND FOR YEAR 1921—BANTJES CONSOLIDATED LIQUIDATION—METAL MARKET.

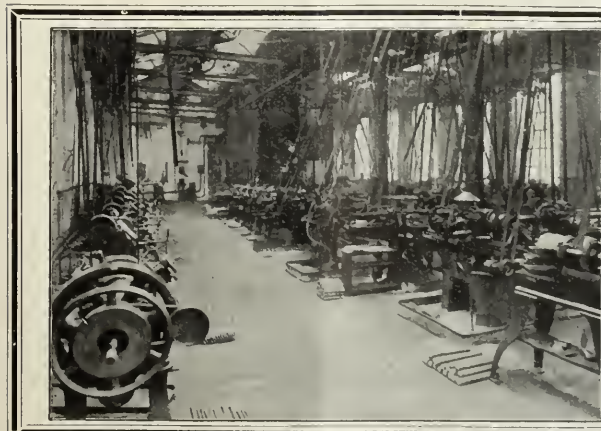
General.

The Industrial Conference, presided over by Mr. Justice Curlewis, has been sitting for some days, but up to Wednesday last no agreement had been reached regarding the coal trouble, which has been taken in hand first, but which seems to bristle with unexpected difficulties. A settlement of the coal dispute was confidently anticipated early in the week. As regards the gold mines strike, this has resulted in the utter dislocation of mining material business in particular and the whittling down of all other commercial activities in general. The losses caused by the strike up to the present amount, it is estimated, to approximately £1,000,000. What this means to the community—with no end of the dispute in view and the losses being added to by every day which passes without a settlement and resumption of work—is only too apparent. In addition to all this it is quite on the cards that by the time these notes appear—unless something crops up in the meantime of which at the moment there is no sign, the City's power works will have come to a stop through exhaustion of coal supplies, which were estimated to hold without accretion till yesterday only. If common-sense action is demanded in respect of the many vital issues surrounding the strike, surely it is absolutely imperative for the convenience of the community that it be exercised in the matter of continuing the running of such an important service as the power station, and it is inconceivable that the Federation will fail of its bounden duty in permitting the requisite supplies of coal to be furnished to allow of the proper and regular running of this service.

Apart from our admittedly low-grade propositions it is not sufficiently kept in view that even our richest mines contain huge quantities of low-grade ore which, if the cost of production is brought down to a reasonable level will provide employment for many years to come for numbers of miners. The extension of working the less rich portions of our richer mines would thus compensate for the inevitable falling out of some of the downright low-grade com-

panies which will be unable to carry on with a further decline in the price of gold, which, however, must inevitably happen.

In the meantime everything is hanging off and there is no life in anything, commercially or otherwise, at the moment. Everybody is tired of the present state of things—the miners just as much as the citizens. A well-known merchant, who has had many opportunities of speaking to numbers of the more respectable and reasonable workers, said there was no enthusiasm among them regarding the strike; that the spirit abroad is not too good; in fact, that there is a nasty feeling spreading among the heads on both sides; and that the men would be only too glad to get back to work. A settlement of the coal strike, he said, would undoubtedly ease matters in respect of smoothing over the more important issues raised by the gold miners' strike. Another prominent importer said it would take many months after settlement of the present dispute before anything like normal business could eventuate. There was, he said, a lot of work to be done—public and other work—which had all been waiting for a reduction of costs. There had during the past few months been a large number of tenders called for, which, however, had been shelved for that reason. Engineering people had told him that for every seven or eight tenders called for perhaps only one had been given out, the others being laid aside for lower production costs. He thought that lower working costs in every class of work would tend to the ultimate prosperity of the Union. Still another influential merchant in the course of a chat this week regarding the present position, said of course everything is absolutely at a standstill, and he thought that the length of time the mines had already been shut down would necessitate a very long period to get the industry into order again, and consequently the commercial community would feel it acutely for at least two months even if a settlement were brought about this week. It looked, he said, as if some of the mines would never start up again, which again would curtail the spending power of the remaining ones, as they would be absorbing the second-hand plant



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and material available from the mines closed down. As regards the duration of the strike, it was of course impossible to judge from the resumé of the conference meetings issued daily, but he did not think the Chamber of Mines would withdraw their notices, or abate one jot of their main principle to secure a reduction of working costs and greater ratio of natives to whites. It depended, also, to a great extent, upon how far the Federation were prepared to accept some slight concessions, with which they could approach their unions; they might perhaps be looking for very little now with which to go to their people and thus with some small compromise save their face. He did not, he said, in conclusion, think there would be any sympathetic strike; nobody, he thought, outside the Rand wanted a strike to-day.

Timber is slightly harder on reports from the Baltic, but iron and steel are inclined to give way a little.

Iron and Steel.

There can, of course, be no question of business in this section while the strike lasts. Merchants are, as a matter of fact, hard put to it to fill up their time, and the perusal of their ledgers showing their losses during the past twelve months is no agreeable pastime.

Latest quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corp., Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{2}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; hammer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 21s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb.; screening, 3s. to 9s. 6d. per sq. yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{8}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton.

L.C. Steel Coke Tin Plates.—L.C. 11 x 20, 112s., 108 lb.; coke quality, 21s. per box. L.C. 28 x 20, 112s., 216 lb.; coke quality, 42s. per box.

Newcastle Iron and Steel Company, Ltd.

General Smuts, Mr. P. Dunean, Sir Thomas Watt, and others visited the above works recently, and the Premier was greatly impressed with all that he saw. The plant is

now completed, and the company hope shortly to have the necessary raw materials on the property, approximately 10,000 tons of iron ore, coke and lime.

Second-hand Machinery.

There is, of course, very little doing just now in second-hand plant, a few industrial inquiries, but not of any magnitude, mostly for spares, pulleys, etc. The mines are naturally the dealers' biggest customers for second-hand machinery, and the strike has minimised orders considerably, all the properties being shut down. One particular dealer had several large orders to complete, and was already on the verge of delivering several orders which he had received, when he was asked to hold them up for the present. Of course, he said, all stores and everybody are affected in a like manner until the strike is settled. This particular dealer was delivering goods up to Christmas and New Year's Eve to several companies that had tried to run low till the end of the year, but were compelled to purchase to keep going. Dealers anticipated big things this present year, but unfortunately the strike has put the stopper on everything.

Iron and Steel Trades in Britain.

The iron and steel trades in Britain continue quiet in spite of a certain amount of Continental business. Prices generally are maintained. The prospects are a little brighter for the Sheffield trades. A fair number of orders have been received, but the armament firms are seriously affected by the cessation of orders and many are reducing establishments. The cutlery and plate trades are still idle, as it is impossible to compete with German goods.

Oudtshoorn's New Steam Power Plant.

The new steam power plant installed in the Oudtshoorn municipal electric light undertaking, at a cost of £15,000, has undergone very successful tests. The plant was erected by the engineering firm of Messrs. Hubert Davies & Co., and is of 150 kilowatts capacity, and it is anticipated will be far more economical than the Diesel oil engines, which, notwithstanding an appreciable drop in oil and fuel, had been a heavy charge on the undertaking.

Agricultural Implements.

Business has not improved but rather the reverse during the past two or three months; money is still very tight, and farmers are finding it difficult to get any relaxation in their financial relations with the banks, in view of the general state of affairs and the low prices obtainable for their products. They are therefore compelled to await better times and lower prices for agricultural machinery.

Timber and Building Materials.

There is but little business doing just now, but prices are very firm here, with a tendency for timber to go higher on reports from the Baltic, where quotations are advancing. Prices.—3 x 9 deals, 1s. to 1s. 1 $\frac{1}{2}$ d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 1 $\frac{1}{2}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; ceilings, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; Oregon, 7s.; pitch pine, 8d.; Corrugated iron, 8 $\frac{3}{4}$ d. to 9 $\frac{3}{4}$ d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1 $\frac{1}{2}$ in., 11d.; 2 in., 11 $\frac{1}{2}$ d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1 $\frac{1}{2}$ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Building Workers' Ballots.

The Building Workers' ballot which was taken at a meeting on Monday last, at which the attendance was over 400, showed a majority of four to one in favour of a sympathetic strike. The Durban Building Workers' decision

was a two-thirds majority, and the East London Union showed 45 for and 19 against a sympathetic strike. Generally, however, among other sections of workers in the Union the tendency seems to be hostile to supporting the Rand Federation's request for a sympathetic strike.

Second-hand Iron and Timber Yards.

Dealers are perforce marking time at the moment, but hopes are high of good business coming as soon as the strike has been satisfactorily settled. Second-hand iron is 6d. to 7d., 9d. to 10d. for timber. The different yards are very fully stocked at present, and their owners are only too anxious to work off some of the accumulated surplus.

Coal Industry in Britain.

The shipment of coal to India, the Far East and elsewhere is very brisk. It is thought probable that the pits will be kept in steady work for some time to come and others added to those now producing. Prices are steady without quotable change. With regard to India the latest inquiry is for 300,000 tons of Welsh Admiralty and Monmouthshire coals for shipment during this year on c.i.f. terms. This inquiry is from sources other than the Indian Government. From the latter tenders have been called for 250,000 tons for shipment during January and February. The Bombay and Baroda Railway, which has already given out contracts for 175,000 tons, is asking for a further 60,000. These inquiries represent prospective business for several months. Welsh coal has been shipped to India and the Far East in very large quantities owing to the Indian coalfields being unable to meet the local and export demands. The shipments during October and November totalled over 300,000 tons.

Union's Coal.

The course taken by the shipping companies gives one some idea of the loss of business which the Union is suffering through the present coal strike. At the first throat of a strike the Union-Castle seamers have taken all possible bunker coal supplies from Home ports, which policy has undoubtedly been followed by other lines. This loss of supply is a great loss to our collieries, leaving the Rand strike and stoppage of supplies out of the question.

Rhodesian Miners' Wage Reductions.

The Rhodesian Mine Owners' Association have advised the Rhodesian Section of the South African Mine Workers' Union that a reduction of wages will come into force on April 1. Wages amounting to 30s. per day will be reduced by 12 per cent., and others will be reduced in the same ratio. After April 1 all overtime will be reckoned at time and a quarter, except that of shiftmen maintaining continuity of shifts, which will remain straight time as at present.

Electrical Appliances.

Business remains very quiet as it has been for some few months; there is naturally, during the present labour unrest, not much doing in town apart from repairs and essential replacements. A large dealer reported the receipt of a few orders from Rhodesia, but few inquiries from other parts. He was sanguine, however, that as soon as normal had again been reached business would improve considerably, as there was to his certain knowledge a large amount of work hingeing on the resumption of building operations. Prices remain without quotable change; stocks on hand are full in all descriptions.

Shipbuilding in Britain.

The shipbuilding industry in Britain, though still below par, shows signs of a revival, and several vessels on which construction was suspended will now be completed. The marine engineering industries also show an improving tendency.

Board of Trade Returns.

The Board of Trade returns for December show imports at 85½ millions, against 89½ millions for November; exports at 68½ millions, against 72½ millions for the previous month.

The decrease is attributed, however, to the fall in prices and not the volume, which is slowly though steadily growing. The total imports for 1921 amounted to 1,086 millions, the exports to 703 millions, compared with 1,932 and 1,334 millions respectively in 1920.

Flooding of Mines.

The action of the Strike Committee at Benoni in pulling out the employees of the Kleinfontein power station has prevented necessary pumping from being carried on on the Modder East, with the result that the mine is now flooded. The water is already up to the 23rd level, and when it reaches the 22nd the electric hoists will be flooded out.

The water in the Village Deep is also steadily rising, but the danger here is not so imminent as in the case of the Modder East.

Bantjes Consolidated Mines, Ltd.

The Board have decided in view of the very small percentage of payability disclosed throughout the drive recently extended to 500 ft. west of the dyke, to call a meeting of shareholders to consider resolutions for placing the company in voluntary liquidation. It will be remembered that the mine was closed down at the end of 1918 and in the opinion of the Board any attempt to re-open the same for the purpose of working the small remaining ore reserve is not warranted. Great expectations were formed of the original Bantjes Company over thirty years ago, which, however, were never fulfilled.

South African Reserve Bank.

The statement of the above on January 14 showed ratio of cash reserves to liabilities to the public 74.3 per cent.

It is reported from Rome that negotiations are under weigh for the reconstitution of the Banca di Sconto with Italian and foreign capital. Mr. Otto Kahn, the well-known New York financier, and Messrs. Dreyfus, of Paris, are expected to participate in the new concern.

New Issues.

A new Commonwealth of Australia 6 per cent. loan of £5,000,000, redeemable from 1931 to 1941, at 97 is being underwritten, while an issue of £4,000,000 sterling of ordinary and 8 per cent. preference shares by the Anglo-Persian Oil Company will, it is understood, be underwritten this week.

Metal Market.

Latest quotations: Standard Copper, £65 12s. 6d. cash, £66 7s. 6d. forward; electrolytic copper, £73 cash, £74 forward; standard tin, £165 2s. 6d. cash, £166 17s. 6d. forward; foreign lead, £23 17s. 6d. cash, £23 15s. forward; quicksilver, £10 15s.; bar silver, 35½d.; bar gold, 97s. 6d. per oz.

SWAZILAND TIN.

The following are the results of the operations of this company for the month of December, 1921:—Concentrate recovered, 18 tons; estimated net profit for the month, including credit adjustments on previous shipments (taking tin at £160 per ton), £264.

MINES DEPT. EXAMS.

CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 6 failures this year (1921)

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),

St. James' Mansions, Eloff St. Johannesburg

New African Railways.
The Strike Drags On.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, JANUARY 21, 1922.

No. 1582.

New Road Bridge over the Vaal at Vereeniging.



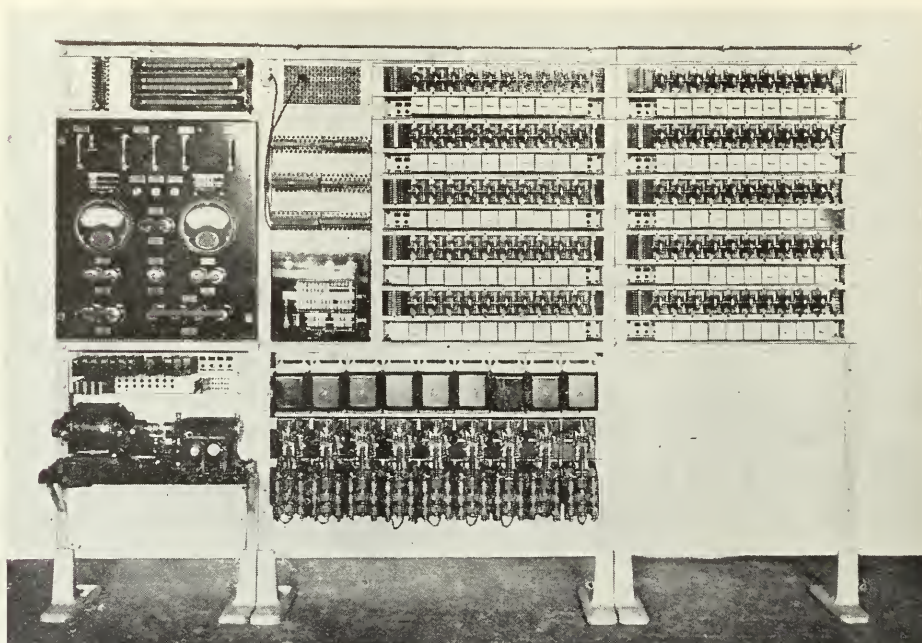
The Bridge consists of 5 spans, each of 150 feet. The material is now on the site and erection work in hand. The photo shows one span erected for inspection in the yards of the Cleveland Bridge and Engineering Co., Ltd., Darlington, England, whose agents in South Africa are A. & S. Ash Brothers. An article on this noteworthy engineering project appears elsewhere in this issue.

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THE STRIKE.

THE CONFERENCE CONTINUES—COAL MINERS REFUSE CONCILIATION—TOWN SHOPS AND ARBITRATION—THE TOWN COUNCIL'S DILEMMA—THE GOLD INDUSTRY—MR. BUCKLE STATES THE CASE FOR THE MINES—LABOUR LEADERS UNREASONABLE.

The Conference sat all day on Saturday and advanced the V.F.P. and town engineering shops disputes a slight stage further. The discussions were resumed on Monday morning, and the Conference will sit till 6 p.m. each day in order to expedite business. It was not expected that the adjourned discussion on the coal question will be resumed for some days. The unanimous decision of the colliery workers at Witbank not to return to work will not be followed by immediate action. The opinion of the colliery workers at Cornelia Colliery (Vereeniging) and other collieries in the Transvaal will next be ascertained, and then the S.A.I.P. Executive will deal with the whole matter before the debate on this subject is resumed in the Conference.

So far as Johannesburg is concerned, some little stir was caused early in the week by the prospect of 10,000 tons of coal from the Albion Colliery being available for municipal services. The Johannesburg Town Council, it may be recalled, did not immediately accept the tonnages of coal offered by the Grenfell and O'Neil Collieries last week, and the Grenfell Colliery then formally withdrew its offer.

Resolution of the Technical Societies.

At a special meeting of the Controlling Executive of the Associated Scientific and Technical Societies of South Africa, held in the Scientific and Technical Club, certain important resolutions on the strike position were passed. The meeting was attended by delegates of the following constituent societies: S.A. Institute of Engineers, S.A. Institute of Electrical Engineers, Chemical, Metallurgical

STRIKE PERSONALITIES.



Professor Lawn, one of the members of the Conference.

and Mining Society of South Africa, Geological Society of South Africa, Witwatersrand Branch of British Medical Association, Association of Transvaal Architects, S.A. Association for the Advancement of Science, S.A. Association of Assayers, S.A. Chemical Institute, S.A. Institute of Quantity Surveyors, S.A. Association of Draughtsmen—with a total membership of 2,380. Dr. A. J. Orenstein presided, and the following resolution was carried unanimously:—

Whereas owing to a strike of employees in collieries, gold mines, and certain other industries, certain public services, essential to the health and safety of citizens are threatened with stoppage, or have already been stopped, and

Whereas the essential services cannot be permitted to be affected by industrial strife, but should be subject to the same immunity as is granted life-saving and health services, even in theatres of war, be it resolved:

(a) That the Controlling Executive urges members of the constituent societies to use all the influence they can muster in their private and professional capacities to ensure the uninterrupted and adequate continuance of such services, especially those of water supply, light, gas and power, sewage disposal, and such services as protect mines and plants from destruction.

(b) That members of the constituent societies are recommended, if need be, to offer their services in such capacity as is within their capabilities, and in which their professional training would be most useful, to operate such essential services.

(c) That the Controlling Executive pledges itself to protect in every way members of societies who may volunteer to help in providing such services or/and in protecting the personnel and plants of such services.

(d) That the Controlling Executive confidently expects that the municipal and other authorities will on no account discontinue such essential services or curtail these to an extent involving any risk to the public health, or safety, or property, which, even though it might fall under the designation of "private property," is still always a national and communal asset.



Mr. F. S. Malan, Minister of Mines. The Government is closely and anxiously following the deliberations of the Conference.

(e) That the Controlling Executive, in pledging its full support to the Union Government and municipal authorities in the maintenance of essential services, confidently anticipates that the Union Government will provide adequate protection for the personnel and plant concerned with such services and deal drastically and instantaneously with any attempt to interfere with same.

(f) That a copy of these resolutions be forwarded by telegram to the Right Hon. the Prime Minister, and also be forwarded immediately to the Town Councils of Johannesburg, Benoni, Brakpan, Springs, Boksburg, Germiston, Krugersdorp, Roodepoort-Maraisburg, and Randfontein, as well as published in the daily Press.—(Signed) A. J. Orenstein (President), H. A. G. Jeffreys (Secretary).

Hope Disappointed.

Last week end the strike assumed a more hopeful aspect on account of what appeared to be a fair prospect of the strike of the coal miners being brought to a satisfactory stage by the submission of the dispute to a Conciliation Board. This hope was, however, quickly dashed to the ground, and the protracted labours of the Conference in connection with the collieries dispute were nullified by the decision of the Witbank employees. The workers' representatives informed the Conference that they could not state definitely what the result of the miners' decision was, as they had no official notification from Witbank. It was impossible to state what the official decision was until the results from Witbank and other districts had been received officially, and not through the Press. The employers' representatives questioned the advisability of continuing the discussion on the other questions after the offer of the coal owners had been turned down. It was pointed out that the conditions made regarding re-employment applied to all the other industries, and for this reason it would be as well to revert to the coal question, as such procedure would remove difficulties on the other points, and would clear the way for a more rapid handling of the disputes on the gold mines, including the status quo.



Sir Robert Kotzé. Government Mining Engineer.

Contention of Men's Delegates.

The workers' representatives urged very strongly that the coal question should be left in abeyance, and that the other problems before the Conference should be dealt with, in the hope of finding a solution. The Chamber's representatives urged that a definite date should be intimated by which the decision of the colliery employees should be officially communicated to the Conference. They pointed out that their proposals could not be kept open indefinitely. After considerable debate it was decided to proceed with the discussion of the town shops dispute, the workers, representatives promising to announce the decision of the colliery workers on the question of the Conciliation Board at the earliest possible date, while the employers intimated that, as no time could be stated when this result could be known, the coal owners reserved the right to withdraw their offer if and when they thought fit.

Terms of Reference.

After considerable discussion on the subject of the town engineering shops, an agreement was arrived at. The actual terms of the agreement were as follows:—Subject to confirmation by the Executives of the Engineers' and Founders' Association and the South African Industrial Federation, we agree:—(1) To refer to arbitration the question whether the contention of the Association is correct that no formal notice was necessary after the wages agreement arrived at between the Chamber of Mines and the Federation in August last,

also whether the notice of December 1 last is a breach of any agreement or understanding existing between the Federation and the Association. One arbitrator to be agreed upon, and two representatives from either side to be allowed to present their respective cases to the arbitrator. Should the men return to work before the award is given, they will return at the Chamber of Mines' reduced rate, provided that if the arbitrator decides in favour of the men, and adjustment in accordance with the arbitrator's award will be made retrospective. The arbitrator's award shall be binding on both parties. If the parties fail to appoint an arbitrator, the Chairman of this Conference shall appoint an arbitrator. The arbitrator to give his decision as early as possible, but not later than two weeks from the date of his appointment. (2) That immediately the men return to work, the parties meet in conference to discuss all other outstanding questions in accordance with the ordinary procedure. (3) The acceptance or rejection of this agreement to be notified to the Conference by the respective Executives during the course of this week.

N.B.—The Association does not withdraw any notice which has been given.

Tenth Day of the Conference.

Monday's sitting of the Conference was the 24th day of the coal strike, the 15th day of the gold strike, and the 10th



Sir Evelyn Wallers, a former President of the Chamber of Mines.

day of the Conference. It was then agreed that the town engineering dispute, as to whether three months' notice of reduction of wages should have been given or not, should go to arbitration. The Conference proceeded to the V.F.P. problem, Mr. Bernard Price declaring that the company had given no ultimatum and had nothing to withdraw.

Other Matters.

The Federation Essential Services Committee on Monday agreed to the purchase of the proffered 10,000 tons of coal by the Town Council if the latter so desired. At a meeting of the Town Council in committee in the afternoon it appeared that there was a difficulty about the ownership of this coal. The Council instructed the Town Buyer in consultation with the general manager of the Power Station to seek out and buy all coal approved of by the Federation. Meanwhile the town's position is practically unchanged. The Citizens' Protection League passed resolutions urging the Council to make immediate efforts to re-start the full essential services, failing which they would ask for Government control.

The total number of natives repatriated up to Tuesday night was nearly 28,000.

The Strike Conference having temporarily cleared the ground of the coal dispute, the reduction of wages in the town engineering shops and the demand of the V.F.P. employees for an increase in wages, reached the big issues

relating to the gold mines on Tuesday afternoon, the eleventh day of sitting.

Mr. Buckle, President of the Chamber of Mines, opened the discussion. In going over the points which had led up to the dispute, Mr. Buckle pointed out that the trouble in the gold mining industry had been primarily caused by the rise in the cost of production from an amount of about 17s. per ton to about 25s. 8d. per ton, or roughly speaking, an increase of approximately 50 per cent.

Mr. Buckle touched lightly on the exchange question, but did not go into details, which, he thought, would be of little value to the Conference. In reviewing the negotiations which had taken place between the Chamber of Mines and the Federation, Mr. Buckle referred to the granting of the £2 8s. per week increase over pre-war rates, and incidentally pointed out that at this particular period the price received for gold had reached its highest point, namely, about 130s. per ounce of fine gold.

Wages and Cost of Living.

Continuing, Mr. Buckle referred to the agreement arrived at during 1921, whereby a sliding scale was fixed in con-

had been held in December last, and then touched on the letter which had been addressed to the Federation on December 28, and which had been called an ultimatum.

Continuing, Mr. Buckle pointed out that the letter under discussion was simply a formal notice, and was required by the provisions of the law before any changed conditions could be introduced. Mr. Buckle further pointed out that the giving of notice was a very necessary precaution in order to avoid unnecessary delay.

Mr. Buckle then referred to the taking of a strike ballot on the so-called ultimatum and the meeting which took place the day before the strike took place. Mr. Buckle stated that the points in dispute had not been discussed at the meeting in question, but that, in effect, the representatives of the workers demanded the withdrawal of the ultimatum, or, failing such a withdrawal, strike action would be taken. Mr. Buckle claimed that the action of the representatives of the workers was not only that of submitting an ultimatum, but amounted to an open declaration of war. Mr. Buckle, in continuing, deprecated the drastic action taken so precipitately by the Federation in that the strike



Group of Miners on an East Rand Property.

formity with the rise or fall in the cost of living within certain limits, viz., between 21 and 57 per cent. increase over pre-war cost. The increase in the cost of living being now less than 21 per cent., the sliding scale came up for reconsideration in accordance with the agreement.

Mr. Buckle next dealt with the Conference which had been held between the Chamber and the Federation towards the end of last year, at which the Prime Minister had presided. He pointed out that when an alteration to the Mining Regulations had been agreed to, Sir Evelyn Wallers had then clearly indicated that while the amended regulations was a step in the right direction, it would be necessary to go much further if the industry was to carry on, and retain anything like its present activity.

The Strike Ballot.

The workers, Mr. Buckle continued, had not said very much on the changes which the Chamber had suggested, but asked that the proposals should be put forward in writing. Mr. Buckle then dealt with the Conferences which

had been called into force at least three weeks before the proposed change was to come into effect, and thus the opportunity of using the time available for amicable discussion was lost.

Mr. Buckle, in closing, said: "Well, sir, I have said that our notice was not an ultimatum, but there can be no dispute as to the fact that the action of the Federation was not only an ultimatum, but it was a plain declaration of war, and they, having even then still three weeks open to them to negotiating, we proposed no change whatever until February 1—being offered by us a full month for negotiations. Instead of availing themselves of that, they deliberately broke off the negotiations, stopped the whole of the industry, and, as I say, declared war

Repatriation of Natives.

Well, sir, that, of course, very greatly aggravated the position of the mines, and it is a continuation of those circumstances which aggravated them still further every day. Every day we have to send away natives, and are sending

them away, and the working of the industry depends largely on its having a full native labour force available, and the wastage has to be kept up by a constant supply pouring in. Of course, under present conditions we have not only had to stop recruiting to fill that wastage, but we are also having to get rid of the natives as fast as they are willing to go and they are time expired, and we are already seriously handicapped in restarting. Mr. George said the other day that two parties who might be quite willing to accept certain terms and conditions between themselves to settle a dispute while they were at peace, would not be likely to accept them after war had broken out.

Underground Contracts.

Mr. F. G. A. Roberts took up the case of the gold mining industry and went into the details regarding the proposed alteration of underground contracts and, incidentally, cited the Underground Contract Commission Report and also the report of the Economic Commission of 1914 in support of the proposals of the Chamber for the present reorganisation. Mr. Roberts explained the difference between the present system of contracts as against the proposed "no cost" contract, this chiefly consisting of, under the old style of paying a price per fathom out of which the contractor had

on the Witwatersrand, and it had evidently been found desirable to practically eliminate the contract system in Kimberley. Professor Lawn, in conclusion, pointed out that the contract system had been investigated by committees and commissions and had been condemned on every occasion.

Mr. Thompson's View.

Mr. Thompson (President, S.A.I.F.), in replying to the case put up by the Chamber, stated that the figures produced by Mr. Roberts left them stone cold, and they were so used to the figures produced by the Chamber being proved false that they had ceased to take any notice of arguments based on figures. As a case in point, Mr. Thompson cited the question of the 48 hour week for engine drivers.

In referring to the points raised by Mr. Anderson, Mr. Thompson stated that if the desire of the Chamber was to pay wages in accordance with ability, he might well start at once, and suggested immediately dispensing with the services of six of the Chamber's representatives and allow Mr. Buckle, the President, to conduct their case, as his salary alone was actually more than the salaries of the seven delegates who represented the workers. Mr. Thompson stated that he would leave the other points to be dealt with by Messrs. Lewis and Price.



Mine Boys Idle on the West Rand.

to pay the cost of labour and stores, whereas, in the "no cost" contract system a much lower price would be paid per fathom, but all labour and stores would be provided, also a guaranteed day's pay would be given and, probably, a bonus on saving in stores.

Mr. Anderson supplemented the technical aspect of the case as put forward by Mr. Roberts, and pointed out that a so-called contractor was not a contractor in the ordinary sense of the term in that he was not required to work out estimates as an ordinary contractor in other industries had to do, and, furthermore, he pointed out that by reason of the guaranteed day's pay the so-called contractor on a mine was not required to take the risk of loss which an ordinary contractor had to take.

Comparison with Kimberley.

Professor Lawn next took up the discussion, and further elucidated the contract system, comparing the present contract system on the gold mines with the system as it had been applied in England, and further drew comparisons with the system adopted in Kimberley. At one time Kimberley contracts had been somewhat similar to those now in existence

Government Figures.

The Chamber's representatives pointed out that the figures submitted by them were compiled from the official returns of the Government Mining Engineer.

Mr. Lewis, in continuing the debate, referred to the remarks from the other side about the Federation having declared war. In his opinion the Federation had simply taken up the challenge thrown down by the Chamber. Mr. Lewis stated that he did not think it was possible for any settlement to be arrived at by the present Conference on many of the points in dispute. He did not propose to go into detail on the question of the contract system, as such details would require to be dealt with at a later date by the Chamber and the unions concerned.

Other Views.

Mr. W. Price (miners' delegate) stated that he did not desire to discuss the contract system apart from the reorganisation of underground work.

This led to some discussion on the order of procedure which had been agreed to on the first day the Conference sat to discuss the various points in dispute.

Mr. Lewis stated that he considered the time spent by the Conference so far was, in his opinion, so much time wasted. Putting the position bluntly, he claimed that the arguments put forward by the other side would in no way convince him any more than he expected his own arguments



Police Quartered on a Rand Gold Mine.

to convince the other side. He had been of this opinion since the Conference commenced, and thought the status quo question should be dealt with.

Mr. Price stated that he agreed with the opinion expressed by Mr. Lewis, but also claimed that it was impossible to discuss the contract system without touching on the re-arrangement of underground work in view of the proposal to include timbering, etc., in the contract.

Mr. Gemmill suggested that the proper course would be to discuss any reorganisation of underground work which was bound up with the contract system, and similarly to discuss any reorganisation of underground work in conjunction with the status quo when the status quo was being discussed.

(Other portions of Mr. Buckle's speech are referred to in a leading article in this issue.)



Technical Societies' Club House, Johannesburg. The members have pledged themselves to assist in the maintenance of essential services during the strike.

Transvaal Silver Progress Report.

The latest report issued by the Transvaal Silvers is dated January 11. It deals with the quarter ended December 31, and gives the following interesting information.—

Dwarsfontein No. 145.

Shafts.—The No. 1 Shaft was sunk 10 feet to a total depth of 383 feet. Sinking has been suspended in the meantime at a depth of 62 feet below the third level. An ore pass has been constructed between the second and third levels, and a start has been made on cutting an ore bin of suitable capacity at the latter plane. **Development.**—The development footage sampled during the quarter totalled 1,620 feet, and gave the following results: Payable, 435 feet, having an average value of 10.6 per cent. lead and 10.7 oz. silver over 48 inches. Unpayable, 1,185 feet, having an average value of 2.1 per cent. lead and 2.1 oz. silver over 32 inches. Exploitation of the lode below the third level is being undertaken by means of a double winze sunk from this plane. Within the past few days this winze has reached the position of the fourth level and the lode has been intersected. Values are not yet available, but the appearance of the lode is distinctly encouraging.

Brakfontein No. 219.

The Brakfontein Shaft was sunk 112 feet, to a total depth of 21 feet below the second level. A cross-cut at this plane has intersected the upper portion of the central lode, which shows satisfactory values. In order to expedite development the Tangye compressor has been transferred from No. 1 Mine to this point, and two new loco. boilers have been erected. As soon as a sump for dealing with the water has been cut on the first level, development both at the first and second levels will be pushed ahead with all possible speed.

Machinery and Plant.

The sorting and crushing station has been in operation during the greater portion of the period under review, and is running smoothly. The concentration plant was completed towards the end of the quarter, and trial runs have been carried out. After making certain minor adjustments, the plant is now running satisfactorily on ore. Erection of the second smelting furnace is in hand. Ninety-one tons of lead bullion, produced from smelting hand-picked ore, has been shipped to Europe. The assay value of this bullion was 98.16 per cent. lead and 110.12 oz. silver per ton.

Mining Men and Matters.

Messrs. Llewellyn Edwards and Son (Llewellyn Edwards, senior, accountant and auditor; Llewellyn Edwards, junior, A.I.M.M.), of 74 Fox Street, Johannesburg, announce that they have commenced a mining, secretarial, insurance, and general agency business on their own account.

Glynn's Lydenburg—re Dividend, 31st January, 1922.

The following is a copy of a cablegram which has been despatched to the London office of this company for publication:—Net cash improvement for the half-year ending 31st January, 1922, is estimated to amount to approximately £1,400 after meeting capital expenditure on new circular shaft and development. In pursuance of its declared policy the Board of Directors has, therefore, decided to distribute no dividend per 31st January.

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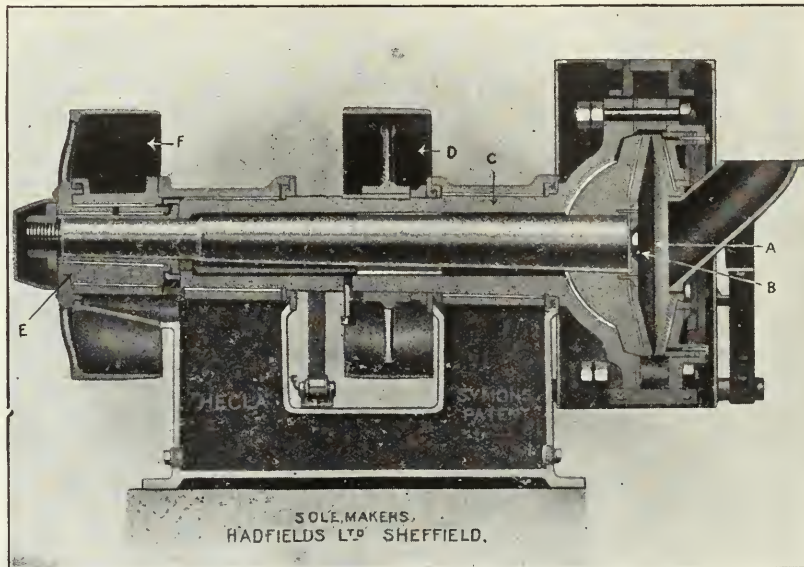
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The V.F.P. and the Strike Conference.

DEADLOCK REACHED—NEW GRIEVANCES ADVANCED—CASE PUT IN WRITING BY BOTH SIDES.

The Strike Conference reached the questions between the V.F.P. and its employees and the Federation last week end.

Mr. Bernard Price opened the discussion on the V.F.P. Company's dispute, and elucidated the position of the company. Beginning with the conference held between the company and its employees early in 1919, Mr. Price described the various classes of workpeople employed by his company, and also described the system of shift work which obtained with the operating staff, namely, switchboard attendants, engine drivers and firemen.

Continuing, Mr. Price described how the rates of pay had been fixed for the semi-skilled workers in relation to the skilled mechanics.

On November 14, 1921, Mr. Price continued, a letter was addressed to the V.F.P. Company by the Federation, submitting demands for increased wages on behalf of certain employees. A schedule setting out basic rates for the various sections was attached to this letter.

The V.F.P. replied showing the impossibility of consenting to these demands.

After reading the voluminous correspondence in the case, Mr. Price replied in detail to the questions brought up by the Federation's representatives. In concluding the discussion, Mr. George stated that if an agreement was arrived at to hold a conference on the V.F.P. question a full statement of the points at issue between the V.F.P. and the A.E.U. would be forwarded. Mr. Price pointed out that several entirely new points had been raised by the representatives of the Federation in which no correspondence whatever had passed between his company and the Federation, and it was essential to have a written statement on every point which the union now urged should be referred to a conference with his company. It was ultimately agreed that a complete statement would be laid before the Conference, setting out the points which the unions considered should be the subject of consideration between the unions and the V.F.P.

The Men's Case in Writing.

When the Industrial Conference resumed on Saturday a letter was submitted, addressed to Mr. Price, General Manager of the Victoria Falls and Transvaal Power Company, from the South African Industrial Federation, reading as follows:—

"On behalf of the different unions affected in the present dispute concerning the reduction of wages, I am directed to inform you that the basis of a conference to the unions' demands should be: The applied reduction as affecting the whole of the workers throughout the company's power stations; discussion on the question of basic rates as put forward by the S.A. Engine Drivers and Firemen's Association; and, further, this not to preclude discussion regarding any previous agreements having been observed."

Mr. Price's Reply.

On Monday these written demands were discussed at great length, and inclosing the debate Mr. Price stated that he had explained the position fully at the beginning of the afternoon session, and he had nothing to withdraw. The Federation had chosen to put forward a very definite ultimatum, namely, the notice of strike, which would force the company to consider those conditions under which it would be justified in restarting its industry. He had pointed out that in regard to the application to his company's employees of the reduced rates of pay, the V.F.P. would adopt such rates as might be adopted as a result of this strike by the larger employer, the gold mining industry.

With regard to rent concessions, he must definitely refuse to reconsider that. The company was not in a position to grant any special privileges, and he could not agree to refer such a matter to a possible future conference. In connection with the switchboard attendants, which was apparently the only point included in the last phrase of the Federation's letter of January 21, setting out the conditions for settlement, there was nothing further to be said. He thought that the V.F.P. on the contrary had acted in a very generous spirit. He saw nothing whatever, therefore, which should be referred to a conference. He wished to make it clear that legitimate points which might arise in regard to conditions of service are, and always have been, matters for discussion, first of all between the shop stewards and the officials, and, if necessary, subsequently between the company and the Federation. He did not wish to alter the machinery which had been adopted to settle matters in the past, but there was nothing of a special nature that required any conference in the future.

The Last Word.

That attitude was maintained by Mr. Price on Tuesday, and before the Conference adjourned the morning. Mr. Thompson, in concluding on behalf of the workers, claimed that Mr. Price had not only put up the case on behalf of his company, but that he had usurped the position of arbitrator, and given a binding decision as well. Continuing, Mr. Thompson desired to know whether the power company would be prepared to submit the outstanding points in dispute to arbitration, both parties to be bound by the decision. If the power company were not prepared to agree to arbitration would Mr. Price indicate how he proposed to meet the present position.

In reply Mr. Price stated that he would put his reply in writing so that the Federation could submit it to their Executive and submit a written reply in due course.

There, for the moment, the matter rests, and the Conference has passed to the discussion of the gold mining dispute.

The war profiteer is a person who is generally, and very rightly, condemned, and particularly by the Labour leaders. These leaders would no doubt be astonished and indignant if Labour itself was accused of being the biggest profiteer in South Africa. But this in point of fact is absolutely true. Labour has put its cost up by 50 per cent. since the pre-war days, and it has given inferior service to that which it rendered in 1914. The prices of all commodities have recently fallen and are continuing to fall. The cost of living continues to decline. Most important of all, the price of gold is falling. But Labour still rides on a high horse of demands which cannot possibly be conceded.

MINES DEPT. EXAMS. CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 6 failures this year (1921) and have secured two-thirds of the certificates issued in S.A

TUITION (Metal or Coal) by class, correspondence or privately
Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St. Johannesburg

African Railway Extensions.

SURVEY OF NEW MOZAMBIQUE LINE SANCTIONED—PAULINGS ACCEPT BIG LOBITO HARBOUR WORKS CONTRACT—WANKIE COAL AND S.W. ASPIRATIONS—PROGRESS OF THE TRANS-ZAMBESIA LINE—GRIQUALAND WEST RAILWAY DEVELOPMENTS.

The announcement in our last issue that negotiations were in progress to finance the continuance of the Lobito Bay-Katanga Railway aroused so much interest that something more may be said of other important railway developments. Apropos of Lobito, it may be mentioned that Paulings, the great railway and harbour contracting firm, have recently secured the contract for harbour works at Lobito Bay, and that the work will be taken in hand at once. Lobito, though of course a magnificent natural harbour, will have to have much money spent on it to complete its equipment.

New Mozambique.

Paulings have also recently secured the contract for the survey of a line from the Mozambique coast at a point behind the island of that name to Lake Nyasa, and the work will begin at once. The country behind Mozambique has long been known for its wonderful natural resources, and the new line is planned to tap this fertile hinterland. When Nyasa is joined up by rail with Luchenza, which is now being linked up with Beira and the Union railway system, the whole East Central African trade will be brought together.

Progress of the Trans-Zambesia Railway.

According to information given by Sir J. D. Rees at the recent meeting of the British Central Africa Company, progress in construction of the Trans-Zambesia Railway has been excellent. Latest advices show that earthworks have been completed to within two miles of the Zambesi, and platelaying completed to mile 142, at which point a temporary bridge over the Pungwe is completed. The opening of the line in the early part of next year will bring Blantyre (British Central Africa) within 24 hours of Beira. Arrangements are being made for carrying the sugar crop of Villa Fontes almost immediately by direct rail route to Beira. A railway is at present open from Chindio on the Zambesi to Blantyre, 174 miles north, and the new line will link up the southern bank of the Zambesi opposite Chindio with the South African railway system within 18 miles of Beira. Until the bridge over the Zambesi is completed, communication will be effected between the right and left banks of the river by a steam ferry. Another railway starting near Blantyre will shortly be commenced, which will run northwards to the southern end of the navigable Lake Nyasa, thus greatly facilitating the movement of merchandise into the Tanganyika territory. In these developments the British Central Africa Company has played a most important part.

Wankie and the S.W. Protectorate.

It is noteworthy that, according to a Luderitz-bucht correspondent, the people in the S.W. Protectorate are insisting upon linking up per rail with Wankie for the export coal trade. The proposal is favoured in influential quarters, and as the distance from Grootfontein in S.W. Africa to the Rhodesia coalfields is not prohibitive, the scheme may be realised one of these days.

Rand miners are, or have been, the most highly paid trades or craftsmen in the Union. Not only are Rand miners more highly paid than any other workers in the Union, but they are better paid, have easier duties to perform, and live or can live under more pleasant conditions than miners in any other part of the world. If all the proposals now put forward by the Chamber of Mines with a view to reducing working expenses, in order that certain low grade mines which employ thousands of white men and which distribute millions a year amongst the community, may continue to be worked, Rand miners would still be better off than miners in any other part of the world, and they would still be more highly paid than any other trades or craftsmen in South Africa. The Chamber of Mines believes in paying a good day's wage for a good day's work, and it has no intention of departing from this principle; but what it does object to and is opposing is

- The anomalies of the contract system;
- The employment of a limited number of redundant and unskilled men on skilled jobs; and
- The restriction of occupation policy of Trades Unionism, which has been carried to an absurd and impossible degree.

In wishing rather to effect these modifications than to be compelled permanently to close down several low grade mines which cannot bear the burden of expenditure imposed upon them, the Chamber of Mines has no intention whatsoever of removing the so-called "colour bar." Those who circulate the statement that the Chamber desires to destroy the colour bar are propagating a malicious falsehood, which is greatly assisting in the prolongation of this strike and is bringing ruin upon a large percentage of the community.

New Industry for Kimberley.

At the last meeting of the City Council in Committee, a letter was read from Mr. H. J. Hbbotson, of Johannesburg, in further reference to the proposed establishment of coal gas locally. He stated that his application was made under the terms of the Cape Local Authorities Gas Ordinance, 1912, subject only to cancellation of the clauses relating to illuminating power. It appeared to him that the only matter to settle was the maximum selling price of gas mentioned in Clause 29, Section 2, which matter he would prefer to leave in abeyance for a short time pending completion of his investigations in regard to estimated capital and working costs, and that the actual contract to be entered into between the Council and himself seemed to be a simple matter.

He added that he estimated the quantity of water required when the works had been in operation for, say, two years would be about 4,000 gallons per day, this being in addition to several hundred thousand gallons required for filling the gas holder or tank, which quantity could be taken at Council's convenience, also that about five acres of land would be required.

The City Engineer's memorandum suggested the ordinary retail charges for water, and that with regard to filling the tank it could be dealt with without difficulty during the cold or rainy weather, when water was in abundance; and that five acres of ground could be set apart for this industry.

GOVERNMENT EXAMINATIONS. METAL. RESULTS, 1921. COAL.

Total METAL MANAGERS Certificates			
Granted in S.A., 1921	..	Messrs. LUCAS & WOLFE	36
Secured by Students of	..	Balance for S.A.	21
			15
7 COAL MANAGERS Certificates obtained in 1921.			
Total OVERSEAS Certificates (Metal and Coal)			
Granted in S.A., 1921	..	Messrs. LUCAS & WOLFE	61
Secured by Students of	..	Balance for S.A.	25
			26
Total SURVEY Certificates			
Granted in S.A., 1921	..	Messrs. LUCAS & WOLFE	11
Secured by Students of	..	Balance for S.A.	9
			2

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Griqualand West Railways.

During the week, as the result of a deputation to the Prime Minister by an influential Kimberley deputation, it was announced that the Government had consented to the immediate construction of a line from Kimberley to Barkley West. Apropos of this a valued correspondent writes to us from Potmasburg as follows:—

With all this agitation going on in Kimberley, over the construction of a railway line from Kimberley to Borrel's Kopje and on to Kuruman, I think that a few words from one interested in farming, mining and trading in the locality affected, on the wider issues of the matter, will not be amiss.

For the sake of regularity I have tabulated the pro's and con's:—

1. The existing main line, between Fourteen Streams and Wellington is congested, and some time back it was very nearly decided to duplicate this section, and thus save eight hours between Capetown and Johannesburg.

2. There is a railway line from Capetown via Piquetberg and Clanwilliam, to closeup to Calvinia.

3. Quite a considerable amount of coal is now being sent from the Transvaal to South-West Africa, and a shorter route than the one via De Aar and Ujington, is being strenuously advocated in some quarters.

These three points summarise the situation as it is to-day.

4. Asbestos, it is acknowledged, is one of the coming industries of this country. The asbestos in these parts occurs in a belt of hills (known as the Asbestos Mountains), extending roughly from Prieska to a little north of Kuruman. No big capital has as yet become interested in this industry, owing to the lack of cheap power.

5. There are several diamond mines in and around Postmasburg, on the western edge of the asbestos belt. These also require cheap fuel.

6. Lastly, in and around Postmasburg there is the finest occurrence of iron ore as yet recorded in this country. It is valueless to-day, owing to lack of cheap power.

These three points summarise the possibilities of these parts.



A map showing Rhodesian Railways connection with the Union and proposed extensions and new railways. (See page 744).

7. One of the first principles in railway construction is to try and arrange your gradients to suit the bulk of your heavy traffic. Thus if a railway was to be constructed to these parts, for the purpose of developing them, bringing coal for power and maize for food, it would have to be built from some point north of where the Kaab Plateau forms a barrier to these parts.

At Pudimoe Junction the Transvaal system links up with the Rhodesian system, and at Pudimoe also we have the ideal site for commencing railway construction to these parts. One finds a gentle down grade from there, via Kuruman, Postmasburg, right down to Marydale. Then, to carry the scheme further, there are no insuperable difficulties to railway construction between Marydale, Kenhardt and right on to Calvinia, linking up with the Cape connection just beyond there. This is a big scheme of railway construction and at the present time beyond the means of the Government, but that is no reason why any railway construction, adopted, we will say from a policy of relieving unemployment, should not be controlled so as to have this big project in view.

What would such a line not mean to the country?

1. It would relieve the congestion on the main line, allowing of speeding up and a consequent saving in outlay on running staff.

2. It would provide a shorter and easier route for the coal traffic between the Transvaal and South-West Africa, giving a fresh stimulus to a South African industry and a bigger revenue to the railways.

3. It would beneficially open up a section of the country, which has mineral potentialities equal to that of the Witwatersrand, providing it with a means of obtaining cheap power, and also a means of exporting their products, considerably cheaper than the old ox or donkey wagon arrangement extant.

4. Truck loads of live stock are, in railway parlance, known as light loads. These and empties would be the chief make up for trains returning from here to the Transvaal.

For the sake of brevity I have left out several minor points, but to anyone with a personal knowledge of this locality, as yourself, or anyone sufficiently interested in the foregoing, a glance at the map, whilst perusing this, will assist in filling in what I have left out.

PROGRESS ON THE S.A. RAILWAYS.

New All-Steel Coaches.

The *S.A. Railways and Harbours Magazine* for this month has an illustrated article on the new all-steel suburban coaches for the S.A. Railways, a few of which were seen at Capetown a little time ago, but are not in use locally. These coaches are almost the same in appearance as the present type of corridor coaches, except, of course, for the metal.

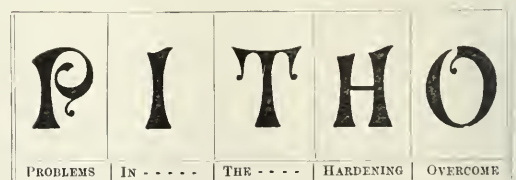
The vehicles have patent pressed steel side pillars, patent detachable window frames, and Fox's pressed steel underframes. Each coach runs on two four-wheeled bogies having 5 ft. 1 in. wheel base and 2 ft. 10 in. diameter wheels, the distance between centres of bogies being 4½ ft. 6 in., with a total wheel base of 50 ft. 7 in. in all cases. The length over headstocks is 60 ft. 7 in., and that over the body corner pillars 60 ft. ½ in. The coaches have a maximum width of 9 ft. 9 5-16th in., and are 9 ft. 1 9-16th in. over side pillars. The height from rail to the top of roof is 11 ft. 11 3-16th in., and the maximum height over the roof ventilators is 12 ft. 6 in.

The coaches are equipped with Laycock's central couplers and enclosed vestibules, vacuum brakes, steam heating and Vicker's system of electric lighting; are constructed with a space between the outer and inner cases of the sides and roofs; this allows for a free circulation of air, the side cases being open at the bottom. Extractors are fitted to the outer roof connecting with the air space only, thus assisting in the circulation of air within the cases.

The seating capacity of the first-class coaches is 72 passengers. The second and third-class composite coaches accommodate 48 passengers in the third-class portion and 32 in the second-class portion. The first and second-class composite brake van conveys eight first-class and 24 second-class passengers, the rest of the coach being devoted to luggage space and a guard's compartment at the rear.



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The M'Fongosi Silver Lead Mines.

A VISIT TO A LITTLE KNOWN ZULULAND VENTURE.

Mr. Jno. Hunter McLea writes:—When the country was in low water in the early seventies the discovery and opening up of the diamond mines set it on its feet again. Then followed the goldfields, which placed it in such a sound position, and the next advance will be that of the silver mines, which are still in their infancy, but which will soon develop into big business and place the country on a still more solid foundation.

I have lately been down to Zululand to see the M'Fongosi Silver-Lead Mines, which are situated in the N'Kandhla district, immediately north of the junction of the Amanzinyayo and M'Fongosi Rivers, the latter river flowing into the Tugela about 1½ miles south of the property. The distance to the Ngobevu crossing of the Tugela River, just below its junction with the Buffalo River, is about 14 miles, and from there to Greytown, by the Inadi wagon road, is about 41 miles, making the total distance from the property to Greytown, over a good road, about 55 miles. The journey is a very interesting one, as there is beautiful scenery, mountains and rivers, all along. The Government ought to put a punt at this crossing for the convenience of wagons and travellers during the rainy season.

A shorter route from the property to the Krantz Kop Railway terminus exists, via what is known as the "Devil's Staircase," making the distance to the railway about 20 to 25 miles. Part of this route would probably have to be overcome by means of an aerial tramway, crossing the Tugela River to the top of the staircase, which is about 1,500 feet high. It could be worked by water power.

The surface of the property may be said to be divided in the direction of its length, which is about 4,800 yards, into a series of six distinct hills, by two rivers and four dry dongas, the highest point being about 400 feet above the river level.

The formation throughout the property is very regular. Nature has scooped out the country into hills and valleys apparently with the express purpose of facilitating the opening of this lode.

A careful examination of the outcrops, together with the exploratory work already accomplished, shows the existence of a distinct well-defined mineral vein or lode running through the length of the property. This vein is parallel with the foliation of the schists which form its hanging and footwalls. In addition to the main lode a number of parallel quartz veins or reefs occur more or less continuously through the property, but so far these have not received attention.

In No. 3 Hill two shafts have been sunk on the side of the hill about 215 feet above river level, on an outcrop of the main lode, showing galena and silver. The one shaft is about 25 feet deep on the true dip of the vein. The other shaft starts about 3 feet from the mouth of the former and is sunk at an angle of about 40 degrees in the direction of the strike of the lode westwards for a depth of 63 feet on the incline. This shaft has exposed the lode about 4 feet wide, carrying galena and silver over a thickness of 4 to 8 inches on the hanging wall for about 40 feet, and the same on the footwall for about 20 feet.

At No. 6 Hill, on the west side and about 2,000 yards from the shafts in No. 3 Hill, the lode has again been opened up about 240 feet above river level by means of an inclined shaft following it down on its true dip at an angle of about 45 degrees to a depth of some 95 feet. The lode is seen to the best advantage at this shaft, varying over the full width of the shaft from 1 to 36 inches and averaging about 14 inches in thickness.

The assay certificates from the Government Laboratory shown to me are:—

Bag marked W shaft: Lead, 74.52 per cent.; silver, 22 oz. 10 dwt. per Imp. ton of lead.

Bag marked E shaft. Lead, 82.05 per cent.; silver, 27 oz. 9 dwt. per Imp. ton of lead.

It must be borne in mind that the history of lead mining throughout the world points to the fact that never does the ore occur perfectly regular and continuous throughout the length and depth of the lode, but in the form of shoots or bunches occurring at more or less intermediate intervals in it.

There is an abundant supply of water in the Amanzinyayo and Amanzinyama Rivers, both of which flow through the property. The former river flows over a series of waterfalls several hundreds of feet in height about a mile north of the western end of the property, and is capable of yielding more water power than is ever likely to be required.

The Qudeni forest overlooks the property immediately to the north on the slopes of a mountainous range 3,000 to 4,000 feet above it. The forest mainly consists of the indigenous hardwoods. Numerous wattle plantations exist along the route from the property to Greytown, which could also supply a useful mining timber.

The property is situated in a populous native district and the natives will probably prefer working near their kraals to going further afield.

An expert in a report on the property some years ago, when the prospecting work was stopped (which report I have seen) said the value of the ore in England dressed to 75 per cent. lead at the then current prices could be taken to be about £7 15s. per ton and the property would show a clear profit of 32s. per ton. What profit would it show now with lead at £24 per ton and silver at 3s. per ounce?

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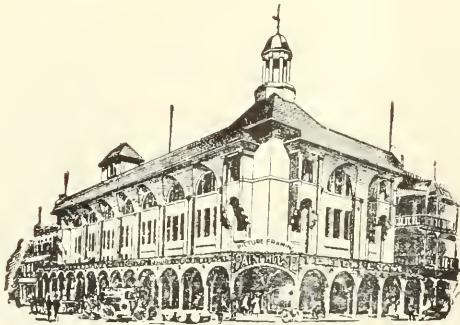
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EDITORIAL.

THE INDUSTRIAL DEADLOCK.

The great strike continues to drag on. It is having a paralysing influence on the Rand, and it is inevitable that the effects of a complete cessation of the gold output will be most detrimental to the finances and prosperity of the whole country. Each day it becomes more and more evident that the ill effects of the strike are spreading to places and industries far removed from the storm centre of commercial South Africa, but which have been riding with the rest of the country on the back of our major industry. The Somerset West works of the Cape Explosives Company, for instance, have for the time being ceased the manufacture of explosives because there is no demand for gelignite and gelatine. Farmers all over the country are beginning

to feel the withdrawal of orders for foodstuffs for the mines. The railway revenue is being seriously affected. It is impossible to compute the total loss to the whole community, but it cannot be far short of a million a week. The Share Market keeps wonderfully firm, and the price of gold remains steady at just under 98s. From an investor's point of view, special interest attaches to the dividends which in the ordinary course of events would be declared in June. It is obvious that every mine on the Rand is incurring enormous losses at the present time, and even if the strike were settled to-morrow many mines would have suffered so much from a financial point of view that they would, under the most favourable circumstances, be quite unable to recoup themselves for several months to come, and it is, therefore, certain that the half-yearly dividends will at the best of it be hundreds of thousands of pounds below the aggregate distribution in December.

The fact is that there has been no such tremendous and prolonged dislocation of the industry since the days of the Boer War. Not a few mines have suffered so severely that they will not be able to reopen. Up to Tuesday night over 28,000 natives had been repatriated, and it must be obvious that in consequence of this exodus the white worker's position has been affected to the extent of nearly 3,000 jobs on the basis of a ten to one ratio. It is becoming more and more clear that the longer the strike continues the more difficult will it be, even if all the proposals of the Chamber of Mines are accepted, to restart the industry on its former scale.

Mr. Buckle, President of the Chamber of Mines, stated the case for the employers very clearly on Tuesday, when, after eleven days of more or less futile debate, discussion of the largest issue of the dispute commenced. Mr. Buckle, in addressing the Chairman of the Conference, Mr. Justice Curlewis, said, *inter alia*:—Well, Sir, as I pointed out just now, war has been declared by the Federation, and that simple fact has made the position of the mines worse, and I doubt very much whether we could carry on to-day or shall be able to carry on to-morrow, simply on the terms which we originally proposed, if they were accepted. Not only is the position made worse with regard to the natives, but some of the mines are being flooded, and that, of course, is always a great cause of cost and of delay in re-starting. In some cases it may prove to be a final bar to re-starting. It may very well be that the prospects of the mines are not such as to warrant the additional expenditure necessary to clear them of flooding. It may be again that other mines we have—as is common knowledge are in any event pretty near their end—it may be that the additional expense involved in re-collecting the native labourers who have gone would be such that the amount remaining to be taken out of the mine will not be worth it. And, generally, it is a very difficult thing to say on what terms it will be worth while to re-open some mines. Well, I might mention one difficulty—an additional difficulty that has been created by the strike itself, and it is the one we have already discussed in connection with the coal mines, and that is the difficulty of re-employment. It is perfectly certain that none of the mines will be able to re-start on their old scale at once. It will be a greater or less time before they can work up to what they were having before. It is, I think, practically certain that some of the mines, even now, will not re-open, and if the strike goes on even a short time longer, more and more mines will find themselves in that position. In other words, like the coal mines, though for a different reason, we shall not be able to take back all the men who went on strike. And as you have seen, Sir, that in itself creates very serious difficulty in coming to an arrangement. And other points will emerge, I have no doubt, in the course of discussion, which will raise similar difficulties.

We quote Mr. Buckle's words exactly as reported, because they so clearly express the present position of the industry. To these remarks and to the evidence on the subject of underground contracts tendered by Mr. Roberts—evidence based on Government statistics—the President

of the South African Industrial Federation merely retorted that the figures left them "cold." If this is the attitude in which the men's representatives approach the dispute, we fail to see why the Conference should go on. The men's leaders continue to falsify the issue and to contend that the abolition of the *status quo* agreement means the removal of the colour bar. The Witbank colliers refuse to submit their case to a Conciliation Board. Apparently the V.F.P. dispute has come to a deadlock, and the only decision that has been reached by the Conference is that the interpretation of a point in the dispute over the engineering shops should be submitted to arbitration. The essential services of the town of Johannesburg have had to be very greatly curtailed, to the inconvenience of large numbers of the public, and the Municipal Council of the town seems at present to be dominated by a local Government of Soviet Nihilism. Under these circumstances, it seems almost hopeless to expect anything which is likely to lead to a settlement from the employees' side.

The daily Press is, of course, full of all manner of solutions of the strike settlement, and whilst it would appear that all the avenues leading to a satisfactory solution of the problem have been searched, at least by the Chamber's representatives, there are a good many people who think that the question of longer working hours has not received the consideration it should from both parties. But, as we have already said, so long as the men's reputed leaders are prepared to sit still and say that economic facts and figures leave them stone cold and are unwilling or unable to bring forward any concrete proposals which would assist in arriving at an understanding between both sides nothing much can be hoped for from the Conference. One is tempted to wonder whether the Federation leaders at the Conference are really representative of the men who are now discarding their livelihoods on an absolutely false issue, and whether better progress towards a settlement of the dispute would not be secured if the present representatives of Labour who earn their livings by disputes of this kind were supplanted by real working miners and engineers who had the voice of the Reef behind them and who are at present sacrificing all they possess on the false altar of direct action. But whether we are right or wrong in our estimate of the men's reputed spokesmen, we are quite certain of one thing, and that is this, that it is the men themselves who are going to suffer principally on account of this ill-timed strike. It is always the men who are the chief losers. The British colliers fought a hopeless struggle for more than two months last year, and then they had to cave in. They were beaten and broken and bankrupt. They lost because they were fighting the strongest opposition in the world, and that opposition was not the colliery proprietors, but economic facts. The men here are going to lose this struggle, too, for the very same reason. They think that they are fighting the Chamber of Mines, but in reality they are fighting a power in whose hands the Chamber of Mines is as mere clay. They are fighting the omnipotent forces marshalled together under the strongest commercial general in the world, and his name is economic facts. The colliers in Great Britain admitted this general's impregnability after they were beaten, and the men here will have to admit the same.

SOME EFFECTS OF THE STRIKE.

The latest statistics issued by the Government Department of Mines—those for November last—show that during that month 30,031 whites were employed on all the mines and metallurgical works of the Union, and that the grand total of mineral output for the country during that month was £4,173,401. Of these 30,031 white employees, there were at work on the Rand gold mines 20,565 men, and on the Transvaal coalfields 1,046 white men, or a total of 21,611 Europeans. The gold output of the Rand during the same period had a value of £3,464,836, and the output of the Transvaal collieries was worth at pit's mouth £172,856 or a grand total for gold and coal of £3,637,692. In other words, the Rand gold industry and the Transvaal coal

industry during November were employing more than two-thirds of all the mine employees of South Africa, and produced nearly nine-tenths of the total mineral output of the country. The total amount disbursed to white persons in the service of Witwatersrand gold mines (large mines) during the month was £829,215, including £37,725 as leave pay and £4,042 as bonus. These figures are issued by the Government Department of Mines, and they are worth thinking over. These industries are at a standstill to-day. No gold is being won, and the only coal being produced is being won by natives under staff supervision for essential services. The white employees of the Rand alone are losing in respect of salaries at the rate of ten millions per annum on account of the strike, which is being prolonged because the men's leaders refuse to recognise economic facts. When a business will not allow of the present wages bill, then wages must come down. The low grade mines have simply got to reduce their wages bill or close down altogether. Instead of endeavouring to settle the strike on a sound and safe and honest basis, the Federation of Trades is continuing to falsify the issue by stating that the Chamber of Mines seeks to break down the colour bar. The Chamber has not any such intention or desire. It has no ability to do so even if it desired to break down the colour bar. The Chamber only seeks to retrench a limited number of redundant men in certain specific occupations, in preference to some mines having to close down and throw a large number out of employment (perhaps as many as 10,000), and it has offered to safeguard the position by the establishment of a fixed ratio of the Europeans to natives. To say that this means the removal of the colour bar is a dangerous falsehood.

MINERS OR OVERSEERS?

The Labour representatives at the Conference appear to have tied themselves up in knots in an endeavour to define the true functions and status of the European "miner" in this country. According to the reports issued by the Press Committee at the Conference as published in *The Star* the claim was put forward by the workers' representatives that it was unfair to compare the South African white miner with the miner in other countries, as the native was the miner in South Africa, the so-called miner was really an overseer in South Africa and was only comparable to the official in other countries.

The Star quite reasonably employed the headline "Workers' representatives declare that white miner is really 'overseer,'" and to this grave exception was taken by Messrs. Thompson, Lewis and George at Wednesday's meeting.

Mr. Lewis, according to the Press report, claimed definitely that "the miner" here was the actual miner, an utterance of profound wisdom which was evidently meant to mean that the *European* miner on the Rand is the actual miner.

Mr. Thompson followed this up by asserting that to a certain extent the miners overseas perform work similar to what is performed by natives here, but with this great difference. The miner overseas is fully competent to perform the whole of the duties necessary in the production of the product, whereas the native miners of this country are to a very large extent without any knowledge of mining. Therefore the white miner here not only undertakes the responsibilities of an official in supervising large numbers of unskilled men, but has actually to perform himself the highly skilled and dangerous work such as all blasting operations, together with arranging all work so that the best results may be obtained, so as to conform to mining regulations.

We do not know what experience the Federation's spokesmen have had of mining and particularly of metalliferous mining in other parts of the world, but, it may be pointed out, that in Cornwall, in North America, and in Australia the white miner has to do all the hard manual labour (which is performed on the Rand by the natives) as well as the "highly skilled and dangerous work."

In those mining camps there is no essential kaffir to "pezulu lo cocopan" or to "tshya lo n achin"; the white man has to do that himself.

There are still some good white miners left on the Rand, but a good many of the European underground employees—call them miners or overseers or what you will—would not last more than one shift in a Cornish Tin or Copper Mine. We say this with some experience of actual working conditions in both countries.

Perhaps the Indian mines provide a closer parallel to the conditions obtaining on the Rand than elsewhere. In India, as in the Transvaal, there is a coloured subordinate labour force working under a white complement. And what are the conditions in the Indian mines? In the Carnichael shaft "A" section of the Champion Reef Gold Mines Kolar Gold Fields, Mysore, 1,509 coloured employees work 32 stopes and 13 developing places under the supervision of 7 white men. These white men are skilled workmen; they would never go down one of the Kolar Fields mines if they were not.

We commend these facts and figures to the Labour leaders at the Conference. Possibly they will assist them in arriving at some definite opinion and in giving a clear expression of what they really do mean.

Some of the remarks on the question of whether the Rand's white employees below surface are miners or overseers or both or neither have been expressed in such terms of illogical contradiction that they are only comparable with the indecisions of a chimera ruminating in a vacuum.

Notes & News.

Owing to printing difficulties this issue of the "Mining Journal" has to go to press considerably earlier than usual, and we are therefore unable to comment on the debate on the status quo agreement at the Conference on Wednesday afternoon.

* * *

Gold Refinery Idle.

The gold refinery at Germiston, which started operations a few months ago, is to-day, as a consequence of the strike, standing idle. The last consignment of gold went through the final process last week, and the works were completely cleaned up. As a result the hands, several of whom came out to this country not long ago on lengthy contracts, have had to be laid off.

* * *

Kleinfontein G.M. Co.

Latest reports from Kleinfontein Gold Mine go to show that flooding is steadily proceeding. On the lower levels the water has submerged the pumps. This mine, like other deep working mines, is supplied with pumps on various levels, the water being pumped from the lowest levels up a few levels higher and again still higher until by about seven or eight pumpings the water reaches the surface and runs off into the dam. The higher the water rises the more difficult it will be to eventually clear the lower workings.

* * *

The South African Mint.

The South African Mint will not be completed for several months. As long as there is an embargo on export gold coins will not be turned out. There is no object in manufacturing them under such circumstances. Furthermore, gold will have to come to its standard value. The Mint cannot and will not pay a higher price than £3 17s. 9d. per ounce for its gold to turn into sovereigns. Owing to the delay in the realisation of turning refined gold into sovereigns—sometimes it may be six weeks—the actual value of the gold may be set down as £3 17s. 10½d. to make up for the loss of interest. Silver coins, like gold coins, will not be minted until the face value of the coin at least equals the cost of the material.

A SUGGESTION TO BOTH SIDES.

Let there be another ballot, a secret ballot under Government supervision, of all men who are now on strike.

The question to be answered to be this:—

Are you in favour of returning to work, leaving your leaders (who may not be your present leaders) to negotiate with the Chamber of Mines and to secure for you the best terms they can?

Yes or No.

* * *

Dr. Molengraaff's Mission.

It is noteworthy that there has just arrived in South Africa a special expedition for the purpose of carrying out scientific work. The expedition consists of Professor Molengraaff, of the Delft High School, who is well known as a geologist in the Transvaal, Professor Charles Palache and Professor Reginald A. Daly, of Harvard University (U.S.A.), and Dr. Frederick Eugene Wright, of the Geophysical Laboratory of the Carnegie Institute at Washington. The expedition has been organised by the Harvard University and members of the Shaler Museum. Asked what the precise object of the expedition was, Professor Molengraaff said: "The object is to investigate the laccolite sheet of the Bushveld which is a unique geological feature in the world. It is not the only sheet, but it is the largest in size." Asked as to whether the Union Government was interesting itself in the expedition, Professor Molengraaff said they had not yet got into touch with the Government. The expedition will remain several months in this country, and should the members, during their geological investigations discover indications of economic value, they will, of course, report, but their mission is entirely scientific. It has been suggested to us that the presence of these distinguished scientists offers a unique opportunity to the Union Government to secure an independent and unbiassed opinion on the vexed question of the reef series of the Far East and South-East Rand, on which there has been so much controversy during the past few years. At a time when there is so much talk of a dwindling Rand it seems the duty of the Government to leave no avenue unexplored which may lead to the discovery of an extension of our gold mining industry. The distinguished visiting geologists might be asked by the Government to visit the area in question and consider the evidence immediately available and give an expression of opinion thereon. They might not require to spend much time over their report as there is a vast amount of evidence available in actual workings and boreholes. The bases of their inquiry might be the questions propounded by Mr. R. R. Mabson, who visited the Rand at the beginning of last year. These questions have been printed *in extenso* in our columns.

* * *

Gambling in Exchange.

We note with much interest a note on the "Evils of Exchange Gambling" in a recent issue of the *Chamber of Commerce Journal*, in the course of which the writer remarks that it is estimated that about 50,000,000,000 marks are held outside Germany by speculators in other European countries and in America. If this estimate is correct, it means that only about one-half of the notes issued by the Bank of Germany is required for currency purposes; the rest is held by speculators. Even at 1,000 marks to the £ this balance represents a sum of £50,000,000. The existence of such a huge amount is of great potential importance, for it means that this is available if a demand should arise for German marks as a result, say, of any modification favourable to Germany on the terms of reparation. As the amount is far in excess of the sum likely to be required for exchange purposes, the future of the mark will be influenced by operations on the part of holders of this currency, and if they decide to sell it is difficult to see how a further severe decline in the mark can be avoided.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgy.

Activities of the U.S. Bureau of Mines.—*Canadian Mining Journal*, December 9, p. 968.

Testing Mine Rescue Apparatus.—*Colliery Guardian*, December 23, p. 1736.

Comparative Results from Use of Old and Modern Explosives.—*Iron and Coal Trades Review*, December 23, p. 905.

Coal.

The Constitution of a Coal Seam.—*Colliery Guardian*, December 23, p. 1725.

The Hydrogenation of a Coal Seam.—*Colliery Guardian*, December 23, p. 1729.

Froth Flotation Process.—*Colliery Guardian*, December 23, p. 1732.

Coal Cutting and Conveying.—*Iron and Coal Trades Review*, December 23, p. 920.

Engineering.

A Large American Boiler Plant.—*Colliery Guardian*, December 23, p. 1727.

Boiler Explosives.—*The Engineer*, December 23, p. 681.

Electricity.

Developments in Power Station Design.—*The Engineer*, December 30, p. 668.

Possible Economics in Large Electric Power Stations.—*The Engineer*, December 30, p. 699.

Induction Type Synchronous Motors.—*The Engineer*, December 30, p. 707.

The Foundry Electric Furnace.—*The Electrical Review*, December 30, p. 877.

Iron and Steel.

Cast Iron for Foundry Purposes.—*Iron and Coal Trades Review*, December 23, p. 923.

Cast Iron Research.—*The Engineer*, December 23, p. 681.

The Iron and Steel Trades in 1921.—*Iron and Coal Trades Review*, December 30, p. 969.

Economics.

Copper's Importance in Domestic Commerce.—*Canadian Mining Journal*, December 9, p. 966.

Assistance to American Coal Export Trade.—*Coal Trade Journal*, December 14, p. 1297.

The Revolt Against Nationalisation.—*Iron and Coal Trades Review*, December 23, p. 924.

The Service of Capital.—*Iron and Coal Trades Review*, December 23, p. 924.

A Campaign Against Taxation.—*Iron and Coal Trades Review*, December 23, p. 923.

Labour Questions.

The Secrecy of the Ballot in Labour Disputes.—*The Electrical Review*, December 30, p. 875.

Labour in 1921.—*Iron and Coal Trades Review*, December 30, p. 959.

Chemistry.

Power Alcohol.—*Iron and Coal Trades Review*, December 23, p. 917.

Metal Report.

Metal report from H. A. Watson & Co., Ltd., dated 28th December, 1921:—

Standard Copper.—The Christmas holidays have intervened since the date of our last circular, but there is no change to report in the general situation. Prices have been just a little weaker latterly, but movements have been unimportant. After closing on 13 inst. at £66 12s. 6d. cash and £67 12s. 6d. three months, the market improved 2s. 6d.

in each position, closing on 16th inst. at £66 15s. cash and £67 15s. three months; these quotations stood until 22nd, when values fell 10s., closing at £66 5s. cash and £67 5s. three months, at which it remains to-day. Closing quotations for manufactured copper are as follow:—Strong sheets, £98 per ton; best select, £68 10s. to £70 10s. per ton; electrolytic, £74 to £75 per ton. Quotations for best select during the past fortnight were as follow:—December 13th, £68 10s.; December 16th, £69; December 20th, £69; December 23rd, £68 10s.; December 28th, £69 10s.

Standard Tin.—Prices advanced smartly from £170 cash and £171 15s. three months, the close on 13th inst. to £174 10s. cash and £176 10s. three months on the 15th inst. The higher level was not maintained and values reacted on 19th inst., when quotations were £2 lower, followed by further reductions on 20th to £171 10s. cash and £173 7s. 6d. three months. Liquidation and profit-taking, also the approach of the Christmas holidays, left a weaker market, and prices again closed lower on 23rd inst. at £173 cash and £173 three months. To-day's market is better, closing at £172 5s. cash and £174 5s. three months. Tin ores continue in good demand and find ready sale. Bolivian bars: Value nominally £152 to £162, according to quality.

Sulphate of Copper.—£27 per ton.

Spelter.—To-day's close is £27 7s. 6d. all positions.

Lead.—The closing prices are £24 8s. 9d. spot, £24 3s. 9d. forward.

Bismuth.—Remains at 7s. 6d. per lb.

Nickel.—Refined reduced at £180 per ton.

Quicksilver.—Prices unchanged at £10 7s. 6d. to £10 10s. per bottle.

Bar Silver.—Closes at 35½d. spot and 34½d. per oz. forward.

Manganese Ores.—Poor demand; value nominally 1s. 1½d. to 1s. 2d. per unit.

Antimony.—Prices unchanged, viz.:—English Regulus £34 to £39 per ton. Chinese £22 to £24 10s. Crude, nominal, £16 to £17.

Wolfram.—There is very little inquiry and the value is nominally about 11s. 6d. per unit for ore of 65 per cent. W.O₃.

Bank Rate.—Reduced to 5 per cent. on 3rd November.

New Mining Companies.

The following are the new mining companies registered in the Union of South Africa from 1st November, 1921, to 31st December, 1921:—Harrismith Townlands Development Syndicate, Ltd., Box 3987, Johannesburg; province, Orange Free State; mineral, oil. Durban Roodepoort Mynpacht, Ltd., Box 7594, Johannesburg; province, Transvaal; mineral, gold. Bethlehem Oils, Ltd., Box 4265, Johannesburg; province, Orange Free State; mineral, oil. Cleveland Mining Syndicate, Ltd., Box 3258, Johannesburg; province, Transvaal; mineral, gold. Platinum Explorations, Ltd., Box 2641, Johannesburg; province, Cape Province; mineral, platinum. Western Main Reef, Ltd., Box 6952, Johannesburg; province, Transvaal; mineral, gold. Afrikander Lease, Ltd., Box 121, Klerksdorp; province, Transvaal; mineral, gold. Kaapsche Hoop Chrysotile, Ltd., P.O. Kaapsche Hoop; province, Transvaal; mineral, chrysotile. Lancaster Central G.M. Co., Ltd., 24 Stock Exchange Buildings, Johannesburg; province, Transvaal; mineral, gold. Arton Copper Co., Ltd., Box 1083, Johannesburg; province, Transvaal; mineral, copper. Lucerne (Transvaal) Asbestos Mines, Ltd., Box 2001, Johannesburg; province, Transvaal; mineral, asbestos. International Coal Syndicate, Ltd., Box 413, Maritzburg, Natal; province, Natal; mineral, coal.

ENGINEERING SECTION.

Bridge Building in South Africa.

ACTIVITIES OF THE CLEVELAND CO.—HUGE STRUCTURE OVER THE VAAL AT VEREENIGING.

As was stated in this Journal some time ago the Cleveland Bridge and Engineering Co., Ltd., of Darlington, England, who were responsible for the steelwork of the Victoria Falls Bridge, have recently been successful, through their sole South African agents, Messrs. A. and S. Ash Bros., Cullinan Buildings, in securing contracts from the Public Works Department of South Africa for steelwork for no less than twenty South African bridges. The weight of the 15 spans required will be approximately 4,400 tons and the cost well over £200,000.

The contract was secured in open competition against the leading firms of Britain, France, Belgium, Canada and the United States. The result is one upon which the world-famous British firm is to be heartily congratulated, also their agents, Messrs. Ash Bros.

The largest bridge of the series is to be erected on the Vaal at Vereeniging, where five spans, each of 150 feet, will replace the present ferry. The material of the bridge is already on the spot and the frontispiece of this week's issue shows the bridge.

Following are details of the twenty bridges, sizes and quantities:—

	Width of		Tons.
	Spans.	Span.	
Vaal River Bridge, Vereeniging...	5	150	465
Knysna River Bridge	2	150	186
Moperi Spruit Bridge	1	150	93
Umhlatuzi River Bridge	3	150	279
Modder River Bridge	2	150	186
Umbogintwini River Bridge ...	2	150	186
*Tugela River Bridge	1	200	156
Unkomaas River Bridge	3	200	468
Umbogintwini River Bridge ...	2	200	312
Umhlatuzi River Bridge	2	200	312
Steelpoort River Bridge	1	200	156
Vet River Bridge	1	200	174
Valsch River Bridge	1	200	174
	(1)	179	
Umhloti River Bridge	(2)		215
	(2)	58ft. 8in.	
Zand River Bridge	2	125	162
Umbilo River Bridge	1	105	119
Crocodile River Bridge	5	100	288
Umtamvuna River Bridge	3	100	174
Crocodile River (at Rivulet) ...	3	100	
Sand River	1	100	
Dorp Spruit	1	100	
Totals	15		4,405

* This is one bridge.

IMPORTANT PATENT CASE.

"Natalite" Loses.

In the Transvaal Provincial Division of the Supreme Court, the presiding Judge, Sir Arthur Mason, read the considered judgment of Mr. Justice Gregorowski in the case

of Thomas Bertram Davies v. Natalite Motor Spirit Co., Ltd., and Natal Cane By-Products, Ltd. This dealt with an application for a patent in respect of a process for manufacturing motor spirit from a combination of alcohol with methyl oxide, which was claimed by the applicant to have a vapour tension sufficiently high for use in internal combustion engines designed for the use of petrol. The respondents opposed the grant of a patent on the ground that the applicant's process was not new or commercially useful. At the hearing, which lasted some twelve days, evidence of a highly technical nature was given by a large number of scientific witnesses called on both sides. In the course of his judgment, his Lordship said the applicant was the managing director of the Natal Distilleries, Ltd., in which he held 15,000 shares, and he was anxious to patent a motor fuel of which alcohol would be the predominant constituent, in order to get a commercial outlet for the alcohol produced by his company. In the ordinarily designed motor engine the vapour of alcohol was not sufficiently volatile, and the task set the applicant to the chemist, Mr. Adam, and his collaborator, Mr. Thornburn, was to mix and infuse some substance not already patented, which would increase the volatility, raise the ignition point, and make starting easy and immediate even if the engine were cold, and generally to improve the inflammability of the alcohol.

It appeared from the evidence as to the tests that the applicant's fuel affected the purpose of starting the engine when cold. The vast number of patents granted with small variations of the ingredients showed that the difficulty of solution of the problem had been great, and immense ingenuity and labour had been expended by various patentees in the endeavour to overcome the disadvantage of low volatility of alcohol used by itself as a fuel for internal combustion engines. The evidence showed that the applicant's fuel was new and was an improvement on existing patents. The application for a patent must therefore be granted, and the objectors must pay the costs of opposition, including proper qualifying fee of the applicant's witnesses.

A Monster Crank-Shaft.

Something approaching a record in large crank shafts was recently achieved in a British engineering works. This shaft was constructed for a large marine engine; it measures nearly forty-three feet long and weighs fifty tons. Much more notable than its size, however, was the accuracy with which it was finished. When the shaft was inspected the error in the total length was only eight one-thousandths of an inch, while the maximum error in all the bearings did not exceed twelve ten-thousandths of an inch. These figures were well within the limits of error allowed and constitute a remarkable achievement in complex work of these huge dimensions.

South African Railway Electrification.

SOME IMPORTANT ECONOMIES.

From a valuable paper read recently before the Natal Institute of Engineers, by Mr. H. Clark, B.Sc., on railway electrification, with special reference to South Africa, we take the following interesting extracts.

Whereas in Europe the railway developed in response to a demand already existing, in this country it has, to a large extent, preceded the demand and opened up the country through which it passed. It is well recognised that in the development of a country which possesses latent possibilities, nothing gives a greater impetus to progress than the provision of a cheap and efficient system of transport. It is doubtful whether any Government expenditure is so certain of ultimate returns as money intelligently invested in extending and improving its railway facilities. Indeed, the very prosperity of the country is, in no small measure, dependent upon the efficiency of operation and extent of its railway network.

Considering the South African Railways, the total mileage of track in the Union at the present time is about 10,100 miles, of which 9,600 miles are Government-owned and the balance private line. In Natal, of about 1,400 miles of line 1,360 are Government-owned. Nearly £100,000,000 is now invested in the railways.

Although at present the whole system is steam operated, it is understood that a large portion of the track is to be electrified shortly, and ultimately the whole 10,000 miles will undoubtedly be electrically worked.

Engineers have not always clearly defined ideas as to the advantages of the electrification of our railways, whilst the general public too often have grossly exaggerated ideas of the benefits to be obtained therefrom. In the first place, it must be borne in mind that many of the big electrification schemes have been carried through by private enterprise, although electrification has also been adopted on a number of State-owned railways. Since the private companies are run for profit, it is clear that the electric train must pay better than its steam rival, under certain conditions of traffic and line configuration.

It may be justly claimed that the electric train can be designed for continuous current, single phase, three phase or split phase, and built for any traffic conditions, and that it will then operate at least as satisfactorily under these conditions as the steam-hauled train. The question is, therefore, narrowed down to an almost purely financial one. For electricity to oust the steam locomotive from a position to which it has risen after 120 years of faithful service, it must prove itself to be capable of working more efficiently or of economically performing a service impossible without its aid.

Economy in Fuel and Haulage.

The first claim for electrification is fuel economy. The steam locomotive can deliver one horse-power hour for a consumption of about 4 lb. of coal used, whereas in a modern 50,000 kw. generating station, with a 50 per cent. load factor, about 1.5 lb. of coal would be consumed per horse-power hour. It may be mentioned that Mr. F. J. Aspidal, as general manager of the Liverpool to Stockport line, published figures which showed that when run by steam locomotives the fuel consumption was 100 lb. per train mile, but after electrification the fuel consumption at the generating station was reduced to 19 lb. per train mile. Also tests with 20 steam locomotives on the New York, New

Haven and Hartford Railway and with electric trains running under the same conditions showed that the coal burned at the generating station was half that burnt by the steam locomotive service. Moreover, in a recent article dealing with the United States railways, it is estimated that the electrification of the American railways would reduce the amount of coal used annually for railway purposes from 176,000,000 tons to 54,000,000 tons, thus saving 122,000,000 tons of coal per annum, to which would also be added any saving effected by developing the water power along the routes.

This claim alone will be sufficient to justify electrification in those countries possessing little coal, as in Italy, or where coal is expensive as in France.

The second big claim for electrification is that it increases the working capacity of the line. As a result of careful investigation, it is established that on most railways 10 to 14 per cent. of the total ton miles carried annually with steam working is represented by hauling locomotive coal in tenders and in wagons for supply of tenders. From this point of view alone an increased capacity of 10 to 14 per cent. is assured by electrification. Actually the weight of the tender of a locomotive in running order is from 45 to 60 per cent. of the weight of its locomotive, and in most cases represents weight useless for adhesive purposes. As will be considered further on, there are other factors which enable the electric locomotive to increase the capacity of the line enormously.

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Regenerative Control and Multiple Unit Working.

Thirdly, regenerative control is possible with the electric train. Instead of applying mechanical brakes to the wheels, the connections of the motors are so arranged that the motors generate electricity and deliver it back into the system. In this way wear and tear of brake shoes, wheels and rails is reduced and economy of energy is effected. On the Italian State Railways the energy returned to the line as the train descends the long gradients is said to be from 60 to 80 per cent. of the energy consumed by the same train on the up journey. Regeneration braking enables very heavy trains to be taken down steep gradients without danger, and on the Giovi-Genoa line, which has very long and heavy gradients, it was found that with electric traction the capacity of the line was trebled, and even then the total running costs were reduced by 25 per cent., due largely to the possibility of using electric braking.

Fourthly, for suburban working the multiple coach system may be employed, and a large proportion of the total weight of the train is then available for adhesion. For freight and main line traffic the tractive force characteristic of the electric locomotive is more suitable for hauling trains than that of the steam locomotive.

Multiple unit working permits of high starting acceleration, and enables the schedule speed upon suburban lines to be raised when stations are close together. The starting acceleration permissible with the steam locomotive is usually about one-third mile per hour per second, whilst with the multiple coach train it may be as high as three miles per hour per second. A schedule speed of nearly 20 miles per hour with stations 730 yards apart is maintained on the Liverpool overhead railway by adopting a starting acceleration of three miles per hour per second.

Fifthly, the capacity of termini is increased, especially where multiple unit coaches are employed upon electrification. Valuable land at termini may sometimes be recovered for building purposes.

Other Advantages.

Many other advantages may be mentioned. Running expenses are greatly reduced. No fireman is required. The cost of repairs is at least 50 per cent. less with the electric train than with the steam train, where the boiler needs constant care and repair. Philip Dawson gives the following particulars relating to the suburban steam locomotive on the British railways:—

- Locomotive under steam, but doing no work 48 p.c. of its life.
- Locomotive under steam pulling train ... 28 p.c. of its life.
- Locomotive under repair or cleaning, etc. 24 p.c. of its life.
- Mileage per annum 20,000 miles.
- Mileage between serious repairs (average) 40,000 miles.

(N.B.—The last report of the General Manager of the South African Railways contained the figure 26.3 for the percentage of locomotives out of commission in May, 1921.)

For the electric train Dawson claims an annual mileage of 50,000 on suburban service and a mileage of 250,000 between serious repairs. The Prussian Government estimated that for equal work with an equal number of reserves 30 per cent. less electric locomotives are required than would be necessary if steam locomotives were employed. It was found that there were always 22.5 per cent. of their steam locomotives in the repair shop, and that there were never more than 54 per cent. of their total steam engines in service at any time—some were being got under steam, others were having boilers cleaned or fire-tubes cleaned, etc.

With the electric locomotive there is no danger of grass fires due to sparks, and this results in a consequent saving of money paid as compensation. Bridges and terminal station interiors need painting less frequently if the corrosive action of the hot sulphurous gasses from the locomotive are eliminated. Costly isolated small generating stations can also be dispensed with.

The electrical engineer will naturally regard the subject from a somewhat broader point of view. He will see in electrification one step towards the universal application of electricity, whereby coal will be burnt economically, its by-products saved from destruction, and the smoke of cities banished.

Germiston Enterprise.

The first steps, of which has been described as the "biggest thing attempted in Germiston," were taken last week when the Council accepted the following resolution without discussion: "That the Council agrees to an option of ten acres in the new industrial township for a period of 12 months from the date of the submission of the draft contract to the Council." In submitting the resolution the Finance and Executive Committee stated that they had been in negotiation with Mr. H. J. Ibbotson, M.Inst.C.E., with a view to the establishment of a gas-producing plant in Germiston. The position is: (1) That the Council grant an option of ten acres in the new industrial township; (2) that a five years' contract be entered into which would provide, *inter alia*, the Council's right to expropriate the plant, mains, etc.; a maximum price to consumers for heating, cooking, and lighting purposes; and (3) protection in regard to any matter arising from the manufacture and distribution of gas.

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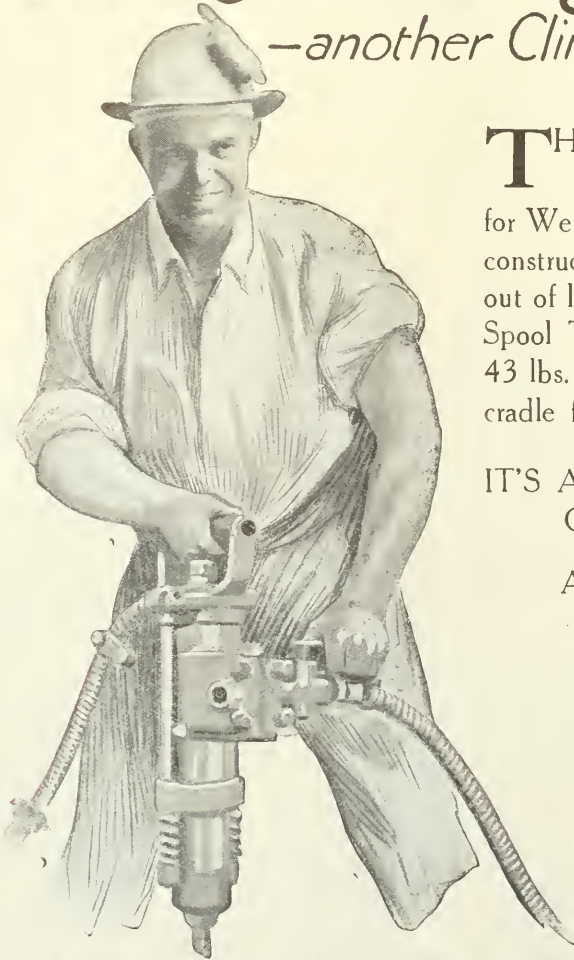
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The Week in the Sharemarket.

PRICES STEADY BUT BUSINESS STAGNANT—WAITING CONFERENCE RESULTS—DIAMOND AND OTHER STOCKS DEPRESSED.

In view of the unsatisfactory course taken by events, prices have remained surprisingly steady during the week. Indeed, some of the Far East Rand favourites have enjoyed support from London, which seems to ignore the possibility of a restriction or absence of dividends for the current half-year. Gedulds were something of a feature on Wednesday, though the whole market tended to become easier on the prospect of the Strike Conference breaking down. At the time of going to press everything pointed to a deadlock, the V.F.P. having declared its non-acceptance of the Federation's arbitration proposals and the Chamber having withdrawn its offer to the Collieries. It is hoped that matters may soon be brought to a head, as business is simply stagnant, and brokers declare they cannot remember any time when there was less doing—not excepting the dark days of the Great War. Diamonds were easier at the beginning of the week, but this department, it is expected, will be the first to recover. Tin and Colliery shares are lifeless, and generally it may be said that the market is anxiously awaiting what the end of the week and the end of this black and troubled month may bring forth.

	Fri. 20th.	Sat. 21st.	Mon. 22d.	Tues. 23d.	Wed. 24th.	Thurs. 25th.	Thurs. 26th.
Anglo-Amer. Corp.	17 6	18 0	17 6	17 0*	17 0*	17 0*	17 0*
Apex Mines	7 0†	—	7 0†	7 0†	—	—	—
Bantjes Cons.	6 10‡	6 9*	6 9*	6 10*	6 9*	6 5*	—
Blauwbosch Dias.	—	—	—	10 0*	—	—	—
Brakpan Mines	14 9*	—	15 0*	—	15 0*	14 6*	—
Bushveld Tins	0 6*	0 6*	—	—	0 6*	0 6*	—
Cinderella Cons.	1 6*	1 6*	1 6	—	1 6*	1 6*	—
City & Suburban	2 2*	2 3*	2 3*	2 3*	2 6†	2 0*	—
City Deeps	41 0†	39 9*	39 3*	—	29 0*	38 6*	—
Con. Diamonds	14 3*	14 9*	14 9	14 3*	14 0	—	—
Con. Investments	—	20 0*	—	20 0*	—	20 0*	—
Con. Main Reefs	7 9*	8 0†	—	7 6*	7 6*	7 6*	—
Coronation F.Holds	0 7*	0 6*	0 8*	0 8	0 7*	0 8*	—
Do. Syndicates	5 0*	5 1*	5 0*	5 0*	—	5 2*	—
Crown Dias.	3 2*	3 1*	3 1*	3 0*	3 1*	3 1*	—
Daggafont. Mines	2 3*	2 3*	2 3*	2 3*	2 6	—	—
East Rand Coals	1 6*	1 6*	1 6	1 6†	1 6*	1 6*	—
East Rand Deeps	0 7*	—	0 8*	—	0 6*	—	—
East Rand Props.	1 9*	—	1 9	—	1 9†	—	—
East Rand Debs.	£85†	£85†	—	£85†	£80*	£81*	—
Eastern Golds	0 7*	—	—	—	—	—	—
F. Smith Dias.	3 1*	3 2*	3 1	3 1*	2 0	3 6	—
Geduld Props.	46 3	46 3*	46 0	44 9	45 3	45 0*	—
Geduldias Deeps	6 0*	—	—	—	6 0*	—	—
Glyn's Lydenburgs	—	—	—	7 0	—	—	—
Government Areas	76 0*	75 0*	75 0*	75 0*	75 0*	75 6	—
Hume Pipes	11 0*	11 0*	11 0*	—	11 0*	10 6*	—
Knight Centrals	1 2	4 2*	1 2*	1 2*	1 2*	4 2*	—
Lace Props.	6 9*	6 9*	—	—	6 3*	6 6*	—
Loeuwoort Tins	7 6*	—	7 6*	7 0*	7 0*	7 0*	—
Lydenburg Farms	4 1*	4 2*	1 3*	1 3*	1 2*	4 9†	—
Meyer & Charltons	—	—	—	—	60 0*	60 0	—
Middellevi Estates	1 0*	—	—	1 0*	1 0*	1 0*	—
Modder West	1 0*	—	—	1 0*	—	1 0*	—
Modder B.'s	23 9*	23 9	23 3*	—	23 3*	23 3*	—
Modder Deeps	38 0	37 9*	38 3†	—	37 0*	37 0	—
Modder Easts	5 9	5 7*	5 6*	5 6*	5 6	—	—
New Eland Dias.	22 6*	22 0*	22 0*	—	24 0†	—	—
New Era Cons.	6 6†	6 3*	6 0*	6 6†	6 0	—	—
New Geduld Deeps	1 1*	1 1*	1 1*	1 4*	1 1*	1 1*	—
New Kleinfonts.	4 6*	4 6*	6 0*	1 3*	4 6*	1 6*	—
New Modderfont.	65 0*	65 0a	63 9*	61 0	63 9*	63 0*	—
New Primrose	1 6*	—	—	—	4 3*	—	—
New Unifeds	4 0*	—	—	3 6*	3 6*	—	—
New State Areas	20 6*	20 9*	21 0a	20 0*	20 3	20 3	—
Nigels	4 8*	4 0*	—	1 0*	4 0*	—	—
Nourse Mines	8 3	8 3*	8 0*	8 0*	7 9*	7 9	—
Pretoria Cements	39 6	39 6	39 0*	38 6a	28 9*	38 0*	—
Princess Estates	—	—	1 0*	1 0*	1 3†	1 0*	—
Rand Nucleus	0 11*	0 11*	1 0	—	—	—	—
Randfont. Central	9 0*	10 0†	—	10 0†	10 0†	10 0†	—
Do. Estates	14 10‡	11 9*	11 9*	11 0	14 0*	14 0*	—
Rouxville Dias.	1 6*	1 6*	1 0*	1 1*	1 2*	1 2*	—
Roberts Victors	7 6*	7 6*	7 6*	7 0*	7 2*	7 3*	—
Rooibergs	3 0*	4 0†	4 0†	4 0†	4 0†	2 0†	—
S.A. Lands	4 0*	3 11*	4 0*	4 0	4 0*	1 6*	—
Springs Mines	34 0*	34 3	33 9*	33 6*	33 0*	23 0	—
Sub-Nigels	9 3*	9 6	9 3*	9 0	9 0*	—	—

	Fri. 20th.	Sat. 21st.	Mon. 22d.	Tues. 23d.	Wed. 24th.	Thurs. 25th.	Thurs. 26th.
S.A. Alkali	12 9*	12 6*	12 6*	12 6*	12 6*	12 3*	12 0*
S.A. Townships	8 6*	8 6	8 6*	8 6	8 6	8 0*	8 0*
Transvaal Lands	—	—	—	—	—	15 0†	15 0†
Trans. G.M. Ests.	—	—	6 9*	6 0*	—	—	6 0*
Transvaal Silvoys	25 0*	24 9*	24 6	24 9	24 0*	23 6	—
Tudors	—	0 6*	—	—	—	—	—
Van Dyk	—	—	—	—	—	—	1 3†
Van Ryn Deeps	59 0*	—	58 0	58 0	—	—	—
Village Deeps	—	—	6 6*	7 6†	7 6†	7 6†	5 0*
West Springs	7 4*	7 3*	7 3*	7 0*	7 0*	7 0*	7 0*
W. Rand Estates	3 0*	—	2 6	2 9*	2 9*	2 9*	—
Witbank Colls.	—	—	—	—	—	32 6*	—
Witwatersrands	—	11 3*	—	—	11 0*	—	—
Do. Deeps	7 0*	—	—	—	7 3*	7 3*	7 3*
Zaaiplaats Tins	3 0*	—	3 0	2 10*	3 9*	2 10*	—
Union 5 per cent.	£99‡	—	£99‡	£99‡	—	—	£99‡
Welhuter	2 1*	2 0*	2 1*	3 1*	3 1*	3 1*	2 1*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Piggs Peak Development.

The report for year ended 31st March, 1921, states that no further mining operations have been carried on since last report. The future of the mine depends upon value of ore in lower levels, where prospects at time of closing down were encouraging. In the meantime it is necessary to extend period of debenture issue for another year, and also to postpone payment of interest due thereon for same period.

* * *

Bwana M'Kubwa.

The long-expected scheme for reconstruction of the Bwana M'Kubwa Copper Mining Co., Ltd., is now officially propounded and was duly approved at a recent special meeting. It is proposed to form a new company with a capital of £100,000 in 5s. shares. Holders of the 925,053 old 10s. shares in issue will be offered one new share, with a liability of 2s. 6d., for each old. Subscribers will be given two and four years' option on additional shares at par. Similar operations will be granted to the guarantors of the issue and also to the influential group which sent the well-known engineer, Mr. A. B. Emery, to report on the property. Mr. Emery is stated to have come to most satisfactory conclusions. The quantity of ore proved and reasonably to be expected down to the 450 ft. level is put at 3,000,000 tons, assaying 4 per cent. copper. It is assumed that an additional million tons will be developed for each further 150ft. opened up on the ore body below that level. The flotation process owned by Minerals Separation, Ltd., has been proved eminently suitable for concentrating the ore, and that company is one of the influential interests backing the present scheme.

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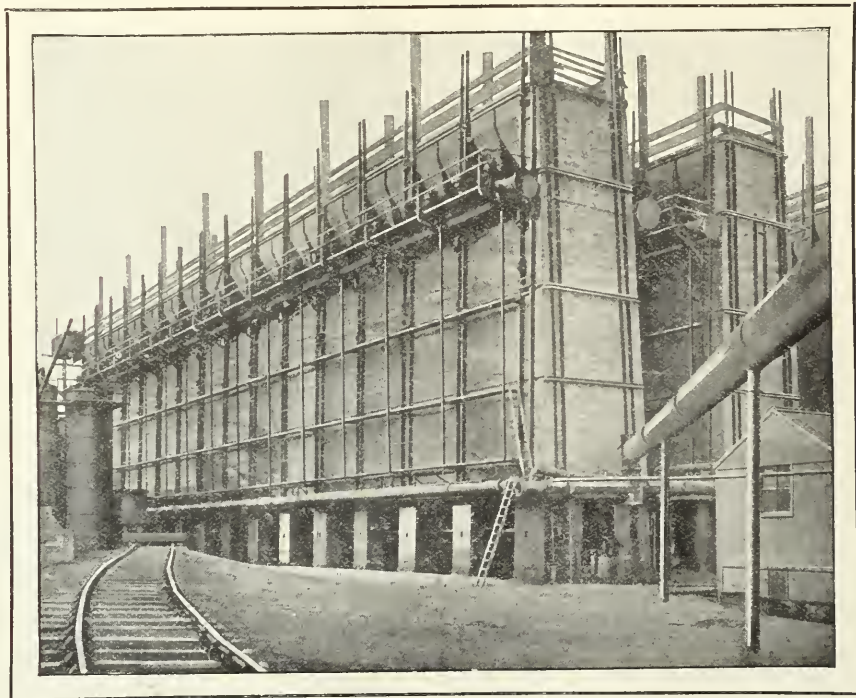
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The Lamplough Synthol Process.

DETAILED DESCRIPTION OF A NEW AND IMPORTANT SOLUTION OF AN OLD PROBLEM.

It has long been known to scientists and others that, subject to certain conditions of treatment, bituminous coal can be resolved into its nascent constituents, and, furthermore, it is more generally known that unless the conditions necessary are obtainable, a re-action sets in, and instead of obtaining what is sought for, the nascent constituents given up by the coal, resolve themselves into acids, and aromatic hydrocarbons, naphtha salts, anthracene, tar, and pitch, all useful products in their way, but not so commercially valuable as the petroleum products obtainable if this reaction can be avoided. Many attempts have been made to obtain the conditions necessary, but as the late Sir Boverton Redwood once observed, the prime difficulty was that chemists were not engineers, and engineers were not chemists, and therefore the harmony necessary between the two to find a solution of the problem, was non-existent. In the present case, the discoverer of a commercial solution of the difficulty happens to be a fully qualified and experienced engineer, with a profound knowledge of industrial chemistry, who, after several years careful experiment and considerable expenditure, has actually solved the problem that has perplexed our greatest scientists and chemists to date. In fact, in 1917, so satisfied was Sir Boverton Redwood (then in charge of the Oil Research Department of the Ministry of Munitions) with his investigation of the Lamplough process, that he strongly recommended the Government to use it for producing the whole of the oil necessary to run the British Navy, and supply the British Armies in the field with petrol spirit.

Before his recommendation could be put into practice came the Armistice, and the advice of Sir Boverton Redwood was not followed up by the Ministry, until last year, when the matter of treating coal for its nascent constituents by the Lamplough process came before the Ministry of Transport, who were, and are, very favourably impressed with the system, and although they cannot guarantee any financial assistance from the Ministry, are prepared to recommend, and use the system for their own requirements as soon as they can be supplied with plants.

In addition to Sir Boverton Redwood's investigations, the system has been thoroughly tested, reported upon and highly recommended by Messrs. Eastlake and Sutton, the well-known oil chemists and experts in such matters. The process is one of great importance to this and other countries, which at the present time are needing an impetus to their industrial progress, and consists of treating coal in such a manner that it is resolved into motor spirit, lubricating oil, gear grease, axle grease, sulphate of ammonia, and smokeless fuel. These results are obtained by an absolutely new and original method of treating the coal, never before attempted by experimenters.

Previous Failures.

There are processes in existence claiming perfect results, while, although backed by much money, and expert advice, have failed dismally to materialise, the chief reason being that they have not overcome the engineering side of the problem, and consequently are still floundering in the stagnant pools of re-actions, which have cursed every attempt to treat coal for its nascent compounds to date. The prime reasons for the many failures to obtain results is through not attacking the problem with a complete understanding of the nature of coal when under heat treatment. For example: Coal in its formation absorbs a large amount of heat, and since its formation has undergone a complete

change of state, needs gentle treatment and humouring to obtain its complete constituents in their nascent condition. Bituminous coal is pregnant with its valuable constituents, which, to be of great commercial value, must be born uncontaminated. To make coal give birth to the perfect fractions of its mother body, requires most careful and positive handling, otherwise the fractions as formed, become degraded, by what is known as the action of destructive distillation, and instead of paraffinoids, one gets reactionary compounds.

The Lamplough System Described.

By the foregoing it will be seen that to handle the prime substance, coal, in a satisfactory manner, is a task of almost super-human difficulty, this difficulty, by the Lamplough process, has been combated and met, by passing the coal through several preparatory zones and keeping it continuously on the move. The first action takes place in the absorption zone. Here the coal, which at this period is endothermic, gradually absorbs heat, and thereby is practically restored to life, and action. At this point the necessary degree of heat saturation is reached, which must be very carefully accomplished, otherwise the coal becomes violently exothermic, and destroys its unborn fractions. By the Lamplough system, a sudden action of this kind is prevented on reaching the exothermic stage, by the coal having by this time travelled into the zone of reduced temperature, where any abullition of excess heat is immediately re-absorbed by the surrounding medium, and by the time the coal has passed through this temperature zone the danger of any possible re-action is entirely averted and the coal commences to distill properly, and give birth to its first fractions, consisting of very light spirit and hydrogen. Having parted with its light fractions, the coal passes into the successive zones of higher temperature, and successively gives off its fractions in the order of their specific gravity, until the hottest zone is reached. From here, after giving up its final fractions, the coal passes into the cooling chamber, where it gives up its heat to the incoming medium, and is passed on to, and through the Briquetting plant, where it is formed into smokeless fuel briquettes, which, paradoxical as it may seem, are capable of giving off twice the radiant heat of the original coal before treatment. Consequently, although in giving up its hydrocarbon content of 20 gallons of oil to the ton of coal treated, plus a quantity of gas and water, and thereby reducing its original weight by 25 per cent., an equivalent in heating effect is obtained from burning the remaining 15-cwt equal to one and a half tons of the original coal from which the oil was extracted.

The net result is a gain of 50 per cent in the fuel value for heating purposes, no smoke or noxious fumes are evolved during combustion, and 20 gallons of oil. From the latter, by a special refining and transforming process (part of the Lamplough system) 3 to 5 gallons of first class motor spirit is obtained, and a similar amount of lubricating oil, the balance being fuel oil, gear and axle grease, and a bituminous pitch, the latter forming an excellent binder for the briquetting part of the process, consequently there is nothing wasted, every scrap of the coal being utilised and accounted for. The gas given off is used for power, lighting, and furnaces, after a preliminary treatment to extract the sulphate of ammonia, for which product there is always a good market, it being always in great demand for fertilizing purposes.

Economic Considerations.

The cost of the plant to obtain these results is quite 50 per cent. less than the cost of any existing plant hitherto used for similar purposes, although the more expensive plants have never obtained anything like the results obtained by the improved and perfected system herein described.



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The Week's Meetings.

WITBANK COLLIERY, LTD.

IMPORTANCE OF EXPORT TRADE.

Railage Development Needed.

At the annual general meeting of the Witbank Colliery, Ltd., which took place on Jan. 25th at the Corner House, Sir Harry Ross Skinner, who presided, dealt with the work of the company during the year 1921, and in the course of his speech gave some interesting particulars with regard to the export trade. He attributed the improvement in output and profit for the financial year as almost entirely due to the volume and satisfactory price of the export trade, especially in the earlier part of the year.

With the termination of the coal strike in Great Britain in June, 1921, the British coal owners instituted a vigorous campaign to recover their lost markets, which had chiefly fallen into the hands of the American shippers. Prices for Welsh coal were rapidly reduced from 40s. to 20s. f.o.b., whilst the low rates of freights ruling in England for Indian Ocean ports (upon which the Transvaal coal owners chiefly depend) enabled British shippers to land coal at these ports at prices at which the Transvaal could not compete, without revision of railage rates as well as pit mouth prices.

The adverse effect which the complete loss of this trade would have upon the future development of our coal resources and upon railway revenue made it imperative that Transvaal coal should not be driven from these markets. Accordingly representations were made to the Railway Administration and I am pleased to state that both the Honourable the Minister of Railways and the General Manager of Railways appreciated the altered conditions, with the result that the export railage rate to Delagoa Bay, which had been reduced in March last to 8s. 3d. per ton, was further brought down to 7s. per ton and finally to its present figure of 6s. 6d. per ton.

All-Round Sacrifices.

The coal owners supported the action of the Railway Administration and at great financial sacrifice, made drastic cuts in their prices, with the result that up to now shipments have been more or less maintained and a certain quantity of business has been booked for 1922 at the much reduced prices.

These cuts in the price for export coal, combined with the reductions that have been found necessary in the rates for the internal trade, more especially in the retail trade, have resulted in a gradual fall in the average pit mouth price realised, from 7s. per ton obtained in January, 1921, to 6s. per ton in November, 1921, whilst for January, 1922, a careful estimate disclosed a further expected fall to approximately 5s. 9d. per ton.

The maintenance of the export trade is of the greatest importance to the Transvaal collieries, as unless it can be kept up, the reduction in the tonnage output would be immediately reflected in a sharp rise in working costs, which would compel an increase in selling prices, of coal for internal consumption, thus adversely influencing the development of other industries. This would, in turn, reflect again on the coal industry, as well as on the general welfare of the country, and so close the "vicious circle" of restriction. Meanwhile, the infinitesimal margin which to-day exists between the average working cost per ton of the collieries as a whole and the average price realised would be converted into a loss, and several of the less favourably circumstanced collieries would have to close down.

It is to be regretted that the Railway Administration has not seen its way to grant a sufficient reduction in the rail-

age rate to Capetown for bunker coal, since the result is that, with the exception of a few steamers with very restricted bunker accommodation, the large number of boats on the Australian route, which used to bunker at Capetown, now take, at British and Australian ports, enough coal to complete the full voyage, and this trade has fallen from over 20,000 to a few hundred tons per month. South Africa not only loses the sale of coal, including railage, but the port loses a certain amount of general trade.

Colliery Workers' Wages.

As our employes have been on strike since January 1 and continue to be so, I, at the risk of being more lengthy than I would wish, think it advisable to explain the position to shareholders.

From August 1, 1920, the "extra cost of living allowances" which, up to that date, had varied according to a man's dependents, were further increased and consolidated into an allowance, applicable to all workers, irrespective of dependency, which brought the wage per day for workers who drew £1 per shift before the war up to 30s., and provided increases in proportion for lower-paid employes. This allowance was based upon the cost of living figures tabulated by the Director of Census, it being understood that, should these figures vary in the future, the allowances would be adjusted accordingly.

The fall in the cost of living during 1921 resulted in certain quarterly adjustments being made in the workers' wages on the gold mines, the first reduction taking effect from August 1, 1921. Representations were made to the representatives of the colliery workers in respect of a similar reduction in their wages, and conferences were held and correspondence was exchanged on the subject during October and November. Finally when it was realised that the workers' representatives could not agree to the proposed reduction, the collieries section of the Chamber was compelled to give the necessary month's notice, on November 25, 1921, that, from January 1, 1922, the allowance to the higher-paid workers would be reduced according to a scale based upon the cost of living figures from 10s. to 5s. per shift, with proportionate reductions to the lower-paid men.

Where the Colliers Gained.

It should be noted that, as the reduction was to come into force five months after it had been accepted by the workers on the gold mines, the colliery workers have enjoyed the higher rates of pay during that additional period, whilst, from January 1, 1922, the wage would be 25s. per shift as against 24s. 6d. per shift on the gold mines.

The employes refused to accept the proposed reductions and struck work on January 2, 1922, since which date the collieries, thanks to the loyal co-operation of their officials, have been able to maintain a steady output of coal sufficient for present though necessarily limited requirements.

Although the scale of reduction of the workers' wages is based upon the fall in the cost of living, the fall in prices of coal during the past few months, especially for export, has so reduced the margin between cost of production and revenue from sales for the collieries as a whole, that, even with the proposed reduction in wages, it is questionable whether some of the less favourably situated collieries will be able to continue operations.

Our industries are to-day faced with grave difficulties, largely brought about by economic conditions in other parts of the world and over which we have no control. In our efforts to overcome these difficulties, those who are entrusted with responsibility in the direction and management of mines and other works

should be able to count on the loyal support and willing effort of all those who gain their daily bread through the employment afforded, instead of being hindered by strike, dictated by a body of officials of various trade unions who have no responsibility in the running of the industries, and apparently a very short-sighted view as regards the real welfare of the workers.

The whole position has been exhaustively discussed at the conference between representatives of the South African Industrial Federation and representatives of the Chamber of Mines and allied bodies which has been sitting since the 14th inst.; a scheme of settlement of the dispute has been put to the workmen for their consideration, and one sincerely hopes that the men will consider these proposals in a reasonable spirit, and that a way out of the present impasse may be found.

How Progress is Made.

Progress in any country is indicated by an increasing number of successful enterprises, and the more we have in this country of healthy concerns like Witbank Colliery the better. Our company, in earning dividends for its shareholders, not only distributes great sums in payment of wages and stores, but also contributes very largely to the public revenues by direct taxation and railage charges on its products. The last item amounted to no less than £765,675 for the year under review, and the handling after leaving the mine of such a tonnage furnishes employment for many workers outside those directly employed on the mine.

Dr. E. T. Mellor in his recent address on "Recent additions to our knowledge of South African Coalfields," said with special reference to the Witbank district in which district Witbank Colliery is perhaps the most important producer:

"The position to-day is that we have practically unlimited quantities of coal of good quality and proved commercial value, which lie ready to hand, and which can be opened up and worked under conditions as favourable as those prevailing in any other country in the world.

"There are, however, two main obstacles to the proper development of an export trade—inadequate and uncertain means of transport to the coast, and still more inadequate and uncertain provision for the handling of the coal between rail and ship.

"With something like 1,000,000,000 tons practically awaiting removal as soon as a suitable outlet is found, one at least of the conditions necessary to provide our railways with an abundance of traffic for a great many years to come may be regarded as fully assured."

It is difficult to gainsay this opinion; and if railway facilities existed which would permit of the economical and rapid transport of coal to the coast, and those who were concerned in the maintenance of the export trade had a measure of control over the loading arrangements, it is not unlikely that all the former export trade would not only be recovered but exceeded, to the benefit not only of the collieries but of the community in general.

Your colliery has several most valuable assets. It is most favourably situated, lying as it does alongside the main line of railway on the Johannesburg-Pretoria-Delagoa Bay line.

It has wide seams of easily worked coal of excellent quality, and what is important, of a quality slightly better than most of its neighbours in the Mid-delburg district.

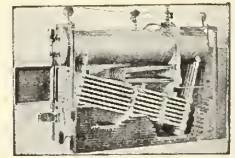
It has a most efficient management and staff, to whom the thanks of the shareholders are due; and after these present most difficult times are behind us I hope their services will be suitably recognised.



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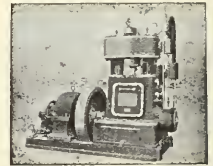
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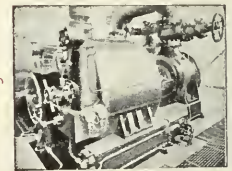


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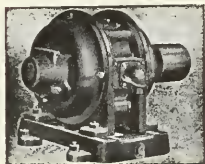


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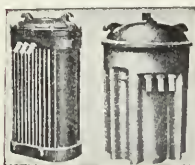
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

STRIKE AND ITS EFFECTS—CESSATION OF WHOLESALE BUSINESS FORESHADOWS RETRENCHMENT OF STAFFS—IRON AND STEEL—UNION'S GRAIN ELEVATORS—TIMBER AND BUILDING MATERIALS—WORLD'S GOLD—AMERICA'S GOLD HOARDS AND WORLD TRADE—INDUSTRIAL WAGE REDUCTIONS IN ENGLAND—UNION'S TRADE, 11 MONTHS TO END NOVEMBER, 1921—RAILWAY DEFICIT—FINANCIAL—METAL MARKETS.

General.

"The Spanish fleet thou canst not see, because—
It is not yet in sight!"

The Strike Conference, except in so far as the temporary removal from the agenda is concerned of the coal question, the reduction of wages in the Town Engineering Shops, and the demands of the V.F.P. employees for an increase in wages, is no whit more advanced in the matter of the much more important issues relating to the gold mines than when it commenced its labours. No end of the main dispute is yet in sight, and unless the Conference, which appears to be at breaking point, breaks up of its own volition, very protracted negotiations appear to be ahead of us.

"Quip's" admirable "tortoise" cartoon which appeared in *The Star* last week, aptly hit off the position regarding the progress—or, rather, absence of progress—made at the Conference, the strike might collapse. He referred to the same cartoon to-day would but too truly depict the position as it now appears to the man in the street. In the meantime upwards of 30,000 natives from the various mines have been sent home, with the result that even if the strike were to be called off now there would be fewer jobs going for at least 3,000 miners. A mass meeting of ratepayers held in the Town Hall on Monday last protested vigorously against the attitude of the Tramway and Lighting Committee in refusing to accept the supplies of coal offered to the Town Council, which would at any rate have prevented the lamentable stopping of the tram service and much inconvenience to the public. Energetic, if belated, action seems now about to be taken in connection with the Albion Mine's offer to supply coal to the Council, and it is much to be hoped that the tram service will soon be in operation again. Commercially the protracted strike is having a disastrous effect; business has fallen off tremendously, in fact, one is not at all exaggerating in saying that for the past fortnight there has been a complete cessation of business operations in the mining material and wholesale houses; and the effects among the retailers have been of a no less devastating character. Speaking to a very prominent commercial man this week, he said the extent of the losses caused the community through the strike was simply incalculable, and that people were sick and disgusted with the whole business. The trend of feeling in commercial circles was that all this trouble could well have been avoided by timely action in taking the necessary steps to come to a proper settlement. Financially, the position was extremely grave, as, should the strike continue much longer—and unfortunately everything points to its doing so—many merchants would be faced with great financial difficulties. Merchants have, of course, to meet their bills falling due, and, in many cases, to keep people going who are indebted to them for large sums, which is a very awkward position, to say the least. To-day, he said, no man could say how long the strike was going to last; there were possibilities of a very long struggle, but, on the other hand, it might just happen that something would come along to end it quickly. It was very clear to him and others that every day that passed without a settlement was automatically laying off so many workers from their billets. He thought that the workers themselves were getting tired of the position, and it was just possible that through the action of the workers

themselves, and not through any efforts on the part of the Conference, the strike might collapse. He referred to the very satisfactory outputs of coal now being made at several of the collieries by mine officials without the aid of the so-called "collier," and thought that it was possible to do away with redundant labour on some similar plan in the gold mines also. A very serious feature in the present strike—leaving other huge losses out of the question—is the loss by the gold mining companies of the present premium on gold—12s. to 15s. per oz. on the thousands and thousands of ounces—now irretrievably lost. A prominent importer of mining material said he could only foresee a bitter struggle ahead, while both parties were so adamant in their demands, and in his opinion the Government should now step in and force a settlement to prevent the further ruination of business. On all sides emphasis was laid on the imperative necessity of wholesale houses resorting to retrenchment of staffs should the strike extend over the present month. This is a disagreeable necessity, but merchants cannot of course carry such big expenses without

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making sales. At the moment merchants are not in touch with overseas markets, no indents are being placed, and everything is hung up waiting on the labour settlement. A leading mining material importer said the Press was at first too optimistic as to the duration of the strike; he was afraid it was going to continue for a long time. In the meantime, in the complete absence of business, he was giving his staff extended holiday leave. Another well-known merchant looked upon the position as very grave, but at the same time said that in view of the present cost of living standard the mining industry could not afford to pay the present high wages.

Iron and Steel.

Latest nominal quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corporation, Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in. iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{5}{8}$ in., $\frac{3}{4}$ in. and $\frac{7}{8}$ in., 9d. per lb.; 1 in., 8 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in. to 2 in., 7d.; larger sizes, 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 35s. to 47s. 6d.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; hammer handles, 14 in., 17s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 21s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 28s. 6d. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 22s. per coil, 100 lb. Barbed wire is meeting with more ready sale; prices are fairly firm; 12-gauge barbed wire, 25s. retail. Screening, 3s. to 9s. 6d. per sq. yard; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{4}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton.

Iron and Steel Trade in America.

Production of steel ingots in November was at about 44 per cent. of capacity, or approximately the same rate as in October. The Steel Corporation's unfilled obligations decreased by only 36,286 tons during November, but shipments, at about 675,000 tons, were the heaviest since last March, so that the bookings were about 650,000 tons, probably the largest since September, 1920. Finished steel prices are practically stationary. Though there is open and active competition, mills show little disposition to cut prices. When the market broadens, probably early this year, some slight further sagging may occur. Sheets, formerly irregular, are now stiffly held at 3 cents for black and 4 cents for galvanised, with a light demand. Pig iron: Prices are unchanged. Bessamer, \$20; basic, \$19; foundry, \$20.50 f.o.b.

The Federal Iron and Steel Corporation has been organised in Spokane for the development of 1,500 acres of iron-bearing land near Tekoa. Plans include a 100-ton pig iron furnace to be erected at Pekoa.

The Anaconda Copper Mining Company will come close to monopolising the western wire trade, once it has brought to fruition its plans for the installation of a plant at East Falls for the insulation of wires.

Union's Grain Elevators.

The contractor for the construction of 36 grain elevators in the Union, Mr. A. W. Meukins, has left for South Africa with the remainder of the expert staff, comprising, chiefly, Canadians, but including several Englishmen, Australians, and two Americans. Interviewed by Reuter previous to his departure, Mr. Meukins emphasised that the material used for the elevators would be British or South African, and that out of an expenditure of £1,250,000 less than £30,000 would go to foreign countries for special requirements which it would not pay to construct in Britain. As previously stated, the order for the machinery for Durban and country elevators has been placed with Messrs. Spencer & Co., of Melksham; that for the machinery for the Capetown elevator with Messrs. Henry Simon, of Manchester; roofing material with Messrs. Briggs, of Dundee; waterproofing material with Messrs. Faldo, of London; and steelwork with the Furness Shipbuilding Co. Practically all the other items required, notably sandstone, cement, reinforcements, and ironwork will be obtained in the Union. As at present arranged, Mr. Meukins will commence the work within two months of his arrival on the Durban terminal and its feeders, with Bethlehem as the central station, covering the Free State east of the main line. He then proceeds to the Transvaal to construct the system covering the Eastern Transvaal, bounded by Standerton, Bethal and Oogies, with the central station at Germiston. It is hoped to commence the terminal at Capetown in September.

Steam Tractors in use by Railways proving very Economical.

The General Manager of Railways states that a number of new rubber-tyred tractors recently introduced in connection with the cartage work in Johannesburg are proving very successful. The load hauled by them averages 70 to 110 tons per day, compared with 24 tons hauled by motor lorries. The quantity of coal consumed in one day by 12 of the new tractors costs very little more than the daily petrol consumption of a single motor lorry capable of handling only 24 tons per day.

Pretoria Engineers Shut Down.

Owing to the absence of orders from the Reef, the firm of Messrs. Delfos, electrical engineers, Pretoria, has closed down.

Timber and Building Materials.

Business has slackened off considerably during the past fortnight. A lot of work is in the offing and will be vigorously tackled so soon as things have again reached normal.

Prices.—3 x 9 deals, 1s. to 1s. 1 $\frac{1}{2}$ d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; coilings, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; Oregon, 7s.; pitch pine, 8s.; corrugated iron, 8 $\frac{1}{2}$ d. to 9 $\frac{3}{4}$ d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1 $\frac{1}{2}$ in., 11d.; 2 in., 11 $\frac{1}{2}$ d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1 $\frac{1}{2}$ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Builders are, it is understood, full up with orders, but are staying their hand for the present, with the result that things are very quiet.

Second-hand Iron and Timber.

Business in this section is exceedingly quiet pending settlement of the labour dispute. Timber is 8d. to 9d., iron 6d. to 7d.

World's Gold.

According to the latest statistics available at the end of 1921, it is stated that the Empire visible stock of gold totals £247,000,000, excluding amounts held privately by the United Kingdom banks. The national gold reserve of the United States, including the Treasury and the Federal Reserve Banks, totalled £789,000,000; France had £219,000,000, Japan £129,000,000, and Spain £100,000,000. The estimated British production in 1921, taken at 85s. per fine oz., was £46,500,000 of the world's production of £66,000,000. Of this amount £34,500,000 came from the Transvaal and £3,300,000 from Rhodesia and West Africa. The British proportion of gold is increasing, although the world production is decreasing.

American Notes—America and its Surplus Gold in respect of World Trade.

The world is still in a curious situation as to its money, says the *Engineering and Mining Journal*. American money is good, because it is gold and silver money. But we have the lion's share of the gold reserves of the world in our vaults. Prosperous as we still are, we see that the prosperity we demand depends upon the revived prosperity of the rest of the world. Through inflation—through vast issues of paper money produced with the superstitious idea that it would turn out to be good or half good—and the exhaustion of gold to pay nations like the United States which would accept, not paper, but gold alone, in settlement of trade balances, many of the European countries besides Russia—such as Poland, Germany, and Austria—find themselves without money. Our problem is to help them to get money again—gold or silver. We must loan them money if they are ever going to be able to re-enter business relations with us again. We have enough metal in our Treasury for that purpose, and the justification therefore no longer exists for the Governmental stimulation of gold production. We must now find some way of distributing our metallic reserve in part among the other members of our world in trade. But have we enough metal, after all, for the vastly increased trade demands and for the vast modern currencies which must be supported? Great as is the store of gold in the world, as compared with former times, it is relatively less when we consider the increased wealth which it represents and the trade it must accomplish. Our position is strengthened through increased reserves of gold and silver and the infiltration into the United States. This will go on for some years. Our gold and silver is at a fixed ratio of \$20.67 to \$1. The unstabilised price of silver in the outside world has fluctuated as widely, almost, as the exchanges. Therefore the silver money of the world, primarily intended as a medium of trade, has become an object of trade, has been melted down and sold outside the countries of issue, thus further stripping these unhappy nations of that money without which they cannot go on. All of these countries have plenty of goods to barter—it is money they need, and that money must be gold or silver.

Silver should be stabilised in Europe and Asia, and the existing stabilisation in the United States should be made permanent.

Industrial Wage Reductions.

In the eleven months from January 1 to November 30 the wage reductions in the principal industries in England have been:—

	No. of workpeople affected.	Aggregate net decrease per week.
Building and allied trades ...	445,000	£303,000
Mining and quarrying ...	1,291,000	2,550,000
Iron and steel smelting and manufacture ...	239,000	431,700
Engineering and shipbuilding ...	1,359,000	652,000
Other metal trades ...	360,000	200,000
Textile ...	1,004,000	594,800
Clothing ...	222,000	44,500
Transport (excluding tramways)..	906,000	383,000
Printing and allied trades ...	202,000	47,500
Furniture and wood-working ...	83,000	53,400
Chemical glass, brick and pottery	230,000	122,900
Food, drink and tobacco ...	195,000	47,400
Other miscellaneous trades ...	123,000	56,700
Public utility services ...	314,000	126,000
	6,973,000	5,563,000

To this aggregate of £5,563,000 per week has to be added the further reductions made in the mining, engineering, shipbuilding, iron and steel, and other industries in December. In most of the mining districts the amount of reduction was small, and South Wales and several other districts are now down to the minimum wage.

Union's Imports and Exports 11 Months ended November, 1921.

	1921.	1920.
Imports ...	£53,472,347	£96,913,441
Exports ...	£55,825,033	£77,485,500
Total ...	£109,297,380	£174,398,941

This is a decline in the trade of the Union of £65,101,561. The exports of raw gold totalled £31,098,000 for 1921, as compared with £32,529,612 for 1920; wool, £7,025,770 last year as against £15,424,488 in 1920; food and drink, £3,485,240 in 1920, as compared with £6,420,699 last year. Decreased entries of food and drink, iron and steel manufactures, wood and timber, cotton and woollen goods account for the decline in imports. Machinery, on the other hand, marked an increase, but the strike has put a stop to any active developments in that direction.

Railway Earnings for Week ended January 14.

These, according to an official statement, were £425,135, which represents a drop of £10,067 under the estimates, chiefly due to diminished coal traffic. The harbour earnings, £23,441, during the same period, show a slight advance on the estimates.

Railway Deficit.

The financial position is steadily becoming worse. Starting the year with a deficit of £2,598,884, losses have been increasing month by month and the probability is that the deficit will be nearly £4,000,000 when the railways start the financial year 1922-1923.

Electrical Goods.

A leading importer of electrical wares stated that business was very bad, and that it was almost a farce to keep open during the present crisis. Rhodesia was ordering a few goods, but otherwise there was nothing doing. Instead of, as normally, taking about £100 to £150 daily, his receipts to-day did not exceed £15 to £20.

Britain's Declining Cost of Living.

The cost of living fell 7 per cent. during December, at the end of which month it was at the lowest since March, 1918, viz., 92 per cent. above the pre-War rate.

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FAIRWOOD, ORANGE GROVE EAST.**

Brick house, lounge 20x16, dining room 20x13, 4 bedrooms, steel ceilings, electric light, hot and cold water, 5 stands, tennis court, pine trees, few fruit trees; easy distance from town, 70 yds. from Johannesburg Golf Club Road. Suitable place near gate for garage.

Owner who is shortly leaving for Europe will accept reasonable cash offer.

Apply L. A. S. c o "Mining Journal"
178 Stock Exchange Building.

Cape Electricians' Strike.

A settlement has been arrived at in the strike of local employees in the electrical trade and the men have returned to work, the highest scale of pay being fixed at 2s. 11d. an hour.

Metal Market.

Latest London quotations: Standard copper, £65 cash, £65 15s. forward; electrolytic copper, £71 cash, £73 forward; standard tin, £158 17s. 6d. cash, £160 7s. 6d. forward; foreign lead, £23 cash, £22 17s. 6d. forward; quicksilver, £11 5s.; bar silver, 34 $\frac{3}{4}$ d.; and bar gold, 97s. 9d. per oz.

New York Metal Market.

Latest quotations: Copper, 13.75 cents; lead, 4.70 cents; zinc, 6 cents; tin, 33 cents; aluminium, 20 cents per lb. for 99 per cent. grade; antimony, Chinese and Japanese brands, 4.50 cents; quicksilver, \$49 per 75-lb. flask.

Copper is steadily rising in America. Last August saw the metal freely offered at 11.75 cents with but few buyers; mid-December it was selling at 14 cents, a rise of almost 20 per cent. At the beginning of 1921 almost one billion pounds of copper was available, a surplus which is now estimated at 600,000,000 lb. Export business in copper continues to be surprisingly good. Germany and Japan are the best purchasers. The copper situation is better than it has been at any time since the Armistice.

Letters to the Editor.

KNIGHT CENTRAL GOLD MINE.

To the Editor, *S.A. Mining and Engineering Journal*.

Dear Sir,—Wouldn't it be a good scheme to place Knight Central in liquidation at once? If the mine does re-open it will only be for a couple of months, and operations for these few months will only result in a loss. Cash in hand at present is sufficient to pay a first liquidation dividend of 3s. to 3s. 6d. per share, but this is being eaten away daily. Let's wind up at once and save as much from the wreck as possible.—Faithfully yours,

SHAREHOLDER.

SOLUTION OF THE STRIKE TROUBLE.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir,—There have been floods of oratory during the past few weeks, but oratory should be fined at present—it is a nuisance. We want to get back to an efficient mining industry, and in this process a large number of men will be displaced—for their own good. Consequently it is up to the Government or some other body, if the Government is quite incapable, to arrange to disperse these men and send them back to their dorps, and, if necessary, issue doles for a period to enable them to get work. It is quite unreasonable to ask that the mines and the railways should become relief organisations, and I think that if the leaders of the men could be told that the redundant workers would be assisted by the Government, the strike would be closed. There is no doubt we are in a mess, but by the exercise of good temper and everyone doing a bit to help the Government, a solution can be found to the present trouble. Naturally, the Government will have to put on a special tax to meet the payment of doles and cost of sending the men back, but this could be met by a special tax on the mines which would benefit by the increased efficiency of mining. It is quite clear that 2,000 or more men cannot roughly be told to "get out"; they should be assisted to find other avenues of employment. South Africa wants a lot of development yet, and the Government should be assisted to

find employment for all our youth, and redundant mine operatives, who will be disturbed by the new conditions which we are determined to get, viz., proper conditions of

EFFICIENCY.

[Our correspondent seems to overlook the fact that it is a question, or rather has been a question, of either 2,000 men being dispensed with or else of a very much larger number of men having to be retrenched in consequence of the closing down of a number of low-grade mines.]

German Wire Ropes for Export.

An export organisation of a somewhat novel kind is proposed by the Economic Association of German Wire Rope Works, of Düsseldorf, for the purpose of promoting the export trade and thereby enabling Germany to obtain foreign currency to pay her indemnity with. The scheme proposes in the first place that German works obtaining an order from abroad shall receive a commission of 5 per cent. on the order in the currency of the country for which it has been booked. In addition to this, the works in question is to be allowed to book one-fourth of the order without this quantity being deducted from its allocation in the Association, and, of course, also one-fourth of the amount of the invoice. The remaining three-quarters of the order are to be divided among the constituents in such a way that 75 per cent. of the three-quarters are distributed among all the constituents of the Association in proportion to the number of workmen employed by the various concerns at the end of 1919, while the balance of 25 per cent. is to be divided among all the works in equal shares irrespective of the size of the different plants. It is claimed that this scheme would render it possible for 70 per cent. of the amount of the bills of exchange obtained through foreign orders to be placed at the disposal of the Government, and mutual underselling of the various concerns abroad would be stopped. It is explained that the situation of the German wire rope industry has hitherto been of such a character, owing to the ruthless price undercutting in the markets abroad, that the obtaining of orders at rates in foreign currency has been prevented to a large extent, and as a rule export prices were consequently forced down to the level of inland prices. Under the pressure of the competition of German non-associated firms, the members of the Association, who until then had faithfully observed the rule to sell only in foreign currency for export, were compelled to drop their allegiance to the Association since last March, and to invoice their goods in marks. Under the proposed scheme, however, as almost all the makers of wire ropes have now joined the Association, it is calculated it will be possible to sell in foreign currency in every case and obtain substantially good prices abroad.

S.A.I.F. Finances.

In view of the ballot to be taken on the strike by Durban building trades, the circular issued last month by the S.A.I.F. to affiliated bodies is interesting, writes a Durban correspondent. It was a reminder to the unions that the executive could not meet their liabilities unless financial obligations were met. Attached to the circular was an approximate amount due to the Federation in respect of affiliation fees. According to the statement, accounts owing to sundry creditors amounted to £1,231 14s. 3d., plus £169 in respect of salaries for December. The principal items were: Johannesburg Trades Hall, rent, £537 17s.; A. Crawford, amount loaned, £210; and Durban District accounts, £117. Affiliation fees in arrear to December 31 totalled £1,936 2s. 6d., the principal amounts being: S.A.I.F. Industrial Union, £196 16s.; S.A. Mine Workers, Benoni, £190; S.A. Reduction Workers' Association, £170; S.A. Mine Workers', Boksburg, £80; Germiston, £80; Springs, £95; A.E.U.S.A. Council, £90; Durban A.S.W., £70; and S.A. Boilermakers, £75. By the way, when do these various unions and societies publish balance sheets and reports? We should particularly like to see them.

The Strike Continues.
Crocodile River Gold Discovery—Union Steel.

The South African Mining & Engineering Journal

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Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, FEBRUARY 4, 1922.

No. 1584

At the Union Steel Corporation's Works, Vereeniging.



Rolling Reinforcing Rods 70 feet long in the 15 inch mill at the works of the Union Steel Corporation (of South Africa). Ltd., Vereeniging. The affairs of this highly progressive and successful enterprise, which has done so much for South Africa, are commented on in a leading article which appears in this issue.

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Crocodile River Gold Fields.

REPORTED DISCOVERIES—A NEW BANKET FIELD?—TOPOGRAPHY AND GEOLOGY OF THE AREA—
A RUSH OF FARMERS AND PROSPECTORS—IS IT BLACK REEF?

Considerable interest is now being evinced in the mineral prospects of the country traversed by the Crocodile River in the mid-western portion of the Transvaal. This area has for long been known to contain promising indications of mineral wealth, including iron ores and coal. Interest in this district has, however, just recently been greatly quickened by reported discoveries of gold. According to one informant, discoveries of rich auriferous ore have lately been made at two or three points in the vicinity of the Crocodile River, and prospectors and farmers are said to be trekking to the new fields in large numbers. One well-known prospector whom we interviewed on the subject stated that he had recently seen specimens of banket from this locality which were very similar in appearance to the conglomerate beds of the Witwatersrand. It is stated that on the farm Hagebomen No. 85, which is situated about 80 miles north of Rustenburg and a few miles from one of the large iron ore discoveries of the country, a conglomerate bed, probably of Black Reef age, is being opened up and that the indications are quite promising. Other authorities, however, contend that the "discovery" has been known of for many years, that it is ascribable to the Lydenburg age, and that it is unlikely to lead to anything of much importance.

Physicgraphy of the Area.

According to Dr. P. A. Wagner's recently published memoir on the Crocodile River iron deposits, the area illustrates in a striking manner the combined effects of complex



On the Bank of the Crocodile River, showing Outcrop of Iron Ore.

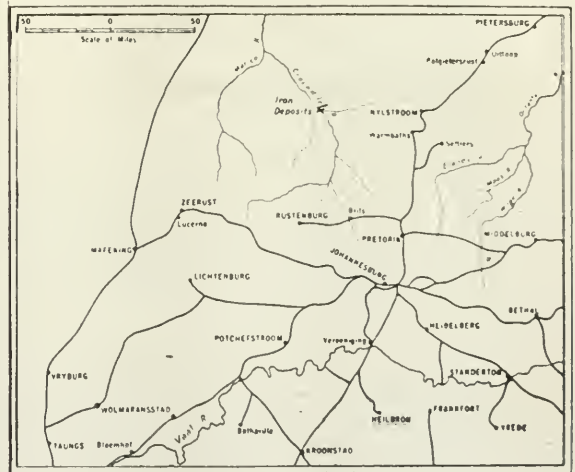
faulting and long continued denudation on a tract of country built up of a succession of highly resistant and comparatively easily eroded sedimentary rocks. It is, as stated, of a rugged nature, lofty ridges alternating with flat-bottomed valleys, which in turn are surmounted by minor ridges and hills. The dominant features in the landscape are three banded ironstone ranges, which in their highest portions attain elevations of from 1,500 to 2,200 feet above the level of the Crocodile River.

The northernmost of the ranges trends in a north-north-east direction from the northern portions of Mooivallei No. 144 and Donkerpoort No. 839 across Rosseauspoort No. 32, Rotterdam No. 237, and Cornwall No. 521; eventually dying out on the last-named farm beneath the Waterberg sandstones occupying the north-eastern part of the area. The range culminates on the farm Rosseauspoort in a great escarpment presenting a precipitous face to the north-west, in which it attains an altitude of 5,160 feet above sea-level. This is the most elevated part of the area.

Geology.

Geologically, the area is situated at the point where the north-western rim of the Bushveld basin has, as a result of thrusting from the south, overridden the south-western edge of the main Waterberg basin. It thus includes small portions of the margins of both basins, that of the former showing the Transvaal and Ventersdorp Systems resting on the older granite and dipping in a general south-easterly direction beneath the igneous complex of the Bushveld.

As in the country lying to the east, the contact between the two basins has been the scene of great earth movements caused by intense pressure acting from the south, and doubtless in great part due to the intrusion of the Bushveld laccolite. The greater part of the area is occupied by the Transvaal System. This forms a broad belt with a general north-east-south-west trend, which on the farms Mooivallei No. 144 and Donkerpoort No. 839 is split by faulting into two portions, one trending north-north-east and the other roughly east and west. The two belts gradually diverge, being separated in the north-eastern part of the area by an irregularly wedge-shaped tract of Waterberg sandstone representing a south-westerly projection from the main Waterberg area to the north-east. The Waterberg sandstone rests unconformably on the rocks of the belt trending north-north-east, while its boundary with the east and west belt is formed by a great thrust fault. Dipping beneath the Transvaal



Map of the Crocodile River Area.

System on the north-west is a belt of rocks partly of volcanic and partly of sedimentary origin belonging to the Ventersdorp System. These rest unconformably on the Old Granite. On the south-east the rocks of the Transvaal System are succeeded by norite and diabase belonging to the Igneous Complex of the Bushveld. These rocks have invaded the upper part of the Pretoria Series and extend as far as the Middle or Daspoort quartzite. The Magaliesberg quartzite is broken up into detached fragments completely surrounded by norite. In the south-eastern corner of the area normal

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red Bushveld granite makes its appearance. South of the southern iron range, and north of it between the Crocodile River and the Bier Spruit, the underlying rocks are over wide stretches hidden from view by a considerable thickness of alluvium and superficial drift. In the valley of the Zand River, for example, one can walk for miles without seeing rock in place.

Awaiting Further Developments.

Until more definite information as to the nature and extent of the deposits is available, it would be unwise to attach too much importance to the statements which are now being circulated as to the finding of a new and rich gold field in this portion of the Transvaal.

It need hardly be said, however, that subsequent developments will be watched with very great interest, and especially so in view of the fact that the great gold mining industry of the Rand is now enveloped in a cloud of black industrial dispute.

Making Maps from the Air.

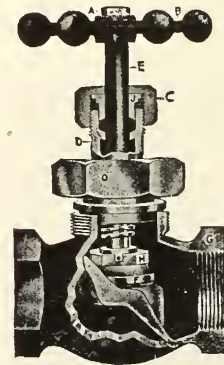
When photography from aeroplanes began to develop many people realised that it would prove of great assistance in surveying countries and making maps. All that seemed to be required was a series of photographs which could be pieced together to form an accurate picture of the country over which the aeroplane passed. The problem is not, however, quite so simple as it sounds. In order to get an accurate picture the camera should be strictly vertical at the moment the photograph is taken. It seldom happens, however, that an aeroplane is flying exactly horizontal; and for this and other reasons, very careful investigation of the problem became necessary before aeroplane photographs could be used for really scientific map making. This investigation was undertaken recently at the University of Cambridge, England. It was found advisable to select and train pilots specially for map photographs and also to carry out careful experiments in the measurement of the tilt of an aeroplane. As a result it was found possible to reduce the tilt to within a safe limit, so that there should be no material distortion of the photograph due to the camera being at an angle. The next part of the problem was to arrange the flights of the mapping aeroplane so as to cover the entire ground without gaps or excessive overlapping between the strips of photographs. Satisfactory progress has been made with this part of the problem, and it is also hoped to develop a system by which relief maps can be composed from photographs taken from the air.

* * *

Gas Engines.

Investigations for the more economic utilisation of coal and the substitution of other sources of power have led to some astonishing results in the use of all sorts of hitherto waste substances which, when dealt with by modern methods, have been found to have a high calorific value. This will prove of great value to South Africa, especially in districts far removed from the coal fields. Apart from the engines and plants to run on anthracite coal or charcoal, gas engines and plants for the utilisation of bituminous coal, loco, smokebox char, green wood, mealie cobs, sugarcane, refuse, spent wattle bark and practically any negotiable refuse not containing more than 50 per cent. moisture are now being manufactured. Also airless cold starting engines from 20 horse-power upwards to run on mineral oils, such as crude, residual, semi-refined and vegetable oil, such as monkey nut, cotton seed and palm oil, are being used in ever-increasing quantities. The Lonely Mine (Rhodesia) has decided to discard its steam engines and to instal three 444 horse-power horizontal multi-cylinder engines for running alternators in parallel and one 333 horse-power for direct coupling to an air compressor. The gas plants to be employed consist of four suction producers, cross-coupled and gasifying the local Rhodesian woods. Three of those engines and plants have been in commission for some months and are reported to be giving the utmost satisfaction. Many other gas plants have been installed in South Africa which are running on wood and products other than coal.

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THE GREAT STRIKE.

FAILURE OF THE CONFERENCE—JUDGE CURLEWIS ATTEMPTS TO BRIDGE THE GULF—GENERAL SMUTS APPEALS TO BOTH PARTIES—COLOUR BAR NOT THE ISSUE—THE CHAMBER STATES ITS NEW TERMS—JOINT EXECUTIVES CLOAK THE DISPUTE WITH POLITICS.

The thirteenth sitting of the Strike Conference on Friday of last week proved its last.

The Federation had made its final proposals to the Chamber the previous evening, and when the Conference resumed its sittings on Friday morning, these were described as preposterous by the Chamber of Mines' representatives, and rejected.

Suggestions were then put forward by the Chairman, Judge Curlewis, with the object of bridging the gulf. But in the afternoon it was intimated that these also were unacceptable, and the conference broke up.

Both parties agreed that further meetings would serve no useful purpose.

When the morning session of the Conference opened, the Chairman, Judge Curlewis, read the letter from the Federation setting forth their final proposals for the ending of the disputes. These were:—

Mr. Buckle commented on the failure of the Federation to put forward constructive proposals, and added that they simply reiterated their direct negative to the Chamber's proposals, and it seemed to him that they had shown an extraordinary absence of sense of responsibility for the carrying on of the industry.

"I want to point out one other thing quite clearly," he added. "Our proposals were put forward last November when the price of gold was undoubtedly higher than it is now, and even if there had been no strike, the steady drop in the price of our product would by this time have compelled us to put forward other proposals. And, of course, this strike has enormously aggravated the situation, and I desire to make it perfectly clear that there can be no question at all of our withdrawing or modifying the pro-



Idle Mine Boys watching a Strikers' Commando on the March.

By courtesy of *The Star*.

Coal Section: Withdrawal of notices, and submission of disputes to arbitration.

Gold Section: Withdrawal of all notices, and no interference with the status quo agreement.

The Federation and unions are prepared to discuss with the employers all other questions in dispute in conference, in accordance with past procedure.

No settlement of the strike can take place until the outstanding disputes with other employers balloted on are settled.

Mr. H. O. Buckle, replying on behalf of the Chamber of Mines, said that the Chamber put forward proposals which, if considered, rightly or wrongly, would prolong the life of several mines, extend the quantity of ore they could work, and would in the long run increase employment. To these proposals the Federation returned a direct negative, and now, in its present terms, it reiterated that.

posals we have put forward. The only question is what increases have to be made to meet the present situation. Of course we entirely reject the Federation's terms."

The Last Effort.

The last effort to prevent the Conference breaking up with nothing done, was made by the Chairman, who at this stage reviewed the points made on either side, and put forward the following suggestions on his own part:—

(1) The statutory regulations laying down the colour bar to remain unaltered.

The status quo agreement to be withdrawn as regards low grade mines, a schedule to be drawn up of what are considered low grade mines. If necessary, a ratio of white to coloured can be fixed for such low grade mines, below which the withdrawal of the status quo agreement shall not be allowed to operate.

The strike to be called off; the men to return to work as soon as the condition of a mine justifies a resumption of operations, and the men to be allowed to resume work in proportion as operations are resumed.

(2) The contract system to be abolished, leaving it to a Conference or Reference Board between the Federation and the Chamber of Mines to decide as to what system of remuneration shall be substituted for the contract system.

(3) The reorganisation of underground work to be settled by a Conference or Reference Board between the Federation and the Chamber of Mines.

It was agreed that the Conference should adjourn until the afternoon, in order to give both sides an opportunity of considering the Judge's proposals.

The afternoon session proved to be the last of the ill-fated Conference.

The Chamber's Last Word.

On the Conference resuming,

Mr. Buckle said: We have considered the proposals before us from the Federation, and the only thing we can say about them is that they are preposterous and impossible. Their proposals that the high grade mines should turn themselves into an association for the relief of unemployment, really seem so far from practicable, that one cannot take it seriously. There is no earthly reason why a baker who has prospered in trade should proceed to take over the employes of a baker who has failed in trade when he does not in the least want them. And what the allusion to the money saved by the high grade mines is, we do not understand. No money has been saved, not that I know of at any rate, but of course that really does not affect the position.

Then the proposal that the ratio should be fixed in such a form as to make a gradual return to the population ratio—well, there really is no foundation for that at all. There is no conceivable reason why a particular industry should employ different races in proportion to the population of the country. The two things have no connection whatever. They must of course be employed in the ratio to what the particular industry demands, and the fact that the relations of white and black throughout the Union is such and such, has no relation whatever to the question of what the ratio should be on the mines.

The remainder of their items are simply reiterating their original oppositions.

What we have got to do clearly is to reconsider the position entirely in the way in which it has been aggravated, and is being aggravated every day.

We shall have to state shortly the terms on which we shall be able to resume the work of the mines, and those terms will have to go further than the ones we have put hitherto. We shall have to deal with other subjects, wages, etc., and then we shall have to consider these in the light of present circumstances, and not of a month or two ago, which are very different, and we shall have to endeavour to go into that and put forth a statement on the matter; but, sir, we entirely agree that under present circumstances, under the present state of affairs, any further discussion will be quite useless.

Mr. Thompson: After what Mr. Buckle has said, I can only state that I agree with Mr. Buckle when he says we have utterly failed.

We have utterly failed at this Conference to find any solution of the present difficulties.

I claim that the reason for that failure will be shown in the records of this Conference that it has been largely due to the continual hardening of the employers. Whenever they opened the Conference, we did show a spirit of compromise. Had the same spirit been shown by the employers, I feel that there was a possibility that we might

have found some solution, but instead of that they have consistently and religiously made the position harder and harder.

General Smuts' Letter.

The Prime Minister on Friday addressed a letter to the President of the S.A.L.F. and the Chamber of Mines, in the course of which he stated:—

Government's Anxiety.

Before the occurrences which led to the present strike, the Government had for some time been gravely anxious about the position of the low grade mines and the threatened extinction of a large portion of the mining industry.

In November last I met both sides to the present dispute at a conference called by the Government, and warned them of the urgent necessity, in view of the fall in the gold premium, for re-organising the mining industry in order to save the low grade mines. How urgent that necessity was appears clearly from the report of the Low Grade Mines Commission, which was signed, among others, by the present Secretary of the Federation of Trades, the present Assistant Secretary of the Mine Workers' Union, and the then Secretary of the Mine Workers' Union. That report pointed out that with gold at 105s. per oz. (as it then was) more than half the mining industry was low grade and in danger. This affected the employment of 11,656 whites and 88,000 natives, and an annual expenditure in wages and stores of nearly £13,000,000.

Fall in Price of Gold.

Since then the price of gold has fallen until to-day it is 97s. 6d. per ounce, and the urgency of special measures to save these mines from disaster has become most acute.

The Conference.

The only effect to-day of the use of the strike weapon has been the endangering of the lives of certain low grade mines, owing to the flooding and the heavy cost of native wages, the loss of over 30,000 natives who have voluntarily returned to their homes, the postponement of the date of re-employment of a number of men far beyond the actual ending of the strike, the closing of many of the public services of the Rand, stagnation and loss to the whole trading community and a great aftermath of unemployment and distress.

The gains are nil.

The Colour Bar.

The country has been flooded with a campaign of mis-statements about the colour bar and numbers of public spirited citizens have been worked up into a state of great anxiety to protect the colour bar which is established on the basis of statutory regulation and has never been either attacked or threatened in the present dispute. The colour bar is as old as the mining industry in the Transvaal and does not rest on the status quo agreement, which was a private agreement between the Chamber and the Federation concluded only three years ago.

The issue is not about the colour bar, but how to save the low grade mines—which means more than half the mining industry—from early extinction. The Chamber say that their proposals involve the retrenchment of less than 2,000 underground miners. The Low Grade Mines Commission's report says that unless special measures are taken to save those mines, many times that number of miners will become unemployed. With the decay in the gold industry white employment is in any case going to contract. We are therefore presented with a choice between evils.

Strikes and violence will not help or save us in the choice which depends on reasonableness and a spirit of compromise on both sides.

Need for Give and Take.

There has, unfortunately, been no evidence of such a spirit in the conference which has just proved abortive. But the Government would once more with all the force and earnestness at their command appeal to both sides to approach the dispute in a spirit of give-and-take.

No principle is at stake but only a question of minimising inevitable harm to the mining industry and to the community generally. At the least special and exceptional arrangements in the case of low grade mines will be necessary to prevent disaster, and those arrangements require calm and fair consideration.'

Chamber's Latest Statement.

At the beginning of the week the Chamber of Mines issued a statement in which it pointed out that the position of the gold mining industry had seriously altered for the worse during December. The present strike has now greatly aggravated even the December position. The heavy strike expenditure, the depletion of the native labour force, the flooding of mines, and the general impossibility of re-starting operations on anything like the normal scale, render it useless for many of the mines to re-open unless satisfactory and reasonably permanent conditions are assured. A patched-up compromise

Those two holidays alone, it is pointed out, cost the industry £80,000 per annum in wages, irrespective of the loss and disorganisation through the stoppage of work, and are a distinct handicap on the poorer mines.

Re-employment Question.

The Chamber's statement concludes:—It is, of course, understood that the Chamber can give no guarantee to the men on strike that they will be immediately employed at the conclusion of the strike, nor that every man taken on will be employed in his former capacity or working place, or even in the same mine. Through the effects of the strike on the scale of operations, there will unfortunately for a time be more men available than can be placed, and managements will naturally select the best men.

Underground men re-engaged (other than mechanics and engine-drivers) will be taken on for general mining work, and will be required to do whatever mining work is required of them by the management. A considerable number of men will necessarily be out of employment owing to the curtailment of operations through the strike, but the Chamber hopes that with the satisfactory and settled state of affairs which should follow the alterations now proposed, the industry will steadily recover, and many of these men would be reabsorbed.



A Strike Scene: Commando marching through Fordsburg.

of the present dispute offers no solution of the problem, and would only be productive of further trouble in a few months' time.

Basis for Restarting.

The Chamber now proposes, as a basis on which the industry can restart with a reasonable prospect of prosperity both for the bulk of the mines and for the community dependent upon them:—

(1) That the average ratio of Europeans to natives on the producing gold mines members of the Chamber be fixed for a period of two years at not less than one European to 10.5 natives, this figure to be calculated over each calendar year, the industry being under a definite obligation to the Government that the ratio be adhered to. Within the limits of this ratio, the industry shall be entitled to make such re-arrangements of its work as it thinks fit, including the right to dispense with employes whom it does not require, but subject always to the mining regulations and to existing agreements as to hours and basic wages.

(2) That, subject to the right to re-organise work provided under (1) above, men employed after the strike be taken on at December, 1921, daily rates of pay plus one-half of the cost of living addition to January 1, 1922, this reduced addition to continue until June 30, 1922, and then to disappear entirely.

(3) That May Day and Dingaan's Day be no longer paid holidays on the mines.

Avenues for Youths.

A temporary reduction in the scope of European employment in the gold mines is, unfortunately, unavoidable, if a very much greater permanent reduction is not to take place, but the situation is not of the industry's making; it is brought about by the pressure of economic circumstances, aggravated by the prolongation of the strike.

The industry is prepared to join with the other sections of the community in any reasonable attempt to mitigate the difficulties of that situation, and it is further prepared to increase substantially the number of apprentices on the mines (the number now employed is the maximum permitted by the unions), and so assist to an even greater extent than it does at present in equipping the youth of South Africa for the future.

Strikers' New Moves: Use of Political Machinery.

The following resolutions, which were adopted at the meeting of the Joint Executives in the Trades Hall on Saturday as recommendations to the Augmented Executive of the Federation, were confirmed by the latter body on Sunday:—

(1) That in the opinion of the Augmented Executive Committee of the S.A.I.F. and the Joint Executives of all unions concerned in the present disputes, the attitude of the Prime Minister indicates that the Government is backing the present attack by the employers on the white workers,

both in reducing their standard of living and curtailing their opportunity of employment. We therefore request the workers, and also all sympathisers, to take the necessary steps in conjunction with ourselves to defeat the present Government and substitute one calculated to protect the interests of the white race in South Africa. That with this end in view a conference be arranged at once with representatives of the opposition parties in Parliament to investigate what immediate steps can be taken to remedy the present situation, and that invitations be extended to all bodies which can and are desirous of assisting to come and offer their services for the foregoing objects.

(2) That all strike committees are instructed to take any necessary steps they may deem fit to stop all scabs continuing to work, and from now onwards they have full powers to do anything they desire to bring the present strike to a successful issue.

POSITION AT WITBANK.

There was little change in the position at Witbank on Wednesday. An aggregate meeting of strikers was held in the Cinema Hall behind closed doors. Pickets were placed upon the doors, and great care was taken that no one but strikers were present or could hear the proceedings. When Mr. Hobson opened the proceedings at 9.30 there must have been quite four hundred present. The meeting lasted until twelve. A resolution was passed affirming determination to stand firm and not to return to work until told to do so by the Strike Committee. A vote of confidence in the committee was also passed.

It is reported that some men were turned away from the Witbank and Station collieries on Wednesday morning, in the first instance because the mine being right in the town, the manager will only take a body of twenty or thirty, and in the second case the men were told to go and bring the rest in. There are only nine or ten employed at the Station Colliery.

On Tuesday meetings were held at Oogies and Tweefontein, at which the usual resolutions to stand firm were carried, but there is no denying that the men are anxious to get back to work and are said to be communicating with Johannesburg direct on the point.

Six more men went down on Wednesday morning, and no attempt was made to interfere with them. The police are always present when the men go down and come up again. The return of the miners is strongly resented by some of the mechanics.

At Oogies on Tuesday a resolution that a secret ballot should be taken was ruled out of order, as was also one that volunteers should be called to go and pull out the strike-breakers. It was, however, resolved that all should go to the aggregate meeting at Witbank, but very few came.

The engineers' and miners' executive on Tuesday night seriously debated the holding of a secret ballot, the result of which would be a foregone conclusion. It would be for a return to work.

AT VEREENIGING.

The employees of the steel works received notice of discharge on Tuesday. The employees of the V.F.P. generating station here also received their formal notices of dismissal on Wednesday morning. This action led to a demonstration by the strikers during the forenoon. A commando, some 500 strong, headed by two mounted men and a couple of dozen cyclists, marched to the V.F.P. power station and there detached a dozen of their number to interview the management.

Headed by Inspector Fall, of Heidelberg, who is in charge of the special police force on duty here, they proceeded to the offices of the company. Inspector Fall saw the manager

alone, leaving the delegates outside. After a few minutes he returned and intimated that the management had nothing to discuss and was not prepared to receive the strikers.

Upon this intimation being conveyed to them the strikers re-formed, marched in front of the station and informed these officials who were on duty that the demonstration was intended to impress upon them the desirability of ceasing "scabbing," and if they ignored it, then the responsibility for any trouble that might develop in the district would rest upon them, after the warning conveyed.

About twenty officials are engaged in running the electric generating plant.

At the Cornelia Colliery on the O.F.S. side of the Vaal River all is quiet. The coal workers on strike have received notice of dismissal. Only about seven officials are at work on the mine.

The Mines and their Employees.

The Government Department of Mines has just published its statistics for the month of December and it is now possible therefore to present certain figures the accuracy of which is vouched for by Government authority as to the output of the mines and the amounts of money paid to white employees last year.

The Witwatersrand Gold Mines during that period produced 7,930,663 fine ozs.

The actual numbers of white persons in the service of the Witwatersrand Gold Mines on the last full working day of each month, and the total amounts of money disbursed to white persons in the service of these mines during each month were as under:—

	Number of White Employees	Amount Disbursed to White Employees	Including Leave Pay as under
January	20,879	£878,060	39,957
February	20,774	772,514	36,645
March	20,889	901,512	36,193
April	20,892	891,494	48,825
May	20,887	890,254	44,036
June	20,938	883,696	44,001
July	20,942	876,738	43,253
August	20,928	876,224	49,602
September	20,912	852,069	41,581
October	20,958	817,253	40,342
November	19,411	829,215	37,725
December	20,764	847,309	44,608

A Fast Scooter.

During the War, small motor boats constructed by the British Navy were among the fastest vessels afloat and did extraordinarily good work in hunting submarines and in patrol work generally. Since the War progress has been made in the design and construction of these vessels. The latest, which has been turned out by a British shipyard for a foreign government, is 55 ft. long with a beam of 11 ft. and a draught of 3 ft. 3 in. For the sake of lightness and flexibility the vessel is built entirely of wood. It has two skins of mahogany with a layer of oiled canvas between them. A third skin at the fore portion of the boat forms a step of about 3½ inches in depth upon which the vessel rises as she gathers speed and by means of which she achieves a skimming action over the surface of the water. This remarkable vessel attained an average speed of nearly 48 miles an hour during her official trials and she carries two 18 inch torpedoes, two depth charges and four machine guns. Moreover, she is capable of standing very heavy weather.

The Strike and Its Effects.

ELEMENTARY TRUTHS—LOSS OF A MILLION A WEEK — CONDEMNATION BY THE PUBLIC — SOME BROADER ASPECTS OF THE STRIKE—LESSONS FROM ENGLAND—THE SUICIDAL POLICY OF ORGANISED LABOUR.

The truth about the present industrial *impasse* on the Rand is being so camouflaged by side issues and by the larger but really irrelevant subject of politics that the general public (which term includes the employees now on strike) must often feel mystified as to what the main issue really is.

In reality the whole problem of the Rand is a simple equation in elementary business. Concisely stated, it is merely this, that under present conditions a considerable number of mines are working at a loss, that in view of the declining price of the product of the mines numerous other companies which are at present earning a small profit are likely to record losses in the near future, that the mines in question are naturally the lower grade and poorer mines of this goldfield and are not, therefore, endowed with large capital resources which would enable them to hang on like a number of industrial Micawbers waiting for something to turn up, and that in consequence of these irrefutable facts the further existence of these properties is in jeopardy and the jobs of about 10,000 Europeans who are employed by the companies concerned are imperilled.

Keep the Issue Clear.

These are the plain facts of the case, and no amount of oratorical side-tracking or debate or confusion with political questions can alter them. It is equally irrefutable that since the management of the mines cannot alter the quantity of gold contained in these propositions or control the selling price of the product, the only way of saving these mines from ruin and the only method of making mining enterprises on the Rand attractive to capitalists in order that new properties may be opened up is by reducing the costs of production. No conferences or conciliation boards, no arbitrators or awards by disinterested parties, can alter these facts. *They are unalterable.*

The Two Ways.

The only aspect of the whole problem which admits of any argument lies in the direction of ascertaining the method by which this reduction of expenditure can most effectively be obtained at a minimum of hardship to the smallest number of people. The method pursued by the S.A.L.F. in endeavouring to refuse acceptance of the proposals made by the managements of the mines on behalf of the shareholders who own these mines, that is to say, by proclaiming a strike and by attempting to extend this strike until it involves all other industries and paralyses the Government and the whole community is the method calculated to do the *greatest amount of harm to the maximum number of people.*

The Verdict of the Public.

The causes and effects of the proposals made by the Chamber have been so much debated by both sides that little good purpose can here be served by repeating the arguments employed by both sides for and against these proposals. But it would seem that whatever may have been the opinion of the general public when this industrial bombshell was hurled into the Union nearly four weeks ago the verdict of the man in the street to-day is that the Unions were wrong in interpreting notices (which had to be legally given under the Industrial Disputes Act) of intention to withdraw from agreements entered into during the abnormal period of the War by the Chamber "without prejudice to negotiations" as ultimatums, and also that the true facts of the position in regard to the *status quo* were misunderstood.

The "Colour Bar" Misconception.

Public opinion (and it is public opinion that in the long run counts in these matters) is now of the view that the Unions acted unwisely in proclaiming a strike. And public opinion is now, too, veering round to the conviction that

the Mining Houses have *no* intention of breaking down the colour bar and *could not do so even if they desired such action and policy.*

These are fast becoming the convictions of the disinterested public, but they need to become the convictions of the men involved in this calamitous business, and particularly of the men's leaders, if this devastating strike is to be brought to a sound and sane conclusion before irreparable harm is done, not only to the mines, but to the country at large.

The Country Losing a Million a Week.

The direct loss to the community due to the present strike on the gold and coal mines and in power stations and engineering shops is estimated at about £700,000 per week. If we add to this the indirect losses such as are bound to result from loss of railway revenue, cost of defensive and precautionary measures, loss of revenue on income tax and super tax due to trade disturbance and on account of other items, it is probable that the country is losing not less than *a million pounds a week, or at the rate of fifty-two millions a year.*

More Disastrous than the British Coal Strike.

Taking the population of the United Kingdom at, say, 50 millions and the white population of the Union at a million and three-quarters, this means that the present strike is costing more than £30 per capita per annum for each European inhabitant of South Africa. This is more than the per capita loss occasioned by the British coal strike of last year. And we in South Africa have only one industry which has been keeping its head above water during recent months.

Lessons from Overseas.

What did the strike of colliers do for Great Britain? It nearly ruined every worker in the country. Organised labour must learn that in the Union, as in England, labour must cut its coat according to its cloth. It must face economic facts and realise that a mine which cannot produce a sovereign's worth of gold for less than twenty-five shillings *cannot carry on*, and it must realise, too, that in seeking to maintain a false and unjustly high rate of wages, a rate of wage immeasurably above the value of the labour given judged in terms of the selling price of the product raised, it is transgressing the fundamental laws of political economy. The action of the Federation in seeking to bolster up a fictitious and economically unsound rate of pay is damaging to the whole community. The effect of such a policy is simply this, that the other inhabitants of the country, and particularly the farmers, have to pay for that portion of the miner's wage which is above the economic limit. In other words, the rest of the country is giving to the miners an immense subsidy, a subsidy which it is beyond the limits of the community to maintain.

Some people contend that head offices' expenses and overhead charges are too high, and that it is in this direction that economies should be effected. These expenses amount to only about 6d. per ton, and if they were abolished altogether the position would not be materially altered. No, a wider field for economy than is offered by head office expenses must be sought, although it may be pointed out that salaries have been and are being reduced in the head office establishments. The mines have got to reduce expenses on and in the mines themselves. Therefore the Chamber has proposed to introduce certain economies which will mean the infliction of a minimum of hardship to the least number of men. The Chamber has no intention, desire or ability to remove the "colour bar." The Federation's method of settling the dispute by calling a general strike and by interfering with public services is doing a maximum of harm to the greatest number of people.

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The Relation of Ventilation to Accidents.

(By W. H. Jones.)

A problem of extreme importance in the present day working of the Rand Mines is that of providing an adequate ventilating current for the whole of the underground workings of the mine. While the shafts and the main drives are beyond reproach in this respect and are amply and sufficiently supplied with large quantities of pure air, the same cannot be said of the parts of the mine where practically all the day's work is carried on and where at least 99 per cent. of the underground workers spend their eight hours working shift. While it is scarcely possible to point to any accident as being actually due to the effect of a vitiated atmosphere, there can be no question of doubt as to the contributory influence of such a condition towards increasing the accident rate. The necessity for providing artificial ventilation did not arise so long as the mines were limited in depth, provided there were two shafts each open to the workings and so connected one with the other, a certain quantity of air was always flowing into and around the working faces always excepting dead ends. It is true that the current of air had no definite direction of flow, and either shaft might be a downcast at times, but generally speaking the limitation of the quantity of air in the workings was not such as to militate against the efficiency of the workers. This also is not exactly true, since the development faces everywhere, were even then most inadequately ventilated and cases of gassing were much more frequent than at present, and even where actual gassing did not occur, the workers in such places suffered very acutely from inhaling impure and vitiated air during the shift.

Pari passu with the extension of the mine workings in depth the disadvantages of a natural ventilation supply of air become more and more pronounced, and culminated in several spasmodic attempts at controlling the direction of the air current while greatly increasing its volume. The installation of fans at the upcast shafts and the creation of subsidiary fans underground were carried out on a number of the deeper mines and the process has gone on until today no mine depends any longer on "natural ventilation," but relies on a large circulating air current produced and regulated by means of steam, air, and electrically driven fans. The mining regulations specify a minimum quantity of air which must be passed through the fan during the periods of work in the mine. It gives the number of cubic feet per minute for each person employed underground—and there it stops—and does not enforce this minimum air supply demand for any particular working face.

In practice it works out that, while some parts of the mine are more than adequately well ventilated, most parts are very much below the standard of supply aimed at. A word as to the proper system of mine ventilation. In all mines where the air current has been carefully thought out, the system of ascensional ventilation is in vogue. This depends for its proper working on the fact that a condition of unstable equilibrium is essential to move air in any direction vertically or horizontally. In other words the difference in weight which may exist between two columns of air contained in two shafts when properly connected will serve to set in motion a volume of air directly proportioned to the difference in density of the columns contained in the shafts. The co-efficient of expansion for air being .00203, the difference of volume or the ratio of the relative volumes

$$u = \frac{t}{1 + .00203 (t - 32)}$$

is expressed by the formula:

$$u, = \frac{t}{1 + .00203 (t - 32)}$$

where u, n, are the volumes t t, = temperatures of the air, 32°F. being minimum temperature of the air ° 212°F. the maximum. The difference in volume of two equal air columns depends on their relative temperatures and pressures. It follows then that if the air columns in the shafts

are altered by any means whatsoever, such as heat, water, a vacuum, in any case the result is to set the air in motion, and the greater the displacement the greater the air current. Since column for column, the longer air column will be the heavier, and since further the tendency of a current of air hotter than a second current is to rise more rapidly and displace the latter, every effort must be made to carry down to the lower parts of the workings the cold air column, since this will, by its greater weight, materially assist in the effort made by the fan to cause a vacuum by drawing towards it the heated air. This difference 212° - 32° = 180° being equal to 0.366 of its original volume:

$$\frac{0.366 + 1}{180} = \frac{1}{491.8} = .00203 \text{ the constant.}$$

A Simple System.

This then is the objective of any well-reasoned system of mine ventilation to make the work of the fan engine as light as possible by carrying down to the lowest workings the cold air which is therefore heavier, and which by sinking displaces the hot air and drives it always upwards.

It will be seen then that the system is extremely simple and easy to work, it is all the more amazing in view of this same simplicity to discover applications of artificial ventilation in some of the large mines of the Rand which aim at reversing the order of nature and try hard to make the heavier air column go up and not down. When one sees a fan engine of the exhaust type placed over the deeper shaft, one wonders what lazy notion of the laws of gases was in the mind of the authority of such a monument to ignorance. One will find also a wet shaft made an upcast; another attempt to reverse natural law. It is, however, when we come to examine the direction of the air currents in the underground workings that we see ignorance and stupidity personified. The bottom workings which ought to be coolest, are filled with warm, moist air, some of the working faces are well provided with ventilation, others have none at all. Split currents of air appear to wander anywhere and anyhow doing little or no effective work, and simply wasting as much power at the fan.

Old stopes are cool and breezy, working stopes are hot and nauseating from the evidence of foul gases which are not removed owing to a sluggish air current and so on. It means in effect, that the importance of proper mine ventilation has not been, and is not even to-day appreciated sufficiently by the responsible leaders of the industry. As against the strict regulations for the use of water—and very properly so—we have only a half-hearted attempt to enforce penalties for inadequate ventilation, the water supply is measured and tested by all in authority, but who concerns himself with ventilation? The dust sampler measures the air current at intervals, and takes more or less accurate records—if his anemometer is in order, the writer has not himself seen a single recording place properly fitted for exhaustive tests on any mine on these fields—he is usually much more concerned with the water supply and its use, and is therefore in good company in neglecting the equally important matter of abundance of air. It appears then that pending a proper lead being given in the direction of penalising ignorance by the Mines Department, we shall not see the Rand mines provided with the necessary air supply at all times and in all places which is essential to the efficient and safe working of the properties. One must perforce append here a word of praise for the De Beers system, which is scientifically conceived in purpose and practical in action. To those who complain about the impossibility of bringing the Rand mines up to date in this respect, a visit to the diamond mines would be a splendid object lesson. We are accus-

toned nowadays to measure all innovations in terms of their payability. A scheme either commends itself or not according as to whether it will reduce working costs or otherwise. While agreeing in the main with this attitude, and while remembering that with a falling gold premium, there is little room for grandiose schemes or a display of altruism. The health of the workers is nevertheless worth something to the owners, and if a good supply of pure air is going to improve health conditions in the mines, it is no longer a luxury, but it becomes at once a paying investment to everyone concerned.

We have all heard of the "box miner," and have each one expressed his opinion of such a person. We have also heard much about inefficient miners and mining of late years in particular. No one will attempt to defend such people when they are to blame, but in our zeal to cast stones we must be careful to rightly apportion the blame. If one imagines the possibility of being locked up in a room day after day with the windows and doors safely locked up with practically no fresh air, but rather the breathing by the inmates of the same air over and over again until not only the nostrils, but even the palate, strives to void the vile element, would it be a matter for surprise to learn that the workers, so handicapped, became lethargic and listless, that they were indifferently interested in their surroundings that they became pale and anaemic, in short that they were inefficient and careless?

Not for nothing have the Factory Laws made ventilation in factories a matter of great importance, and if necessary there, how much the greater is the need when in addition to all other obstacles to efficiency is added that of semi-darkness. The man becomes careless and blind to the dangers surrounding him, he hasn't that clear brain which is essential to the proper safe-guarding of himself and others. He is not on the *qui vive*, and consequently, he loses vigour and elasticity. Under such conditions, the worker is no longer efficient and even if no actual danger to life and limb ensues, he is not fitted to carry out his duties in such a manner as to give a fair days' work to his employers.

The Economic Aspect.

It may be argued that the whole matter is grossly exaggerated and fantastic, that the average conditions underground are not so pronounced, and that the average efficiency is greater than seems to be accepted by the writer, but when it is remembered that with the easiest-mined gold reef in the world and one very amendable to simple metallurgical treatment, the working costs are nearly at the peak of the world's records, and this while depending in a large degree on a broad low wage basis of unskilled labour, there is undoubtedly a very considerable margin of waste in efficiency which reacts on the mining costs. A healthy, intelligent and progressive worker will make for reduced

costs, the converse will pile up costs always. If the Rand miners were enabled to perform their work under the best possible conditions, as regards abundance of fresh air, it is not too much to assert that not only would there be reduced working costs due to greater application and consequent efficiency, but the big accident bill rendered yearly by the mines could and would be tremendously reduced. Give the man live air to breathe, not dead poison and he may reasonably be asked to respond to the call for greater effort. A twenty-five per cent. increase in efficiency would go far to counteract the loss of the gold premium. It must be remembered that this handicap of bad ventilation affects the official as well as the workman, and makes both of them inefficient. Plenty of fresh air would make for a speeding up all round to the lasting benefit of the industry as well as of the individual worker. No exact records are at hand which would afford data for measuring the influence of impure air in the development of Silicosis, that it has an ill effect on the lungs is certain, weakening their action and impeding their powers of recuperation, and thus rendering them less able to resist other injurious elements, but we may safely assume that the matter of ventilation is urgent in the interests alike of safety, health and low costs of mining, and therefore is a matter of very present urgency.

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The Wolhuter.

POINTS FROM ANNUAL REPORT.

The annual meeting of the Wolhuter Gold Mines, Ltd., will be held on March 23. From an advance copy of the annual report for 1921 we learn that the net profit for the year was £71,767. Mr. A. J. Brett, the consulting engineer, writes:—The following is a summary of the salient features of the work of the past three years: Tonnage milled, 1919 348,902, 1920 370,200, 1921 378,600; working costs per ton, 1919 22s. 1d., 1920 20s. 5d., 1921 23s. 6d.; revenue per ton at standard price of gold, 1919 24s. 8d., 1920 23s. 6d., 1921 21s. 1d.; working profit per ton at standard price of gold, 1919 2s. 7d., 1920 0s. 1d., 1921 2s. 5d. (loss); working profit at standard price of gold, 1919 £45,713, 1920 £2,339, 1921 £45,915 (loss); additional revenue from increased price of gold less realisation charges and exchange, 1919 £18,500, 1920 £132,997, 1921 £119,871; total working profit, 1919 £64,317, 1920 £135,336, 1921 £73,956; development footage, 1919 6,319, 1920 4,714 1921 3,642; ore reserve tonnage, 1919 653,894, 1920 661,904, 1921 399,100; average value of ore reserve (dwt. per ton), 1919 5.7, 1920 5.7, 1921 5.6; average strength of coloured labour force, 1919 2,187, 1920 2,325, 1921 2,501.

The working profit earned during the year under review was £61,380 lower than that of the preceding financial year, the result of an inevitable and anticipated decline in the grade of ore treated. A satisfactory supply of native labour permitted the milling of a larger tonnage while the rate of sorting was increased by nearly 2 per cent., which made the working costs 5d. per ton milled higher than they would have been had the same rate of sorting been kept to as in the previous year. However, even with the increased sorting it was not possible to avoid a decrease in the yield, and with gold at standard price it would have been impossible to operate the mine at a profit. There remains little further development to be done on the South Reef, Main Reef Leader, and Main Reef, and development operations during the year were confined, in the main, to the pyritic lode in the Western Section of the mine, on which body a small but comparatively high-grade area has been opened up. From the information at present available, however, it would appear that but little extension of this payable zone can be looked for. During the year an agreement was arrived at with the City Deep, Ltd., mutually advantageous to both companies, under which this company is enabled to mine its remaining portion of the boundary pillar between the two properties.

The ore in reserve at the end of the financial year was estimated to be as follows: Immediately available, 345,750 tons, value 5.5 dwt. per ton; temporarily unavailable, 53,850 tons, value 6.8 dwt. per ton; total, 399,600 tons, value 5.6 dwt. per ton. In addition to this total there are certain fully

developed and available areas containing in all 92,000 tons, which would fall within the limit of payability on a reasonable reduction in operating costs. In view of the depleted state of the ore reserves and the necessity, as time goes on, of relying to an increasing extent on reclamation sources for the supply of ore to the mill, a further decline in the yield seems probable during the coming year. Given uninterrupted working, however, it may be possible to effect some reduction in the cost of operating the mine, but the influence of the price of gold on the profits of a low-grade mine is so great that this will obviously be the dominant factor in the results to be achieved during the ensuing year.

The manager, Mr. W. C. Mossop, writes, *inter alia*:—Tonnage and working cost: The tonnage milled shows an increase of 8,400 tons compared with the previous year, the working cost being 1d. per ton higher. Throughout the year the supply of native labour has been satisfactory, the average number at work underground being 1,945, as against 1,775 during 1920. Mining: The proportion of ore mined from reclamation was 36 per cent. With regard to the coming year, I am of opinion, should the supply of native labour be maintained, and nothing of an untoward nature occur, the tonnage milled will compare favourably with that of the past year. It is, however, improbable that last year's rate of yield will be maintained. The development during the year has been practically confined to the pyritic lode and the opening up of small faulted blocks of ore at various points of the mine. The work done on the pyritic lode (west shaft section) has been very helpful. The payable tonnage developed on this body has, however, been confined to a moderately small area, and outside this area, where prospecting has been carried out at likely points, the results have been disappointing. Government Miners' Training School: During the year the pupils of this school were transferred to the City Deep mine, where better accommodation in the way of working faces could be afforded them. This withdrawal necessitated the employment of a few additional white men underground. Sand filling: During the year 41,290 tons of sand have been placed in the mine. Staff: In conclusion, I wish to express my thanks to the mine staff for the loyal service rendered to the company during the year.

The leaders of the Federation of Trades and their political supporters, not content with disseminating the falsehood that the Chamber of Mines is desirous of removing the "colour bar," are widening the front of their attack upon the industry by endeavouring to propagate the belief that the standard of living of employees of the Witwatersrand mines is poor and that the Chamber now seeks to still further lower this standard of living. Nothing could be further from the truth. According to the Government Mining Engineer's report the average wages of 19,719 white employees of Witwatersrand mines during 1920 were £478 per head, or nearly £40 per month for each employee of the industry. This compares with £308 per head for 18,655 white employees in 1914. The wages paid to white employees of the Rand amounted to £5,753,206 in 1914 and to £9,423,036 in 1920. These figures are in each instance for employees other than staff. In addition special payments to or on behalf of men on active service, 1914-1920 (both years inclusive), amounted to £902,986, exclusive of active service pay to staff men. In no other mining field in the world do employees draw such high wages and in no other mining field do European miners work under such easy conditions as in the mines of the Witwatersrand, and in no other mining field can employees live amidst such comfortable surroundings as they can on the Witwatersrand.

MINES DEPT. EXAMS.

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MANAGERS' EXAM., September, 1921

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	Metal	Coal	Totals
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Rest of S.A.	3	2	5
Total for S.A.			17

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The Week in the Sharemarket.

A FIRM TONE—SPECIALITIES IMPROVE—DIAMONDS BETTER.

The feature of the week has been the surprisingly firm tone in face of many depressing factors. The strike outlook gets no brighter as the days go by, and the market is learning to take the news with stoic resignation. Professional buying at times during the week caused a flutter, but the public and the houses refuse to be tempted in to taking any active interest. The cable delays make business with London well nigh impossible, and help to try the patience of those who attempt to do anything. Nevertheless, a few specialities have shown unexpected improvements. New States were done at 24s. on Wednesday, and several sporadic signs of life have been visible in the market. Diamonds have on balance been slightly better, De Beers Deferred touching £10 5s., and the Preference £9 7s. 6d. Consolidated have touched 15s. 6d., Crowns 3s. 3d. each, and Frank Smiths 3s. 4d. In the debenture list, it may be noted that Cape Explosives were dealt in at £101½, Consolidated Diamonds at £112½, East Rand Proprietary at £80 and £85, and Randfontein Estates at £80 and £90. The immediate future of the market is, of course, bound up with the strike issue. Meanwhile, gold continues to fall in price, the cabled figure on Thursday being 46s. 6d. The week's fluctuations in share quotations are set out below.

	Fri. 27th	Sat. 28th	Mon. 30th	Tues. 31st	Wed. 1st	Thurs. 2nd
Princess Estates	—	0 11*	0 11*	—	—	1 0*
Rand Collieries	—	—	—	—	0 6*	0 6*
Randfont. Central	10 0†	10 0†	9 0*	9 3*	9 3*	9 2*
Do. Estates	14 0*	14 3*	14 6*	15 1½	15 6*	15 3
Rouxville Diamonds	1 0*	1 1*	1 2*	2 0†	1 3*	1 0*
Roberts Victors	7 9*	7 9*	7 6*	7 9*	8 6*	8 0*
Rooibergs	3 3*	4 0†	4 0†	4 0†	3 0†	—
S.A. Lands	—	4 0*	4 0*	4 1	4 1*	4 1*
Springs Mines	32 9*	33 0*	—	34 0	35 3	35 0*
Sub Nigels	8 9*	9 6†	9 3	9 3	9 1†	9 3*
Swaziland Tins	—	—	—	—	10 0†	—
S.A. Alkali	12 3*	12 6*	12 6*	13 6†	12 9*	12 9*
S.A. Townships	—	8 3*	8 3*	8 6	8 6	8 3*
Transvaal Lands	—	—	—	—	14 0*	14 0*
Trans. G.M. Ests.	6 6*	6 6*	6 9*	6 9*	7 0*	7 0*
Transvaal Silvers	23 3	22 3	22 0*	22 3*	22 6*	22 6*
Tudors	—	0 7*	0 8*	0 7*	0 8*	0 7*
Van Ryn Deeps	—	—	59 0*	—	62 0	61 3*
Van Ryn Estates	—	—	—	60 0*	—	—
Village Deeps	—	—	—	4 9*	5 6*	—
West Springs	7 0*	7 0*	7 0*	7 0*	7 0*	7 0
West Rand Estates	2 9*	2 9*	2 10*	2 9*	3 0*	—
Witbank Collieries	32 6*	33 0*	33 3*	—	34 3*	34 6*
Wit. Deeps	—	7 3*	7 3*	7 6*	7 6*	7 6*
Zaaiplaats Tins	2 10*	2 9*	2 10*	2 9*	3 0	2 9*
Union 5 per cent.	£991*	£991*	£953*	£991*	£1001*	£1001
Wolbuteer	3 1*	3 0*	3 2*	3 2	3 2*	3 2*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Lieut.-Col. J. Grenfell, Chairman of the Messina Co., has returned to South Africa.

	Fri. 27th	Sat. 28th	Mon. 30th	Tues. 31st	Wed. 1st	Thurs. 2nd
Anglo-Amer. Corp.	17 0*	17 1½*	17 3*	18 6	18 6	18 5*
Ban'jes Cons.	6 8*	6 9*	6 9*	6 9	6 6*	6 6*
Brakpan Mines	—	45 6†	47 0†	44 0*	—	—
Bushveld Tins	0 7*	0 7*	0 7*	—	0 7*	0 6*
City & Suburban	2 6†	2 6†	2 0*	2 2*	2 6†	2 1*
Con. Diamonds	13 6*	13 9	13 6*	14 3*	15 3	15 0
Con. Investments	20 0*	20 0*	—	—	—	—
Con. Langlaagtes	11 0*	—	—	—	11 3*	—
Con. Main Reefs	—	7 6*	7 6*	7 9*	8 1*	5 5*
Con. Mines Selection	—	—	—	—	—	12 0*
Coronation Colls.	—	27 6*	—	—	—	39 0*
Coronation F'hlds	—	0 7*	—	0 7*	0 7*	0 7*
Do. Syndicates	5 0	4 9	4 6	4 3*	4 9	4 8
Crown Diamonds	3 0*	3 1*	3 1*	3 2*	3 2	3 3
Crown Mines	—	—	—	—	—	31 0*
Daggafontein Mines	2 3*	2 3*	2 3*	2 3*	2 3*	2 3*
East Rand Coals	1 5*	1 5*	1 6	1 6*	1 6*	1 6*
East Rand Deeps	0 8*	0 6*	0 8*	—	0 8*	—
East Rand Minings	—	—	6 3*	—	—	—
East Rand Props.	—	4 0*	4 3*	4 6*	—	—
East Rand Debs.	£80*	£80*	£80*	—	£80*	£80*
Eastern Golds	—	—	—	—	0 7*	—
Frank Smith Dias.	3 1*	3 1*	3 1*	3 1*	3 3*	3 1
Geduld Props.	6 0*	—	6 0*	6 0*	6 0*	—
Glynn's Lydenburgs.	—	7 0†	—	—	—	—
Government Areas	75 9*	75 6*	76 0	76 6	77 6*	77 6*
Hume Pipes	10 6*	10 6*	10 6*	10 6*	10 6*	—
Knight Centrals	4 2*	4 1½*	4 2*	4 2*	4 4*	4 4*
Lace Props.	6 3*	—	—	—	6 9†	7 0
Leeuwoort Tins	7 0*	7 6†	7 0	7 3†	7 0	7 0*
Lydenburg Farms	4 1*	4 0*	—	4 3*	4 3*	4 3*
Meyer & Charltons.	60 0*	64 0*	60 0*	—	60 0*	—
Middelvllei Estates	1 0*	1 0*	1 0*	1 0*	—	—
Modder West	—	1 0*	1 0*	1 0*	—	—
Modder B.'s	23 3*	22 9*	23 0*	23 6*	24 0*	24 6
Modder Deeps	37 6A	36 6*	37 3	37 6	38 6A	38 0
Modder Easts	5 3	4 10	4 10*	5 3	5 1*	5 3
Natal Navig. Colls.	—	—	27 6†	—	26 0*	26 0*
New Eland Dias.	—	23 0*	—	—	—	—
New Era Cons.	5 9*	6 0	—	6 3†	6 3*	—
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfontein	4 3*	4 3*	4 3*	4 3*	4 9*	4 6*
New Modder	63 6*	63 6	63 3	64 6	65 3*	66 0
New Primrose	—	4 0*	4 0*	—	4 0*	1 3*
New Unifields	3 6*	3 6*	3 6*	—	4 0*	—
New State Areas	20 6	20 6*	21 0	22 6	23 6	23 10½B
Nigels	5 0*	4 6*	—	4 0*	5 3*	5 3*
Nourse Mines	7 9	7 9	7 10*	8 0*	8 3*	8 1
Pretoria Cements	38 0*	39 0	39 0	39 0	40 6	—

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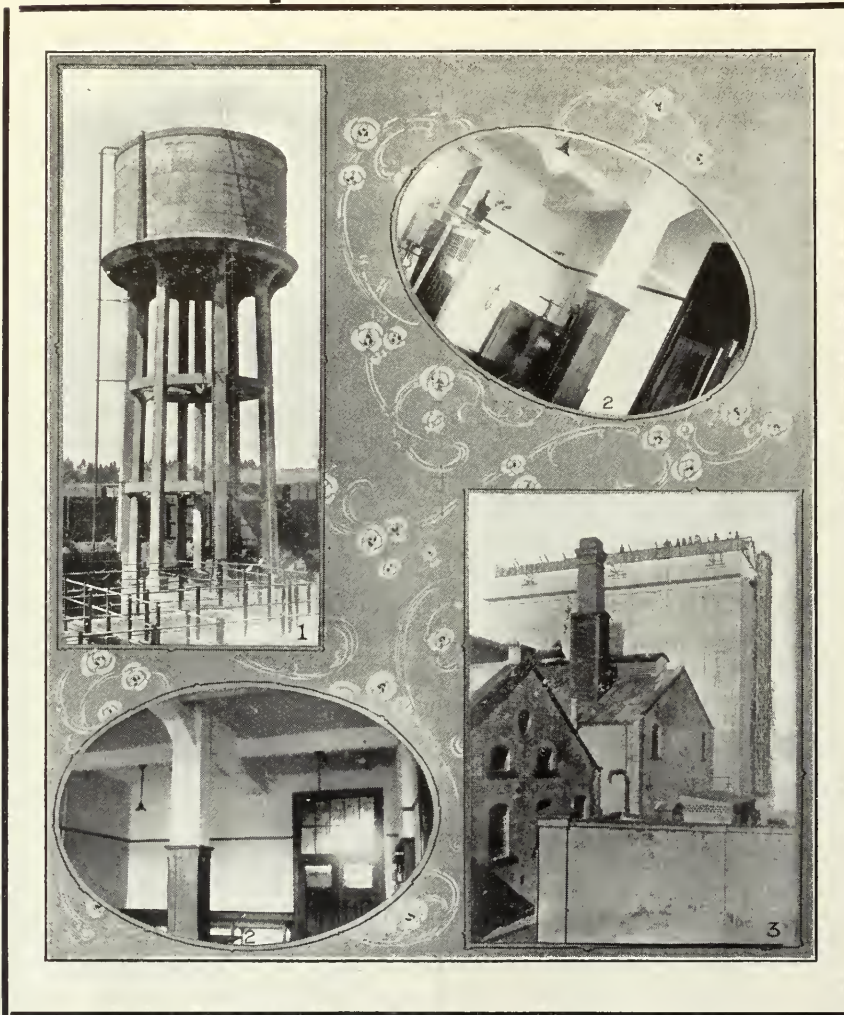
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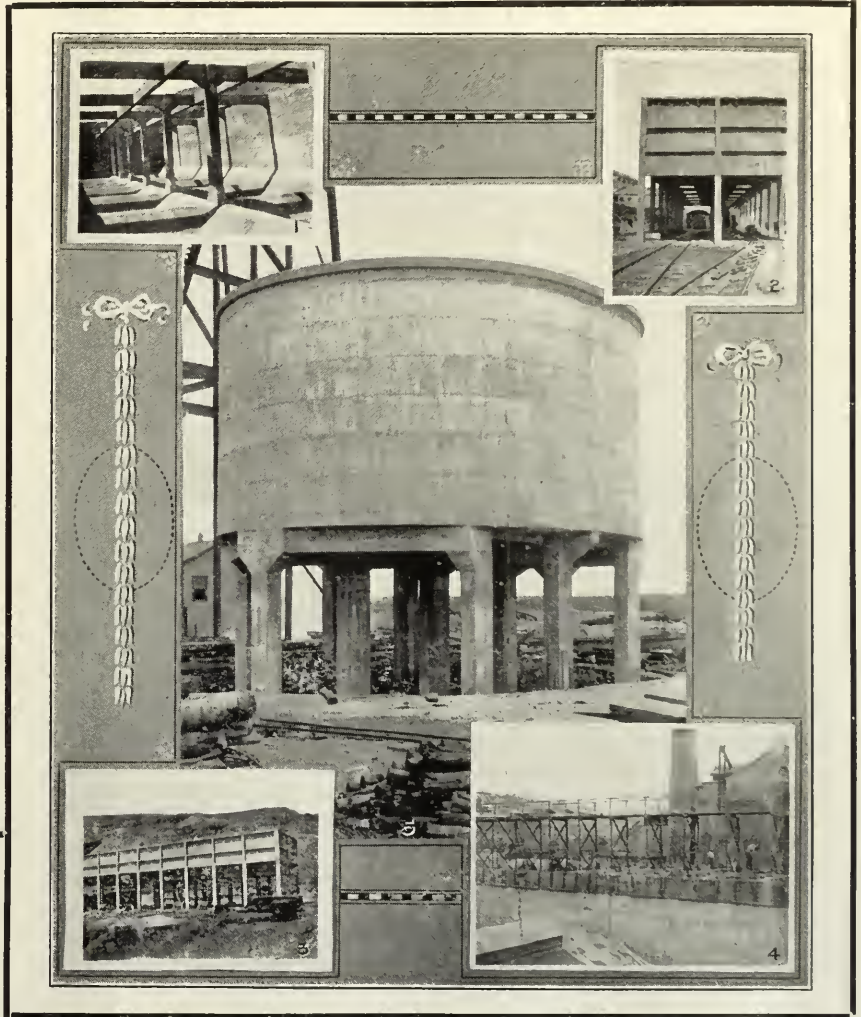
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EDITORIAL.

THE UNION STEEL ENTERPRISE.

Unusual interest attached to the annual meeting of the Union Steel Corporation of South Africa last week. A full report of the Chairman's speech appears in another part of this issue, and will repay perusal by everyone interested in the industrial development of the country. Mr. Isaac Lewis presided, and in his speech dealt with the general conditions of the steel industry and the special conditions as they concerned the Union Steel Corporation. The main feature of the latter is that the gross manufacturing profit amounted to £146,381, being about £4,000 more than that for the previous year. The cash position of the company is a strong one, the year's profit added to the balance brought forward leaving a total credit to profit and loss account of £215,519. The financial policy of the directors seems, in the circumstances, eminently sound and reasonable. In order to meet trade demands, to strengthen the position to meet overseas competition, and to conserve their resources in face of "the present unstable economic conditions" throughout the country, the directors have decided, for

the present, not to declare any dividend, other than those on the preference and preferred ordinary shares. Very wisely, it seems to us, a substantial interest has been acquired in the Newcastle Iron and Steel, Ltd.—a promising enterprise with an assured future. In view of the set back to trade towards the close of last year, and the competition from overseas, the results won certainly reflect the greatest credit on all concerned. Unfortunately for the company, competition from overseas has become increasingly serious of late, and Continental-manufactured goods have begun to play a prominent part. This form of competition is artificially helped by the present industrial conditions in some European countries, by the depressed exchanges, and by the low sea freights which are quoted for some of those competing Continental products. We entirely agree with the Chairman that "this is an artificial combination of advantages in favour of foreign competitors which imposes a real hardship on our local manufactures, and which must result in checking the development of our own local industries at a time when their expansion is so much needed." Mr. Lewis made an eloquent appeal for some form of protection for the industry, and he quoted with approval the supporting views of the Prime Minister and of the President of the Transvaal Manufacturers' Association. In this connection he paid a graceful tribute to the Press for the interest and sympathy it has shown towards the efforts being made to establish local industries. Referring to the policy of his company, the Chairman expressed the Board's determination to keep the South African trade in the products it manufactures; to keep its works operating to the fullest extent possible and to keep its men employed "with a view to the fruition of the larger scheme we have in mind." The Chairman was able to announce that several large and important orders for reinforcing steel had been secured and that others were in sight. To meet competition and to prepare for improved trade conditions, the works of the company have been considerably enlarged. Regarding the vexed question of the treatment of native ores for the production of pig iron, the Chairman emphasised what the company had already done in this direction. Briefly, it has spent large sums in the location and examination of local ore bodies and raw materials, and in the experimental production of pig iron. Twice the company has brought to this country, at great expense, the best experts both on steel making and in the knowledge of the raw materials necessary for the purpose, and it was the first to take that action. The first report was most satisfactory, the second is in course of preparation and promises to confirm the first. In consultation with the experts the directors have prepared schemes for the establishment of the big industry, and have conducted important negotiations to raise the large capital necessary. The financial conditions, however, throughout the world have been unfavourable to obtaining this money at present. Summing up the records of the company, the Chairman, with justifiable pride, pointed out that it had produced over £1,500,000 of finished goods; employed over 180 white men earning good wages, the majority of whom are Afrianders who have been trained over a period of years in this skilled industry; had given employment to nearly 500 natives; had paid very large sums to the Government for the purchase of their scrap steel and in railage on this scrap and on finished products, and, moreover, had paid further during the past two years some £57,000 to the Government in taxes. "We have been acting, not merely talking," Mr. Lewis declared, and he certainly was able to substantiate the statement. The Chairman ended in a note of hope and cheerfulness. "I have the fullest confidence," he said, "not only in the future of the steel industry, but also in the early and successful expansion of the agricultural and manufacturing industries of the Union, and if wise counsels prevail in the present dispute, I am convinced that these will provide new and ever-increasing fields for the employment of labour." This, of course, is the spirit that makes for success, and the chairman and directors of this Vereiniging enterprise are to be congratulated on the splendid measure of success that has already rewarded their labours.

CONTINUATION OF THE STRIKE.

Since the break up of the Conference at the end of last week things have moved slowly on the Witwatersrand. In the Witbank coalfields a considerable number of colliers have returned to work, but in so far as the gold mines are concerned the position is just the same as it was a week ago except for the continued repatriation of the natives. The failure of the Conference to come to any real solution of the trouble was more or less of a foregone conclusion. But it was hardly expected that the suggestions of the chairman of the Conference, Mr. Justice Curlewis, would be so curtly dismissed by the Labour representatives. The breaking up of the Conference was immediately followed by a letter addressed to both disputant parties by the Prime Minister. In this letter General Smuts asked for a spirit of compromise and declared that the issue of the dispute was not the Colour Bar at all but the salvation of the low grade mines.

The augmented executive of the Federation has held several meetings during the past week and at these the questions of proclaiming a general strike, of the rights and privileges of the Press, of the necessity for Parliament assembling at the earliest possible opportunity to consider the position and, if necessary, to legislate thereon, were debated at length. In addition to such vital matters as these contentious problems irrelevant to the dispute, such as selective mining, have been discussed, and there has been a considerable ventilation of Bolshevik bunkum.

One or two of the Nationalist leaders have come to the fore as sudden found champions of Labour, and in some quarters a strong Nationalist-Labour coalition is spoken of.

There is, however, unfortunately, no apparent disposition on the part of the men's leaders to face the economic facts of the case and to see the dire necessity that existed for some radical reform which would secure substantial reductions in Rand working costs if the low grade mines were to be saved from closure. Three such mines are now being finally closed down and the future of several others, including the E.R.P.M., is highly problematical.

The Chamber of Mines has now made it quite clear that the proposals which it originally made and which the Federation replied to by means of a strike called on a false issue are not the terms upon which they are prepared to restart the industry. Thirty-six thousand natives have now been repatriated, and obviously on this account alone nearly four thousand Europeans have lost their jobs. Other causes have greatly tended to aggravate the condition of the industry, and it must therefore be clear that when the mines resume operations the field for white employment will be restricted for some time to come.

At the moment of writing the only new development in the situation is that a resolution has been passed by the Germiston Executive of the Strike Committee recommending that ways and means be found to see the Prime Minister and the Governor-General to request that an Arbitration Court be set up immediately to settle the present crisis.

The importance of this resolution lies in the fact that it is the first reply that has been made to the Prime Minister in respect to the statement he issued last week, in which he said the Government, if approached by either or both parties, was prepared to explore any avenue which might lead to a settlement of the dispute.

The Prime Minister was not long in replying to the Germiston resolution, and expressed his willingness to receive a deputation from Germiston on Thursday morning.

The following resolution from the Germiston Executive Strike Committee was signed by J. MacMillan, Secretary of the Executive Committee, and M. T. Crawford, General Secretary, and read:—"We, the Executive Strike Committee of Germiston, recommend that ways and means be found to approach the Prime Minister and the Governor-General with a request that an Arbitration Court be set up immediately to settle this present crisis, and that the court consist of five persons, the men's representatives to be Colonel Creswell and Advocate Lucas, and that Judge Curlewis be chairman of the court. To show to the public that it is our desire to settle this crisis, we, in the event of a court being set up, are prepared to recommend to the col-

liery section that they accept 50 per cent. of the Chamber's proposals, and that the other sections of the workers go back to work on the terms they came out on, and to await the decision of this court, whose finding shall be final."

The Strike Committee also issued the following communication:—"In reference to our recommendation of yesterday re an Arbitration Court, we further recommend that a convening or agenda committee be appointed to take all necessary steps to the furtherance of essentials necessary to such a court, and recommend that the following personnel be the nucleus of such a committee: R. Tennant (secretary, E.D.A.), A. Crisp (organiser, A.E.U.), A. Crawford (general secretary, S.A.I.F.), and one member of the Mine Workers' Union to be selected by the executive of the M.W.U. In respect of the above it will be seen that it is our intention to get a fresh personnel in action. In our opinion the present action, or lack of action, of the Augmented Executive of the S.A.I.F., is one that is going to lead to a stalemate and further disorganise the ranks of the workers."

We are glad to observe that the name of Mr. A. Crawford is included in this broader personnel of the strikes committees. Mr. Crawford is a man of wide experience and of moderate and sane views, and his presence in any Executive Commission of Conference would be of incalculable benefit to the men and also to the industry. But it is clear that no good can come of any further Conferences unless the men's representatives are first of all prepared to recognise the true economic facts concerning not only the Rand of a month ago, but the Rand of to-day. And, moreover, it must be frankly recognised that this is no political quarrel but a dispute on a business subject which can only be settled in a businesslike manner.

[Since writing this we have been informed that the interview with the Prime Minister has been postponed owing to the attitude of the Mine Workers Union in the Germiston District.]

THE TRUTH MADE MANIFEST!

"Long threatening comes at last," and the "closing down bogey" has, during the week, become a cold fact and very stern reality. In this, as in other directions, the coal industry led the way, and the directors of Breyten Colliery were the first regretfully to announce that the mine had closed to open no more. "Facts are chiefs that winna ding!"; and the Breyten object-lesson was not lost, let us hope, on the white colliery employees of the Transvaal. But Breyten Colliery was not long left alone, being soon joined by the New Goch and Roodepoort United Main Reef. The Luipaardsvlei Estate G.M. Co., Ltd.—despite the chairman's recent cheery speech at the annual meeting in London—was the next to find itself, in the vernacular, "up against it." After an anxious period of cabled correspondence between the London and the local boards, the company had to confess itself unable to "carry on," the sinews of industry having failed it. The mine will cease operations on February 28, and the officials are all under notice. The repatriation of the natives (numbering 2,000) began on Thursday, and the 150 white workers on the mine have been discharged. With nothing coming in, the company has been paying out £400 per day since the strike began—and the age of miracles is past! Krugersdorp will feel the blow first, but the rest of South Africa will feel it likewise—merely a little later. Then the case of the E.R.P.M. falls to be mentioned. Every newspaper reader, one might almost say every child on the Reef, knows the case of the E.R.P.M. The Low Grade Mines Commission gave the property the place of honour in its now historic report—a report which now appears about to be only too thoroughly vindicated, and a special Commission only the other day said "ditto." The E.R.P.M. has not yet actually and finally closed down—at least not up to the time of writing. But the mine is spending £70,000 per month, no gold is being won, and Sir Harry Ross Skinner has publicly declared, more in sorrow than in anger, that "the position of running the E.R.P.M. at a dead loss cannot continue indefinitely." That surely is simple enough and direct enough to give pause to the most eloquent strike leader, however "intoxicated with the verbosity of his own enthusiasm" he may be. In fact, that's all there's "to it."

THE MINES AND THE FARMER.

According to the statistics issued by the Government Department of Mines in respect of the year 1920, the purchases of Rand Gold Mines in that period included:

Beans, 6,216,000 lb.	£64,060
Rice, 879,098 lb.	21,106
Mealie Meal, Kafir Corn etc.	702,775
Malt and Cereals for Beer	57,390
Meat, 30,549,922 lb.	564,083
Sundry Food (including Bread)	205,148
Sundry Food (including Bread)	205,148
Vegetables 66,211	
Coffee, Sugar, Oil, Ghee, Molasses etc.	68,734
Fodder for stables (Bran, Chaff, Mealies, Forage, etc.) 41,797	
Timber (Mining Poles and Lagging) 526,052	
Total	£2,522,504

In addition to these there were the purchases of the European employees of the mines. In 1920 the Rand paid over eleven millions sterling to such employees and obviously a very large proportion of this must have been spent on food stuffs produced by South African farmers.

What is the position on the Rand to-day? The mills are silent, the miners are earning no wages and the mines are compelled to repatriate large numbers of natives for whom in normal times they purchase vast quantities of food. The strike was called on false issues, and is being carried on by the Federation on false issues. If a farmer cannot make his farm pay he either has to reduce expenditure or give the farm up. The position is exactly the same with the mines. The Chamber of Mines proposed to reduce the working costs. Any sensible farmer who found that his farm was not paying would have done exactly the same thing. But the whole issue of the dispute is now being camouflaged by a lot of political clap-trap and by sudden found champions of the Labour cause who are in reality Nationalist opportunists out to make Party capital from the present industrial misfortune.

The public generally, and particularly the farmers and the men on strike will be well advised to treat the doctrines of these political mountebanks with disdain, and to follow their counsels either with extreme caution or—best of all—not to follow them at all.

Explosives and Chemical Works.

FORTHCOMING PUBLICATION.

IMPORTANT NOTICE.

The "South African Mining and Engineering Journal" will publish in the near future a special illustrated supplement dealing with the explosives and chemical works of the Union. Several of the principal firms having factories of this nature in South Africa have expressed their approval of such a publication, which will be issued as a supplement to the ordinary weekly issue of the Journal. Special commissioners have been appointed to visit the various works, and the results of their investigations will be published in this supplement in the form of lengthy and illustrated articles. The supplement will also contain valuable data as to the quantities of explosives, fertilisers, chemicals, etc., produced in the Union, methods of manufacture and details as to markets and consumption.

Prospective advertisers and manufacturers of chemicals, etc., interested in this supplement are advised to communicate with this office at the earliest opportunity.

Notes & News.

The Busy Man's Page.

Owing to the delay in the delivery of the mail papers this week and the need for going to press early, the "Busy Man's Page" must be held over till our next issue.

* * *

The Heidelberg-Roodepoort Redivivus.

The old Heidelberg-Roodepoort G.M. dies hard. According to a correspondent of our esteemed contemporary, the *Heidelberg News*, Mr. A. G. Langley, a well-known resident of Greylingstad has been fossicking round the old mine "with most surprising results." He has been finding gold in all directions and drawing quite good revenue from washing the dust between the broken shale on the waste rock dump." Mr. Langley is also credited with having found iridium "in no inconsiderable quantities." A local syndicate has been formed to exploit these finds, and a Continental firm is said to be sending out a representative to verify their representations regarding the property with a view to purchase. The *Heidelberg News* contains a very interesting article on the subject.

* * *

An Object Lesson.

The disastrous policy of withdrawing the safety men from home collieries during the coal stoppage of last spring is in no small degree responsible for the high figure of unemployment among workers of the mining industry (says an exchange). This is exemplified in the case of Hucknall No. 2 colliery, which has only just re-opened since closing down on March 31 last. Serious damage to the shaft resulted from the total abandonment of the mine. The management spared no effort to expedite the repairs necessary for re-opening the property, but this has proved a long and difficult business. There has been considerable distress among the workers formerly employed. They have now been given the opportunity of signing on to re-start work.

* * *

What Chartered Shareholders May Receive.

The Chartered report is fully dealt with elsewhere in this issue. It will be seen that the capital of the Chartered Company is £9,000,000, and there is a debenture debt of £1,250,000. A distribution of cash assets would mean over 10s. per share for the shareholders, assuming that expenses will be moderate in amount. The company has been dividendless during the whole period of its existence. The £9,000,000 invested has not returned to the shareholders a single penny. Sometimes the shares have been as high as £9, and at others below 10s., though these fluctuations have to some extent been influenced by increases of capital. The company has secured Rhodesia for the Empire, and all the reward the shareholders have had is that which a patriotic effort, involving a loss of over £40,000,000 sterling, may bring.

AFRICAN VANADIUM.

An extraordinary general meeting of the African Vanadium and Lead Mines, Limited, will be held at 36, Permanent Buildings, Harrison Street, Johannesburg, on Wednesday, the 15th day of February, 1922, at 11 o'clock a.m., for the purpose of considering, and if deemed advisable of passing, the following resolution:—

"That the African Vanadium and Lead Mines, Limited, be wound up voluntarily."

Notice is also given that a further extraordinary general meeting of the company will be held on Friday, the 3rd day of March, 1922, at the same hour and at the same place, for the purpose of receiving a report of the above-mentioned meeting, and, if thought fit, of confirming as a special resolution as set out above.



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Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

Quoted Prices and Intrinsic Merits.

The relationship of quoted prices to the intrinsic merits of the investment concerned could not have been better stated than it was by Mr. C. F. Rowsell, who, speaking recently at the annual meeting of the African and European Investment Co., Ltd., in London, said: "The question of your land brings forcibly before me a point which I think is almost one of the most striking facts of the present time, and that is the remarkable difference between the intrinsic value of the shares of public companies and the value placed upon them by the market at the present time. I do not think I can remember a time in the City when this difference was more marked. If one is acquainted with the histories of many companies, and in the case of the companies who publish, as we do, full details of their holdings, from evidence contained in the balance-sheets, it is possible to see that in many cases the market value of a share is far less than at which its cash assets could be realised, without regard to the value of its fixed and speculative assets." Mr. Rowsell went on to mention several cases in point—as, for example, that of Rhodesia Gold Mining and Investment Co., the shares of which stand in the market to-day at 7s.—8s., or less than the actual cash and immediately realisable assets which that company holds, whilst, in addition, it has a mine which is making satisfactory profits besides possessing other valuable assets. He mentioned a further case—that of Vereeniging Estates, Ltd., which is paying regular dividends, and has shown every year a greater appreciation of intrinsic value. These shares stand to-day at 13s.—14s., and Mr. Rowsell said it would be impossible to acquire assets of similar value to those owned by Vereeniging Estates at a figure which would represent £2 to £3 per share for the whole of the issued capital of that concern.

Railway Finance.

Returns published in the latest *Gazette* show that the railways and harbours deficit continues to mount up. The figures given are for the first eight months of the financial year, and carry the position down to the end of November. The ordinary working expenditure of the railways for that period amounts to £10,519,676. To this must be added £83,139 for renewals and £1,111,782 for depreciation, thus making the total working expenditure £11,711,598. The earnings of the railways for the period under review total £14,328,831. There is thus a balance of earnings over working expenditure of £2,614,233. To this sum must be added various items such as the profits on the book-stalls and on the catering and motor services, and interest on investments, which bring the net railway revenue total up to £2,842,462. Against this revenue must be set £2,571,678, interest on capital; £163,528, interest on superannuation and other funds; £1,080,296, abnormal cost of living allowance, and various smaller sums for other items, totalling in all

£3,876,022. There is thus a net railway deficit of £1,033,559 to be carried to the joint account, in which the harbours also show a deficit.

What Nationalisation Means.

In their annual review of financial conditions for 1921, Messrs. Joseph and Strauss write:—"The war and its aftermath have turned a strong sidelight on the inefficiency and wastefulness of bureaucratic control of public services everywhere, which in some cases resulted in deficits nothing short of disastrous. The American Government have wasted untold millions in mismanaging public services, and have practically bankrupted the railways. The deficit of the German railways for 1921 will reach 15,000,000,000 marks; the French telephone showed a loss of 200,000,000 francs in 1920; our own Budget is evidence of similar experience. Hence a universal cry for denationalisation even in Germany, which set the example for nationalisation. 'More business in Government and less Government in business' sums up to a nicety what is wanted and what President Harding emphasised. While the history of the past year (2,000,000 unemployed in this country and more than 5,000,000 in America)," conclude Messrs. Leopold Joseph and Strauss, "would not seem to afford much comfort and encouragement, there are fortunately some inspiring indications of a more hopeful outlook. There is a more reasonable disposition among the nations and between capital and labour to pull together."

Depreciated Currencies.

In a long and interesting review of the course of international financial conditions during the past year, and of the outlook for that just begun, Messrs. Leopold Joseph and Strauss reach the conclusion that in 1921, though the period was full of cares and anxieties, distinct progress in the direction of concerted action to shoulder the burdens and responsibilities attaching to the task of reconstructing and readjusting the economic structure of the world was made. This, despite serious losses which were suffered, as in every crisis. In reviewing the events of 1921 Messrs. Leopold Joseph and Strauss point out that "the necessity for economy by Governments and individuals—in the world is to recover from the waste and disorganisation—was not properly heeded, while all nations wanted to export, none to import. The stabilisation of currencies in the present state of chaos and confusion seems to be beyond the genius of mankind. Some European currencies have become so depreciated that they can hardly serve any more as means of exchange. In Russia the old rouble, formerly worth 2s., is now of such an infinitesimal value that the old denominations are entirely out of circulation, and only notes of 10,000 roubles and upwards are used for trade. Similar conditions, though not quite so bad, exist in Poland and Austria. In Germany, too, a situation has arisen which makes it difficult for her to use her own currency as a medium in trade. The value of the mark has not lost in purchasing power internally as much as in foreign markets, but naturally that difference will narrow down as and when the effect of imports of raw material, etc., bought at depreciated rates of exchange, upon the cost of living asserts itself. Hand in hand with the depreciation of the currency the issue of notes naturally increases, other means of payment not being available, so that the increase of the note issue and its depreciation must react upon one another in a vicious circle."

Mr. Herbert Freeland, who has been associated with the firm of Sturrock (S.A.) Ltd. since its inception, has retired from this Company in order to devote himself to mining work.

Letters to the Editor.

THE "PASSING" OF THE DIAMOND INDUSTRY.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—On my previous visit to Kimberley a short time ago, everything seemed flourishing. The demand for diamonds was good and the price per carat appeared to be advancing almost daily. This was an ideal state of things as far as the prosperity of the city of Kimberley is concerned, for its welfare depends wholly and solely on a good demand for diamonds. To-day Kimberley has no future for there are no buyers of diamonds and no prospect of any.

This is the state of affairs which the late Mr. Francis Oats feared might come about. He foresaw that the world could only absorb a certain quantity of diamonds and that if sales were pushed to the utmost, sooner or later the point of saturation must be reached.

Probably the putting on the market of Russian jewels has somewhat hastened the day, but this state of affairs would have come about in any case had the diamond party of De Beers Company continued their policy of selling as many diamonds as possible. The portion of the community which purchases diamonds is only limited, and immediately the point of saturation was reached the demand would cease. It is not a question of the price per carat, whether the price be twenty pounds or twenty shillings makes no difference if there are no buyers. An all important point bearing on the future demand for diamonds is the fact that for some little time now it has not been considered good form for ladies, as distinguished from others, to wear jewellery. This applies to England, France and America. Most of us remember when gentlemen wore watch chains and rings, now no gentleman does so. The wearing of jewellery by the fair sex will also soon be taboo. After all the wearing of jewellery or ornaments is only a relic of a barbaric custom. The present mining debacle is the only case on record where the public alone have not been left to "nurse the baby." The rough diamond buying syndicate are possessors of diamonds which have cost them millions of pounds and which have no commercial value. The Syndicate has been badly hit; to use a sporting expression, they have got it in the neck. The public are the unfortunate holders of De Beers Company shares, and the case of elderly people who have invested their hard earned savings is particularly hard for they are dependent on the dividends from De Beers shares. Some have seen the writing on the wall and have left Kimberley, while others are preparing to leave at an early date. When I said at the commencement of this article that Kimberley has no future, I gave expression to the conclusions of some weeks of close observation.

Everyone is waiting for the improvement in trade that will furnish buyers of diamonds. The Directors of De Beers Company are hugging this delusion and are preparing for the direct treatment of the ground from the mines. They must realise on careful consideration that the old conditions will not recur. They should, therefore, at once set their house in order, reduce their large and expensive staffs and re-organise the Company. Every day's delay in so doing means a wasting of the Company's assets. Taking to-day's value of real estate at Kimberley at the figure of one hundred (100) it is doubtful if in six months time it will reach fifty. If the programme of the late Mr. Francis Oats had been followed up, the De Beers Company by this time would have proved the commercial importance of the copper occurrences of the North-West, and could have utilised their workshops for the manufacture of copper wire, tubes, sheets, etc., from the rough copper obtained from this source. It is not too late to remedy this failure to do the obvious. It is futile to appoint com-

mittees of industries the members of which do not possess the rudiments of any technical knowledge. Whether Kimberley possesses any special features to recommend it as a manufacturing centre is a matter to be determined by qualified experts. Left to itself, Kimberley will dwindle to a dorp. The Kimberleyite is a trader and has as much initiative as a sheep. The explosive works established by De Beers Company at Somerset West must be re-valued and probably re-organised, for the De Beers Company were the best customers of the explosive works. Mr. Warrington Smythe recently delivered a lecture at Cape Town in which he spoke of the manufacture of rich agricultural manures from coarse fish which exist in practically unlimited numbers off the West Coast.

Should this come about the million pounds raised in guaranteed debentures by De Beers Company for the purpose of manufacturing artificial manures from imported phosphates, may prove to be a heavy charge on the Company's resources. The Directors of the De Beers Consolidated Mines, Ltd., must surely by this time have realised the fact that the conditions that have gone will never return, they must cut down their staffs and overhead charges to the lowest, and ascertain at once in what way they can employ the resources of the Company to the best advantage of their shareholders. This is the only way to enable the Company to make any return and so relieve to some extent the sufferings of a large number of its shareholders. There will always be a certain industrial demand for diamonds for crowns of boring machines or drills, but this demand will be easily met by the production on a small scale of South-West Africa diamonds which are better suited for this class of work than mine stones. This letter might well have been headed "A Sermon in Stones."—Yours, etc.,

"ENGINEER."

[It must be understood that we do not endorse this correspondent's views.—Ed. S.A.M. & E.J.]

The issue of the "colour bar" continues to be misrepresented by the Federation and its political partisans throughout the country. Despite all the categorical assertions to the contrary made by the Chamber of Mines, it is still being published broadcast that the notice given by the Chamber of Mines to the Federation—a notice given without prejudice to negotiations—of its intention to withdraw from what is known as the "status quo" agreement, is merely a blind to cloak the motive underlying all the recent efforts of the Chamber to reduce working costs in the interests of the struggling low grade mines. That motive is said to be the removal of the "colour bar." It is in fact being freely represented by people who have axes to grind in the interests of Labour and Labour's political friends that there is a tremendous conspiracy afoot, a conspiracy which has as its objective the turning of South Africa into a black man's country, in which there shall be no room or hope or prospect for the white man. This of course is all absolute moonshine. The tragedy of it is that it is moonshine of a particularly dangerous character, since the propagation of this maliciously false doctrine is obviously tending to prolong the strike.

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Tel. 5892.

WRIGHT'S ROPES

H. ALERS HANKEY - - - Sole Agent.

ENGINEERING SECTION.

Ingersoll Rand: Extending their Business.

In these hard times, we welcome signs of extensions and development of business, and it is therefore a pleasure to notice that the Ingersoll-Rand Company, whose mining and compressed air machinery is so well known on the Rand and throughout South Africa generally, are opening a Natal branch to take care of their business in that territory.

The Ingersoll-Rand Company has offices at 338a Smith Street, Durban, and that well-known Durban business man, Mr. H. P. MacNay, is manager of the branch. We wish the new office every success, and trust that it will prove of mutual benefit and a convenience to the Natal coal fields, sugar industries, and all other users of machinery in that progressive territory.

* * *

Motor Cars Made of Cotton.

It is predicted that motor cars will in future be made out of a material consisting mainly of highly pressed cotton, which replaces the steel, thus greatly reducing the weight and cost. Mr. Ford, at Detroit, is now working on a scheme to make motor cars from this new substance, which is a mixture of formaldehyde, glue and cotton, called "cottonoid." The material is described as tough and long wearing. Should the experiments prove successful, a revolution in the motor-car world is expected.

* * *

A Trade Inquiry.

The American Trade Commissioner, Mr. P. J. Stevenson, has received an inquiry from a large and important American manufacturer of stationary engines, including paraffin, petrol, gas, distillate and oil engines. This manufacturer also produces sawing outfits, log and tree saws, stump borers, pumping outfits and hoists.

Any firms interested in securing information and details should communicate with Mr. Stevenson at P.O. Box 6989, or 42, Standard Bank Chambers, Johannesburg.

A New Flexible Shaft.

For many small appliances such as dental drills, horse clippers and speedometers, it is necessary to use a flexible shaft between the driving mechanism and the tool or instrument. An interesting novelty in this type of appliance has been developed in Great Britain. It consists of a steel chain with alternate pin joints at right angles to each other, the whole mechanism being enclosed in a flexible metallized tube. This tube is filled with grease so as to lubricate all the joints thoroughly; and the arrangement is simple, flexible and highly efficient.

NEW PATENTS.

- Thaddeus Joy Armstrong.—Improvements in the construction of buildings.
- Harry Holmes Cuthbert. Improvements in or relating to the manufacture of decarbonising agents for internal combustion engines.
- Bullifants' South African Co., Ltd.—Improvements relating to unstable chemically or electrolytically produced solutions.
- Sigismund Rudolf James.—Improvements in wet hammer rock drills.
- William George Blake Brinton.—Spray for allaying dust after blasting in mines and the like.
- Maschinenbau Aktiengesellschaft (H. Flottmann & Co.).—Improvements in percussive rock drills.
- Ferdinand Dietzsch and Robert Pattison Farquhar Prain.—Improved preparatory treatment of ores or metallurgical products.
- Vickers Ltd. and Cecil Leslie Sumpter.—Improvements in or relating to oil well boring tools.
- Frederic Augustus Eustic.—Improvements in or relating to the art of making electrolytic iron.
- William Francis Makelin. Fixed gasket for hose-pipe spuds.
- The English Electric Co., Ltd.—A protective device for direct current electric motors.
- Stewart Roy Hlingworth.—Improvements in the coking of coal and apparatus therefor.
- Peter Burd Jagger.—Improvements in and relating to rope untwisting apparatus.
- William Josua v. d. Kloet and Willem Alexander Lodewyk Tuft.—Pivotal connection for iron structures.
- Jan Arend Schallies.—New process and machinery for burning plaster of paris.

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Road Surfaces.

MERITS OF BITUMINOUS MATERIALS—LESSONS FROM BRITAIN AND INDIA.

With the growth of motor traction the importance of good roads to the development of the Union is, as we showed recently, to-day more than ever apparent. In this connection the following extracts from a long and valuable paper on road surfaces by Mr. Measham Lca, M.Inst.C.E., may be of interest.

The large increase in the number of motorcars and mechanically propelled vehicles now using the roads compels a consideration of the methods of road making to be adopted to meet the necessities of the present-day traffic.

An average taken of several of the larger cities in India, shows that the number of mechanically propelled vehicles in use in 1920 is four times the number of those in use in 1914 and twice the number of those in use in 1918, whilst the number of heavy motor lorries has shown an even larger percentage increase.

Beyond all question, motor traction must go on expanding to an amazing degree, and the very character of our roads must alter in consequence. Further, it has become self-evident that unimproved and improperly built highways constitute a positive barrier to the development of economic highway transport, and the ultimate solution of the road problem of to-day is to be found in the adaptation of the roads to the new traffic conditions rather than in restrictive regulation of traffic, or of vehicle construction.

The term "water-bound" macadam serves to distinguish the type of road surface which is formed by laying down a coating of road metal, rolling by a steam roller to consolidate it, spreading with binding, copiously watering and rolling until a compact surface is formed to the road.

Such a water-bound macadam road not only produces dust when used by motor vehicles, intolerable to all road users; but further the road surface is rapidly disintegrated under such traffic.

The object lesson which road engineers, all the world over, have learned is the futility and waste of money in endeavouring to maintain roads for mechanically propelled traffic by the former method of piling on macadam, to be shattered, pulverised, and subsequently removed in the form of mud and dust.

The Ministry of Transport in England have stated that: "The condition of road surface is a most urgent problem, upon that depend both the alleviation of the intolerable and injurious nuisance arising from mud and dust and also the mitigation of the burden of increasing cost of maintenance which is causing such widespread apprehension. Many miles of important roads in nearly every country are not constructed or surfaced so as to be suitable for motor traffic; and on the other hand the motor traffic, which on surfaces properly constructed and bound with water proof bituminous binding material probably causes less damage and wear than is caused by horse drawn traffic, is destroying and wearing existing water-bound surfaces in many districts to such an extent, that the cost of the frequent renewal which they require to keep them in fair condition imposes on the rate-payers quite a considerable burden. The most immediate and pressing need, therefore, at the present day is to encourage Road Authorities to strengthen and improve the crusts and surfaces of roads without delay, so as to secure satisfactory road surfaces for the requirements of modern traffic to alleviate the dust nuisance and to check the waste that is being incurred by continuing to maintain roads by the use of materials unsuited to the traffic requirements."

The experience in the City of Karachi, in Bombay, and other cities in India, coincides with this generally expressed opinion that the "water-bound" macadam road is not a satisfactory or even an economical road surface for motor traffic, and as the number of motor cars, mechanically-propelled wagons and motor buses increase on any given road, this defect will be more and more manifest.

Paved Roads.

As the intention of this paper is to lead up to a consideration of bituminous forms of construction, the reference to paved roads will be brief.

In most of the important cities and towns of Europe, the main thoroughfares in the central districts, where the density of traffic is great, are provided with paved surfaces, the following types of paving being adopted, viz.:

Granite sett paving on cement concrete foundations. Wood block paving on cement concrete foundations. Compressed asphalt on cement concrete foundations. The granite setts are dressed blocks of granite or other hard suitable stone from 4in. to 6in. deep, by, say, 4in. to 5in. wide and 9in. long. Additional care is now being taken to finely dress the setts so as to get close joints and smooth surfaces, reducing noise, and give a better tractive surface. The wood blocks now generally used are soft, 6in. to 9in. in thickness, and in some cases 12 hard wood blocks such as Jarrah and Karrah Wood, Red gum, etc., which have been tried have not been found to be so satisfactory as the soft deals creosoted, as the latter wear down evenly and do not result in the bumpy roads which the hard woods give after some years of life. The compressed asphalt is prepared from a mineral rock impregnated with asphalt found in a natural state, which is ground to powder and laid and consolidated whilst hot in a layer from 1½in. to 2in. in thickness on a prepared cement concrete foundation.

For each of the three types of paving referred to a cement concrete foundation over the whole surface of the road is necessary, varying from 6in. to 9in. in thickness and in some cases 12 in. in thickness according to the traffic requirements of the road. Nearly all the large towns in England have some of the principal thoroughfares paved with one or more of these methods. In London, for instance, the city area proper has compressed asphalt roads, the West End wood paving with some asphalt, whilst in the East End the roads carrying the dock traffic are, in many cases, paved with granite setts. The cost of granite sett paving, wood block paving or compressed asphalt, all on cement concrete foundations, at the present time, is approximately from Rs. 30 to Rs. 35 per square yard.

None of the cities of India have yet attempted to lay down road surfaces on any considerable scale involving costs even approaching the figures given above. The City of Calcutta laid one road with wood-paving, but it underwent an unfortunate experience during monsoon rainfall, and was removed last year and replaced with asphalt road surface. Wood paving was laid in Karachi many years ago, but had to be removed owing to the surface becoming very uneven. A small experimental area of wood paving was laid in Frere Road, Bombay, but the more recent experiment in this road is in the direction of laying granite setts on cement concrete foundations. The harder woods are liable to wear unevenly and are therefore unsuitable for road surfaces, and if wood paving is to be laid successfully in India it is incumbent on the Forest Department to put on the market, if possible, soft woods approximating to the Norway deals, and plants to creosote the wood blocks would be necessary.

Bituminous Materials.

The Ministry of Transport in England, in order to provide any satisfactory road surfaces for the requirements of modern traffic, have made available a sum of £10 millions sterling or 15 crores of rupees to be distributed this year

to cities and authorities maintaining roads, and they decided in dealing with applications for grants for the improvement of road surfaces to encourage the use of bituminous binding materials. They were advised by their Engineering Committee that it is essential in order to obtain strong and durable road surfaces which will stand modern traffic, that the old "water-bound" system of construction should be superseded by the use of some bituminous binding material in all important roads.

Summary.

Water-bound macadam road surfaces, even when made of the best materials available, are not capable of withstanding the wear and stress of any considerable volume of motor traffic, the road surface being more rapidly disintegrated under such traffic. The extent and character of the traffic now using the roads in Karachi and other cities demand that some forms of more permanent road surfaces should be provided and that the old water-bound system of construction should be superseded by the use of some bituminous binding material in all important roads.

A palliative may be adopted on roads of moderate traffic by spraying the surface with bituminous material such as tar, and residual oil, and this is the class of protection which can be most quickly and readily afforded, but for the roads where the volume and weight of the traffic is great, tar-painted roads are insufficient, and in such cases the road crusts and not merely the surface should be bound with bituminous materials in the form of tar macadam or the two-coat asphaltic road, both of which have been described.

An important factor making for economy in such bituminous roads, is that the bulk of the materials can be provided locally, the imported bituminous material only forming a comparatively small percentage of the materials required, whereas to provide paved surfaces the whole of the materials would require to be imported. The two-coat asphaltic road provides a road at a moderate cost to withstand heavy self-propelled traffic.

The construction of roads of a more permanent character will involve a large initial cost, but when their longer life and other factors in their favour are taken into account, it does not follow that over their life they are more costly than roads of low initial cost. A description of the various types of roads which have been, and are being, used leads to the conclusion that in the case of Karachi the two-coat asphaltic roads, tar macadam roads and tar-sprayed or oil-coated roads offer the best solution to the problem of how to prepare the roads to meet the motor and other traffic at present existing and which will undoubtedly grow. There are some special cases where reinforced concrete roads might be tried.

OIL FUEL IN SOUTH AFRICA.

The valuable and instructive paper read recently before the S.A. Institution of Engineers by Prof. Dobson, on oil fuel in South Africa, led to an extremely interesting discussion. To that discussion Mr. H. W. Miller (Past President of the Institution) contributed the following:—

He said he had watched the development of the coal mines with great interest, as he knew that cost was a very important factor in power production. In the Transvaal, up to the year 1914, the average cost of putting a ton of coal on to the trucks at the pit mouth was a fraction under five shillings a ton. On the top of this they had to allow a reasonable profit to the coal owners, and they still got a fuel which compared favourably with first-class coal mined in other parts of the world, even in its calorific value. Great events had taken place in the last seven years, and conditions had changed owing to the war. The conditions governing the coal mines had changed; the coal they used to get in England at from 8s. to 9s. a ton delivered at the works had risen in price in recent years to something like ten times that amount. The economic conditions were thus entirely altered. Oil had figured largely in these changes. He thought that power users really owed a great debt of gratitude

to Labour for the attitude it had taken up in the last few years, by which it materially increased the cost of the old-fashioned fuel, coal, and therefore gave the necessary stimulus to engineers to devise means of producing power in a more economical manner. If they considered the production of fuel in South Africa, they would see that the cost of coal had not advanced very materially. When they began with costs at 5s., now brought up to 7s., the cost to-day, they would see that, while the difference represented a large percentage on the original amount, it was not a big item. What hampered our coal industry in this country was the enormous freight charged by the railway. The charges had increased owing to the peculiar labour conditions, which had changed so materially in the last four or five years, but this had given engineers the necessary stimulus to turn their attention to other means of power production, and the internal combustion engine was therefore, he thought, coming into its own. He was sure that if Ackroyd were alive to-day he would be a proud man to have heard Professor Dobson's paper read, especially that section devoted to the semi-Diesel engine, which is largely the development of his researches, and which is simple in its design and economical in its use, as shown from the actual results quoted by Professor Dobson in his paper of the recent trial by Captain Riall Sankey. As he had mentioned, railway cost was a heavy item. To rail 100 lb. of material from Johannesburg to the borders of Rhodesia cost a sovereign, yet the same quantity of material could be sent round the world several times for the same amount. For this reason it was impossible for the coast towns to avail themselves of our coal resources inland, and power users there found they could import better fuel, oil fuel, and land it at their own doors at a more favourable price, especially when one considered the value per heat unit, which was, after all, its real value. It seemed to him that the only thing they could do, unless conditions might soon alter, now that the Government was faced with the necessity of reducing railway rates, was to consider the more scientific use of their coal fuel by extracting all that was contained in it, and, instead of burning it in a wasteful way, extract its constituent oils, tarry matters and other by-products for the manufacture of dyes and so forth, leaving the coke, a very valuable fuel in itself, and perhaps also making use of the gases as fuel. It was quite instructive to go through some of the steel works to-day and see the remarkable reduction in the quantity of coal used. All the power plant was operated from the furnace gases, and by the use of ingenious burners the boilers were fired with tarry residual matters, which proved excellent fuel. He thought that Professor Dobson had opened up an immense field for thought, and he was sure that many of the members of the Institution would be able to give further valuable information on that subject, so that all could see the benefits of the economic use of the more modern method of power production outlined in the paper.



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The Chartered Company and its Shareholders.

ISSUE OF LENGTHY AND DETAILED REPORT—THE CAVE AWARD—IMPORTANT NEGOTIATIONS IN PROGRESS—THE FINANCIAL AND COMMERCIAL POSITION OF THE B.S.A. CO., LTD.

The mail brings a long and detailed report of the Chartered Company for the year ended March 31, 1920. The report, however, is not so belated as it seems, as it contains the full history of the momentous events in which the Company has been concerned down to date. The directors are under a bond of secrecy respecting discussions now passing between the Company and the Secretary of State for the Colonies. So confidential and important are these discussions that the directors have decided not to summon a meeting until full disclosure can be made "without breach of confidence and consistently with the shareholders' interests." Nothing, of course, could be more unprofitable than to talk over accounts nearly two years old with the consciousness that nothing that matters dare be mentioned. In point of fact the balance-sheet of March 31, 1920, could not safely be discussed, for it has been recast to conform so far as possible with the award of Lord Cave's Commission, while keeping in being, as a problematical asset, the net difference of £2,372,400 between the Company's claim and the amount awarded.

Besides being an exposition of the Company's views, the report is a historical document of value by virtue of the numerous appendices reproducing the Privy Council judgment on the ownership of unalienated lands, the reports of the Cave Commission and the Buxton Committee and sundry other illuminative reprints. The report proper plunges at once into a review of the Cave Commission award. This is described as "not wholly unsatisfactory," but only because the Crown had admitted liability for no more than £1,500,000. As Lord Cave and his colleague wisely eschewed reasons, the directors are "unable to conjecture the grounds on which, as against a claim of just over 7½ millions, the Company was, in effect, awarded something under 5 millions." In two respects the award was "profoundly disappointing." The flat statement of opinion that, "in the circumstances of this case, interest should not be allowed," was final, and the directors see that protest is useless. But, "advised by counsel of the highest eminence," they believe that interest must run on the amount of the award as from March 31, 1918. In the balance-sheet they credit the Company with such interest, calculated provisionally at 5 per cent., for two years, but put an equal sum into suspense on the debit side. The same counsel advise that the principal of the award, with accumulated interest, will be payable as soon as the Crown puts an end to the Company's administration of Southern Rhodesia. That matter is under correspondence with the Colonial Secretary.

The Company's Accounts.

The receipt of the report of the Cave Commission necessitates considerable alterations in the balance-sheet, which, for the year ended March 31, 1920, now appears in a new form. For the convenience of shareholders a copy of the balance-sheet as at March 31, 1918, is appended, and the figures in the balance-sheet as at March 31, 1920, should be compared with it, and not with the balance-sheet as at March 31, 1919, because while the 1919 balance-sheet was similar in form to the 1918 balance-sheet, it was upon the figures up to March 31, 1918, that the Cave Commission's award was based.

The administrative accounts of Southern Rhodesia show a deficit of £32,223 for the year ended March 31, 1920, as compared with a surplus of approximately £100,000 for the year ended March 31, 1919. This deficit has been added to the Company's claim against the Crown, and the Company will be entitled to repayment thereof in the manner determined by the Judicial Committee of the Privy Council. The net administrative expenditure on public works and buildings account in Southern Rhodesia during the year 1919-20 was £28,974. The deficit on administrative account in Northern Rhodesia for the year ended March 31, 1920, was £90,481,

as compared with a deficit of £47,071 for the previous year. The net administrative expenditure on public works and buildings account in Northern Rhodesia during the year ended March 31, 1920, amounted to £25,613.

Commercial Accounts.

The commercial accounts (that is those covering the Company's personal finances) for the year ended March 31, 1920, show an excess of revenue over expenditure of £166,898, as compared with £229,490 in the previous year. The difference is partly due to the fact that quit, lease and other rents in Southern Rhodesia, which in former years were included as revenue, have been excluded from commercial revenue account in the year ended March 31, 1920, and have been applied to the reduction of past administrative deficits. No dividend upon the Company's shareholding in the Rhodesia Railways Trust, Ltd., was received during the year ended March 31, 1920, whereas an amount of £51,607 was received during the previous year. The total advances received by the Company from His Majesty's Government up to March 31, 1920, to meet disbursements in connection with military operations in Africa against the Germans amounted to £1,915,000. A further advance of £25,000 on this account has been received since that date. The Company's resources in cash and first-class securities at 31st March, 1921, amounted to approximately £1,570,000. The corresponding figure at March 31, 1920, was £1,785,000. As the whole question of the future of Rhodesia is now, in view of the new Constitution, in the melting pot, comment had better be reserved until the result is known of the coming conference with the Premier of the Union.



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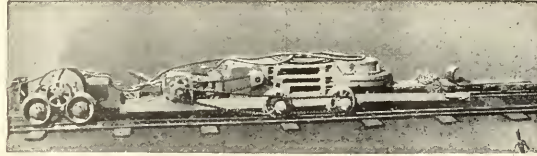
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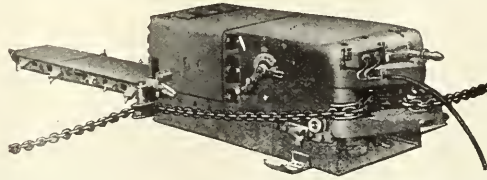
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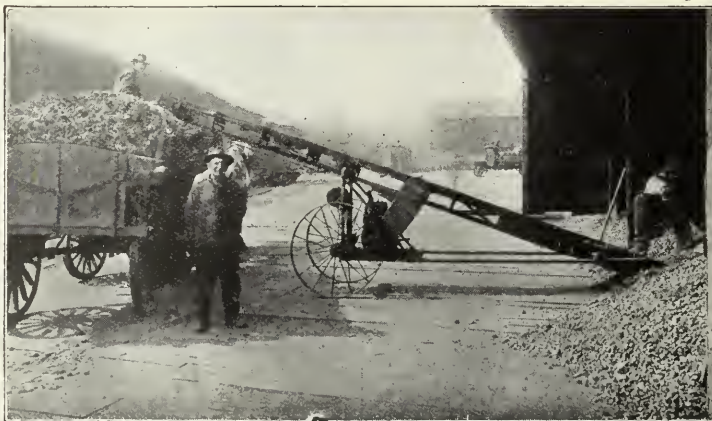
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

THE STRIKE: VIEWS OF COMMERCIAL MEN ON PRESENT IMPASSE—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—OILS AND COLOURS—COAL—BRITISH CREDIT AND INDUSTRIES—IMPERIAL WIRELESS CHAIN—RUBBER—PREDICTED MOTOR CAR REVOLUTION—OIL—METAL MARKET.

General.

Notwithstanding the efforts made by the Premier and the Chamber of Mines since the break up of the Strike Conference, to arrive at some *modus vivendi* for the settlement of the dispute, the position at the moment is one of stalemate. The opinion generally expressed in commercial circles is that the strikers are beaten and that they know that they are beaten, but the community is also of the opinion that unless strong and determined action is at once taken to bring things to a head, the present unfortunate state of affairs may continue for some time longer. One ray of hope is seen in the weakening of the coal strikers and their return to work in the Witbank district. All indications seem to point to the resumption of coal mining, to the extent the industry will at present permit of, at an early date. Unfortunately for the coal strikers the Breyten Colliery, which had for some time past been sailing very close to the wind, has been forced by economic causes to shut down, a factor which, together with others already adumbrated in our columns will tend to curtail the number of men it will be in the power of the Collieries to employ at the moment. Johannesburg has been very much impressed by the statements issued by the Chamber of Mines during the past week of the results attained by certain gold mining companies during last year with gold at an average price of 105s. per oz. compared with the present price of 97s. and a few pence and the normal price of about 85s. These figures, which are as startling as incontrovertible, may leave the Federation leaders "stone cold," but they give the ordinary man "furiously to think." When it is borne in mind that the average working cost for 1921 was 25s. 8d. per ton compared with 17s. 8d. in 1914, only those belonging to, or at any rate possessing the intelligence of, the stone age can fail to see the imperative necessity, and the immediate necessity, in the face of the steadily decreasing price of gold, of reducing working costs.

Merchants' views as to the present impasse are, as is to be expected, diverse, but the majority do not anticipate an early settlement. The opinion is that the men's leaders have been false to their trust and have offered no terms which could be accepted as a basis for negotiations. The strikers are, it is generally admitted, in a hopeless position, leaving them no other course to adopt than to break away from their unions and go back to work. If the strike were prolonged for yet another three months no other solution could be found. A leading commercial man reaffirmed his contention all along that if the men returned to work at the wages now offered by the industry, they would before the end of June, in view of the declining cost of living, be better off than at the higher rate. He thought the fact that some of the Collieries had now full complements and that colliers were steadily dribbling back to work was very significant as to what both coal and gold miners were thinking at the present time, and he looked for similar happenings here on the Rand in respect of the gold mines. Stern economic facts—not the Chamber of Mines—had beaten the men, and their leaders were deserving of all blame for calling the strike when the month's grace conceded by the Chamber of Mines would have enabled negotiations to be carried on without the present dislocation of business and inconvenience to the public. Another merchant said unless

common sense were going to be exercised on the part of the strikers and their leaders the trouble would apparently last some time longer, the consequences of which would, however, be bound to react on the men eventually. He thought that a new conference, with Mr. Crawford as the moving spirit, with the Government and the Chamber of Mines, would give a new index to the position. The strikers had got into deep waters and were making no headway at all. Mr. Crawford was inclined to act more sympathetically than the present leaders, and if a mandate were given him there seemed some possibility of an agreement being arrived at. He thought, reading between the lines of recent communications to the Press such office would not be unacceptable to him. A large importer of mining material said he thought the strike would end quickly because of economic pressure. The present upheaval had undoubtedly taught the country a good lesson—not to be too reliant upon the mining industry alone, but to adopt agricultural and other industrial measures. The mining industry is a perishing asset, and the problem will have to be faced one day as

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it had been in other countries) of replacing the present main industry by other permanent ones. The Rand commercial community could not possibly subsist, he said, if anything serious happened to the mining industry, either in the ordinary way or extraneously. He was confident, provided progressive measures were adopted, South Africa would eventually make good. Still another substantial merchant said it was impossible to say what the effects of the present upheaval would be. The present position was one of stalemate, and financially it was very serious indeed. Storekeepers along the Reef were heading towards bankruptcy, nor were the prospects in Johannesburg itself more reassuring.

To date nearly 40,000 natives have been repatriated, meaning less employment for some 4,000 whites at least. The Luipaardsvlei G.M. Co., Ltd., which has struggled valiantly for years past, is, it is stated, on the point of shutting down. This will mean unemployment for nearly 200 whites and 2,000 natives.

Iron and Steel.

One important mining material importer reported having done very fair business with outside districts during the week, but no other merchants whom we called upon had a similar tale to report but the reverse. Business on the whole had been stagnant, was the general report, with no prospect of trading until the strike was finally settled.

Latest nominal quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corporation, Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 55s. 6d.; shafting, $\frac{3}{4}$ in. to 2 in., 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{4}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 30s. to 35s.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 21s.; hammer handles, 14 in., 7s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 22s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bull tee fencing standards, 14 lb., 27s. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 19s. per coil, 100 lb. Barbed wire is meeting with more ready sale; prices are fairly firm; 12-gauge barbed wire, 25s. retail. Screening, 3s. to 9s. 6d. per sq. yard cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{4}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton. Tin plates (L. C. Cokes), 20 in. x 14 in., per box f.o.b. Swansea, 19s. 3d. Galvanised sheets, 15 $\frac{1}{2}$ d. to 16d.

British Iron and Steel Production Costs.

The Controller and Auditor-General, Mr. J. de V. Roos, in his report on the statement of accounts of the Railways and Harbours for the financial year 1920-21, says, *inter alia*, that 98 engines had been supplied by an American corporation all of which had been found to be defective. The cost to the Union was £1,409,447, and the Auditor-General is clear that the compensation paid by the American corporation for these defects, £52,000, was below the legal liability which the Railways could have enforced.

Union American Locomotives.

Replying to a deputation from the National Federation of Iron and Steel Manufacturers, who urged reduction of freights, Sir Owen Phillips, President of the Chamber of Shipping, stated that freights had fallen very heavily and were now no more than barely living rates. He referred to the contract recently placed by the Rand Water Board with a Dusseldorf firm for materials in connection with the Vaal River scheme, the German company's price being £117,000 below the British tender, and that, therefore, even if the shipowner carried the goods free, the British price would still be unacceptable. He urged the iron and steel industry to work towards low production costs as well as excellence of quality.

British Iron and Steel Trades.

London cables that there is little change in the iron and steel trades. A fair amount of buying for forward delivery is passing. Foreign offers of iron and steel are falling off, current prices being more on the level of English quotations, at which, owing to their more reliable quality, the home products are generally preferred. Competition in regard to pig iron, steel billets and wire rods, which a short time since was very formidable, has now practically ceased. The pig iron section is quiet in expectation of reduced railway rates this month, which is restricting business, as consumers anticipate lower rates will bring reduced prices. The situation in Sheffield is not at all bright, there being nearly 50,000 unemployed, and the cancellation of battleship contracts is being specially felt. There has been some demand for tin plates and galvanised sheets for the Argentine and other parts of South America. German competition is seriously impeding disposals of enamelled hollowware. Screws, rivets, nuts, bolts and edge tools are suffering from the flooding of the market by Government surpluses.

American Iron and Steel Trades.

New York advises that the improvement in production and orders is quite pronounced, and all indications are that the principal consumers, the railways and the builders, will expand their demands very substantially during the coming months. Lowering of the price of steel plates has started negotiations which may result in the placing of very extensive tonnage.

It is reported from Berlin that a German metal trust has bought a number of old British warships as old iron for £500,000, with the object of supplying the German industry with raw material, especially high quality steel.

Australian Steel Industry.

The Australian Prime Minister, Mr. Hughes, has uttered a warning that unless a determined effort is made to meet the new conditions created by the fall of prices Australia would soon have to face an industrial crisis. Unless the price of Australian steel was reduced so as to compare with the American price, plus freight and tariff, further Australian shipbuilding would be impossible.

Timber and Building Materials.

Prices of timber remain practically unchanged with, however, a firmer tendency, especially in 3 x 9 deals, which, according to latest advices from the Baltic, are inclined to go higher. There has been a little activity in building—no large contracts, of course, but the building of small cottages by people assisted by the building societies.

Prices.—3 x 9 deals, 1s. to 1s. 1½d.; scantlings, 11d.; heavier boards, 4¼d. to 4½d.; floorings, 6¼d. to 6¾d.; ceilings, 4½d. to 4¾d.; Oregon, 7s.; pitch pine, 8s.; corrugated iron, 8¾d. to 9¾d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1½ in., 11d.; 2 in., 11½d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1½ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mill; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

No new jobs are being started at present, only old ones are being continued.

Plastic Wood.

This is the name given to a material recently introduced by a British firm. It is made of very fine wood meal mixed with collodion. One of its most valuable applications is in the making of patterns for casting purposes. It can be built up into any form, and it sets quite hard, so that it can be cut like ordinary wood or turned in the lathe. It is waterproof and does not warp or deteriorate through damp. Nails can be driven firmly into it without cracking it.

Electric Goods.

There is, of course, very little business doing just now. Materials are coming in very slowly and, according to a leading importer, Germany is not sending stuff out so willingly as previously, as prices of raw materials are on the up-grade in that country as was predicted would be the case some months ago. Three manufacturers' representatives of the Central Powers here have all put up their quotations. My informant said that a serious feature in the electrical business was that, owing to the recurring labour troubles which had affected the Rand, numbers of really steady and experienced young mechanics had become disgusted with their prospects here and were migrating to the United States, where a more settled state of affairs seemed to prevail and a better future held out than was to be realised here.

Oils and Colours.

White lead in oil, 39s. per 50 lb. keg; English red lead, 10d. per lb., 9d. per lb. in 50 lb. kegs; dry white lead, 1s. 6d. per lb.; linseed oils, raw or boiled, small bottle, 1s. 6d. each; 7 lb. tins 7s. 6d. each, 4 imp. gall. 35s.; spirits of turpentine, small bottle, 2s. each, 12s. 6d. per '83 imp. gall.; turpentine substitute, 5s. 6d. per tin, each 5-6th imp. gall.; finest linseed oil putty, in 100 lb. drum bulk, 4½d. per lb.; English putty, in bladders, 6d. per lb.; colours ground in oil, 1s. 6d. to 4s. 6d. per lb.; dry colours, 6d. to 10s. 6d.; colours ground in water, 1s. to 2s. per lb.; in turpentine, 2s. 6d. to 10s.; motor colours ground in gold size, 2s. 6d. to 5s. 6d.; ready mixed paints, 1s. 6d. per lb., 70 lb. drums 75s.; roof paints, 16s. 6d. per 14 lb. tin, 75s. per 70 lb. drum; varnishes, 25s. to 47s. per imp. gall.; calcite cold water paint, 38s. per case of 8 7 lb. packets; pumice stone, 1s. 3d. per lb.; bees wax, 1s. 6d. per lb.; alum, 9d. per lb.; creosote, 4s. 6d. per 5-6th imp. gall. tin; gum arabic, 3s. 6d. per lb.; methylated spirits, 5s. 6d. per tin 5-6th imp. gall., bottles 1s. 3d.; resin, 8d. per lb.; caustic soda, 1s. 3d. per lb.; coal tar, 4s. 6d. per '83 imp. gall., per 4 imp. gall. 17s. 6d.; Stockholm tar, 9s. 6d. per '83 imp. gall. 47s. 6d. per 5 imp. gall.; common glue, 10d. per lb., good quality cake 1s. 3d., finest Russian 1s. 6d.; gold leaf, English plain, per book 3s. 9d., transferred per book 4s. 3d.; aluminium leaf, plain, 1s. 9d. per book, transferred 2s. per book.

Cheaper Petrol and Paraffin.

The Vacuum Oil Co. (S.A.), Ltd. notify that the price of petrol has been reduced by 1s. per case, and paraffin by 1s. 6d. per case.

Union Grain Elevators.

Messrs. W. H. Menkin and Benjamin have arrived in Capetown and proceeded to Durban in order to make a beginning on the construction of the 36 grain elevators.

Coal Options in Carolina District.

It is reported that options upon practically the whole of the coal rights lying in the triangle formed by the Delagoa Bay, Springs, Breyten and Machadodorp-Piet Retief railway lines have been given to American and English syndicates. The capital represented totals, it is stated, several millions.

There is at present such a demand for Welsh anthracite coal that orders can only be met with difficulty; on the other hand, the conditions in the Welsh steam coal market are the reverse of good.

Coal and Oil Finds in Germany.

Borings in Central Germany, near Esbeck-Schoeningen, have led to the discovery of a large lignite field, which it is expected will also yield a high-grade coal. Experts are of opinion that considerable seams have still to be found, especially in Bavaria and Southern Germany. Coal has further been discovered on the Harz Mountains, and a lignite seam has been found below the centre of Berlin.

Some fairly important oil discoveries have recently been made in Germany. Borings near Bruchsal, in Wurtemberg, have given satisfactory results, and in Bavaria some small oil fields have been discovered.

Synthetic Coal.

It is reported from Munich that a practising chemist in that city has discovered a new coal after experiments lasting over six years. A patent has been applied for. A demonstration before a number of professors and experts has, it is stated, convinced them that the discovery is a genuine and important one. The coal is said to have a heating power of 8,000 heat units. It produces gas at least equal to that obtained from the best gas coal, and the cost of its production is said to be about half the market price of ordinary coal at the present moment.

British Industries Fair.

The British Department of Overseas Trade is organising a British Industries Fair, at which British manufacturers will be able to show their goods to home and foreign buyers. The fair will be held in London and Birmingham concurrently, from February 27 to March 11. 48,000 invitations have been sent out to buyers in all parts of the world. Special attention is to be paid to buyers from abroad, including the provision of a special class of men able to introduce them to the firms most competent to meet their demands. Another branch of the official staff of the fair will explain the facilities afforded for foreign credit by the Trade Facilities Act. The Export Credit Department will negotiate general and specific credits.

Shipbuilding in 1921.

According to Lloyds' annual summary the total tonnage of merchandise launched in the United Kingdom during 1921 was 1,500,000 tons. 590,000 tons of this was for owners abroad, being a decrease of 517,000 tons compared with the record year of 1920.

The world output of ships was 4,340,000 tons, a decrease of 1,500,000 tons compared with 1920, but an increase of over 1,000,000 tons compared with the previous record in 1913. The tonnage under construction in the world amounts

to nearly 4,500,000 tons, being 2,700,000 tons lower than a year ago. The construction of many of these vessels has been suspended, and orders are still far below normal.

British Credit.

According to late cables a steady improvement has taken place recently in British credit resulting from reduced value of money. As a consequence of this $5\frac{1}{2}$ per cent. Treasury bonds are now being converted into 5 per cent. bonds at 99, which it is expected will place the Government in a satisfactory position regarding near debt maturities, seeing that some £250,000,000 in cash must have been subscribed for the $5\frac{1}{2}$ per cent. bonds. Outside that loans are 3 to 4 per cent. Discount rates have risen to about $3\frac{3}{4}$ per cent., but this is looked upon as temporary only, and the bank rate is still expected to be reduced later. The improvement in the New York rate of exchange has been of great assistance to general trade. There has been keen competition for new issues, all Colonial loans offered being subscribed quickly.

Imperial Wireless Chain.

The Wireless Telegraphy Commission appointed by the British Government in December, 1920, has reported recommending the erection of thermionic valve stations in England, Canada, Australia, South Africa, India, and Egypt and the erection of arc stations in East Africa, Singapore and Hong Kong. The average cost for oversea stations will not, it is estimated, exceed £150,000, while the cost of stations in England, Egypt, East Africa, Singapore and Hong Kong, for which presumably the Imperial Government will be responsible, should not exceed an aggregate of £853,000. The arc station in East Africa will probably draw its electrical power from the falls of the river Thika. The plans for South Africa assume that the stations will be on the Rand, near the bulk of the supply of electricity. The Wireless Commission's report is severely criticised by the *Manchester Guardian*, which says that the course of experiment and discovery in wireless has moved so swiftly that it is doubtful whether the plan recommended is worth proceeding with. The need of the British Empire, the *Guardian* says, is a wireless plant that will reach the ends of the earth cheaply, and such a plant will be perfected before long. That paper asks, not without reason, why, if we can speak comfortably to the Antipodes, instal a plant in East Africa merely to pass on messages. The *Guardian* thinks the present expensive programme should be modified in favour of a simpler and more courageous plan.

New Use for Rubber.

An absolutely new use for rubber has been discovered in connection with cold storage installations. This is india rubber expanded by gas into highly cellular form. It has been found that by packing the cold chamber with this material the amount of heat that comes in from outside is lower than in the case of cork or of any other substance

NICE HOUSES FOR SALE IN THE NORTHERN SUBURBS.

HOUGHTON.—The owner, who is leaving, has instructed us to offer for private sale at £3,300, his residence in Houghton Estate, containing lounge, 6 rooms (2 of which are of large dimensions), usual offices, hot water, etc. Substantially built garage, stable and boy's room. There are two freehold plots tastefully laid out with lawn, garden and fruit trees, etc., etc. The property is in good order throughout and possesses those attractive features which appeal to a discriminating purchaser.

MOUNTAIN VIEW.—Pretty residence on the hill side, of rondavel type, 5 rooms, etc., on full acre. Photographs at our office.—£2,200.

PARKVIEW.—Villa of lounge and 4 rooms and all modern conveniences, two minutes' from Zoo gates. £1,800. A larger house (7 rooms) in same vicinity £1,000.

YEOVILLE.—Double-storey residence of 7 rooms, sewer-d. hot water, £1,850.

R. A. PRIOR,

Registered Public Accountant and Member Real Estate Agents' Association, 105 Fox Street. Phone 3305.

previously employed. This cellular expanded rubber is prepared by vulcanising under gaseous pressure amounting to as much as 100 atmospheres.

Rubber sheets for paving London streets have proved satisfactory and are likely in the very near future to replace the present wood blocks and asphalt paving. The initial cost of the rubber sheets is, it is stated, double that of wood, but the sheets last six to ten times as long.

Seamen's Reduced Wages.

The shipowners' and employees' organisations, representing all ranks in the mercantile marine, have arrived at a complete settlement of the question of wage reductions. The wages of men on foreign going vessels will be reduced by £2 a month, viz., 30s., on March 4 and a further 10s. on April 1. The wages of the men employed on coasters will be reduced 10s. 6d. a week, with proportionate reductions for officers ranging from 25 per cent. to 10 per cent.

Unemployment in Britain.

It is announced that 250,000 fewer people were registered as wholly unemployed on January 17 as compared with six months ago, but the present total is nearly two millions, of whom 124,000 are employed on Government and municipal schemes of emergency work.

Revenual Effect of Stoppage of Trams.

The tramway traffic returns for the week ended January 21 have been considerably affected by the curtailment of the Thursday and Friday and complete stoppage of the Saturday services. The total receipts were £6,932, as against £10,105 during the same period last year.

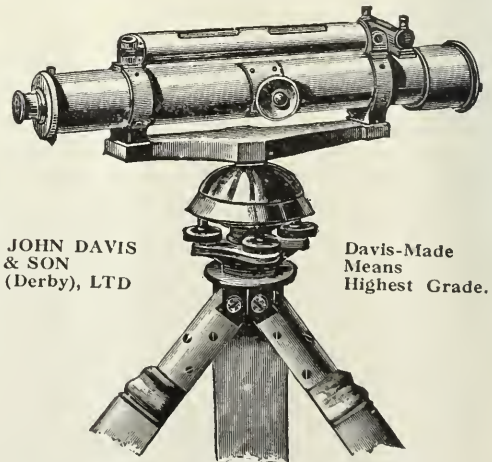
Anglo-Persian Oil Company's Successful Issue.

The Anglo-Persian Oil Co., which invited subscriptions for £4,000,000 in ordinary and preferred shares, closed their lists almost as soon as they were opened, the applications totalling £57,000,000.

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and at Kimberley and Durban.

The Week's Meetings.

THE UNION STEEL CORPORATION.

INCREASED PRODUCTION.

SEVERE EFFECT OF STRIKE.

The tenth annual general meeting of shareholders of the Union Steel Corporation (of South Africa), Ltd., was held on Friday, January 27, 1922, in the board-room, Lewis and Marks Building, President Street, Johannesburg, at 12 o'clock noon.

Mr. Isaac Lewis (the chairman of the company) presided. Among those present were Messrs. George Falcke, C. B. Kingston, G. Roy Lewis (managing director), T. Marks, F. A. E. Wells, A. D. Viney, R. W. Townsend (representing African and European Investment Co., Ltd.), Alfred d'Altera Dowsley, H. J. Dowdall, L. First, G. Robson (manager), D. MacGregor Kay (secretary), representing 141,150 shares out of an issue of 231,607.

Chairman's Speech.

In moving the adoption of the report and accounts, Mr. Isaac Lewis said:—

Gentlemen: The report and accounts before you record the result of your Company's operations for the year ended September 30 last. I am pleased to say that the year with which our accounts deal was a record one, both in respect of tonnage production and value of the sales. The gross manufacturing profit of £146,381 15s. 5d. exceeded the figures of the previous year by about £4,000. After the usual writings off as detailed in the Profit and Loss Account, and after making liberal provision for depreciation on machinery, plant and buildings, dwelling houses, bad and doubtful debts and normal tax assessment to June last, there remains a net profit for the year of £82,069 18s. 1d., as compared with £85,652 19s. 9d. in the previous year. The decrease of £3,583 1s. 8d. in the net profit is chiefly accounted for by the increased reserve made for depreciation, by a larger provision for Government taxation, and by an increase in our general expenditure in South Africa, which has been caused by the larger volume of trade, and by the increase in our organisation. The year's profit added to the balance brought forward at September 30, 1920, leaves a total credit to Profit and Loss Account of £215,519 17s. 6d.

On referring to the Balance Sheet, you will see that from this amount there has been appropriated for the payment of excess profits duty and for the balance of Normal Tax to June 30, 1920, an amount of £50,415 16s. This is in addition to the provision in the Profit and Loss Account before you of £7,455 1s. 6d. for Normal Tax to June 30, 1921. A settlement of our liability for excess profits duty and normal tax to June 30, 1920, was only concluded after publication of our last year's accounts, and therefore the amount could not previously be brought into account. As you will see, the Government's share of our profits has been a substantial one.

During the year a sum of £37,477 7s. 2d. was appropriated and paid for dividends on the Eight per Cent. Cumulative Participating Preference Shares to

September 30, 1921, including the participating dividend on the Eight per Cent. Preference Shares and Seven per Cent. Preferred Ordinary Shares, in accordance with their respective rights and interests. To meet the demand of our trade, to strengthen our position to meet overseas competition, and to conserve our resources in view of the present unstable economic conditions throughout the country, the directors, after fullest consideration, have decided not to declare any further dividend for the present.

A sum of £71,182 3s. 6d. has been transferred from the Profit and Loss Account to Funds Appropriated for Capital Expenditure Account as at September 30, 1921, representing capitalised profits to that date expended upon the extension of our plant and buildings.

Additions During the Year.

On the assets side of the Balance Sheet, machinery, plant and buildings show an increase over last year's figures of £38,311 1s. 11d., represented by very considerable improvements and additions made during the year, including the new 25 ton furnace and the extension of our building in connection therewith, to the commencement of which work I referred in my remarks at our last annual meeting. There remains a net balance to credit of Profit and Loss Account of £53,411 10s. 10d., which is carried forward.

We have made provision of a further sum of £18,500 for depreciation of plant, machinery, buildings and dwelling houses, so that the total reserve for this purpose now stands at £72,951 14s. 9d. There is also an increase of £6,090 2s. 6d. for provision of dwelling houses, being the cost of additional accommodation provided during the year for our employees. Owing to the rapid industrial expansion at Vereeniging and to the increase of our own trade, there is still a shortage of houses, but steps are being taken to overcome this, and some of our employees are now building their own homes.

With regard to the item of Investments, you will see that we have acquired 25,000 shares of £1 each in the Newcastle Iron and Steel, Limited. After full consideration your Board were of opinion that it was sound business to assist the Newcastle Company by subscribing to its capital, so that we might be assured of an early supply of pig iron required either by reason of the extension of our own manufactures, or by any curtailment in the supply of scrap steel until such a time as our own blast furnaces may be erected and come into operation.

Other Purchases Made.

We have purchased 9,998 shares of £1 each in the business of Stewart, Sanders and Company, Limited, manufacturers of steel nuts and bolts, etc., as a condition of which they are erecting their factory in the vicinity of our own works at Vereeniging, and it is confidently hoped that as soon as the erection of the factory is completed, we shall do an increasingly important trade with them in our steel.

Stocks of scrap and manufactured goods show a small increase over last year's figures.

The ascertained bad debts have been written off and the item of £1,510 13s. in the Profit and Loss Account includes a provision of £1,000 against contingent bad and doubtful debts, which is considered ample. Your Corporation have been singularly fortunate in escaping any serious losses from bad debts, considering the total amount of sales effected.

Cash at bank and at call amounts to £32,214 12s. 7d., a decrease from last year accounted for by the purchase of shareholdings in the companies referred to and also to the capital expenditure on extension of our works.

I do not think there are any other items in the Accounts which call for special comment.

Gentlemen, we all know that in the early part of last year there were distinct signs of a set-back in trade and industry, and that local manufacturers were beginning to suffer from the effects of overseas competition, which has since become increasingly severe. In the light of such knowledge, I think we have reason to be very pleased with the year's work as disclosed in the accounts before you, and the result reflects great credit on the management and staff of the Corporation. Since the close of the year under review our trade, in common with that of many other industries, has fallen off, as both the mines and the railways, our two largest customers, have been buying practically from hand to mouth, but we have endeavoured to maintain our share of such business as has been available.

Continental Competition.

In some directions our trade has been adversely affected to an increasing extent by overseas competition, particularly by Continental manufactured goods, and especially in the coastal markets, where we have recently found it difficult to compete. A young industry such as ours, with neither tariffs nor bounties to protect it, is sufficiently handicapped by legitimate and normal competition from the more highly developed overseas producers. But the competition with which we are now faced is artificially helped by the present industrial conditions in some European countries which are favouring cheap production, by the depreciated exchanges and by the low sea freights which are quoted for some of these Continental products. This is an artificial combination of advantages in favour of foreign competitors which imposes a real hardship on our local manufactures and which must result in checking the development of our own industries at a time when their expansion is so much needed.

In one of his speeches on the subject, General Smuts, the Prime Minister, said:—

"Firm support must be given to those industries which have arisen and which are now exposed to heavy attacks from overseas industries which are better organised and more highly developed."

This speech was made some time ago, and showed the Prime Minister's prophetic vision and statesmanlike appreciation of what is needed. I think today not only those concerned in manufacturing industries, but the whole country are anxiously waiting to learn the results of the deliberations of the Advisory Board of Industries and the Tariff Board, and I may add that overseas capitalists who have been approached for their co-operation are also not unmindful of this aspect of the matter.

Local Support Needed.

In this connection I want to say that while we have every reason to be satisfied and even grateful for the support which has been accorded us by our customers, I cannot too strongly emphasise at this crisis in the industrial life of South Africa the vital need for consum-

ers in this country to place their orders with the local manufacturing concerns to the fullest extent of their power. The economic conditions of the country today demand that the loss of employment and trade caused by the closing down of some, and the rapidly shortening life of other, gold mines shall be compensated by the development of permanent industries. The Unemployment Commission, realising the seriousness of the position, emphasised in their report the necessity of this, so that surplus labour might be absorbed and an avenue of employment found for the youth of the country.

The difficulties are great, and success and permanence can only be attained by the hearty co-operation of labour, and by the sympathetic support of both the consumer and the merchant. As Mr. Skeels, the president, so pertinently pointed out at the last meeting of the Transvaal Manufacturers' Association, that:

"If they put nothing in the place of the mines, the output of which was diminishing year by year, it would not be long before the purchasing power of the community would be so decreased that there would be little left to distribute."

Many thanks are due to the Press for the interest and sympathy shown towards the efforts being made to establish local industries, and I hope it may not be thought that I am going outside my province if I express the hope that the Press will continue in an ever-widening degree to inform and educate the public and enlist their sympathy for local manufacturers, so that the industries already established may prosper and the capital for their further expansion be obtained.

We realise that the special conditions under which these industries worked during the war period no longer operate in their favour, and that we have now to face, unaided for the moment by any Government assistance in the way of protective tariffs or bounties, the artificial competition of the imported article to which I have referred. We on our part are sparing no effort to maintain and improve the quality of our products, and to satisfy customers both as to quality and price, and I feel justified in saying that our customers are generally well satisfied.

It is the determination of your Board, so far as lies in its power, to keep the South African trade in the products it manufactures; to keep its works operating to the fullest extent possible; and to keep its men employed with a view to the fruition of the larger scheme we have in mind.

Grain Elevators Contract.

I am sure you will be pleased to learn that we have successfully competed in London for the order for the whole of the reinforcing steel required for the erection of the 36 Government grain elevators in South Africa. We have further large orders in view which we hope to secure. To meet competition and to prepare for the improved trade conditions to which I confidently look forward, we have considerably enlarged our works.

The new 25 ton furnace should have been ready for work this month, but has been delayed by the strike. It is confidently expected that this new furnace will enable us to double our output of ingots and show a very substantial reduction in cost of production.

The Heroult Furnace, erected in 1919, the first of its kind to be installed in South Africa, continues to give excellent results, and the steel castings produced from this furnace have proved to be of the very best quality and have given entire satisfaction to our customers. Shoes and dies for the mines are being

produced from the steel from this furnace. We are taking steps to overcome any defects that may have been detected in some of our earlier deliveries, and are now supplying both cast and forged shoes which give a life bearing the most favourable comparison with the imported article with which we are competing.

We are about to commence the production of a much heavier rail than we have hitherto produced, and for which there is a large demand. The rolls for these rails are already ordered, and we hope to obtain delivery very shortly. This marks another step forward in the expansion of our industry to meet local needs. We have also in contemplation the rolling of very much heavier angles, rounds and flats, which will greatly add to the range of sections now being produced.

The foundry equipment has been further improved, and we are in a position to machine our castings and also to undertake forging of every description.

We continue to do a large trade in steel rails, rounds, angles, flats, squares, fencing standards, tube-mill bars, in mild and hard steel castings, etc., and in reinforcing rods to British standard specification.

Gold Medal Awarded.

Specimens of our products have been sent to the office of the High Commissioner for South Africa in London, for exhibition and should prove of great interest to English shareholders.

For the second time in succession we were successful in obtaining the gold medal for our exhibit at the Witwatersrand Agricultural Show last year.

Disappointment has been expressed in some quarters that greater progress has not been made in the development of the steel industry, particularly from native ores. I may therefore be pardoned if I repeat and supplement some of the information I gave you last year as to the scope and nature of our efforts to establish a large iron and steel industry in South Africa, because I do not think that the critics have attached sufficient importance to them or that it has been sufficiently recognised that practically the whole of the work has been carried out by private enterprise. I contend that the work done by the Union Steel Corporation has been the most important factor in bringing this steel industry into prominence and revealing its great possibilities.

With our friends we have spent very large sums in the location and examination of local ore bodies and raw materials, in the experimental production of pig iron. We have twice brought out to South Africa, at great expense, the best experts both on steel making and in the knowledge of the raw materials necessary for the purpose, and we were the first to take this action, which we did as soon after the close of the late war as conditions at home permitted. The first report was most satisfactory; the second is in course of preparation, and I have every hope that it will confirm the promise of the first one. In consultation with our experts we have prepared schemes for the establishment of the big industry and have conducted important negotiations in the endeavour to raise the large capital necessary, but the financial conditions throughout the world have been unfavourable to obtaining this money at present.

Produced over £1,500,000 Goods.

In addition this corporation produced over £1,500,000 of finished goods; they employ over 180 white men earning good wages, the majority of whom are Africans who have been trained over a period of years in this skilled industry; we give employment to nearly 500

natives; we have paid very large sums to the Government for the purchase of their scrap steel and in railage on this scrap and on our finished products, and, moreover, as you will have seen by the balance sheet, we have paid further during the past two years some £57,000 to the Government in taxes. We have been acting, not merely talking.

I have dwelt upon this aspect of the question, because of the great importance of the subject. Unhappily, I have to address you in the midst of a disastrous strike which is taking place and threatening the whole economic stability of the country. At a critical period of readjustment to post-war conditions, the strike is creating a serious obstacle to the conduct of the principal industries, retarding progress in every direction, and giving a most favourable opportunity for foreign competitors to reconquer the market for goods which were being produced in South Africa.

Your corporation has suffered very severely from the effects of the strike, coming, as it has, at a time when every effort is being devoted to fighting foreign competition.

It is well known that employees of your corporation have been liberally treated during the whole of the War period, and even at this moment we have no differences excepting with a very small minority of them. The unions, however, decided to call out all our men in sympathy with their fellow-workers on the mines, and so far as I can gather, for no other reason, as agreements between ourselves and the various unions in regard to a reduction of wages of our own employes had already been accepted, and were actually in force when the strike broke out.

Effect of Present Dispute.

We must all pray that those who are conducting the present negotiations in regard to the labour dispute may quickly find an avenue for a peaceful settlement, and an early return to work. The whole economic structure and welfare of this country is at present unfortunately so largely founded upon the profitable working of our mining industries, that any prolonged cessation of work there, such as we see to-day, and which follows upon the closing down of the diamond mines and some of the low grade gold mines must inevitably bring in its train further unemployment and privation and suffering to a majority of the population not directly involved in the present disputes.

Whatever settlement may be made as to the division of the product of labour, it cannot be too clearly recognised that it is only by high efficiency and greater production by each unit of labour that the industries can be successfully carried on and the material welfare of the worker permanently improved. This applies in a special degree to an industry like our own, which is still in its infancy and which has to fight its way against the more highly organised efforts of producers in Europe and America.

I have the fullest confidence not only in the future of the steel industry, but also in the early and successful expansion of the agricultural and manufacturing industries of the Union, and if wise counsels prevail in the present dispute, I am convinced that these will provide new and ever-increasing fields for the employment of labour.

I now move the adoption of the report and accounts as submitted.

Mr. Falcke seconded, and it was carried unanimously.

The retiring directors, Mr. L. Marks and Major Aubrey Butler, were re-elected, and the appointment of Mr. G. Roy Lewis on the directorate was confirmed. Messrs. Deloitte, Plender, Griffiths, Annan and Co. were re-appointed auditors.

Business Before Politics—The Synthetic Gold Hoax—
Randfontein's New Hoists.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, FEBRUARY 11, 1922.

No. 1585.

At a Great Rand Deep Level Shaft Now Idle.



A New Photograph of the Headgear at the Turf Shaft, the Deepest Shaft on the Rand. Idle on account of the Strike, which has now lasted for more than a month.

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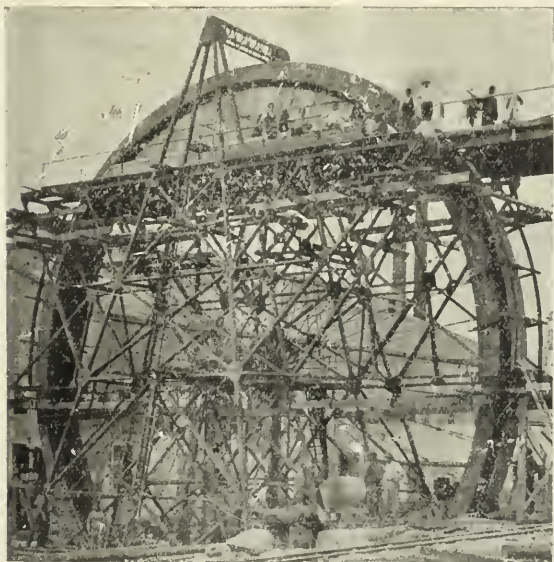
Continuation of the Strike: The Week's Developments.

BOTH PARTIES CONFER WITH THE GOVERNMENT—THE CHAMBER'S OFFER AND ITS SUBSEQUENT WITHDRAWAL—FEDERATION MERELY REITERATES ITS IMPOSSIBLE "DEMANDS"—THE REPUBLICAN FIASCO—S.A.I.F. AGAINST GENERAL STRIKE—NEARLY 40,000 NATIVES REPATRIATED—THE CASE OF THE ROBINSON MINE—KLEINFONTEIN POWER STATION RESTARTED—MEN ANXIOUS TO RETURN TO WORK—FIVE ARRESTS IN JOHANNESBURG—POSITION AT WITBANK.

During last week-end prospects of bridging the gulf between the two parties in the present dispute assumed a temporarily brighter aspect. The Federation of Trades made the first move by announcing that it intended approaching the Government in terms of the Prime Minister's letter of the previous week-end. The Chamber of Mines representatives also met General Smuts on Sunday and the Federation representatives again on Monday. The result of these interviews is contained in the following statement issued on Monday afternoon by the Prime Minister's office:

The Prime Minister and the Minister of Mines met the representatives of the South African Industrial Federation on Saturday morning. After discussion, the Prime Minister proposed the following terms of settlement:—

(1) That in view of the gravity of the situation and the necessity of avoiding further delay in the discussion of the terms of settlement, the men return to work immediately



An Idle Tailings Wheel on the Reef.

as operations can be resumed on the various mines, and that they do so on the best terms they can get, and if no other terms can be obtained, then on the terms contained in the Chamber's letter of last Saturday.

(2) That the terms on which the men return to work be subject to modification and readjustment in the final settlement, as hereafter explained.

(3) That the Government immediately appoint an impartial board to inquire into all the matters raised in the present dispute by both sides, and that their finding be reported to the Government as soon as possible.

(4) That on the receipt of such report the Government immediately lay it before Parliament for its consideration, and if the findings prove fair and workable the Government undertake to see that they are given effect to.

(5) That, if necessary, a ballot of the men be immediately taken on the above terms of settlement.

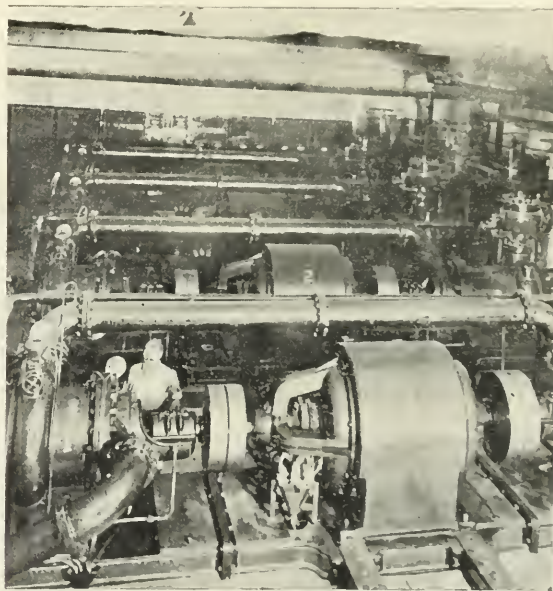
Discussion followed the proposals, as a result of which the Prime Minister met the representatives of the Chamber of Mines on Sunday morning, February 5, and discussed the position with them.

The Chamber's Proposals.

On Monday morning the Chamber submitted the following modifications of the letter of January 28:—

"That the termination of the status quo agreement shall take effect in respect of the low grade mines, namely, mines whose cost per fine ounce during the last three months of 1921 exceeded the standard value of gold, and that in respect of all other gold mines the termination shall be suspended until the Government and Parliament have considered the report of the Board. The Government Mining Engineer shall, in case of dispute, decide into which of the above categories any particular gold mine falls."

The conference between the Prime Minister and the Minister of Mines and the representatives of the Federation was resumed on Monday, and discussion ensued on the proposals of the Prime Minister in conjunction with the amended proposals of the Chamber of Mines above referred to.



Maintaining Essential Services During the Strike: An Underground Pumping Station on the Reef.

After a full discussion, the representatives of the Federation submitted the original proposals authorised by the Augmented Executive of the South African Industrial Federation as a basis for a settlement of the dispute by which the industries can be restarted, which are as follows:—

(a) Unconditional withdrawal of the notice re the status quo.

(b) The coal dispute to be submitted to arbitration

(c) The question in dispute in other industries to be submitted to arbitration.

(d) The question of contracts and the re-arrangement of underground work be a matter for discussion between representatives of the Unions and the Mine Managers' Association.

(e) The finding or award to be given not later than six weeks from first day of sitting

They are prepared to recommend that men return to work providing they return on the December, 1921, conditions, until a settlement is reached.

Turned Down by the S.A.I.F.

After further discussion the representatives of the Augmented Executive of the S.A.I.F. submitted their final proposals in regard to the suggested terms of settlement, subject to the approval of the Augmented Executive, which read as follows:—

(1) That in view of the gravity of the situation and the necessity of avoiding further delay in the discussion of the terms of settlement, the employers and the Federation agree to the resumption of operations in the industries concerned in the present dispute under pre-strike conditions.

(2) That the Government immediately appoint an impartial Board to inquire into all the matters raised in the present dispute by both sides (with the exception provided for in paragraph 4) and that their findings be reported to the Government as soon as possible.

(3) The terms on which operations are restarted to be subject to modification and readjustment in a final settlement, based on the findings of the Board appointed by the Government.

(4) The status quo agreement to remain in force, but should it be found necessary, the board might make recommendations as to any method alternative to the status quo agreement and the "colour bar" regulations for the more adequate protection of the position of the white workers in the industry.

(5) In view of the serious position that has been created by the present strike, and as a means of avoiding if possible any such like dispute arising in the future, we suggest that the Government establish a permanent Industrial Board to co-operate with Parliament for the purpose of advising on all matters concerning the industrial life and development of the resources of the country.

No agreement was arrived at. It was understood, however, by the Conference that if new light was thrown on the situation the Government and the parties concerned would consult again.

The Republican Fiasco.

Early last week the situation began to assume a distinct and dangerous political complexion, and during this week there have been one or two interesting developments in connection with this phase of the dispute.

On Sunday the following resolution was carried at a meeting of strikers in Johannesburg: "We ask the members of Parliament assembled in Pretoria to proclaim a South African Republic and immediately to form a Provisional Government." This was duly conveyed by a deputation on Monday.

Mr. M. Kentridge put the case to the meeting of Parliamentarians assembled in the Capital. Mr. Waterston seconded. The resolution was supported by messages from the Strike Committees in Springs, Brakpan and Benoni.

A special committee at the Pretoria gathering reported, *inter alia*, in response: "That such change of system can only be reached by obtaining a majority of the people in favour thereof, such majority to be reflected in Parliament."

Mr. Roos Favours Constitutional Methods.

Mr. Tielman Roos, speaking for the Nationalists, said if they fell in with the Johannesburg resolution they would belie the principles they had preached for years. The Party congresses had decided to achieve their object by constitutional means.

There was no concerted movement of the commandos on Monday, as had been expected. "Waterston's Army" at Brakpan paraded peacefully and in greatly diminished

numbers; while on the Central Rand the only "pulling-out" movement recorded affected four men on the City and Suburban, three of whom afterwards returned to work.

Reports from the East Rand indicated that no pulling-out of "scabs" was attempted. There was drilling by various commandoes, and a Brakpan meeting of strikers and other citizens endorsed the resolution passed at Sunday's meeting in Johannesburg.

Natives Still Leaving.

The number of time-expired mine labourers who had their passes endorsed for home brought the aggregate early in the week up to close on 40,000.

Endorsements for home have been few during the past two or three days, but the fact of the depletion of the available native labour force by nearly 40,000 is a very serious one, and means a tremendous diminution in the possibility of white employment after the strike.

Tuesday's Developments

An official warning was issued on Tuesday that the use of bodies of men such as commandos for "pulling out" purposes constitutes public violence; and the police have been instructed to take action in all such cases. The Augmented Executive of the S.A.I.F. has reaffirmed its approval of the commando system.

In view of the fact that the water conditions of the Modder East mine will render it impossible to save that mine unless active steps are taken within the next few days, the board of the New Kleinfontein Company have thought it necessary to make urgent representations to the Government, and it has now been decided that the New Kleinfontein power station should begin lighting the fires at 7 o'clock on Wednesday morning. It is hoped that power to pump the Modder East and New Kleinfontein mines will be available on Friday morning.

At a big gathering at Brakpan on Tuesday, Mr. Waterston deprecated that the republican resolution had been attributed to him, as he had not the brains for such an inspiration. It was proposed, he said, by a member of the Sons of England and a returned soldier at a meeting of East Rand delegates, and seconded by a Britisher.

The Brakpan commando kept a "truce of God" on Tuesday as a mark of respect to the memory of the late General De Wet.

A gathering of East Rand commandos took place at Boksburg on Tuesday for the purpose of considering a resolution recommending the S.A.I.F. Executive to declare a General Strike.

A deputation from "Roos's Parliament" waited on General Smuts yesterday to express their view of the seriousness of the industrial position.

FURTHER STRIKE DEVELOPMENTS.

Chamber of Mines Offer Withdrawn.

The following statement has been issued by the Chamber of Mines:—

"It will be remembered that the Chamber, with a view to facilitating a settlement of the present strike, offered to suspend the operation of the cancellation of the *status quo* agreement on all but the low-grade mines until Government and Parliament had an opportunity of considering the report of the proposed impartial Commission.

"The Chamber, in making this most important offer, was influenced not by any belief that the concession was required in equity, but solely by the urgent representations of the Prime Minister and by the desire to help the whole community, which is faced with ruin through the strike."

"The Federation representatives having rejected the Government's terms, together with the concession offered

by the Chamber, the Chamber desires to make it clear that the Chamber's offer, and its acceptance of the Government's terms, therefore automatically fall to the ground."

A prominent member of the mining industry said in the course of a statement to the *Daily Mail* on Wednesday:—

"What is exercising the men's minds very considerably is the obvious fact that the Chamber of Mines is not likely to leave its present terms open for long.

"It will be remembered that the Chamber proposed to take back men at December rates less one-half of the January cost of living allowance—very much better terms than if the Chamber had decided to pay only the minimum rates of pay provided for in the agreement, as, of course, it would be quite entitled to do. Indeed, if the Chamber decided on the latter course, it could hardly be called an unreasonable decision.

"Such an alteration would not mean much to the younger and less efficient employees who form the backbone of the present strike, but the older and more experienced men who have been promoted above minimum rates would be badly hit, and it behoves them to take this possibility into consideration very seriously."

wages to the strike funds—75 per cent. of the contribution to be utilised for the relief of distress and 25 per cent. to form a "fighting fund."

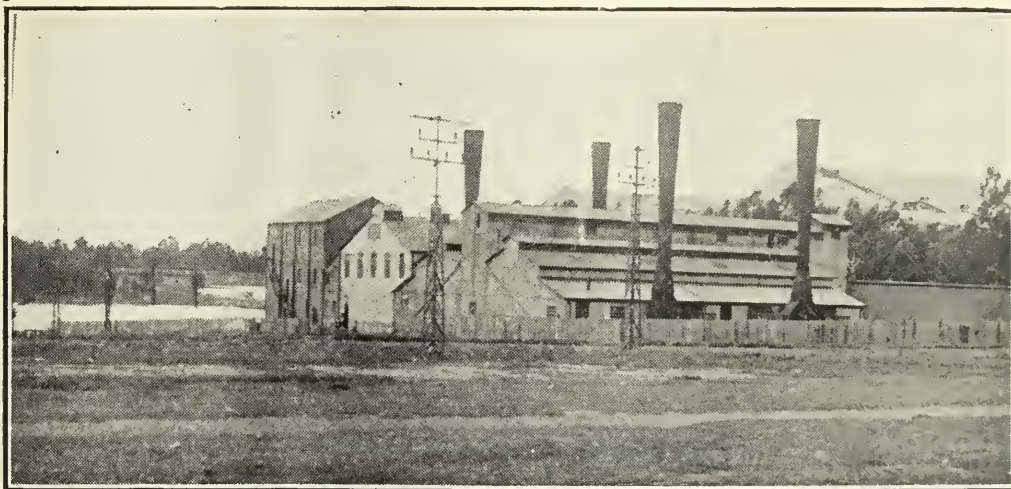
"The Council of Action": Five Arrests Effectuated.

The police moved quickly after their official announcement on Tuesday that they intended taking action in regard to certain phases of the strike. It was learned on Wednesday that five men had been arrested on charges of inciting to public violence. Their names are:—

- Ernest Shaw.
- Percy Fisher.
- Jack Wordingham.
- H. Spendiff.
- A. McDermid.

All these men are members of the S.A. Mine Workers' Union, and are amongst the number who were fined and suspended from office owing to their participation in the spreading of the Langlaagte strike in February last year.

After they had been debarred from office in their union, they identified themselves with what is known as the "Council of Action"; all the men being understood to hold very strongly to the "direct action" policy instead of more conciliatory methods of dealing with industrial disputes.



The Kleinfontein Power Station, where work has been resumed.

General Strike Vetoed.

The resolution in favour of a general strike which was carried at the Johannesburg Town Hall meeting during Wednesday morning came before the Augmented Executive of the Federation in the afternoon as a recommendation from the rank and file.

Such an extension of the strike has repeatedly been urged upon the central authority by local strike committees and other bodies, but the Executive has always taken a stand against action in this direction, on various grounds.

On Wednesday the whole question was gone into, and the resolution passed at the Town Hall was carefully considered. Finally the Executive declared its decision in the following official communication:—

"That the Executive are of opinion that no advantage would be gained by calling a general strike at the present juncture."

The Executive went further into the question of how best the assistance of other workers could be enlisted in behalf of the men on strike, and at length they agreed upon a scheme whereby all workers not affected by the strike should be recommended to contribute 10 per cent. of their weekly

The Case of the Robinson.

The effect of the strike on the prospects of the Robinson mine is shown in the following official announcement, issued on Wednesday:—

The board of directors regrets to announce that on the resumption of work on the mine after the present strike, the basis of operations will have to be reduced to approximately the tonnage which can be mined monthly from the ore of better grade remaining in the mine, viz., to a tonnage milled of about 12,000 tons per month. The effect will be to reduce the white and native labour force by approximately 250 whites and 2,000 natives.

Towards the end of last year the future of the company was most uncertain, owing to the continued fall in the price of gold. However, it was hoped that the mine would struggle on for a few months longer in 1922 on the recent output basis, but this is now not possible owing to a further fall in the price of gold and the heavy losses made due to the strike. Moreover, since the strike started, No. 2 shaft, the main hauling shaft of the mine, has been completely closed for a distance of about 60 feet by a fall of rock.

Apart from the low-grade Main Reef ore, there only remains in the mine about 63,000 tons of South Reef and Main Reef Leader, chiefly in the form of pillars. The consulting engineer therefore reports that the time has now arrived when the mine cannot be worked on a monthly milling basis of 38,000 to 40,000 tons, as the recovery, including the Main Reef ore, only averages slightly over 4 dwt. per ton, which at to-day's price of gold makes it impossible for the company to continue working the Main Reef without incurring losses.

Returning to Work: Incidents on the Mines.

On one of the big mines of the Rand a considerable number of the white workers approached the management with a request that they be allowed to return to work on the terms of the Chamber of Mines. A list of these names has been taken, and it is understood that the management intends to restart the mine at the earliest possible moment.

Other notable developments occurred on Wednesday which are regarded in many quarters as indicative of a growing desire on the part of mine employees to return to work—and the determination of the extremists to stop them.

On the City Deep a meeting called by a shaft steward with a view to discussing the possibility of returning to work was packed by the local strike committee and rendered nugatory, although a large number of the mine employees wished to attend.

On the Wit. Deep the surface employees proposed to take a ballot on Wednesday morning with a view to testing feeling with regard to resumption of work on the Chamber's terms.

A large body of Boksburg extremists intervened, however, and refused to permit the ballot to be taken.

"It begins to be clear," said an official on Wednesday, "that definite action by the Government towards providing protection and enabling those men who desire to do so, to resume work, is now called for."

Kleinfontein Power Station.

It had been anticipated that there might be some trouble in connection with the starting of the fires at the Kleinfontein power station, but the welcome smoke commenced to roll out of the stack shortly after 7 o'clock on Wednesday, and no one interfered.

Perhaps the presence of a strong force of armed police only a few hundred yards from the entrance gate had something to do with this passivity on behalf of the strikers. It was expected that power would be available on Friday. The Government is determined to protect power stations at all costs.

At Witbank.

At a public meeting at Witbank on Wednesday the following resolution was passed: "That in view of the gravity of the situation in regard to the industrial crisis and the ruin facing the country, we, the workers of the Witbank district, recommend the Augmented Executive of the S.A.I.F. to request the Government to appoint a tribunal of seven with Judge Curlewis as chairman, with full power to settle the following points: Colliery dispute, V.F.P., town shops, re-organisation of underground work and the contract system on the gold mines. The tribunal should be composed of two representatives from the employers, two from the workers, one from the Government, and one from the community. Further, the *status quo* remain in force until the tribunal investigates and reports on the same, such report to be submitted to Parliament to legislate accordingly. That if the Cabinet agree to this, we immediately return to work on terms to be agreed upon, such terms to be subject to readjustment or modification in accordance with any findings of the tribunal. That in view of riot and violence we appeal to the Government to act at once."

Union Minière Output.

At the meeting of the Union Minière held in Brussels in July last the chairman, after giving the figures of the copper output for the first half of the year, expressed the hope that production would still further improve, and that the total

for 1921 would be much higher than that for the preceding year. The particulars of the December return are now to hand, and the hope has been fulfilled, the quantity of copper produced being 2,980 tons, bringing the total for the twelve months up to 30,468 tons, which compares with 18,962 tons for 1920 and 23,028 tons for 1919. It will be remembered that the leaching works were expected to start in October, and that the programme of treatment when the whole of the additional works are in operation provides for "an important output of metal which may rise progressively to 100,000 tons of copper per year, independently of the production of our present plant."

Modder East and New Kleinfontein Mines.

The water conditions in these mines render it impossible to save them unless active steps are at once taken. The board of the New Kleinfontein Company have therefore made urgent representation to the Government and have already fired up the New Kleinfontein power station. It was hoped that power would be available yesterday to pump the Modder East and New Kleinfontein mines.

GLYNN'S LYDENBURG.

The following are the particulars of the output for the month of January, 1922:—Tons crushed, 4,030; yielding, fine oz., 1,539; estimated value of month's output, £7,169; estimated profit for month, £753. Note: The above figures are exclusive of expenditure for the month upon shaft sinking, special development and capital expenditure amounting to £2,615. The gold output for the month is valued at £4 13s. 6d. per fine oz., after allowing for exchange and realisation charges.

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JOHANNESBURG.

Pressing Needs of the Gold Industry.

NECESSITY FOR REORGANISING RAND WORK—VIEWS OF HIGH GOVERNMENT OFFICIALS.

In a time like the present, when two sections of the community are involved in a great industrial dispute, one must naturally look to the Government for guidance, and also information. No doubt the ordinary public are sometimes mystified as to the whys and wherefores of the present *impasse*, and are unable to make up their minds as to who is right and who is wrong when one party makes a categorical assertion and the other party gives that assertion a point-blank denial.

It should therefore serve some useful purpose if reference is made to certain statements contained in the last report of the Department of Mines and Industries of the Union of South Africa—that is to say, in the annual report of the Secretary for Mines and Industries and the Government Mining Engineer for the calendar year ended 31st December, 1920, issued in August last. This report deals exhaustively, competently and impartially with all aspects of the mining industry in the country, and the statements contained therein can be challenged by either party to the present calamitous dispute.

It is here proposed to deal with certain views expressed therein by Government officials on some of the matters which have tended to bring about the great strike. The following are extracts from the reports of the officials whose names are stated at the commencement of each quotation.

Mr. H. Warrington Smyth, Secretary for Mines and Industries.

The salvation of the low-grade mines depends entirely upon two factors, viz., the price of gold and working costs, the danger being that a decline in the former will not have immediate effect in a corresponding reduction of the latter. Every effort will certainly be made to tide the poorer mines over that very critical intervening period, but, should it be prolonged, the question of reducing costs by an all-round efficiency will have to be faced seriously to enable those mines which, if closed down, could never be reopened, to carry on until the working costs can be brought into line with the general reduction in the cost of living.

Another Official's Views.

There can be no doubt that numbers of men were attracted to the mines during the past few years by the high wages easily gained without the necessity for any preliminary knowledge or training. Such men are not like old miners who have spent their lives at the one occupation, and are consequently unable to adapt themselves to any other calling. Many of them have been mining for so few months that it would be no hardship to send them back to their original occupations. It certainly seems unreasonable that because a man has once obtained an engagement in a mine he should expect to be clothed, housed, fed, and have his pockets kept filled with money for the rest of his life, irrespective of what he gives in return. Some of them seem to forget that there are two sides to every bargain, and since wages are standardised, and consequently must be paid in full, the employer must have the right to balance the account in some other way—such, for instance, as choosing his workmen. At some of the mines attempts appear to have been made to force the management to agree to an arrangement whereby any vacancy occurring shall be filled by an employe of the mine engaged in a lower class of work. For instance, if a stoper is required, the manager is not permitted to engage a stoper from outside, however good his record in that class of work may be. The vacancy must first be filled by someone working in the mine—say a trammer. If that trammer has had no experience of stoping before, it makes no difference; he must be given the opportunity. Consequently he is put into the stope to show what he can do. If he gets the

place into bad shape and proves himself incompetent, he may be removed, but must be replaced by the next in seniority, and so on. How anyone can expect efficiency under such conditions passes all comprehension.

Krugersdorp Inspectorate (Mr. M. Fergusson).

If all the white men employed in responsible positions in the mines were qualified miners, capable of using their knowledge and experience to the best advantage in obtaining the highest results from the gangs under their charge, there might be a lot to be said in favour of the existing conditions of labour, but where large staffs of highly-paid white men—many of whom are of no benefit to the company—have to be employed simply because the law or the unions demand it, many mines will be rendered unpayable which, if worked on a purely economical basis, would continue for many years to carry on operations at a profit to the shareholders and to the benefit of large staffs of employes. High wages do not necessarily mean high working costs, as was proved in America before the War. In that country wages in many industries were higher than in any other part of the world, and yet by reason of the great efficiency of the workmen and the systematisation of the work, America was able to send her products abroad and compete with all foreign markets. In this country the high wages exist, but it is to be feared that to a very large extent the other factors mentioned are lacking. As has been pointed out on previous occasions, the white workmen on these fields may be divided into two classes: (a) the skilled workman, and (b) the unskilled or partially skilled workman. Those included in the first class know what is expected of them, and know how to calculate the cost of their labour and the value of the product. Very little is ever heard of them. They perform their work in a thorough and conscientious manner and give satisfaction to themselves and their employers. Such men are naturally in great demand, and there is a tendency to secure their services by offering them substantial rewards for their labour in the form of big wages or highly remunerative contracts. Those included in class (b) are more difficult to deal with. They do not always understand the work, and in some cases do not attempt to learn it. Their whole object in coming to the mines is to obtain the highest wage possible without considering the value of the work which they give in return. Where these men are concerned it is frequently found that they are merely lookers-on whilst the more intelligent natives amongst their gangs are doing the skilled part of their work. They see men included in class (a) drawing big cheques and they agitate for increase in pay, because they consider they are entitled to as much as anybody else. Certain duties become irksome because they do not understand how to perform them, and consequently they are inclined to dictate to the managements what work they shall do. Such men are extremely difficult to control, and where they have a difference of opinion with one of the officials they endeavour to use the whole weight and influence of their Union to obtain their individual ends. This is made easier for them by the fact that it is not always that class (a) men can be found to take office in the Unions' services, their time being generally too valuable to spend in listening to the numerous complaints which they would be required to investigate. It is generally accepted that there are a number of men working on the mines to-day who are neither experienced nor industrious; consequently it is surprising to find that any attempt on the part of the employers to get rid of such incompetent persons is often strenuously opposed by the body of workmen.

Bcksburg Inspectorate (Colonel H. Bottomley).

There has been no sign of improvement in the atmosphere of unrest and antagonism amongst mine workers during the year under review. Boards of reference have

been frequent, and still more frequent have been the submission of grievances to the committees appointed to deal with such matters. The ceaseless agitation which has been apparent appears to be the natural characteristic of the Africander unskilled workers, who, as is well known, form the major portion of our underground men. Underground efficiency has never been on such a low mark as it is now, and the time appears to have arrived for drastic reorganisation in the methods of working and pay.

Mr. C. E. Hutton, Germiston Inspectorate.

The efficiency of the white miner has not, speaking collectively, improved. Despite the fact that managements have frequently expressed the opinion that there are many natives more competent than the semi-experienced white men, there has been no attempt to economise in white labour, which could be done in certain directions without contravening the Mines and Works Regulations. The reason, no doubt, why managements do not cut down to a legal minimum the number of white men, both surface and underground, can be put down to charity and fear of public opinion.

The inspectors of mines whose opinions are cited above are all qualified mining men with long experience of Rand conditions. As is well known, their views and requirements are often in conflict with the policy of the Chamber of Mines and with those of the mine managers, and therefore and because of the fact that they are Government officials, and accordingly impartial observers, the considered opinions expressed by them in the Government Blue Book, of which extracts are given above, should receive the close attention of every member of the community.

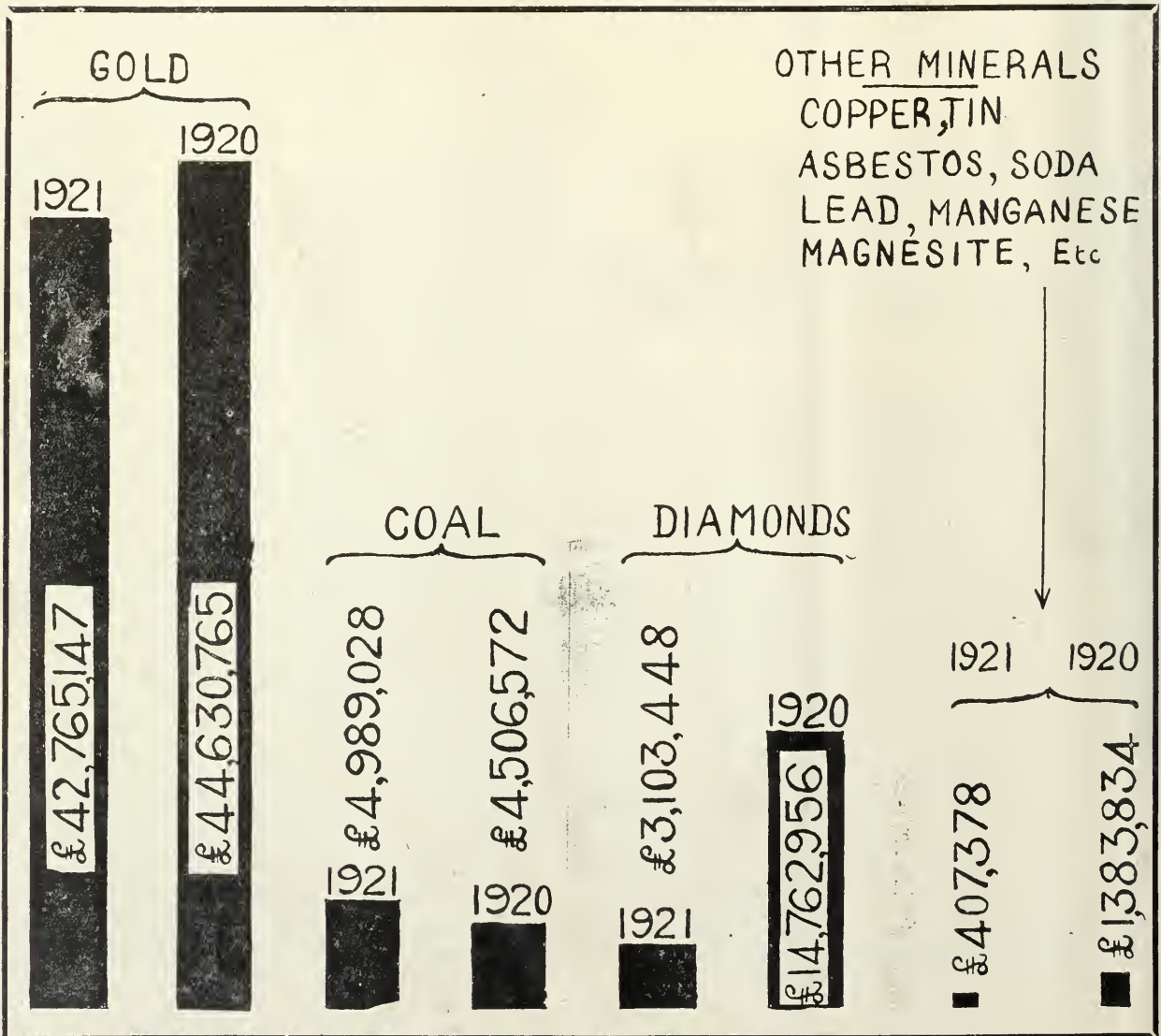
ANSWERS TO CORRESPONDENTS.

A. J. C., Bulawayo.—All the shares in the New State Areas have been taken up and paid for.

Improved Acetylene Cutter.

For rough work the ordinary acetylene blowpipe is quite satisfactory, but where it is desired to cut out a piece of metal with a sharp edge the blowpipe by itself is not suitable as it leaves a ragged edge where it cuts. The wide scope for an oxy-acetylene cutter which would give a fine edge has induced a British inventor to undertake research into the best form of blowpipe, which cuts almost as fine an edge as a saw. He has developed, in conjunction with this blowpipe, an ingenious machine which enables any shape to be reproduced; that is to say, once a pattern has been made, the machine will reproduce it as often as required by cutting metal sheets to precisely the same shape. The process is so rapid and so perfectly performed that the machine has attracted the greatest interest among railway companies, motor-car manufacturers, and others who have a large amount of reproduction work in sheet metal to perform.

UNION'S MINERAL OUTPUT: 1920 AND 1921 COMPARISONS.



The following diagram exhibits in graphic form the essential figures of output in last year and in 1920:—

"Synthetic" Gold.

THE THEORY OF TRANSMUTATION—A DISTORTED VERSION WITH NO FOUNDATION IN FACT.

(Percy G. Paris.)

The recent rumours of a German method of producing gold synthetically have already been widely commented upon by the British and French Press, generally in a derisive and sceptical manner. In spite of the extreme improbability of a practical solution (in our time) of a problem that has been the dream of chemists ever since the middle ages, the matter is particularly interesting in the light of recent knowledge of phenomena that seem to have some bearing on the subject. Though this knowledge has opened up a completely new field of research, which in the coming years will no doubt be productive of results, the wide gulf that exists between experimental conditions and practice, and the years it will take to bridge it, leave the commercial considerations a matter of purely remote interest. Nevertheless, as the centre of the world's gold production, the Rand will necessarily watch with close interest the gradual development of these theories, upon which the present claim of the so-called synthetic gold has, no doubt, been based.

In the first place, it should be stated that the term "synthetic" is a misnomer. Synthesis indicates the building up of a compound by a combination of the primary elements, disclosed by analysis; and is, therefore, the exact converse of "analysis." In the case of a complicated organic structure, such as indigo, camphor and rubber (all of which can be made synthetically) combination is made of various intermediate products, each of which contains certain of the essential elements that analysis of the natural product has indicated. Generally speaking, it is not possible to produce synthetically by simply taking the primary elements required, as these will most probably not combine with each other. Consequently this has to be done by indirect methods and in several steps or manufacturing stages to bring about the proper grouping of the necessary elements and the discarding of those not needed. There are comparatively few instances of direct syntheses in industrial chemistry; the simplest and the best known is, of course, the combination of nitrogen and hydrogen to form synthetic ammonia.

The case of gold is, however, quite different; it is itself a primary element, uncombined with any other except in so far as it can be converted to its own salts. Hence the term "synthetic gold" that has been the subject of so much discussion is quite misapplied; any process claiming to produce gold from some baser metal should more correctly be termed a transmutation.

The unity of matter and the transmutation of elements are theories that have existed since the middle ages; they were in fact the philosopher's stone of the early alchemists. Presupposing the correctness of their theory, they devoted all their energies to the production of gold from base metals; and were encouraged by the fact that minute traces of gold were actually found in certain ores after treatment, simply because these existed as impurities in the ores! It was only in quite recent years that the ancient theory of transmutation, that is the conversion of one element to another, has been proved to be feasible. The investigations into the phenomena of radio-activity have given us the first ray of light on this question, and though much ground has yet to be covered before a complete understanding of these phenomena can be attained, there exists already sufficient experimental proof that the transformation of the elements may not be so wide of the mark after all.

It may be interesting to recall that it was Becquerel, in 1896, who first noticed that uranium in uraninite (pitchblende) Uranium, uranium X, ionium, radium, radium emanation, of rays, but that these rays differed from those of light, in that they could not be reflected, refracted nor polarised. His discovery was confirmed and amplified by the researches of Mme. Currie, but she attributed the phenomena to the

existence of a new element, which she named polonium (after her native land) and which she definitely established some years later. The story of her discovery and isolation of radium itself is too well known to require repetition. Radium though widely diffused can only be isolated in very minute quantities, 10 tons of pitchblende being required for a bare half-ounce of radium salt; from the same quantity of pitchblende only about one-hundredth of an ounce of polonium is obtainable; this gives one some idea of the careful work her discoveries have involved.

Conversion of Copper to Lithium.

When propounding the theory of the electrons (a term applied to the minute subdivisions of the atom), Ramsay suggested the feasibility of a transmutation of the elements, and actually demonstrated this by converting copper to lithium under radio-active influence. He also showed that under similar conditions gases such as carbon dioxide and carbon monoxide were evolved from certain metals, zirconium, thorium, lead, etc.

Space does not permit of our following the individual researches of the foremost chemists and physicists during the past year; it suffices us to note the following determinations. Radium emanates certain rays, called alpha rays, which are themselves identical with the element helium; other radio-active materials, such as actinium, also emit helium, in fact presence of this gas is now taken as a general indication of the existence of radio-active material. Radium is itself derived from uranium, and is but one link in a cycle of changes from one element to another, brought about in the process of time. Thus we have the following cycle: Uranium, uranium X, ionium, radium, radium emanation, radium "A," "B," "C," "D" and radium "F," the last named being identical with the polonium discovered by Mme. Currie. Similar cycles have been determined from actinium and thorium. It is evident from our present knowledge that transmutation tends to take place from an element of higher atomic weight to one of lower. It is also significant that of all the elements we know of at present there are only two of higher atomic weight than radium (224), namely, uranium (236) and thorium (230); helium comes right at the other end of the scale with an atomic weight of only (4). This agrees very well with the electron theory of Ramsay, conversion from one element to the other being due to loss of electrons, hence loss in atomic weight, and the regrouping of the remaining electrons into a more stable formation. His experiments converting copper (63) to lithium (7) also bear out this loss in weight, though not necessarily the factor of stability. There is also some side-light on this question from other fields of research. There has always been some conjecture on the part of astronomers and physicists as to the source from which the heat of the sun is derived. Chemical reaction would not compensate for the heat lost by radiation, and there must, therefore, exist some other source of energy sufficient to maintain these conditions. Spectroscopic examination of the sun's rays have disclosed the predominant existence of both uranium and helium, from which we are led to deduce that the mass of the sun is still largely composed of unstable elements, and that these, by emission of electrons, are developing the heat necessary to compensate for that loss by radiation.

Mendeljew's Theory.

Carrying this hypothesis a step further, the present condition of the earth is believed to be such that it is composed of elements, formerly of unstable character, which have in the process of time and under the electron theory changed to stable formation; and that there still remains a certain amount of unstable matter, under which category would fall

materials of a radio-active nature. To show how these various aspects of the question seem to dovetail with each other, mention must be made of the periodic system of the elements, as enunciated by the famous Russian chemist Mendelejew in the middle of the last century. By listing all the elements that were then known, in ascending order of their atomic weights, he was able to arrange them in series of seven in such a way that those elements occupying similar position in different series resembled each other in certain respects. As he went higher up the scale of atomic weights he had to leave blank spaces in his tabulation, because elements which would belong to the spaces in question were not at that time known. So convinced was he of the periodicity of all elements, as indicated by those he already knew, that he not only predicted the discovery of several elements that have since been obtained, but was able to foretell correctly what their general properties would be. The bearing that the periodic system has on the hypothesis of the unity of matter and the transmutation of the elements lies in the clear manner in which it demonstrates the connection between their properties and atomic weights. The electron theory explains that this conversion and change in properties is due to loss and regrouping of electrons with resulting loss in atomic weight. Finally the study of radio-activity has demonstrated that inter-elemental conversions are actually taking place. Hence there is no reason to doubt that gold also is the result of conversion from some other element and that all the elements originate from some one primordial substance. On this assumption, therefore, and taking the case of gold, we would have to look to some element of higher atomic weight to find that from which the conversion is to be made. Referring to Mendelejew's table, gold is the lowest member of its series of seven, other members of the series in ascending order being mercury, thallium, lead, and bismuth. On the other hand, in the arrangement of the elements in groups, according to their position in the periodic series, and their similarity in valency and in properties, we find gold, silver, copper, sodium, and lithium falling in the same group, with gold heading the list in atomic weight. It is also noticeable that copper and lithium, which have already been referred to as providing an example of transmutation, both occur in this group.

On the basis of our present knowledge, it therefore seems feasible to expect that we may presently discover the parent element from which gold is derived. We are not yet sufficiently well acquainted with the laws governing transmutation to determine whether this "parent" element will, according to the periodic system, fall in the same group as gold, silver, copper, etc.; or whether it will occur in the same periodic series as gold, mercury, lead, etc.; but we do expect that its atomic weight will be higher than that of gold itself.

Even when that point shall have been reached, we shall still be very far away from any practical application of our knowledge. The time factor in radio-active transmutation, and the wide distribution of radio-active material in but small quantities, will keep this question in the domain of only theoretical interest for many years to come. This is no new conception and has been the subject for debate by learned societies all over the world. Even the foremost chemical journal in Germany was willing some years ago to publish and advertise a claim by a German scientist to produce gold by some such means.

In the present instance, we may safely conclude that the rumoured production of synthetic gold is a distorted version of the theory of transmutation and that it has no practical foundation in fact.

POWER ALCOHOL.

The Fuel Research Board (Department of Scientific and Industrial Research) have published their Second Memorandum on "Fuel for Motor Transport." The Inter-Departmental Committee on Alcohol for Power and

Traction Purposes, in their Report dated June 23, 1919, recommended that an organisation should be established by the Government to initiate and supervise experimental and practical development work, at home and overseas, on the production and utilisation of power alcohol, and to report from time to time for public information on all scientific, technical, and economic problems connected therewith. The Report was referred to the Committee of the Privy Council for Scientific and Industrial Research, and on the recommendation of their Advisory Council they decided, in the first instance, to appoint a suitable officer with the necessary assistance, under the Fuel Research Board, who would be charged with the duty of collecting accurate data from different parts of the Empire as to the possibility of producing alcohol in bulk from local vegetable materials, and of arranging for the continuance of any experiments and negotiations connected with utilisation which could usefully be undertaken. Accordingly Sir Frederick Nathan was appointed Power Alcohol Investigation Officer under the Fuel Research Board in December, 1919. An Interim Memorandum on Fuel for Motor Transport was issued by the Board in July, 1920.; The present Memorandum gives a brief general survey of the work of the Board in regard to Power Alcohol since that date.

The subjects dealt with in the Memorandum include, among others (1) production of alcohol in the British Dominions and Colonies; (2) synthetic production from calcium carbide and from the ethylene in coal gas from gas-works and cokeries. Considerable attention has been given during the last two years to the possibility of removing ethylene from coal gas and its subsequent conversion into power alcohol. A manufacturing-scale process has not yet been developed, however, and even should a successful one be worked out, it would still be a question whether it would be profitable to produce alcohol by such process at the expense of the calorific value of the coal gas. Some of the general conclusions arrived at in the Report are:—

(1) The prospect is remote of adding materially to the supplies of liquid fuel for internal combustion engines in this country by the manufacture of alcohol from home-grown materials.

(2) The production of alcohol within the Empire from materials containing sugar or starch is only likely to be possible commercially in the near future in some of the Dominions and Colonies, and then only on a sufficient scale to meet local requirements.

(3) It is unlikely that alcohol could be produced in excess of local needs and at a price, when freight to seaboard and to this country is included, at which it would find a market here.

(4) Synthetic production on a commercial scale in this country is unlikely; it might be possible, however, in Canada and Australia.

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**SOUTH AFRICAN MINING AND
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The Reconstruction of the Coronation Syndicate.

LONDON UNDERWRITERS GUARANTEE FRESH CAPITAL—OPTION OVER LUIPAARDSVLEI No. 10
TO BE EXERCISED—DETAILS OF THE SCHEME.

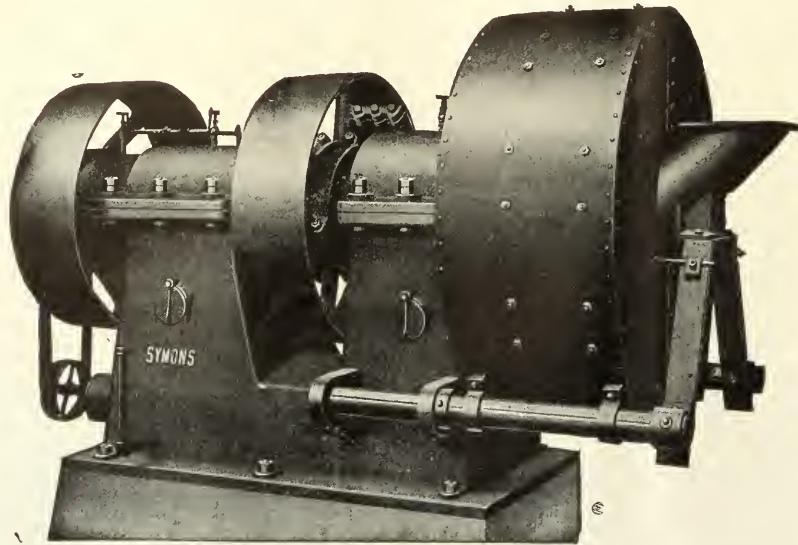
The Coronation Syndicate is to be reconstructed with the object of acquiring portion of the farm Luipaardsvlei No. 10, upon which, it will be remembered, important reef discoveries were recently made. The purchase price of the mineral contract of lease over portion of the farm is 1,000,000 new shares of 5s. each to be created. The agreement with the London underwriters provides, *inter alia*, that the company's issued capital of £520,000 in £1 shares all issued and fully paid up be reduced to £130,000 in 520,000 shares of 5s. each, by writing the sum of 15s. off each of such issued shares; that such reduced capital be increased to £180,000, by the creation of 1,400,000 new shares of 5s. each ranking *pari passu* with the above-mentioned 520,000 shares; that the option held by the company for the purchase of the mineral contract of lease over portion of the farm "Luipaardsvlei" No. 10, District Krugersdorp, be exercised; that 1,000,000 of the said new shares be issued as fully paid up in consideration of the said mineral contract, in terms of the option; that the remaining 400,000 new shares be offered for subscription at par to shareholders in the company *pro rata* to the holdings of such shareholders in the said reduced capital of £130,000; that all shares not

applied for by shareholders may be applied for by shareholders at par within a time fixed by the company, the allotment of such last-mentioned applications to be as the directors of the company may determine. Each of the shareholders who has been allotted any of the 400,000 shares shall have the right, exercisable at any time after the 1st February, 1924, and before the 28th February, 1924, to call for one further share of 5s. in the company, at the price of 7s. 6d. for every share allotted to him out of the said 400,000 shares; the underwriters will subscribe at par for all the 400,000 shares not applied for by shareholders; in consideration of his undertaking each underwriter is to be paid by the company a cash commission of 5 per cent. on the par value of the shares underwritten by him, payable at the expiration of three calendar months after the date of the offer of 400,000 shares to existing shareholders, and also receives the right, exercisable at any time after the 1st February, 1924, and before the 28th February, 1924, to call for one further share of 5s., at the price of 7s. 6d. for every share so underwritten by him. The main point is that the necessary new capital is underwritten and that the mineral lease is being acquired for a share consideration in the reconstructed company.



Geological Plan of the Far West Rand, showing the farm Luipaardsvlei No. 10,

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The Year with the Premier Diamond Mining Company, Limited.

BIG DROP IN REVENUE—RESTRICTED OPERATIONS—STRONG CASH POSITION.

The annual meeting of the Premier Company was held this month, and an advance copy of the report to be submitted to the shareholders for the year to October 31 last shows a working profit of £110,385. Diamonds on hand at the end of the year have been taken into stock at nominal value of 1s. After allowing for expenditure on equipment £20,030, the balance is £90,354, which is the amount available for distribution between the Government and the company. Revenue from diamonds was only £439,636, as against £2,098,482 for the previous year. Two dividends of 6s. 3d. each per share, less dividend tax, have been paid on the Preference issue.

The general manager in his report states that the total number of loads of 16 cubic feet hauled from the mine was 1,996,981, total production of diamonds 411,981 carats, average yield per load .211 carat, average cost per load mined and washed 3s. 5.230d., average cost per carat 16s. 3.347d., average cost per load on total loads hauled 3s. 4.347d.; last three items calculated on mine expenditure only—namely, £335,716. Mining and washing operations were restricted to two shifts of eight hours each per diem from 1st November, 1920, to 27th February, 1921, and thereafter to one shift per diem until 30th June, when all productive work was further curtailed to five shifts per week.

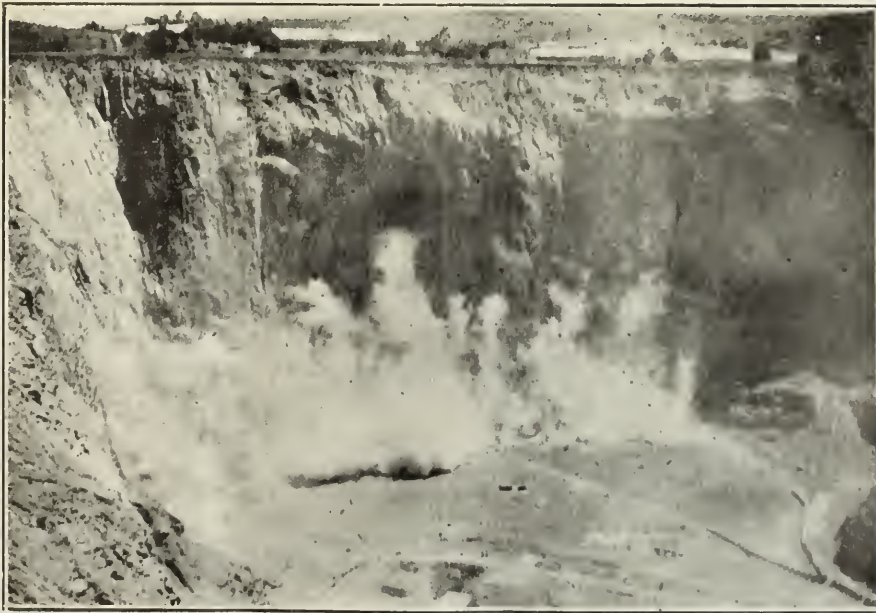
In view of the abnormal conditions which have obtained, comparisons with previous financial periods are rendered valueless, and it will, therefore, suffice to add that the quantity of blue ground washed and the recovery is less by 2,706,268 loads and 408,583 carats respectively than corresponding figures for preceding year. Mining has been confined practically to the working faces above the 410 feet level in the several sections of pipe area, and in this connection it

may be mentioned that the quantities of ground shown as having been drawn from the 360 and 410 feet levels include a considerable percentage of "blue" from levels nearer the surface of the mine which for various reasons were not entirely worked out before, especially in the vicinity of the rim rock, and this is a factor which has probably had a favourable bearing on the yield as reflected in the higher average recorded for period under review.

In comparison with the previous year the total working expenditure at the mine shows a decrease of £303,553, but the average cost per load mined and washed is 8.310d. higher, due to the restricted scale of operations and to the fact that certain standing charges could not be proportionately reduced. Further, the gratuities paid to the employees who were retrenched, amounting to £8,231, also added appreciatively to cost of operations.

In consequence of the reduction of operations, and the fact that the development of the mine generally was well ahead of requirements at the close of the preceding year, very little work has since been done beyond the development of additional working faces below the 360 feet level in the central section of the mine. The quantity of blue ground available above the lowest level so far developed—namely, 460 feet—is 39,000,000 loads, of which 25,000,000 loads are contained in the working faces above the 410 feet level. The average depth of the mine is 294 feet, an increase of 6 feet for the year. The pumping plant at Wilge River station continues to work smoothly and economically, and the total quantity of water pumped to the mine represents 370,000,000 gallons.

The curtailment of operations necessitated the repatriation of 3,146 natives whose services were no longer required. The recruiting agencies in the Cape Colony have been closed down entirely, and such representation only as is necessary to ensure a regular supply of natives for present requirements has been retained in other labour areas. The total number



Blasting at the Premier Diamond Mine.

of natives to the compound was 2,675, and the actual number in service at the close of the year was 1,228. Wages amounted to £97,955, equivalent to 3s. 5.473d. per native per day, including piecework and overtime, natives, as usual, providing their own food. The services of 354 white employees were dispensed with during the period under review,

and at 31st October last the total number of men employed, including 29 apprentices, was 266.

The Premier's History in Brief.

The following table gives the history of the Premier Mine in brief:—

Year Ended	No. of Loads Washed.	No. of Diams. Found.	Value of Diamonds.			Yield per Load. Carats.	Value per Carat.			Cost of Production per Load Washed				
			£	s.	d.		£	s.	d.	£	s.	d.		
31st Oct., 1903...	76,931	99,208 $\frac{1}{4}$	137,135	2	9	1.29	1	7	8.5	1	15	8.7	4	7.2
31st Oct., 1904...	939,265	749,653 $\frac{1}{2}$	866,030	0	5	.798	1	3	1.2	0	18	5.3	2	7.62
31st Oct., 1905...	1,388,071	845,652	994,687	5	7	.609	1	3	6.29	0	14	3.98	3	3.44
31st Oct., 1906...	2,988,471	899,746	1,277,739	6	4	.301	1	8	4.82	0	8	6.61	3	5.71
31st Oct., 1907...	6,538,669	1,889,986 $\frac{3}{4}$	1,702,630	19	8	.290	0	18	0.20	0	5	2.49	2	4.44
31st Oct., 1908...	8,058,844	2,078,825 $\frac{1}{4}$	1,536,719	19	0	.258	0	11	9.40	0	3	9.75	1	10.24
31st Oct., 1909...	7,517,793	1,872,136 $\frac{1}{2}$	1,172,378	7	2	.219	0	12	6.29	0	3	1.43	1	11.42
31st Oct., 1910...	9,331,882	2,145,832 $\frac{1}{4}$	1,436,641	5	5	.230	0	13	11.39	0	3	2.49	2	0.55
31st Oct., 1911...	8,325,272	1,774,206	1,433,970	6	9	.213	0	16	1.97	0	3	5.34	2	2.02
31st Oct., 1912...	9,707,098	1,992,474	2,004,943	3	5	.205	1	0	1.50	0	4	1.57	2	4.79
31st Oct., 1913...	10,434,680	2,107,983	2,336,828	15	1	.302	1	2	2.05	0	4	5.74	2	6.67
31st Oct., 1914...	7,683,943	1,417,755	1,259,643	5	11	.185	0	17	9.23	0	3	3.34	2	5.89
31st Oct., 1915...														
31st Oct., 1916—														
From Mine Ground ...	851,785	153,001 $\frac{1}{2}$)	475,856	4	2	.267	1	2	7.95	0	6	0.63	2	7.62
From Tailings	717,736	266,945 $\frac{1}{2}$)												
31st Oct., 1917...	4,928,629	906,341	1,198,922	5	9	.184	1	6	5.48	0	4	10.38	2	2.68
31st Oct., 1918...	4,805,851	851,573	1,203,903	15	2	.177	1	8	3.29	0	5	0.12	2	2.68
31st Oct., 1919...	4,529,261	814,577	1,961,259	8	1	.180	2	8	1.84	0	8	7.92	2	10.68
31st Oct., 1920...	4,650,498	820,564	2,098,482	19	9	.176	2	11	1.77	0	9	0.06	3	2.59
31st Oct., 1921...	1,954,230	411,981	439,636	1	6	.211	1	1	4.11	0	4	5.99	3	4.43

MINING OPERATIONS SUSPENDED.

* After allowing for Sundry Revenue amounting to £28,893 8s. 3d.

S.A. Carbide.

An issue of £75,000 Eight per Cent. First Mortgage Debenture stock is offered to holders of Ordinary and Preference shares of the South African Carbide and By-Products Company at par. The stock will be secured by trust deed as a first specific charge on the present immovable property, and a first floating charge on the undertaking and other assets, including uncalled capital, and in addition the deed will bind the company to execute such First Mortgage bond and/or Notarial bond over the property in Natal as necessary to secure an effective first specific charge over all the present immovable property and assets and an effective floating charge over the remaining property, present and future, including its uncalled capital.

Otavi Mines Report.

The management committee, in their report for the period from April 1, 1914, to March 31, 1921, which was presented at the meeting held in Berlin on December 30, state, *inter alia*:—"Throughout the war we suffered severely through the greater part of our men being called to the colours. Work at the mine was confined to what was strictly necessary. The railway was surrendered to the military authorities. After the capitulation at Khorab on July 9, 1915, and the occupation of the Tsumeb Mine by the Union Authorities, the latter offered to allow work to be continued, provided the mine was operated to its full extent. This measure, however desirable in itself, unfortunately could not be guaranteed in the absence of any possibility of marketing the ores which would be extracted if the mine were in full working order. Only a few steamers were available for ore freights, and these at exorbitant rates. In addition, there was no possibility of treating direct with buyers, negotiations being necessarily conducted through the South African Government. There was consequently no profit on the shipments made. The working of the railway being taken out of our hands by the occupying forces, no further revenue accrued from this source. Considerable stores of materials, the company's property, were also

seized. We have notified our claims in this respect with the proper Government authority, but so far received no payment. We were only able, during the seven years under notice, to ship 87,614 tons of ore, or about the fourth part of what in former and normal years we should have shipped during the same period; and these shipments have nearly always been effected under the pressure of circumstances at abnormally high freights and smelting costs. We were thus compelled, in order to maintain our work, to obtain loans from South African banks, which reached the high total of about £300,000, against which we could, of course, set *inter alia* the value of the developed ores. Having regard to all the above we consider it, after all, a tolerable result that these seven years, notwithstanding the crushing conditions under which we had to work, notwithstanding the impossibility of making shipments at prices corresponding to the circumstances, and notwithstanding high rates of interest, have yielded a profit. This profit has been utilised to write down our undertaking. Contrasting with the uncertain position during the war and the subsequent period under review, we have to-day the satisfaction to be able to say that the company once more stands upon firm ground. By Proclamation, dated November 17, 1920, the Administrator of the South-West African Protectorate definitely acknowledged the following rights of the company: (1) The property in all mines actually being worked; (2) the freehold rights in the 1,000 square mile area, as well as in a zone of 10 kilometres broad on each side of the railway, within the freehold territory of the South-West Africa Co.; (3) the sole right to prospect for and win minerals (other than precious stones) in the 1,000 square mile area until November 17, 1921, which period has been subsequently extended to November 17, 1923. So far as our mining rights are concerned, they are substantially intact. The Government of the South-West African Protectorate has not recognised the railway lease which had still to run until 1940. We have not yet succeeded in obtaining from the authorities compensation for being deprived of the working of the railway, nor for the stores and materials which were also taken from us, although in no way the property of the German Government. Our claims in this respect are being urged.

The New Union Company Law.

PROVISIONS OF DRAFT BILL—A CONSOLIDATING BUT COMPLICATED MEASURE.

The draft Bill to consolidate and amend the laws in force in the several provinces of the Union relating to the incorporation, registration and winding up of companies is gazetted. The Bill contains no less than 224 clauses, and it has been modelled upon the 1908 Act of Great Britain and the Transvaal Act of 1909. In the introductory matter of the Bill it is provided that for the purposes of the registration of companies under this Act an office shall be established in Pretoria, called the Companies Registration Office, with a Registrar of Companies at the head and, if necessary, other officers and staff; that all registers kept in any public office under any of the Provincial companies laws shall be incorporated in, and form part of, the register of companies kept in the office established as above. All powers and functions vested in any officer in the public service in relation to the registration of companies and all powers and functions in relation to the administration of any of the Provincial companies laws, other than those vested in any Master of the Supreme Court, shall vest in the Registrar of Companies appointed under this section.

The Bill consists of eight chapters, the first dealing with constitution and incorporation. Clause 4 prohibits any company, association, syndicate or partnership consisting of more than 20 persons being formed for carrying on any business for acquisition or gain unless it is registered as a company under this Act, or is formed in pursuance of some other law or of letters patent or Royal Charter.

The Act goes minutely into every detail. For instance, a couple of columns are taken up in explaining what the memorandum of association of a company must state, what must be done in the case of its being required to alter the objects of the company, and what documents should be delivered to the Registrar; and if a company makes default as to the latter it shall be liable to a fine of £10 a day for every day during which it is in default. Clauses 12 to 20 deal with the articles of association and the various documents in connection therewith, which must be sent to the Registrar, and default in complying with the requirements entails a fine for each offence of £1.

Companies not for Profit.

With regard to associations not for profit, it is provided that if the Minister is satisfied that the limited company is to be formed for promoting commerce, art, science, religion, charity, or any other purpose not associated with race interests or political aims, the pursuit of which is calculated to be in the interests of the public, and intends to apply the profits in promoting its objects, then the Minister may direct the association to be registered with limited liability, without the addition of the word "Limited" to its name.

Chapter 2 deals with the distribution of share capital, and here again there is provision for supplying the Registrar with a large amount of information, and if there is default in compliance the penalty is a fine of £5 for each day. Failure to notify the Registrar of increase of its share capital or of increasing the number of members beyond the registered number entails the same penalty.

If a company reduces its capital it shall add to its name, until such date as the Court may fix, the words "and reduced." There are penalties provided.

Chapter 3 deals very fully with the management and administration of a company, and provides that if the name of the limited company is not affixed as directed in the Act it shall be liable to a fine of £5 for every day it is not affixed, while there is a fine for any director, manager, secretary or other officer of a limited company who uses, or authorises the use of, any seal which has not the name of the company upon it, or signs any financial documents or orders for goods without the name of the company appearing, and such person shall also be liable to the holders of the documents.

A Heavy Penalty.

Where a prospectus invites persons to subscribe for shares in or debentures of a company, every person who is a director of the company at the time of the issue of the prospectus, and every person who has authorised the naming of him and is named in the prospectus as a director or as having agreed to become a director either immediately or after an interval of time, and every promoter of the company, and every person who has authorised the issue of the prospectus shall be liable to pay compensation to all persons who subscribe for any shares or debentures on the faith of the prospectus for the loss or damage they may have sustained by reason of any untrue statement therein, or in any report or memorandum appearing on the face thereof, or by reference incorporated therein or issued therewith, unless it is proved that the person had reasonable ground for believing that it was true.

It is provided that a register of mortgages shall be kept at the company's registered offices under a penalty of £50.

The Minister of Justice may appoint one or more inspectors to investigate the affairs of any company, and to report thereon; in the case of a company having a share capital, on the application of members holding not less than one-tenth of the shares issued; if the company has not share capital, then on the application of not less than one-fifth of the members.

There is a penalty for carrying on business with less than the legal minimum number of members.

The procedure for arbitration and power to compromise is dealt with in clauses 103 and 104.

Master of Supreme Court.

There are four columns devoted to the various modes of winding up companies, and then come clauses dealing with the powers of the Master of the Supreme Court. Where the Court has made a winding-up order, the Master has to be supplied with a statement as to the affairs of the company, giving all particulars of assets, debts, liabilities, creditors, the securities held by them, and so on. Then the Master has to submit a report of the company's affairs to the Court.

This statement is to contain the particulars already furnished by the auditors and liquidator, and also state if the company has failed, the causes of the failure, and whether further inquiry is desirable. The Master may also, if he thinks fit, make further reports, stating whether any fraud has, in his opinion, been committed, and any other matters which in his opinion it is desirable to bring to the notice of the Court.

With regard to the clauses dealing with the Master, the Chamber of Commerce report states that the Master's office at the Cape is already overloaded with work, and it seems unnecessary to give the Master the additional work which this new draft Bill seeks to place upon him. If a liquidator's accounts have been audited by a fully-qualified accountant, why should the Master have to do the work all over again? Very few Masters of the Supreme Court would be qualified to make an effective investigation into a company's affairs and report thereon. To make an investigation of this nature one would require to have the training of an experienced accountant.

Practically the whole of the remainder of the Bill deals with the procedure in winding up and what has to be done in special cases, the removal of defunct companies from the register, and the position of foreign companies.



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EDITORIAL.

BUSINESS BEFORE POLITICS.

Last week-end the strike position assumed a more eventful aspect than it had borne since the break up of the Conference. After the move on the part of the more moderate minded faction at Germiston had been frustrated by the extremists, the Federation announced that it had been considering the Prime Minister's offer contained in his letter addressed to both parties when the Conference broke up.

The Federation had apparently spent a great deal of time in considering General Smuts's desire to place the machinery of the Government at the disposal of the disputants with a view to searching all avenues which may possess the semblance of a path to solution.

In point of fact it is probable that the Federation leaders took this step because they sensed a weakening of some of its adherents. The deputation from the S.A.I.F. then waited on the Prime Minister and the Minister of Mines, and on Sunday morning the Chamber of Mines representatives met the Government in Pretoria and offered to suspend

the conditions of the status quo agreement in so far as the mines not classified as low grade are concerned pending a full Parliamentary enquiry. On the following day the Federation leaders again proceeded to Pretoria and after debating with General Smuts and Mr. Malan merely reiterated their original demands and turned down the new basis for negotiation offered by the Chamber. The Federation, it seems, despite all the assurances that it has given to the industry of its intention of bringing forward proposals which would greatly assist in solving our difficult industrial problems merely reiterates its original demands which clearly cannot possibly be conceded. And so long as the present leaders of the Federation are entrusted with the representation of organised labour one cannot feel particularly hopeful as to the likelihood of an early settlement.

Simultaneously with the short-lived progress and breakdown of these negotiations, the political aspect of the dispute which had been worked up to a fever pitch by agitators and party opportunists terminated in a fiasco; and on Tuesday unmistakable signs of a weakening interest in the commando movement were to be observed.

The most noteworthy of these was the amazing disclaimer of Mr. Waterston, who said that he was not responsible for the revolt motion but was only the mouthpiece of returned soldiers.

The chief incidents on Wednesday in Johannesburg were the arrest of five of the agitators and the holding of a meeting at the City Deep of employees of that company on the subject of returning to work. At this meeting opinion seems to have been somewhat sharply divided between British and Dutch employees.

These matters are in reality only side-shows of the dispute, and were it not for the elements of danger that lurk in such fiascos as Waterston's army and Tielman Roos's parliament they might be regarded as the star turns of a political pantomime. The most serious feature of these distractions is that they are tending to deflect public opinion from the real issues at stake.

The dispute is in reality an industrial one. Concisely put, the issue is simply this—Do the gold mines of the Rand belong to the shareholders of these mines or to the South African Industrial Federation?

The Chamber of Mines has very properly pointed out during the past week that the bulk of the shareholders in these mines are not millionaires. The majority of the shareholders are people who do not possess more than 100 shares. Why should these people be compelled to forego dividends just because trades unionism desires that the mining industry shall be compelled to continue working on an absolutely false and uneconomic basis, employing more white men than it has need of and paying more wages than it can afford to?

The facts of the case are quite clear. The Chamber of Mines has published broadcast facts and figures concerning the mines and the disabilities under which they work, which are irrefutable. These facts and figures have never been disproved by the Labour leaders; on the contrary, they have been confirmed by Government Commissions. There is nothing in the case which calls for arbitration, simply because there is no controversy upon which to arbitrate.

The Chamber of Mines has no more right to submit the present dispute to arbitration than the present Government has a right to decide by arbitration whether Smuts or Tielman Roos and Bob Waterston shall rule in Pretoria. If the Chamber agreed to arbitration in regard to the future management of the mines its members would be just as guilty of a serious breach of faith to the shareholders in the mines as the Government in seeking arbitration to decide which party rules South Africa would be guilty of breaking faith with the electorate of the public who put the Government into office.

There is a very real danger of the true industrial aspects of this dispute being lost sight of in a smoke screen which

is being created by political opportunists. But the real facts of the position remain unaltered and unalterable. Until the present leaders of the men are prepared to recognise these facts or else make way for men who will recognise them a speedy and satisfactory settlement of the trouble can hardly be looked for.

One cannot be surprised at the fact that the Chamber withdrew its offer on Wednesday. With gold back to less than 95s. per oz. and with the disastrous effects of the prolongation of the strike becoming more pronounced every day it is clear that this is not the time for concessions of any kind.

EXCESSIVE COSTS.

The Transvaal Chamber of Mines has recently published an interesting table exhibiting a few examples of the results of certain companies during 1921 with gold at an average price of 105s. and what the results would have been had gold been at its present price of 97s. 7d. and if gold had been at par, with working costs remaining the same. The figures for a dozen mines are:—

Mine.	Results for 1921. £	Results at 97/7. £	Results at par. £
Aurora West ... P.	5,886	L. 7,536	L. 27,579
New Goch ... P.	6,557	L. 11,009	L. 38,237
Roode. U.M.R. ... L.	14,309	L. 36,432	L. 67,803
West Rand Cons. P.	54,978	P. 10,847	L. 56,599
Robinson Deep ... P.	185,638	P. 106,889	L. 25,547
Crown Mines ... P.	672,030	P. 372,392	L. 16,093
Durban Deep ... P.	36,490	L. 12,434	L. 77,681
Rose Deep ... P.	124,907	P. 51,631	L. 43,931
Village Deep ... P.	112,746	P. 28,409	L. 82,889
Cons. Langlaagte.. P.	167,912	P. 112,688	P. 21,326
Langlaagte Estate P.	144,749	P. 89,360	L. 3,586
Randfontein ... P.	225,242	P. 59,557	L. 210,164

For 1921 the average working cost was 25s. 8d. per ton, while in 1914 it was 17s. 8d. per ton. The Chamber, in publishing this compilation, aptly remarks: "The above table must make every thinking man realise how imperative it is for the industry, with gold falling in price, to get the cost of production down." The latest price of gold is 94s. 9d. per oz.

Explosives and Chemical Works

IMPORTANT FORTHCOMING PUBLICATION.

The "S.A. Mining and Engineering Journal" has now in preparation a special illustrated supplement dealing with explosives and chemical works of the Union. Several of the principal firms having factories of this nature are giving their active support to the publication, which will be issued as a supplement to the ordinary weekly issue of the journal. Special commissioners are now visiting the various works, and the results of their investigations will be published in the supplement in the form of full, descriptive and illustrated articles. The supplement will also contain valuable data as to the quantities of explosives, fertilisers, chemicals, etc., produced in the Union, methods of manufacture and details as to markets and consumption. Prospective advertisers and manufacturers of chemicals, etc., interested in this supplement are advised to communicate with this office at the earliest opportunity.

Notes & News.

Mr. Bleloch's Proposals.

Mr. W. Bleloch has submitted certain proposals for settling the present difficulties on sound economic lines, and it is understood that the S.A.I.F. has given his memorandum consideration. Pressure on space prevents us from

dealing with the whole of Mr. Bleloch's suggestions, some of which appear to be of rather problematical value. But the memorandum constitutes an impartial and unbiassed effort to propound some thesis of which a portion is capable perhaps of being used as a basis of settlement. There are several admirable points in Mr. Bleloch's memorandum. There is, for example, a very profound and valuable bit of philosophy in the following: "To the leaders of the Federation I will say that, although it may sound paradoxical, it is usually true that the strike weapon is only of use before it is used."

And the following paragraph is eminently sensible:—
*It is impossible to lay down regulations for all mines alike, whether on the lines of a definite ratio of black to white or otherwise which will be suitable or workable for each individual mine if efficiency is to be attained. The native labour required for the work in each mine, whether the working places be shafts, winzes or raises, stopes or drives, or for any other work in or on the mines, are matters which should be left in the hands of the management and the men concerned to arrange for according as commonsense dictates and according to the requirements of each specific place or work. Always provided that the present works regulations are complied with—that is the "colour bar"—for skilled work affecting life and limb shall not be removed.

*Note.—It is quite impossible to lay down any ratio. On Meyer and Charlton, with 48' to 55 inch stope on 24 deg. dip, a man can comfortably run 40 boys, while on the Roodepoort United, with a narrow reef, steep dip 60 per cent. and faulted, it is harder work to run 20 boys.

Developments in the Klerksdorp District.

Renewed attention is being directed towards the possibilities of this district, says the *Klerksdorp Record*. The rejuvenation of some of the derelict mines has actually commenced. Following on the reopening of the Atrikander Mine noticed in our columns recently, the claim area of the New West Bonanza Gold Mine has been repegged. A strong syndicate is in process of formation to work the property, and pumping will be proceeded with at once in order to dewater the mine and to restart operations underground while the mill and cyanide plant is being re-erected. A considerable quantity of mining material is now on the ground, and it is further proposed to crush the rock in the mine dump, which has been sampled and goes upwards of 3 dwts. unsorted. The large tonnage of sand and slimes will also be retreated and will return a good yield when treated by modern methods of extraction. This district contains several derelict mines which would bear further investigation in order to revive the gold industry of the Western Transvaal, the old Wolf-skal, the Homestead, the Jooste and other properties are all open at present and would give good returns on a moderate capitalisation. A property of very considerable possibilities, the Riet Kuil, has also been taken up by certain people here, and will in due course be re-equipped on a modern basis. The Riet Kuil formerly belonged to Messrs. Neumann's, and a very large amount of money has been spent on the development of the mine. Several thousand tons of 7 dwt. ore are lying at grass awaiting treatment. Thousands of feet of development work has been done showing good average values, and there is no reason why this property should not become a steady gold producer on a 50-stamp milling basis. When it is remembered that the district is extremely healthy and within about eight miles of the Kimberley-Johannesburg main line, with a good motor road to the mining area, there ought to be a steadily increasing mining activity in process, and we shall be very pleased at any time to furnish information which will be helpful to those who may desire to participate in the growth of this new-old mining district.

South African Trade with America.

South African trade with the United States during December was practically the same as in November, according to cable advice from the Department of Commerce

to the American Trade Commissioner, Mr. P. J. Stevenson. American imports of South African products were again \$200,000, while American exports totalled \$1,600,000, which is slightly under the figure for the previous month. In the last half of 1921, the United States imported directly, South African raw materials to a value of \$1,768,000. It is probable that the indirect imports, largely through England, were vastly in excess of this figure. Exports from the United States were \$8,700,000, making the total commerce between the two countries during this period, \$10,468,000, as compared with \$57,763,107 in the first half of 1921, when American exports were \$46,925,067, and imports were \$10,838,040.

Conditions in the United States in December may be described as spotted. On the one hand, production has been increasing slightly, money is plentiful and interest rates are declining. On the other hand, the unfavourable factors include heavy commercial failures, and irregular prices. American oversea commerce in December continued to show an upward trend in imports, while exports were stationary.

* * *

The Seitz Diamonds.

In the report of the Union Auditor-General for 1920-21, the following appears under the head of "Mining Royalties":—"A sum of £235,040 12s. 10d., being tax in connection with a parcel of diamonds known as the 'Seitz diamonds.' The last shipment of diamonds from South-West Africa during the German occupation took place on July 27, 1914. Stones produced subsequent to that date were, on the advance of the Union troops to Luderitz, despatched to Windhoek on instructions from Governor Seitz for safe keeping by the Treasury. These stones were subsequently removed by the Germans and hidden in the Grootfontein district, but were afterwards handed over to the British Military Governor in terms of an agreement entered into with the said German Governor. The stones in question were sold after the cessation of hostilities in terms of an agreement with the London Diamond Syndicate. The proceeds were disposed of in accordance with the German laws. The sum of £248,000, the estimated amount of tax in connection with the Seitz diamonds, was actually credited to revenue. The difference will be deducted from the amount payable to revenue during the current year in respect of diamond tax, the amount of the final assessment being considerably greater than the amount credited upon provisional assessment. The amount of the assessment of the diamond tax for 1919 was £931,921. After the schedules of assessment had been scrutinised, the tax was finally assessed at £1,006,984. This amount will be paid over to revenue during the current year, less the sum assessed in respect of the Seitz diamonds."

Sir Henry Strakosch has left the Rand for England.

Mr. F. G. A. Roberts, Technical Adviser to the Transvaal Chamber of Mines, has left the Rand for a well-earned six months' holiday in Europe.

What man in possession of his senses would put money into a losing venture (with a very limited life under the best of conditions) like the E.R.P.M. when he can get 3½ or 4 per cent. in a Post Office Savings Bank with capital and interest guaranteed by the State? The mines of the Rand have simply to put their industrial houses in order and reduce costs to such a level that they can at least pay their way, or else they will have to close down. No conferences or arguments or arbitrators can alter these unassailable facts, and the labour leaders in wilfully distorting the issue and camouflaging the facts by a smoke screen of political clap-trap are doing the country and everybody in it an immeasurable amount of harm.

TRANSVAAL ALLUVIAL DIGGINGS IN 1921.

The complete monthly returns for the South-Western Transvaal alluvial diggings for last year were as follows:—

	Carats.	Value.
January	4,281½	£22,719
February	4,376½	20,272
March	5,178	26,227
April	6,734½	35,177
May	5,084½	29,972
June	5,353¾	27,444
July	5,919	38,640
August	5,687	41,990
September	6,427	49,411
October	6,141	40,048
November	5,399¾	35,684
December	5,257¼	33,418
Total for 1921	65,839¾	£401,002

The Producing Areas.

To the year's output there were 84 different contributing areas, and an analysis of the returns for the twelve months shows that the output of the principal individual diggings for the year was as under:—

	Carats.	Value.
Blesbokfontein	9,335½	£53,439
Kameelkuil	7,551¾	48,163
Kareeboom	6,441½	36,469
Schweizer-Reneke	4,096¾	28,189
Zwartlaagte	4,332¼	25,398
Bloemhof	3,883½	22,876
Kareepan 137	3,634¾	22,589
Plessisdam	3,638	20,371
Syferfontein	2,954½	19,021
London	3,081¼	18,073
Leeuwfontein	2,393	15,563
Kareepan 161	2,300	14,010
Rietkuil	2,069¼	11,883

Building the British Trade Ship.

Active preparations are being made for the "Trade Ship" which is to be built to carry samples of British manufactures and other products on exhibition to all parts of the world. The builders of the ship are obtaining provisional tenders for the various parts and fittings. Not only will the ship itself be a demonstration of British engineering, but every part of it will constitute an exhibit. Care is being taken to select only those component parts which will represent the best in British production. Keen rivalry is expected in this connection. The vessel is expected to sail from London in the autumn of next year on a voyage which will occupy eighteen months.

A Steam-Petrol Engine.

An entirely novel type of engine is dealt with in "The Motor." This new engine, which may ultimately revolutionise all forms of mechanical transport, works on the principle that the waste heat of an internal-combustion engine is used to keep the exhaust of a steam engine continually in the form of steam, while the power of the engine re-compresses it so that it is used over and over again. The steam engine is coupled up to the driving wheels of the vehicle or whatever it is wished to drive, and instead of a boiler there is an internal-combustion unit, which serves two purposes—firstly of reheating the exhaust steam so that it does not condense back into water; and, secondly, of compressing it so that it can be used again in the steam engine,

Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the Journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

Breyten Collieries.

An extraordinary general meeting of shareholders of the Breyten Collieries, Ltd., will be held in the Board Room, Consolidated Goldfields Buildings, Johannesburg, on Monday, 10th April, 1922, at 10 o'clock in the forenoon, to consider the advisability of, and, if thought fit, passing the following resolutions, as extraordinary resolutions, under the Companies' Act, 1909, of the Transvaal Province:—(1) That it has been proved to its satisfaction that the Company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same, and accordingly that the Company be wound up voluntarily; (2) a resolution appointing a liquidator or liquidators and giving them any special directions that may be deemed necessary in connection with the winding-up of the Company and fixing his or their remuneration. The share transfer books of the Company will be closed from 1st to 10th April, 1922, both days inclusive. All proxies to vote at the above-mentioned meeting may be lodged at the head office of the company at any time before the meeting, or may be delivered to the secretaries up to the time of the opening of the meeting.

Rhodesian Dividends for 1921: Total Mining Distributions to Date, £8,201,821.

For the year ended December 31 the mining companies of Rhodesia distributed the following dividends:—

Name of Company.	Rate declared or its equivalent subject to income tax. Per cent.	Amount absorbed.
Gaika Gold Mining Co., Ltd.	12½	£34,187
Globe and Phoenix Gold Mining Co., Ltd.	11½/7	228,571
Lonely Reef Gold Mining Co., Ltd.	30	81,302
Rezende Mines, Ltd.	40	48,000
Rhodesia Broken Hill Development Co., Ltd.	10	35,000
Shanva Mines, Ltd.	30	180,000
Wankie Colliery Co., Ltd.	10	56,733
Total		£663,793

The total cash dividends declared by Rhodesian mining companies to December 31, 1921, amounts to £8,201,821. This figure does not take into account dividends declared by Rhodesian development and miscellaneous companies in cash or scrip amounting to over £3,800,000, net dividends paid by local Rhodesian mining companies and syndicates, not distributions effected in the form of return of capital.

The total of £663,793 declared during the year ended December 31, 1921, is the third highest on record. During 1920 a total of £1,056,840 was declared, but this figure was swelled by the fortuitous inclusion in that year of certain dividends from profits made in the previous year.

The following dividends also have been declared by Rhodesian development and miscellaneous companies during the year ended December 31, 1921:—

Name of Company.	Rate declared or its equivalent subject to income tax. Per cent.	Amount absorbed.
Beechuanaland Exploration Co., Ltd.	8½	£25,074
Beechuanaland Trading Association Ltd.	2½	1,319
Charterland and General Exploration and Finance Co., Ltd.	15	24,572
Crescens (Matabele) Mines and Land Co., Ltd.	10	7,271
Exploring Land and Minerals Co., Ltd.	5	13,765
Gold Fields Rhodesian Development Co., Ltd.	10	125,711
Mashonaland Agency, Ltd.	4	8,257
New Bulawayo Syndicate, Ltd.	10½/7	4,896
Rhodesia Copper and General Exploration and Finance Co., Ltd.	12½	22,001
Rhodesia Land Bank, Ltd.	5½/7	10,000
Tobacco Co. of Rhodesia and South Africa, Ltd.	7½	5,000
Total		£247,866

S.A. Banking in 1921.

Deposits in the South African banks steadily declined from £102,331,940 at December 31, 1920, to £90,747,977 at September 30 last, and the restriction in business is also reflected in the returns from the bankers' clearing houses at the principal centres, which show material all-round reductions compared with the previous year. The proportion of advances to deposits, on the other hand, still remains at the high figure of approximately 83 per cent., and evidences the assistance given by the banks in financing the country through difficult times. The stability of exchange rates on London, which fluctuated during the year within the comparatively narrow margin of 2½ per cent., has been a satisfactory feature in view of prevailing conditions.

A Year's Imports and Exports.

Trade returns for the complete year are not yet available, but for the 11 months ended 30th November last the total imports of merchandise (excluding specie and articles for the South African Government) were valued at £48,635,403, as against £87,385,232 for the corresponding period of 1920. Lower prices are responsible for part of the decline in total value, but there has also been a material decrease in the tonnage of goods imported.

Exports (including re-exports) for the same period of 1921 were valued at £58,147,961, compared with £79,638,175 for the previous year, the decline being due mainly to the lower prices obtained for produce and to the falling off in the demand for diamonds. If allowance is made for Government imports and for specie it appears likely that the trade figures for the whole year will approximately balance, whereas in the previous year imports exceeded exports by about 21½ millions.

Harmony Proprietary.

According to the "Zoutpansberg Review," Mr. J. F. Stewart, the General Manager of the Harmony Proprietary Company, Ltd., is on a business visit to London, and on his return, in March or April, there is reason to believe that this Company's large and valuable estate will be developed on an extensive scale.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining and Metallurgy.

Liquid Air Explosives.—*Iron and Coal Trades Review*, Jan. 6, p. 14.

Correlation of Metallurgical Statistics.—*Journal of the C.M. and M. Society*, December.

Coal and Coke.

Froth Flotation Process and Metallurgical Coke.—*Iron and Coal Trades Review*, Jan. 6, p. 2.

The Full Utilisation of Bituminous Coke.—*Iron and Coal Trades Review*, Jan. 6, p. 4.

The Upkeep of Colliery Plant and Machinery.—*Colliery Guardian*, Jan. 6, p. 40.

Service Bookers for Coke Ovens.—*Colliery Guardian*, Jan. 6, p. 39.

Gas Coals and Refractories.—*Colliery Guardian*, Jan. 13, p. 91.

Engineering.

The Value of Standardisation.—*Iron and Coal Trades Review*, Jan. 6, p. 17.

The Holman Drill Sharpener.—*Iron and Coal Trades Review*, Jan. 6, p. 12.

Light Railways.—*Colliery Guardian*, Jan. 6, p. 30.

Purchasing Second-hand Boilers.—*Colliery Guardian*, Jan. 6, p. 39.

Iron and Steel.

Research in the Steel Industry.—*Iron and Coal Trades Review*, Jan. 6, p. 9.

Commercial Electrolytic Iron.—*Iron and Coal Trades Review*, Jan. 6, p. 11.

Iron and Steel Trades in 1921.—*The Engineer*, Jan. 6, p. 3.

The Latest in Steel Rails.—*Scientific American*, Jan., p. 3.

Iron and Steel Works of the Broken Hill Proprietary Company, Newcastle, N.S.W.—*Iron and Coal Trades Review*, Jan. 13, p. 35.

Electricity.

Electric Colliery Locomotive.—*Iron and Coal Trades Review*, Jan. 6, p. 12.

Oil.

Developments in Oil Fuel Burning, 1921.—*Oil Engineering and Finance*, Jan., 1922, p. 33.

Geology.

Igneous Rocks of the Province of Huelva and the Genesis of the Pyritic Ore Bodies.—*Bulletin of the Institution of Mining and Metallurgy*, Jan., 1922.

Asbestos.

Milling Asbestos Ore in Quebec.—*Mining and Scientific Press*, Dec. 31, p. 932.

Metals.

The Fatigue of Metals.—*Bulletin No. 124, University of Illinois*.

ELECTRIFICATION OF ITALIAN RAILWAYS.

It is announced from Rome that a report has been laid before the Senate relating to the authorisation given to the Railway Administration to raise a sum of 440 million lire for special works. At the present moment electric traction is employed on 559 kilom. of line with a length of rails aggregating 1045 kilom. The complete electric plant is about to be put into operation for the whole Ronco line, thus completing the electric equipment for the entire Turin-Rome line. The electrification of the direct lines Ronco-Arquata-Tortona, Tortona-Novì, Voghera-Bivio-Bornida and Genoa-Ovada-Alessandria has been begun. It is hoped to complete very shortly the electrification of the Rome-Tivoli and the Rome-Anzio-Nettuno lines, after which the works for the electrification of the direct Rome-Naples line will be pushed on. Thus at the beginning of 1923 another 500 kilom. of electrified lines may be completed with 1370 kilom. of rails.

But since the electrified lines would be useless without electric locomotives, and the construction of the latter takes from eighteen to twenty-one months, the Railway Administration has been obliged to give orders already, beginning with one for 111 locomotives, at a total estimated cost of 165 million lire. Some of these locomotives will be used to complete the equipment of the lines already in use, and the remainder will serve for those in course of electrification. The proportion of the 111 locomotives, however, destined for use on the lines to be electrified by the beginning of 1923 is considered insufficient by the Railway Administration by a decree law to raise 169 million lire for the acquisition of 120 additional electric locomotives.

There is one aspect of the present strike on the Rand which so far has received little notice. But it is a matter of very great importance, and therefore deserves considerable attention. If South Africa is to continue in its position as the leading gold producing country of the British Empire and of the world, large sums of money will have to be found during the next few years for the expansion of mining operations. Whatever the outcome of this strike may be, it is certain that several mines have but a limited life. Provided working costs can be reduced to a reasonable level and the efficiency of the labour force can be brought up to something approaching the level of efficiency in other mining fields, there should, however, be a long period of comparative prosperity before the Rand, because there are enormous tonnages of low grade ore in the so-called rich mines which cannot be exploited under the conditions which recently have obtained. And if ability to work these low grade tonnages at a profit is shown capital will be forthcoming for the development of new areas, and particularly those in which the Government and therefore the people of the Union have a big interest as leaseholders. But if working expenses are not reduced to a reasonable level and if Trades Unionism is going to continue a policy of harrassing the mines at every turn, it is certain that capitalists will fight shy of South Africa. They will turn to other fields where returns are more attractive and where there is less Labour obstruction and more freedom from political-industrial attempts at revolution which are fast reducing the stability of South Africa to the level of a Central American Republic.



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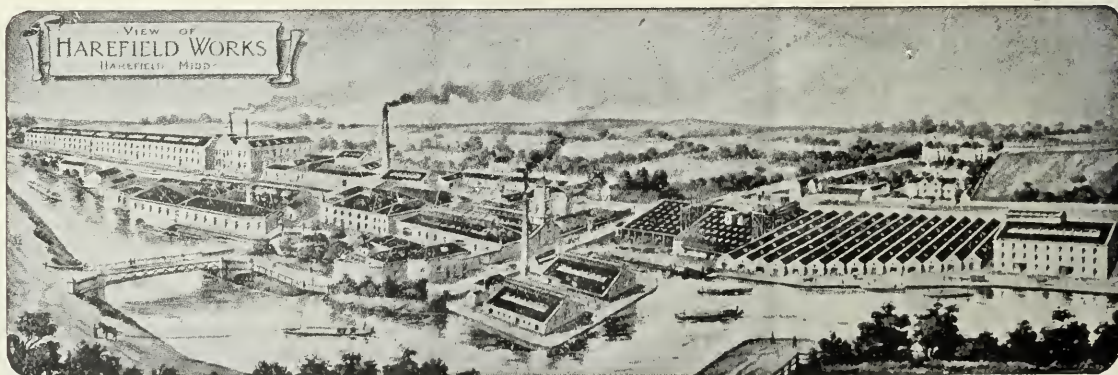
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ENGINEERING SECTION.

Randfontein Central.

HOISTING EQUIPMENTS.

The hoists shown in the accompanying photo are installed at the north deep and south deep shafts, Randfontein Central Gold Mining Company, Limited, and are designed to raise a load of rock of five tons from a vertical depth of 5,000 feet, or a total load of 22½ tons at a maximum speed of 4,000 feet per minute.

These hoists are operated on the "Ward Leonard" system, each hoist having two direct current motors carried on extensions of the drum shaft. The normal rating of each motor is 2,500 h.p., with a maximum capacity of 5,000 h.p.; the combined effort, therefore, will be capable of a maximum output of 10,000 h.p. for each hoist.

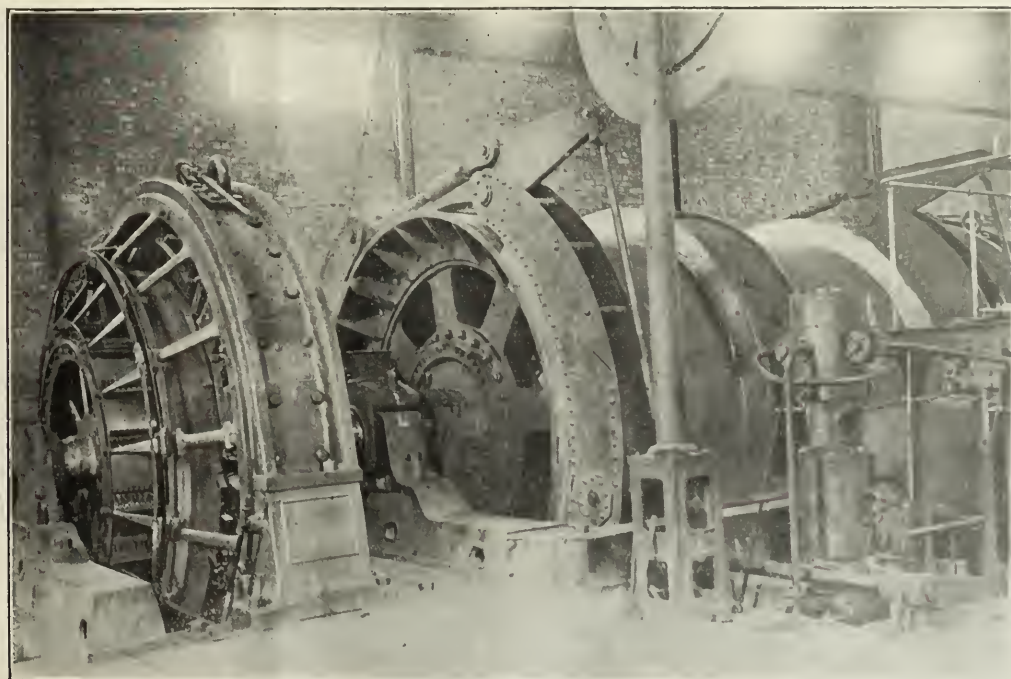
The converter set supplying these hoists with power consists of one induction motor with a normal rating of 5,000 h.p., driving two generators with a normal rating of 4,000 K.W.

A novel feature of these hoists is that they are provided with a special dynamic braking arrangement, designed by the consulting mechanical engineer of the J.C.I. Group, which makes it practically impossible for the skip either to run away or to be too abruptly retarded. Such an accident, therefore, as occurred at the Meyer and Charlton some years ago would not occur under similar circumstances here.

The power for driving the hoists is supplied by the Randfontein Estates Power Station, the operating pressure being 2,000 volts on the alternating side and 600 volts on the D.C. side.

The electrical portions of the hoists were manufactured by the General Electric Company, U.S.A., and the mechanical portions by Messrs. Fullerton, Hodgart and Barclay, Paisley.

Political opportunists are seeking to make all the capital they can out of the present dispute, which is purely an industrial dispute and should in no way be confused with party politics. They are helping to propagate the falsehood that the Chamber of Mines seeks to remove the Colour Bar. This is an absolute lie and the dissemination of this malicious falsehood is helping to prolong the strike and to bring ruin to this country which depends so largely on the Gold Mines of the Witwatersrand. All that the Chamber of Mines has proposed to do is to introduce certain measures of reform calculated to reduce working costs with the object of saving several of the large low grade mines from closure and with a view to enabling the richer mines which have only a limited quantity of high grade ore to work their huge tonnages of low grade ore, thereby prolonging and expanding the life of the industry.



Randfontein's New Winders.

South Africa's First Giant Grain Elevator.

So much has been heard of the grain elevator contract of late that a few technical details regarding the Durban installation may be of interest.

The elevator is being constructed at Congella Wharf, Durban, under a contract amounting to £1,250,000. The site covers three acres, so that there will be ample room for future extensions or accessories as may be necessary. The work was started in March last, and is expected to occupy over four years. This great structure will be built on reclaimed ground and to do this effectually scientific engineering skill and experience is required. An enormous amount of draining is continually going on necessitating the laying down of a huge pumping plant capable of drawing away 20,000 gallons of sea water per day. In order to protect the foundations of the grain elevator from flooding, they have to be completely surrounded by sheet steel joists approximating in weight about 900 tons, and each 36ft. in length. Every one of these joists must be driven into the ground to a depth of 35ft. and this is accomplished with the aid of four immense steam pile-drivers, 60ft. high, and a steam hammer weighing approximately $4\frac{1}{2}$ tons. This hammer, holding the upper end of the steel joist in a powerful cramp, keeps up a continuous beating, averaging 120 beats per minute. In nine minutes this steam giant crushes into the earth a steel joist to the depth of 35ft., and it has been known to accomplish the feat in seven minutes. The force of each blow is $4\frac{1}{2}$ tons.

To reach the beds for the foundations, excavations must be made through a 4ft. surface of sand and 32ft. of clay. The foundation beds will be covered by two solid slabs of concrete each 4ft. thick. The beds will have to support 3,400 piles of reinforced concrete, composed of 36,000 steel rods, and squares to hold the mixture. Each pile is 36ft. long and 15ft. square, and weighs $3\frac{1}{2}$ tons.

NEW TYPE OF S.A.R. LOCOMOTIVE.

During the past two years, says the *S.A. Railway and Harbours Magazine*, five locomotives of a type totally new to this continent have arrived, and have been put in service on the South African Railways. They are of the Garratt articulated type, and are of three different designs. There are three of the 2ft. gauge; one is a light type for use on 45lb. standard gauge rails, and the last a heavy main line locomotive. Two of the narrow gauge engines have been working on the Stuart's Town line, and the third on the Aventura line; the branch line engine is on the Natal coast lines, and the large one on the Natal main line.

A "Garratt" locomotive is made up of three distinct units: two bogies, each carrying a pair of cylinders and a set of coupled wheels, and a boiler on a rigid plate frame. Tanks are carried on the bogies, and thus a "Garratt" engine appears unlike the usual locomotive, its most peculiar feature being the tanks, one in front of the smoke box and the other behind the cab.

Perhaps the most interesting feature of the "Garratt" locomotive, says the magazine, is the large boiler it is possible to apply. The designer is free to develop the firebox, not being encumbered by the limiting factors of frame clearance or coupled wheels, the presence of a bissel truck, and an easily accessible ashpan can be fitted. A large boiler barrel is possible, as the clearance between the boiler cradle frame can be arranged to suit. In the large locomotive the outside diameter of the middle ring is 6ft. 9in. diameter. The Belpaire firebox is very deep, thus giving large volume without the complication of a combustion chamber.

The large "Garratt" is an engine of great tractive power, and is larger by forty tons than any previously constructed locomotive of this type. Although, therefore, be-

The manufacture of these concrete mammoth piles proceeds at the rate of 41 per day, in detachable mould boxes.

Before anything is put into the mould boxes, each box is well white-washed, and allowed to dry thoroughly. The steel rods and squares are then placed inside, and the concrete mixture poured in. When the box is full the mixture is allowed to thoroughly harden, after which the sides of the moulding box are taken away and the pile is left to itself for some days. Then it is turned over, the bottom of the moulding box removed, the top of the pile covered with sand, and left to await the time when the pile will be driven into the earth.

Three Ransom mixers are used. The water necessary for mixing is carried through a net of piping 12,000ft. in all. Over 900 concrete piles are already finished, and in the pile yard are from 4,000 to 5,000 tons of stone and Umgeni sand. Sixty days are allowed to elapse from the time of pouring the mixed concrete into the moulding before a pile can be driven. Excavating through 4ft. of sand and 31ft. of hard clay is proceeding at the rate of 500 cubic yards per day. Thirty iron steam-hauled dumping wagons are being used. Fifteen white mechanics and white handymen are employed besides 450 boys. This labour will not suffice in the future, for the contractors intend working a night as well as a day shift, and for this purpose have erected a large electric plant carrying 15,000 candle power flood lights, ready for the increased staff that will be required when the concrete piling is ready. This mammoth grain elevator is designed for the storage of grain in bulk and direct loading into ships—a serious want that South Africa has experienced for a long time past. The capacity will be 48,000 tons of maize, and when the grain elevator is completed in its entirety Durban will have one of the largest in the world.

ing somewhat experimental, engine 1649 must, at any rate, be given credit for being the highest powered locomotive in the world designed for and working on 1 in 30 grades and 300 feet, radius curves at the customary speeds for such conditions.

This type of articulated locomotive, being primarily designed to enable a large boiler of straightforward design to be used on a narrow gauge railway, has doubtless many other attractive features; and while the development of the idea is only emerging from comparative infancy, it is perhaps not too optimistic to expect that the "Garratt" locomotive will command a big field in the future, and probably give another lease to the steam locomotive.

The Assistant General Manager, Durban, in his report for the quarter ended September 30, says that the "Garratt" engines in Natal continue to work satisfactorily.

Better Roads without Expense.

In districts where traffic has increased or has grown more serious by the change from horses to motors, road engineers are apt to be pessimistic about the heavy cost of bringing the road up to the higher standard necessary. In one British city, however, the road engineer has cleverly contrived to make the change without demanding any increase in the rates for road making and maintenance. The secret of his success lies in the skilful use of materials having a long life. He claims that a good water-bound road, eight yards wide, painted or sprayed with tar, can stand 400 to 600 tons of mixed traffic per day. For roads carrying 80 to 100 omnibuses tar macadam on a sound foundation is economically satisfactory; and on roads with 300 to 400 tons per day clinker-asphalte or a similar surface is sufficient. In one case a road was laid with clinker-asphalte four years ago and shows no signs of deterioration although the traffic amounts to 6,000 tons per day.

Big Engineering Contracts.

Three months ago there was much discussion in the press over the award of a large contract for the supply of steel pipes by the Rand Water Board to a German firm. The German tender was about £270,000 and the lowest tender of a British firm was £117,000 more in amount. Naturally, a good deal was said about the decadence of British engineering, and doleful prophecies were made about the decline of British trade. The difference in the amounts of the tenders was startling but, apparently, it was due to a strong attempt by Germany to gain a foothold in the South African market. The effort has not been sustained, and it is only fair to notice the less sensational events which have happened in connection with other and similar engineering contracts since that time. In every case British firms have been successful in the face of severe competition from all over the world. We recently announced that the Metropolitan Vickers Company had obtained the contract, to the amount of over three-quarters of a million sterling, for the supply of material, including seventy electric locomotives, needed in connection with the electrification of the Glencoe-Maritzburg section of the South African Railways. And this large contract is not singular. The Rand Water Board is constructing a large barrage across the Vaal River and has been calling for tenders for the supply of a considerable

amount of plant and material for this purpose. It had occasion a few days ago to consider the tenders for the supply of pipes similar to those for which the German firm obtained the contract three months ago. The positions are now reversed, the lowest British tender is considerably lower than the lowest German one, and the price per ton of steel of the German tender is about 20 per cent. higher than it was for the successful German contract obtained three months ago. The recent British price is only about three per cent. higher than that for the pipes then ordered from Germany. All the Rand Water Board's contracts, too, for such complicated plant as boilers, turbo-centrifugal pumps, and electric generating sets, have been awarded on an economic basis to British firms. The *Cape Times* says that the successful British tenderers have agreed to all the conditions laid down by the Board, the prices are firm, and the time for delivery is satisfactory.

The s.s. "Sandown Castle," the first oil-burning steamer of the Union-Castle Line, which has recently been delivered by the builders, sailed from Southampton on the 24th December for New York, where she will load for South African ports.

INDUSTRY AND SCIENCE.

Prof. R. B. Young presided over the quarterly session of the Advisory Board of Industry and Science, which was held at Capetown last week. There were also present Col. W. Arnott (president of the South African Agricultural Union), Mr. W. J. Laite, Prof. B. L. St. J. van der Riet, Sir Carruthers Beattie, Prof. G. H. Stanley, and Dr. J. D. P. Gilchrist, together with Dr. E. P. Nobbs (Director of Agriculture, Southern Rhodesia, representing the Rhodesian Government) and the following Government officials: Dr. H. J. van der Byl (scientific and technical adviser to the Government on industrial questions), Col. A. K. Harvey (officer in charge of the Industries Division), and the secretary (Mr. A. C. Marsh), Mr. Warington Smyth was prevented from attending owing to the labour troubles in Johannesburg. The proceedings were not open to the Press, but it is understood that among the matters discussed was the question of by-products obtainable from an electric power generating station (in view of the early electrification of railways), fisheries survey, the manufacture of alcohol for industrial purposes, soil erosion, and the

point as to whether anything can be done for Kimberley in the way of industrial development to relieve the depression caused by periodical slackness in the diamond trade and consequent unemployment in connection with the mines. During the proceedings a discussion on general matters took place between the Board of Industry and Science and the newly-formed Board of Trade and Industry (a Board to deal with Customs and railway tariffs). It might be mentioned that the Advisory Board of Industry and Science has been in existence since 1917. It was re-organised in October, 1920. Its purpose is to advise the Government on questions affecting the development of the resources of the country, particularly those things that concern the establishment of industries. In addition to that, it is permitted to initiate matters which, in its opinion, are of sufficient importance to warrant their introduction for development purposes. In view of its advisory capacity, all its deliberations are conducted in private; but an annual report is prepared, presented to Government, and published in the usual way. The account of the year's work is always rendered promptly. As a matter of fact, the report for 1921 has already been completed, and will be submitted to the Government in the course of a few days.

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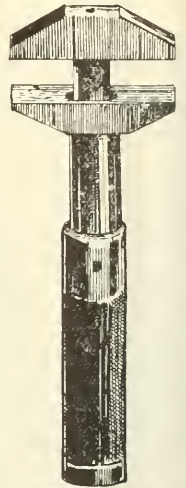
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The Week in the Sharemarket.

PRICES KEEP FIRM—GEDULDS A FEATURE—DIAMONDS BETTER.

The local share market keeps remarkably firm, and as indications are not lacking that a large number of men on strike are anxious to return to work it is generally felt that prices are likely to improve despite the declining price of gold. Gedulds have been a strong feature throughout the week and diamond shares are also better. Business before High Change on Thursday was moderate in amount, but prices were firm. Springs Mines were bought at 36s. 9d. and 37s., Nourse Mines at 9s. 3d., Consolidated Diamonds at 15s. 6d., and £1,000 Debentures at £112 10s. On the Call there was considerable inquiry for several stocks and Gedulds were bought in some numbers at 48s. 9d., an advance of about 6d. Springs Mines were 1s. 6d. higher at 37s. buyers. Modder Easts were better at 5s. 10d. and 5s. 11d. sales. Anglo-Americans were 6d. up at 19s. 3d. sales. Brakpans about 1s. at 45s. 6d. sales. Randfonteins were 7½d. higher at 16s. 1½d. sales, etc. New Modders, City Deeps, Van Ryn Deeps, Modder Deeps and Modder B. were unchanged. Consolidated Diamonds were 7½d. higher at 15s. 7½d. sales. Frank Smiths and Crowns slightly harder, etc. Tin shares were inactive. Pretoria Cements were about 1s. higher at 41s. and 41s. 3d. sales; Transvaal Silvers higher at 21s. 6d. buyers, and Alkali firm but inactive. Union 5 per cent. Tax Free Loan was easier at £100 sales, and the 4½ per cent. Loan steady at £92 10s. sales.

	Fri. 3rd.	Sat. 4th.	Mon. 6th.	Tue. 7th.	Wed. 8th.	Thurs. 9th.
Rooibergs	3 7½	1 0*	3 0*	3 0*	3 0*	4 0*
S.A. Lands	4 1	1 1*	4 0*	4 1*	4 1*	4 0*
Springs Mines	31 6	34 9	34 9	35 0*	35 6*	37 0*
Sub-Nigels	9 3*	9 3*	9 3*	9 3*	9 3*	9 6*
S.A. Alkali	12 9*	12 9	12 6*	12 6*	12 9*	12 9*
S.A. Townships	8 3*	8 3*	8 6*	8 3*	8 3*	8 6*
Transvaal Lands	15 6†	11 0*	—	—	—	—
Trans. G.M. Est.	6 9*	—	6 6*	—	6 6*	—
Transvaal Silvers	20 6*	21 6	21 0*	21 0*	21 0a	21 6*
Tudors	0 8	0 7*	0 8	—	—	0 6*
Van Ryn Deeps	61 6†	—	60 6*	61 6	62 0	62 1
Village Deeps	6 0*	—	—	7 0*	—	—
West Springs	6 6*	6 0*	6 6	6 6	6 4*	6 7½*
West Rand Cons.	—	—	—	—	2 0†	—
Western Rand Est.	3 3	3 0*	2 8*	3 0*	3 0*	3 0*
Withank Colls.	35 6	—	34 9*	34 6*	34 6*	—
Wit. Deeps	7 1*	—	7 6*	7 9*	8 0*	8 0*
Zaaiplaats Tins	2 9*	2 9*	2 9*	2 9*	2 9*	2 9*
Union 5 per cent.	£100½	£100½	£100½	£100*	£100½	£100

* Buyers. † Sellers. a. Odd lots. b. Ex London.

	Fri. 3rd.	Sat. 4th.	Mon. 6th.	Tues. 7th.	Wed. 8th.	Thurs. 9th.
Anglo Am. Corp.	18 0	18 6	18 0	18 3*	18 9	19 3
Apex Mines	—	10 6	7 0†	7 0†	7 0†	—
Bantjes Cons.	6 6*	6 6*	6 6*	6 3*	6 3*	6 3*
Brakpan Mines	—	—	45 0†	44 0*	41 6*	45 6
Breyten Colls.	—	5 0†	—	3 0†	—	—
Bushveld Tins	—	—	—	0 6*	0 6*	—
Cassol Coals	—	—	—	18 0*	—	—
City and Subs.	2 0*	2 0*	—	2 0*	2 6†	2 5†
City Deeps	41 0	41 0	40 0*	40 0*	41 0†	40 6
Con. Diamonds	11 9	15 3	14 6	15 0	15 0*	15 7½
Con. Main Reefs	8 1*	8 1*	8 0*	8 0*	8*	8 0*
Con. Mines Select.	—	—	11 9†	—	—	—
Coronation Colls.	30 0*	—	—	—	30 0*	—
Do. Freeholds	9 7*	0 7*	0 7*	0 7*	0 7*	0 7*
Do. Syndicates	4 6*	4 6*	4 6*	4 9*	4 8*	4 10*
Crown Diamonds	3 3*	3 2*	3 4*	3 1*	3 4*	3 6
Crown Mines	31 0*	31 0*	—	—	—	30 0*
Daggafontein Mines	2 3*	2 3*	2 3*	2 3*	2 5	2 3*
E.R. Coals	1 6*	1 6*	1 6*	1 6*	1 7*	1 7*
E.R. Deeps	0 6*	—	—	—	0 8*	—
E.R. Props.	—	4 3*	4 6*	4 6*	4 6*	4 6*
E.R. Debentures	—	£80*	—	£80*	£80*	£80*
Frank Smith Dmds.	3 4*	3 3*	3 5*	3 4*	3 4*	3 6
Geduld Props.	47 3	47 3	47 3	47 6	48 0	48 9
Goldenhuis Deeps	6 0*	6 0*	6 0*	6 0*	6 0*	—
Govt. Areas	77 0	77 6	76 0*	76 9*	77 6	77 6*
Hume Pipes	11 0†	11 0†	11 0†	10 9†	10 6†	10 6†
Jupiters	—	—	—	—	1 0*	—
Knight Centrals	4 6	4 1*	1 3*	4 1*	4 4*	4 1*
Lace Props.	6 0*	—	—	6 3*	7 3*	7 0*
Leeuwoort Tins	6 6*	6 6*	6 9	6 6*	6 9	6 6*
Leidenburg Farms.	4 3*	4 5*	4 3*	4 3*	4 6†	4 3*
Meyer and Charltons	60 0*	—	—	—	60 0*	—
Middelvelo Estates	—	—	—	1 0*	—	1 0*
Modder B.'s	24 3	24 3	24 0*	24 9	24 0*	24 9*
Modder Deeps	37 6*	38 3	37 6	37 9	38 3	38 0*
Modder Easts	5 3*	5 3*	5 2	5 3	5 6	5 1*
Natal Navig. Colls.	26 0*	—	26 0*	26 0	25 0*	26 0*
New Era Cons.	6 3†	6 0	—	5 10*	5 9*	5 9*
New Geduld Deeps	1 4*	—	—	1 1*	1 4*	1 4*
New Kleinfonteins	4 6*	4 6*	4 6*	4 6*	4 6	4 7½*
New Modders	65 6*	—	66 3	66 6	66 9	66 9
New Primrose	4 3*	—	—	—	—	—
New Unifeds	3 9*	—	—	—	3 0*	—
New Slate Areas	22 9*	23 3*	23 0	23 3a	—	23 6*
Nigels	5 0*	—	5 0*	5 0*	5 0*	—
Nourse Mines	8 1*	8 3	8 0*	8 0*	9 0	8 10†
Pretoria Cements	39 0*	39 6*	39 3*	39 6*	40 3*	41 3*
Princess Estates	—	1 0*	1 0*	1 0*	1 0*	1 0*
Randfontein Cent.	9 9†	9 0*	10 0†	10 0†	9 0*	9 6*
Randfontein Est.	15 0*	15 6	15 0	15 3*	15 6*	16*
Rouxville Diamonds	—	1 1*	1 0*	1 0*	1 1*	1 1*
Brakpan Victors	8 6*	8 3*	9 6†	8 6	8 0*	8 0*

GERMAN ELECTRICAL COMPANY'S PROFITS.

The annual report of the German General Electrical Company shows that at the beginning of its last business year, which closed at the end of June, the share capital was 200,000,000 marks. During the year the capital was increased to 850,000,000. The additional issues of shares consequently took place after the first big drop in the value of the mark, and before the second. Nevertheless, it pays a record dividend of 16 per cent. on 350,000,000 ordinary capital and 6 and 7 per cent. respectively on the two emissions, each of 250,000,000 preference shares. But that is not all. Before these dividends were allowed for, 100,000,000 were assigned as the first instalment of the new "works maintenance" reserve, 5,000,000 for benevolent funds, and 12,000,000 to "foundations." From the figures published it is not evident what further allocations were made for writing off and reserves. But even this does not finish the tale of the company's abounding prosperity. The directors ask for powers to issue a further 250,000,000 shares during the current year. That will bring the total capital up to 1,100,000,000 marks, or, with debentures, to 1,302,000,000. The Allgemeine Electricitaetsgesellschaft will thus be the first German company to pass the milliard mark with its capital. The *Vossische Zeitung*, which is well informed on commercial matters, assumes that it is the "development of the organisation abroad" which makes it necessary to increase the pecuniary resources contemplated for this year. A similar lesson is to be learnt from the report of the Mannesmann Tube Works. This company, which has a paid-up share capital of 89,750,000 marks, shows a net profit of 84,500,000 marks, places 108,000,000 to reserves, and increases its dividend from 20 to 30 per cent. Figures published show that during the first nine months of this year new companies were founded with a total capital of 2,300,000,000 marks. In the same period old concerns increased their capital by 11,067,000,000. During the whole of 1913 new flotations accounted for 217,000,000 marks, and increases of capital 418,000,000 marks.

On the London Metal Exchange on Wednesday bar gold closed at 91s. 9d. per oz. Standard copper, £61 12s. 6d. ash, £62 12s. 6d. forward; electrolytic copper, £67 cash, £69 forward; standard tin, £157 7s. 6d. cash, £159 2s. 6d. forward; foreign lead, £21 5s. cash, £21 2s. 6d. forward; quicksilver (middle), £11 7s. 6d.; bar silver, spot, 34½d.

The Pilgrims Rest Gold Fields.—II.

SOME FURTHER NOTES ON THE MINES OF THE DISTRICT.

Some weeks ago we printed notes by Mr. H. C. F. Bell on the Pilgrim's Rest goldfields. The following is the conclusion of his paper which was read recently before the C.M. & M. Society of S.A.

Vertical Reefs and Leaders.

These are numerous and uncertain in value. To go into details would require a separate paper. In the area round Mt. Anderson, and from the Waterfall River to Marieps Mountain, vertical quartz leaders abound. Some carry little or no gold, while others are exceptionally rich. One leader recently opened up gave 294 ozs. from 20 tons of ore crushed. Of vertical reefs there are three being worked, namely "The Rietfontein Reef," "The Sunlight Reef," and the reef being worked by the "Hepta Syndicate." On the farm Sabie Nook there are several vertical reefs, one of which is the Rietfontein Reef, and which carries some encouraging values. Vertical reefs several miles further north have been located, but insufficient work has been done on them to indicate their merits. They are probably the same series as on Sabie Nook.

In recent months considerable activity is being shown in the opening up and working of leaders with profitable results to the "small man."

The Black Reef Series.—One of the most interesting belts of country in the district is the long strip of Black Reef Series running along the edge of "The Berg," almost due north and south, and extending from south-east of Sabie to Marieps Mountain. From it a great amount of alluvial and "leader" gold has been won. Alluvial diggings in this belt start from the eastern portion of the farm Spitzkop No. 39, but in the neighbourhood of Spitzkop Mountain there are other alluvial workings which lie in the lower part of the dolomite series.

About two miles north of Sabie there is a busy little group of mines producing iron pyrite from the sandstone reef. This class of mining, which has been in vogue for the last few years only, is very attractive, owing to its simplicity and cleanliness. The Sandstone reef is very pyritic and hard. The ore is crushed to a coarse mesh and passed over concentrating tables. The concentrates, which vary in gold contents from 2 ozs. to 3 ozs., and in sulphur from 40 to 45 per cent., are railed to chemical and explosive works, chiefly for the manufacture of sulphuric acid.

Further north there are the Mac-Mac and Graskop diggings. Running through the Graskop diggings is the Mali-Dyke, and here is the "Mali-Dyke" gold mine. This mine is most interesting in that the reef is in immediate contact with the wall of the dyke, which is vertical. The reef splits in places and runs right into the dyke, and even in the dyke it carries payable gold. This dyke is not easy to trace, but what appears to be the Mali-Dyke outcrops at Waterfall, and there is reef in the same vicinity. Some serious prospecting here might open up a payable mine. When the dyke has once been unmistakably located in a second place, the problem of tracing it further afield will be much easier. Its probable line traverses the farms Lisbon, Berlyn, London, Ledouphine and Goedgeloof. It is possible that the main dyke which runs through the New Chum Mine is the Mali-Dyke.

Several miles further north the Sandstone reef has been found in several places carrying fairly good values, but very little work has been done towards proving the extent and value of this reef. One area in particular, where several good assays have been obtained, requires development, and may prove to be a profitable proposition. Water is a little troublesome, but could be overcome with hand-pumps.

The next important area is the one locally known as "Waterfall," situated on the farms Lisbon and Berlyn, where there have been extensive alluvial diggings and a fair amount of reef mining. The New Lisbon Berlyn Company did a lot of work here many years ago. A small mill is now in the course of erection, and alluvial digging is still being carried on in a quiet way. There are two reefs, called the "Robertson" and the "Pidgeon" reef. They are above the Sandstone reef and below the Glynn's Lydenburg reef.

Between this area and Belvedere is an area in which some very rich leaders have been found, one of the most noted of which was the "Tucker Leader," which, though very narrow, extended for 1,400ft. into the hill and produced many thousands of pounds' worth of gold.

Not very far from here is the "New Chum Syndicate" Mine. This has been working for several years. A main drive, 2,000ft. has been driven into a hill parallel to a large dyke. This drive intersected several small cross dykes and leaders, and of the latter the biggest, which is called "Big Ben," runs right through the dyke. The smaller leaders do not run through, but there are rich leaders on both sides of the dyke. For a long time prospectors have maintained that the leaders on the east side of the dykes do not carry gold, but this belief has been definitely disproved at the New Chum Mine.

At the Hepta Syndicate Mine, in this same area, nearly all the gold is in the form of nuggets, and some very fine specimens have been obtained. Most of the gold is found in a seam of dark-coloured clay, in contact with a vertical reef. Until recently it was believed that there was only one goldbearing horizon, but recent development has proved that there is payable gold at other horizons.

In this vicinity a goldbearing flat reef has also been found, but no work has been done on it. It is alleged that further north there are clay seams of possibly good value which have not been developed, and no serious prospecting has been done to find others.

Just below the junction of the Treur with the Blyde River, amidst beautiful scenery, are situated the "Bourke's Luck" and the "Deintje" Gold Mines. These two mines are, I believe, on the same reef called by some the "Bourke's Luck" reef, and by others the "Sherwell" reef. I think the former theory is correct, and that the Sherwell reef is lower down.

The Deintje mine is dealing with a pyritic ore containing a high percentage of copper, and the concentrates are being sent overseas for treatment. The "Bourke's Luck" mine has a large dyke running through it, and associated with this dyke are numerous leaders, which in places almost form a stock-work. These leaders have supplied practically all the ore for the mill. Some time ago the mine closed down, but has recently been re-started.

Several miles further north is a baby mine, where a little three-stamp mill is situated amongst the wild surroundings of Marieps Kop. Only vertical quartz leaders are being worked at present.

Comparatively little prospecting has been done in this area, but those who know it fairly well believe that it offers excellent opportunities for the "small man."

Corner House Mines in the last Quarter.

A DIGEST OF REPORTS—FIGURES FOR TWELVE SUBSIDIARIES—FALLING PRICE OF GOLD AFFECTS PROFITS—REFERENCES TO THE STRIKE.

Reports of the various subsidiaries of the Central Mining-Rand Mines Group have now been published, and from these we take the following extracts:—

City Deep.

Development work: Total footage, 7,807 ft.; total footage sampled, 3,450 ft. The payable reef disclosures were as follow: Main Reef Leader, 1,990 ft., width 21·7 in., assay value 20·5 dwt.; South Reef, 110 ft., width 24·6 in., assay value 12·5 dwt. Tons crushed, 259,600. Total profit, £170,178. The yield per ton was slightly lower than that of the preceding quarter, but the decrease in profit was mainly due to the decline in the price of gold. Development work was considerably increased. In addition to the development recorded above, the south shaft was sunk 400 ft., making its depth 4,470 ft., which is the horizon of the 17th level.

Consolidated Main Reef.

Development work: Total footage, 5,751 ft.; total footage sampled, 3,340 ft. The payable reef disclosures were as follow: Main Reef Leader, 2,145 ft.; width 7 in., assay value 61·5 dwt. Tons crushed, 149,800. Total profit, £37,618. The decrease in profit is mainly the result of the decline in the price of gold.

Crown Mines.

Development work: Total footage, 10,394 ft.; total footage sampled, 7,220 ft. The payable reef disclosures were as follow: Main Reef Leader, 2,700 ft., width 24 in., assay value 18·3 dwt.; South Reef, 1,840 ft., width 27 in., assay value 16·9 dwt. Tons crushed, 521,000. Total profit, £163,836. A reduction in the price received for gold of 11s. per fine oz., coupled with the decrease in production consequent on the strike of miners, caused a serious decline in profit, as compared with September quarter. The strike, which commenced at No. 5 shaft on the 9th November and extended to all producing sections on the 25th of that month, was due to the management refusing to discuss with the Mine Workers' Union the dismissal of an official of the company. The Chamber of Mines, in taking the matter in hand, approved of the action of the management, and eventually on the 5th December a settlement was arrived at, the terms being practically those laid down by the Chamber. Development was commenced in the southern section from No. 5a shaft, and No. 14a shaft was sunk 238 ft., to a total depth of 414 ft. below the 19th level. The dewatering and equipment of No. 12 shaft down to the 19th level was completed.

Durban Roodepoort Deep.

Development work: Total footage, 3,682 ft.; total footage sampled, 2,780 ft. The payable reef disclosures were as follow: Main Reef, 525 ft., width 33 in., assay

value 12·2 dwt.; South Reef, 1,740 ft., width 5 in., assay value 60·1 dwt. Tons crushed, 80,000. Total loss, £1,794. Owing to a fall in yield of 577 dwt. per ton milled, and a reduction in the average price of gold of about 11s. per fine oz., the total revenue for the quarter was £25,932 less than for September quarter. Although working expenditure was £4,510 lower, the above factors brought about a working loss for the quarter. The expenditure on capital account was made in connection with the Robey hoist, west incline. Development operations were well maintained with satisfactory reef disclosures. The price now ruling for gold makes it impossible to work the mine without incurring losses unless a material reduction in working expenditure can be effected.

East Rand Proprietary Mines.

Development work: Total footage, 6,832 ft.; total footage sampled, 5,365 ft. The payable reef disclosures were as follow: Main Reef, 465 ft., width 28 in., assay value 17·2 dwt.; Main Reef Leader, 2,095 ft., width 22 in., assay value 23·6 dwt. Tons crushed, 380,500. Tonnage mined and from surface dumps, 413,550 tons; total yield, 95,884 oz. fine; total yield per ton, 5·040 dwt. Working revenue, £473,202, or £1 4s. 10d. per ton milled; working costs, £466,491, or £1 4s. 6d. per ton milled; working profit, £6,711, or 4d. per ton milled; total profit, £4,802. Working costs show a substantial decrease as compared with the previous quarter, but the yield per ton has fallen, and with the severe decline in the price of gold profits have been reduced almost to vanishing point.

Ferreira Deep.

Development work: Total footage, 231 ft.; total footage sampled, 215 ft. The payable reef disclosures were as follow: South Reef, 4 ft., width 25 in., assay value 25·0 dwt. Tons crushed, 83,900. Total profit, £15,281. A fire was discovered on the 7th December in a stope above No. 1 incline shaft, which eventually caused the stoppage of all underground work, one European and five natives unfortunately losing their lives as the result of gassing. During operations in connection with the extinguishing of the fire a fall of rock occurred at the 7th level station, entombing five Europeans, and although heroic services were rendered by the employees and others in attempts to save the lives of those who had not been killed by the fall of rock, their untiring efforts proved of no avail. Work was restarted in the western portion of the mine on the 21st December, 1921. Results for the quarter were adversely affected by the fire and the serious accident above referred to, and by the decline in the price of gold.

Geldenhuis Deep.

Development work: Total footage, 2,377 ft.; total footage sampled, 1,545 ft. The payable reef disclosures were as follow: Main Reef, 320 ft., width 46 in., assay value 9·4 dwt.; Main Reef Leader, 105 ft., width 8 in., assay value 62·8 dwt.; South Reef, 445 ft., width 24 in., assay value 27·5 dwt. Tons crushed, 146,760. Total loss, £4,281. The working loss for the quarter is due almost entirely to the heavy fall in the price of gold. In view of the working loss and the grave situation confronting this company owing to the heavy fall in the price of gold, the directors again decided to declare no dividend for the half-year ended 31st December, 1921.

Knight Central.

Development work: Total footage, 184 ft.; total footage sampled, 140 ft. The payable reef disclosures were as follow: Main Reef, 20 ft., width 79 in., assay value 13·0 dwt.; South Reef, 95 ft., width 46 in., assay value 9·9 dwt. Tons crushed, 88,500. Total profit, £6,498. Capital

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expenditure, £11. The tonnage milled during the quarter constitutes a record in the history of the company, while working costs per ton show a further decrease of 2s. per ton. The decrease in profit is chiefly due to the heavy fall in the price of gold.

Modderfontein East.

Development work: Total footage, 5,665 ft.; total footage sampled, 4,950 ft. The payable reef disclosures were as follow: No. 1 shaft, 1,055 ft., 38.0 per cent., width 31 in., assay value 13.3 dwt., 412 inch-dwt.; No. 2 shaft, 800 ft., 63.0 per cent., width 22 in., assay value 14.1 dwt., 310 inch-dwt.; No. 3 shaft, 645 ft., 71.3 per cent., width 20 in., assay value 19.7 dwt., 395 inch-dwt.; total and average, 2,500 ft., 50.5 per cent., width 25 in., assay value 15.0 dwt., 375 inch-dwt. Tons crushed, 75,800. Total profit, £13,596. The reduction in profit, compared with the preceding quarter, was mainly due to the heavy fall in the price of gold. The sources of ore supply were 80.4 per cent. from stoping, 14.6 per cent. from development faces, and 5.0 per cent. from surface development dumps. The net expenditure on capital account was less than in the preceding quarter, the total of £19,094 being made up as follows: Development, £13,020; underground equipment, £2,168; surface equipment, £3,906.

Nourse Mines.

Development work: Total footage, 4,179 ft.; total footage sampled, 2,440 ft. The payable reef disclosures were as follow: Main Reef, 100 ft., width 51 in., assay value 9.2 dwt.; Main Reef Leader, 1,490 ft., width 26 in., assay value 14.2 dwt.; South Reef, 440 ft., width 26 in., assay value 18.3 dwt. Tons crushed, 136,100. Total profit, £15,219. The working profit from current operations was £14,877 less than for the preceding quarter, principally owing to a reduction of approximately 11s. per fine oz. in the estimated price obtainable for gold. Owing to a full supply of native labour, it was possible to increase the tonnage output by 6,500 tons, and working costs were lower at 30s. 8d. per ton milled, a decrease of 1s. 7d. per ton. Development operations were well maintained, with reef disclosures fully up to the standard of the mine.

Rose Deep.

Development work: Total footage, 1,548 ft.; total footage sampled, 1,144 ft. The payable reef disclosures were as follow: Main Reef, 278 ft., width 39 in., assay value 12.8 dwt.; Main Reef Leader, 159 ft., width 33 in., assay value 7.6 dwt.; South Reef, 453 ft., width 36 in., assay value 9.4 dwt. Tons crushed, 165,300. Total profit, £23,830. All work on the property has ceased, with the exception of certain essential services (such as pumping, etc.), which are being carried out as far as possible by the company's officials. The results for the current quarter will therefore be seriously affected.

Village Deep.

Development work: Total footage, 6,297 ft.; total footage sampled, 3,150 ft. The payable reef disclosures were as follow: Main Reef Leader, 2,800 ft., width 25 in., assay value 15.5 dwt. Tons crushed, 152,400. Total profit, £17,111. The decrease in working profit was due to a slightly lower yield, and a reduction in the average value obtained for gold of about 11s. per oz.

The working revenue is arrived at by calculating the value of the gold produced at the following prices:—October, £5 1s. 9d. per fine oz., after deducting realisation charges; November, £5 0s. 9d. per fine oz., after deducting realisation charges; December, £4 13s. 9d. per fine oz., after deducting realisation charges.

The above-mentioned profits are subject to taxation. In the case of all the subsidiaries a brief paragraph refers to the strike. The stereotyped statement is as follows:—In consequence of certain alterations in conditions of employment proposed to be introduced on Witwatersrand gold mines by the Transvaal Chamber of Mines (of which this company is a member) as from the 1st February, 1922, a general strike of all European day's pay employees was called by the South African Industrial Federation on the 10th January, and is still in progress. All work on the property has ceased, with the exception of certain essential services (such as pumping, etc.), which are being carried out as far as possible by the company's officials. The results for the current quarter will therefore be seriously affected.

In respect of the Modder East and Village Deep it is stated that pumping operations are not proceeding.

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QUARTERLY REPORTS.

The following are extracts from mining companies' directors' reports for the quarter ended 31st December, 1921:—

Consolidated Langlaagte Mines.

Crushed, 133,100 tons; total working revenue £195,416, or 29s. 4d. per ton crushed; total working costs £155,410, or 23s. 4d. per ton crushed; profit £40,006, or 6s. per ton crushed; sundry revenue, £1,392; total profit for quarter, £41,389. There was an increase of 2,800 tons in the quantity of ore crushed as compared with the preceding three months. The working costs were decreased by 4d. per ton, and the revenue was 3s. 10d. per ton lower, with the result that the working profit was £22,145 less than that for the previous quarter. The development footage sampled totalled 2,361 feet, and gave the following results:—Payable, 1,101 feet, having an average value of 31·73 dwts. over 12·12 inches of reef; unpayable, 1,260 feet, having an average value of 10·96 dwts. over 10·67 inches. The average number of natives at work underground during the quarter was 3,162, as compared with 2,914 for the previous quarter.

Government Gold Mining Areas.

Crushed, 421,500 tons; total working revenue £915,478, or 43s. 5d. per ton crushed; total working costs £449,445, or 21s. 4d. per ton crushed; profit £466,033, or 22s. 1d. per ton crushed; sundry revenue, £2,311; total profit for quarter £468,344. The quantity of ore crushed was 3,500 tons less than that for the previous quarter. The working costs were 2d. per ton higher, and the revenue 1s. per ton lower, with the result that the working profit was £27,354 less than for the preceding three months. The development footage sampled totalled 3,900 feet, and gave the following results:—Payable, 2,640 feet, having an average value of 11·4 dwts. over 64 inches of reef; unpayable, 1,260 feet, having an average value of 3·2 dwts. over 45 inches. The average number of natives at work underground during the quarter was 6,913 as compared with 6,597 for the previous quarter.

Langlaagte Estate.

Crushed, 133,600 tons; total working revenue £202,881, or 30s. 4d. per ton crushed; total working costs £164,774, or 24s. 8d. per ton crushed; profit £38,107, or 5s. 8d. per ton crushed; sundry revenue, £1,404; total profit for quarter, £39,511. The quantity of ore crushed during the quarter was 10,400 tons more than that for the preceding three months. The revenue showed a decrease of 3s. 8d. per ton, and the working costs were 1s. 3d. per ton lower, and the working profit was £11,694 less than that for the previous quarter. The development footage sampled totalled 2,186 feet, and gave the following results:—Payable, 1,256 feet, having an average value of 24·6 dwts. over 21 inches of reef; unpayable, 930 feet, having an average value of 6·1 dwts. over 20 inches. The average number of natives at work underground during the quarter was 3,092, as compared with 2,749 for the previous quarter.

New Primrose.

Crushed, 65,700 tons; total working revenue £72,406, or 22s. per ton crushed; total working costs £62,474, or 19s. per ton crushed; profit £9,932, or 3s. per ton crushed; sundry revenue, £864; total profit for quarter, £10,796. There was an increase of 200 tons in the quantity of ore crushed as compared with the preceding three months. The working costs were 6d. per ton lower, the revenue 2s. 5d. per ton lower, and the working profit at £9,932 was £6,192 less than that for the previous quarter. The average number of natives employed underground during the quarter was 1,431, as compared with 1,283 for the previous quarter.

New Unified Main Reef.

Crushed, 34,800 tons; total working revenue £38,781, or 22s. 3d. per ton crushed; total working costs £33,606, or 19s. 4d. per ton crushed; profit £5,175, or 2s. 11d. per ton crushed; sundry revenue £315; total profit for quarter, £5,490. There was an increase of 900 tons in the quantity of ore crushed as compared with the preceding three months. Working costs were 8d. per ton lower, but as the revenue showed a decrease of 2s. 2d. per ton, the working profit was £2,283 less than that for the previous quarter. The average number of natives at work underground was 667, as compared with 611 for the previous quarter.

Randfontein Central.

Crushed, 358,000 tons; total working revenue £521,496, or 29s. 2d. per ton crushed; total working costs £494,444, or 27s. 3d. per ton crushed; profit, £27,052, or 1s. 6d. per ton crushed; sundry revenue £3,778; total profit for quarter, £30,830. The expenditure on capital account amounted to £108,865, and debenture interest to £32,560. The ore crushed during the quarter was 34,500 tons less than for the preceding three months. The revenue was 3s. 1d. per ton lower, and working costs 1s. 2d. per ton higher, with the result that the working profit was reduced by £85,647, as compared with the previous quarter. The development footage sampled totalled 6,395 feet, and gave the following results:—Payable, 3,905 feet, having an average value of 23·5 dwts. over 17 inches of reef; unpayable, 2,490 feet, having an average value of 11·4 dwts. over 13 inches. The average number of natives employed underground during the quarter was 10,084, as compared with 10,494 for the previous quarter.

Van Ryn Deep.

Crushed, 162,800 tons; total working revenue £434,944, or 53s. 5d. per ton crushed; total working costs £204,548, or 25s. 1d. per ton crushed; profit £230,396, or 28s. 4d. per ton crushed; sundry revenue, £4,322; total profit for quarter £234,718. There was an increase of 11,800 tons in the ore crushed as compared with the previous quarter. The working costs were 2s. 4d. per ton lower, the revenue was 7s. 4d. per ton lower, and the working profit was £21,319 less compared with the preceding three months. The development footage sampled totalled 1,950 feet, and gave the following results:—Payable, 1,045 feet, having an average value of 31·1 dwts. over 25 inches of reef; unpayable, 905 feet, having an average value of 5·3 dwts. over 36 inches. The average number of natives at work underground during the quarter was 3,365, as compared with 3,132 for the previous quarter.

Witwatersrand Gold Mining.

Crushed, 128,400 tons; total working revenue £160,690, or 25s. per ton crushed; total working costs £139,212, or 21s. 8d. per ton crushed; profit £21,478, or 3s. 4d. per ton crushed; sundry revenue, £4,078; total profit for quarter, £25,556. There was an increase of 9,400 tons in the quantity of ore crushed as compared with the previous quarter. The revenue was 3s. 4d. per ton lower, the working costs 1s. per ton lower, and the working profit at £21,478 was £12,177 less than that for the preceding three months. The development footage sampled totalled 960 feet, and gave the following results:—Payable, 670 feet, having an average value of 13·6 dwts. over 32 inches of reef; unpayable, 290 feet, having an average value of 7·5 dwts. over 16 inches. The average number of natives at work underground during the quarter was 2,507, as compared with 2,242 for the previous quarter.

New State Areas.

Capital Expenditure.—The expenditure on capital account for the quarter amounted to £112,054, of which £72,586 was spent on development and the balance on ventilation, underground electric traction, air mains, and surface works. Development.—A total of 6,557 feet of development was accomplished, 3,918 feet being on reef. South Shaft.—1,820 feet were sampled, of which 1,460 feet

were payable, having an average value of 30.1 dwts. over 20 inches. 360 feet were unpayable, having an average value of 9.1 dwts. over 8 inches. North Shaft.—2,100 feet were sampled, of which 720 feet were payable, having an average value of 8.1 dwts. over 38 inches. 1,380 feet were unpayable, having an average value of 5.3 dwts. over 18 inches. 924 feet were driven in the connecting drive.

General Remarks.

The declared profits have been arrived at by adding together the published monthly figures. The value of the gold was taken as follows:—October, £5 3s. per fine ounce; November, £5 2s.; and December, £4 15s. 6d. These figures average 11s. 2d. per fine ounce less than those for the previous quarter.

No allowance has been made in the profit declarations as above for taxation.

Technical Books Received.

“The Analysis of Coal and its By-Products,” by S. Roy Illingworth, M.Sc (Lond.), A.R.C.Sc., F.I.C., assisted by Jenkyn Griffiths, F.C.S., Chemical Engineer, Assistant Editor of the “Colliery Guardian,” formerly of the South Wales School of Mines, and Coke and By-Products Section of the Welsh Navigation Steam Coal Co., Ltd.; with a foreword by Sir Robert Robertson, K.B.E., F.R.S., the Government Chemist.

This is a valuable text book on coal analysis and the determination of its many and complex by-products. The author prefaces the volume by stating:—“The efficient utilisation of our coal resources is a problem that becomes more pressing every day. Progress in the matter is largely in the hands of the chemist and chemical engineer, supported by a wider outlook on the part of the coal producer and the coal consumer. Our educational institutes are endeavouring to produce men specially trained in the technology of coal and fuel. The author, in the course of his professional activity in these matters, has come to the conclusion that there exists the need for a book which deals with the analytical work required in the training of fuel and colliery chemists. Empiricism has characterised certain phases of the commercial analysis of coal and its products, with the result that the agreement of analytical data between buyer and seller has been a contentious matter, and the sale of coal on specification has made no headway. Too many people prefer to rely on the name of a coal, without being in a position to define the particular product or to check delivery thereof. The author has therefore endeavoured to pass under review and criticise alternative methods of analysis, in the hope that the book will not only be of value in the training of students, but that it will help towards the standardisation of commercial practice.

“The author would welcome criticism. In this country we can no longer look upon coal as a product won from Nature solely by the sweat of the brow, and then handed over, to be burnt, to a man strong in the arms and back. Coal is a natural commodity that can be refined or manufactured into fuel; performance per unit of cost is the criterion of value. In the winning, the refining, the selection, and the evaluation of coal and its uses, sound analytical methods are essential. The author has endeavoured to collect together such methods in this book, and he will feel amply rewarded if these furnish a nucleus around which there is subsequently crystallised a more scientific control of the winning, sale, and use of coal and its products.”

In a foreword, Sir Robert Robertson, K.B.E., F.R.S., the Government Chemist, writes:—“Coal, our indigenous source of energy, and the one on which we must depend for many years for maintaining our position as an industrial nation, has in the past been wastefully used, with little or no regard either to the iniquity of squandering our national resources, which, after all, are limited, or to the loss due to neglecting to recover the valuable by-products that form a

basis for numerous important industries. A gradually awakening consciousness of the need for the better utilisation of the national wealth stored in our coal measures has led to this problem being attacked in the only way that is likely to conserve and make the fullest use of our supplies, namely, by the application of scientific methods of treatment. Little more than a beginning has been made, and a great deal remains to be done to combat the present wasteful methods of using coal, and to win from it substances of commercial value. Progress in this direction can come only from the application of scientific method, and there are few subjects to which the application of science will materially benefit the nation more than the technology of coal and its products. In the direction of the many industries which had to be started in this country during the war, while production on the largest scale was of the first importance, the necessity for economy, in process, in personnel, and in usage of material, became increasingly urgent, and such records as those of the Department of Explosives supply, now being edited by Mr. MacNab, show how this need was appreciated. The hope may be expressed that the large number of young scientific men who were brought for the first time in touch with such manufactures, have had brought home to them the vital importance of ordered method in the conduct of industrial processes, and that they may carry into peaceful industry the lessons learnt during the past few years. The need for chemical control in the manufacture of chemical products is a subject which had occupied the mind of the author of this book before the war, when in his publication he pressed for more research, more technical education, and more application of scientific method to national industries. His present activities are intimately associated with the application of scientific method to the control of the important industries of winning coal, and of using it as a fuel alone, or as a source of products vital for innumerable manufactures. His practical knowledge of these industries should therefore render valuable his collection and criticism of the analytical methods that are employed in the technical treatment of coal.”

The volume is published by the Colliery Guardian Co., Ltd., 30 & 31, Furnival Street, Holborn, London, E.C.4, at the price of 21s. net.

TRANSVAAL G.M. ESTATES.

The following are the particulars of the output for the month of January, 1922:—Central Mines: Tons crushed, 12,600; yielding, fine oz., 3,853. Elandsdrift Mine: Tons crushed, 1,700; yielding, fine oz., 993. Vaalhoek Mine: Tons crushed, 1,930; yielding, fine oz., 623. Estimated value of month's output, £25,053; estimated loss for month, £437. Note: The gold output for the month is valued at £4 13s. 6d. per fine ounce net, after allowing for exchange and realisation charges. Grade for month at Central Mines and Vaalhoek Mine was slightly better. Loss due to abnormal expenditure and increased prospecting expenditure consequent on improved native labour position.

GOVERNMENT EXAMINATIONS.	
METAL.	COAL.
Total METAL MANAGERS Certificates	
Granted in S.A., 1921	36
Secured by Students of Messrs. LUCAS & WOLFE	21
Balance for S.A.	
	15
7 COAL MANAGERS Certificates obtained in 1921.	
Total OVERSEERS Certificates (Metal and Coal)	
Granted in S.A., 1921	61
Secured by Students of Messrs. LUCAS & WOLFE	25
Balance for S.A.	
	36
Total SURVEY Certificates	
Granted in S.A., 1921	11
Secured by Students of Messrs. LUCAS & WOLFE	9
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	2
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RHODESIAN SECTION.

Rhodesian Mine Wage Reductions.

OFFICIAL FIGURES—CUT OF FROM 12 TO 6 PER CENT.—OVERTIME AT TIME AND QUARTER.

We have received for publication, from Mr. J. D. Morton, Secretary of the Rhodesia Mine Owners' Association, the following copy of a letter addressed to the Secretary of the Rhodesian Section of the South African Mine Workers' Union with regard to the proposed reductions in wages and overtime rates on mines in Rhodesia in view of the decreased cost of living and the necessity for a reduction of mine working costs, together with a copy of a notice which is being posted on the various mines, setting forth very full particulars in regard to the reductions in question: The Secretary, Rhodesian Section, South African Mine Workers' Union, Bulawayo.

Dear Sir,—With reference to my letter of the 29th ultimo I now send you herein copy of a Notice to be posted on the various mines connected with my Association setting forth full particulars of the reductions in wages and

As already advised you, it is intended that the reductions should take effect as from the 1st April, 1922.—
Yours faithfully,

J. D. MORTON,
Secretary, Rhodesian Mine Owners' Association.
Bulawayo, January 16.

The accompanying notice reads:—
RHODESIAN MINE OWNERS' ASSOCIATION

NOTICE TO MINE EMPLOYEES.

Particulars as to the Reduction of Wages and Overtime Rates already notified.

On and from 1st April, 1922, wages amounting to 30s. per day will be reduced by 12 per cent., and for lower or higher rates a percentage will be deducted which is in the same ratio to the wages as 12 per cent. is to 30s.

To facilitate calculation of the percentage in each case the formula will be $12 \div 30$ equal to the factor 0.4 which is to be multiplied by the rate of wages.

Examples calculated to the nearest 3d. upwards are as follows:—

Present rate.	Deduction.	New rate.
s. d.		s. d.
32 0	12.8 per cent.	28 0
31 0	12.4 ..	27 3
30 0	12.0 ..	26 6
29 0	11.6 ..	25 9
28 0	11.2 ..	25 0
27 0	10.8 ..	24 3
26 6	10.6 ..	23 9
25 0	10.0 ..	22 6
24 0	9.6 ..	21 9
23 0	9.2 ..	21 0
22 6	9.0 ..	20 6
22 0	8.8 ..	20 3
21 0	8.4 ..	19 3
20 0	8.0 ..	18 6
19 0	7.6 ..	17 6
18 6	7.4 ..	17 5
18 0	7.2 ..	16 9
17 6	7.0 ..	16 6
17 0	6.8 ..	16 0
16 0	6.4 ..	15 0
15 0	6.0 ..	14 3

Any further revisions of wages in future will take place at one month's notice in accordance with any alteration in the cost of living.

On and from 1st April, 1922, all overtime shall be time and a quarter, except in the case of shiftsmen maintaining continuity of shift, which shall remain straight time as at present.



Some of the Leaders of the Rhodesian Mining Industry and Members of the Government in Conference.

overtime rates as decided upon in view of the decreased cost of living and the necessity for a reduction in the working costs on the mines in Rhodesia.

The following reasons are given for this proposed re-adjustment of overtime rates, viz.:—

It has been frequently stated both by employers and employees that neither desire overtime if it can possibly be obviated. In ordinary industrial concerns carrying on work on day shift only, maintenance and repairs can be done by special men at night, but the case is different in mining, in which work has to be carried on continuously by successive shifts, and maintenance and repairs have to be carried out at once and executed promptly, as otherwise many employees would be thrown out of work. All mine workers know that in mining a certain percentage of overtime is therefore essential, and that it could not be done away with. It is, therefore, unfair to impose a special penal overtime rate on the industry.

It may be mentioned that at the International Labour Conference held in Washington in November, 1919, and at which over 40 countries were represented, it was agreed that the rate for overtime should be time and a quarter.

Rhodesia's Mineral Output.

OVER 60 MILLIONS STERLING.

Totals for 1921.

The summary of mineral production in Southern Rhodesia during December, 1921, is as follows:—

	Value.
Gold, 55,967.64 fine ounces	*£267,005
Silver, 13,369.77 fine ounces	1,433
Coal (raised), 50,457 tons (sales)	14,971
Do. (used for coke)	5,960
Copper (Blister), 270.28 tons	16,217
Chrome Ore, nil	nil
Asbestos, 754.69 tons	15,049
Arsenic, 41.84 tons	993
Tin, 1.12 tons	53
Mica, 1 ton 1,968 lb.	496
Diamonds, 5.5 carats	17
Total	£322,194

*Includes £30,952 gold premiums.

Comparative figures, 1920 and 1921, are:—Gold, 1920, 552,498.12 fine oz.; 1921, 585,524.99 fine oz. Silver, 1920, 158,981.96 fine oz.; 1921, 152,988.80 fine oz. Copper, 1920, 3,108.17 tons; 1921, 3,079.94 tons. Chrome Ore, 1920, 60,268.96 tons; 1921, 50,187.76 tons. Coal, 1920, 578,492 tons; 1921, 574,753 tons. Asbestos, 1920, 18,822.63 tons; 1921, 19,528.71 tons.

The following official table gives the grand total of the mineral output of Southern Rhodesia to date:—

Gold, 12,300,414 ounces	£51,501,615
Silver, 3,123,817 ounces	410,668
Lead, 7,072.17 tons	94,788
Copper, 24,769.43 tons	2,094,661
Chrome Ore, 727,296.77 tons	2,301,521
Tungsten Ores, 233.90 tons	26,946
Coal (raised), 5,563,998 tons (sales) ...	2,094,016
Antimony Ore, 79.11 tons	1,550
Asbestos, 76,349.27 tons	2,187,163
Arsenic, 173.24 tons	46,093
Ironstone, 29,604.42 tons	4,198
Tin, 16.92 tons	2,784
Barytes, 53.66 tons	88
Mica, 188 tons 321 lb.	47,243
Diamonds, 13,652.625 carats	63,295
Other Precious Stones, 72,977 carats ...	8,065

Grand Total of Mineral Production to date £60,884,604

Northern Rhodesia.

Total output and value from commencement to December 31st, 1921:—

Gold, 12,336.39 ounces	£53,546 15 0
Silver, 53,592.28 ounces	7,490 12 6
Lead, 67,316.43 tons	1,527,815 2 0
Copper Concentrates, 5,232.06 tons	220,959 2 8
Copper Finished, 7,154.26 tons	378,510 5 5
Bismuth, 6.24 tons	3,491 9 5
Zinc Ore, 13,175.85 tons	85,198 5 3
Mica, 1.18 tons	412 0 0
Vanadium Ore, 61.76 tons	2,401 1 3
	£2,279,824 13 6

Rhodesia and the Gold Premium.

Cabled advice has been received by the Rhodesia Chamber of Mines from the London office of the B.S.A. Company, dated 18th January, that Messrs. Rothschild and Sons distributed on that date the sum of 18s. 4d. per fine ounce profit on gold realised during the period ended 7th January (December quarter). The following are the premiums distributed to date:—July 25th to December 31st, 1919, 17s. per fine oz.; January 1st to March 31st, 1920, £1 9s. 8½d. per fine oz.; April 1st to June 30th, 1920, £1 0s. 9d. per fine oz.; July 1st to September 30th, 1920, £1 7s. 1d. per fine oz.; October 1st to December 31st, 1920, £1 13s. 5¼d. per fine oz.; January 1st to March 31st, 1921, £1 2s. 5d. per fine oz.; April 1st to June 30th, 1921, £1 0s. 11d. per fine oz.; July 1st to September 30th, 1921, £1 7s. 3¼d. per fine oz.; October 1st to December 31st, 1921, 18s. 4d. per fine oz.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

COMMUNITY'S DISGUST AT FEDERATION'S TACTICS—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—UNION'S TIMBER RESOURCES—VIEWS ON PRESENT POSITION—BRITISH TRADE CONDITIONS—AMERICAN TARIFF BILL—REDUCED PARRAFIN AND PETROL PRICES—RAILWAY STRIKE IN BERLIN—EFFECTS OF RAND STRIKE ON COAST FACTORIES—TRADE WITH BELGIUM AND FRANCE—METAL MARKET.

General.

Whom the gods deride they sometimes make mad. Or when, as in this case, their intention has already been forestalled, metamorphose them into leaders (save the mark!) of a forlorn hope and clothe them with a little brief authority!

The week under review has been marked by events of a serious and, if the issues involved were not of such grave importance, of a childish, if not Gilbertian, character. Under the first category come the turning down by the Federation of the Chamber of Mines' very generous offer regarding redundant labour on the richer mines until such time as an impartial investigation could go thoroughly into the question, and the abortive result of the Conference between General Smuts and a delegation of the Federation on the general issues raised by the strike. It is perhaps unnecessary to make more than a passing reference to the ridiculous resolutions passed at the Town Hall meeting in respect of revolutionary measures and the reception the deputation met with at Pretoria at the hands of Mr. Tielman Roos and his fellow Nationalists when those resolutions were formally announced. Such a severe slap in the face is bound to make the misguided miners ponder deeply on the present state of affairs, and combined with the turn of the month, when financial obligations come more prominently to the fore, eventually cause him to come to the conclusion that "Codlin is his friend, not Short." While the commercial community on the whole does not see how the Chamber of Mines can farther go in the matter of concessions, in view of the present parlous state of the industry, a not unimportant minority are inclined to cry: "A plague on both your Houses" and to invoke the aid of Government and Parliament to stop the disastrous struggle, which has now dragged on for more than a month, to the incalculable loss of the mining industry and the commercial community of the Rand in particular, and to the whole of the Union in general.

A prominent commercial man said there was no alternative but for the workers to go back to their work, and he failed to understand the non-acceptance by the Federation of the Chamber's handsome offer to find employment for practically 50 per cent. of redundant labour on the richer mines—an offer which, under the circumstances, no other industry in the world would have made. It was essentially necessary that the men should resume work as speedily as possible, as their so-called leaders had done nothing and were not likely to do anything for them even if the strike should last as many months as it has weeks. The present ebullition of the Federation leaders he looked upon as so much camouflage and as a safety valve for the escape of hot air. The talk, he said, about 95 per cent. of the people of the Union being in favour of a Republic was absurd; it was altogether the other way about. Where was there a freer Government in the world than ours? People now earnestly wish for a settlement, because the effect on commerce is a very serious one indeed; some of the large houses are suffering from the present inaction very considerably. These, he said, to use an expressive phrase, could "live on their own fat" for some time, but there were of course limits to even this form of nutriment, but to many of the

smaller concerns the present cessation of business would probably spell ruin, and that in a very short time, unless the mines speedily resumed operations. It would, in any case, take the industry a long time to get back to normal again—more months than many people at the moment probably realise. The price of gold is still steadily declining, but that was, he said, in the circumstances, a secondary matter; the first essential was that the industry should get on its feet again. Asked as to how long, in his opinion, the present impasse might last, he thought that the coming week was fraught with big possibilities.

Another light in the commercial life of the Rand, who has opportunities beyond most of sounding the rank and file of the workers regarding labour conditions, said he had been impressed by the views expressed by a Cornish miner of many years' standing. This practical man, with over 30 years' experience on the Rand mines, said the root of the trouble was the incidence of the 75 per cent. to 80 per cent. of Afrianders who had replaced the experienced British and Australian miners in the mines. Those men, he said, were

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COLD BLAST PIG IRON
HAULAGE GEARS
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not worth their salt, had no idea about the work, could not cut ground, and were absolutely useless there, and would not improve in a further five generations. They were all very well at sitting on the stoep "so long," drinking coffee and talking, but were of no practical account underground. This was the whole crux of the matter, he asserted. There were too many of these passengers down below, and the mines must get rid of them. They came in at 5s. to 7s. 6d. a day, but the Unions soon forced their wages up to skilled miners' scale. These men, he said, go down the mines day after day and have to ask instructions as to their work. It takes, in his opinion, five of these so-called miners to do what one of the old miners did. It was, he concluded, the Chamber of Mines' own fault; they begrudged the old experienced miners their wages and replaced them by these incompetent.

The retrenchment of staffs in commercial houses foreshadowed a fortnight ago has now in several instances been effected, and the pruning knife, it is generally expected, is likely to be more largely used should the strike be much longer protracted.

Iron and Steel.

Latest nominal quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corporation, Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{3}{4}$ in. to 2 in., 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{2}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb., $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{4}$ d.; 1 $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 30s. to 35s.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 21s.; hammer handles, 14 in.,

7s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 22s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb. 27s. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 19s. per coil, 100 lb. Barbed wire is fairly firm; 12-gauge barbed wire, 25s. retail. Screening, 3s. to 9s. 6d. per sq. yd.; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{4}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton. Tin plates (L. C. Cokes), 20 in. x 14 in., per box f.o.b. Swansea, 19s. 3d. Galvanised sheets, 15 $\frac{3}{4}$ d. to 16d.

Second-hand Machinery.

As was to be expected, the advent of the strike has made a tremendous difference as regards sales of second-hand machinery. Several very big deals have been hung up on that account, one dealer in particular reckons he has lost at least £500 in commission alone through several orders which were practically closed having been cancelled on account of the strike. There is not much serviceable spares for batteries and other parts required by the mines to be had just now, as those mines which have closed down are practically exhausted of stocks which they had. It must be admitted that the mines have been most sparing of their orders of late, purchasing second-hand spares whenever required. This is, of course, a big contrast to what it used to be, when goods were ordered practically for months in advance; to-day the mines are purchasing from hand to mouth. Prices remain practically the same as they were a week or so ago. Steel plates are the same, anything from £12 to £16 second-hand. Boilers are scarce of the smaller loco sizes. Of the larger sized boilers there are still a number to be had. Many of them were scrapped when steel plates were selling at £50 per ton second-hand, so that there is a scarcity of this kind of power in the country. A prominent dealer said he thought at least 100 boilers were scrapped for steel plate alone when this was so scarce here during the War, hence the present shortage. Undoubtedly many a good boiler has thus been cut up, and until freights are lower and labour cheaper at Home, there will be very few new boilers coming into the country.

German Machinery for the Congo.

The Minister of the Colonies, says a message from Brussels, is now considering the question of inviting Germany to supply machinery for the Belgian Congo. He declares that for every hundred francs' worth of such goods at least a hundred and fifty should be reckoned for transport charges and the installation of machinery. Belgium will not permit the introduction of German workmen into the Colony.

Union Grain Elevators.

The approximate amount of the contract secured by Messrs. Spencer & Co., Ltd., the well-known Melksham engineers, for the whole of the plant of the terminal elevator at Durban, and also for the smaller collecting elevators, is £500,000. It is estimated that it will take 18 months to complete the order, which was obtained in face of American and Continental competition.

Timber and Building Materials.

There is very little indeed being done at present in the building trade; old jobs are in most cases being completed, but no new enterprises are being started, people waiting to see what is going to happen.

Prices.—3 x 9 deals, 1s. to 1s. 1 $\frac{1}{2}$ d.; scantlings, 11d.; beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; ceilings, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; Oregon, 7s.; pitch pine, 8s.; corrugated iron, 8 $\frac{3}{4}$ d. to 9 $\frac{3}{4}$ d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second

MINES DEPT. EXAMS.

CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S. A.	3	2	5
Total for S. A. 17			

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 6 failures this year (1921) and have secured two-thirds of the certificates issued in S.A.

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),

St. James' Mansions, Eloff St. Johannesburg

at the coast; American oak, 1 in., 10d.; 1½ in., 11d.; 2 in., 11½d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1½ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelling, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Business in the second-hand iron and timber yards is practically at a standstill pending settlement of the strike. Timber is 8d. to 9d., iron 6d. to 7d.

There is considerable building activity in Durban owing to the lower costs due to wage reductions and reduced prices of materials. The strike on the Rand is, however, holding up several important schemes.

Union's Timber Resources.

Mr. K. A. Carlson, the Transvaal Conservator of Forests, has written a very thoughtful and interesting article in the South African *Journal of Industries* about this country's timber resources. Civilisation, he says, is built up and maintained on wood, and though iron and steel are necessarily in the foreground wood remains the first essential, being cheaper, lighter to handle, more elastic and easily worked. Mr. Carlson emphasises that the world's sources of timber are drying up, and advocates the afforestation of South Africa on a really vast scale. America has lost five-sixths of her original forest area and must import 60 per cent. and more till the situation is relieved by the planting of some 260 million acres. Canada and Russia have a large percentage of forests incapable of producing timber, and in Sweden the present position is regarded as very grave, and steps are being taken to plant nearly 2 millions of commercial timber. Mr. Carlson, taking two acres per unit of consumption as the standard figure for the Union, and assuming that the population will have doubled itself in the next fifty years, says we should then require no less than 14 million acres of forest to sustain the needs of fully developed industries. As the present effective area of industrial timber does not much exceed 100,000 acres, the Union is faced with the titanic task of planting an average of nearly 200,000 acres every year for the next 50 years. While America is estimated to have 0.92 acre per capita, the Union is only possessed of 0.43 per unit. He says that most of the accessible private forests in the Union are being rapidly cut out and destroyed without replacement. Much of the work in Government plantations has been experimental, and 75 per cent. of the private plantations are under wattle, chiefly for the production of bark. The Forestry Department had done its best, but altogether insufficient provision had been made as regards afforestation in the Union. If the public only realised, he states, what an intimate bearing timber production has on our industrial advance, and what a valuable asset a great forestry scheme would ultimately prove, sufficient pressure would be brought to bear to carry out such an absolutely necessary scheme. Mr. Carlson concludes by saying that those countries which do not possess sufficient forests of their own will be compelled to retire from whatever position they may have attained in their competition for the world's trade.

Prominent Merchant's Views on Present Position.

In the course of a chat with an important merchant, he said that his personal opinion regarding the present position was that somewhere about the end of this month some of the mines would attempt to start up again—probably confined to the richer mines, such as the Government Areas, New Modderfontein, etc.—provided no definite settlement had been arrived at with regard to the strike. He thought the ultimate result of this trouble was going to be the complete

collapse of the Federation, and of course things were bound to be very bad. The starting up of the mines was going to be a very gradual process, and was going to reflect back on the whole of Johannesburg to a very serious extent for at least six to nine months. The spending power of the town, he said, is going to be permanently curtailed on account of the old low-grade mines never starting up again. So far, he said, only three mines had been officially notified as shut down, but certainly four or five more would eventually be added to the list, and of course when it comes to spending power the low-grade mines are just as good to the community as the richer propositions; the E.R.P.M.'s spending power would be much greater than that of the New Modder and it would be of more benefit to the community to keep such properties alive than the richer mines. He thought the result of this strike must mean the financial ruin of a large number of the smaller commercial firms; they will never, he thought, be able to get through this crisis, which is undoubtedly the worst ever experienced by Johannesburg. Of course, the effect of it will not be apparent to-day, but will be apparent, say, in anything from two to three months' time—that is when the real effect is going to be felt. Take the position of a short time ago, say in November and December last. The stocks of many of these people were getting fairly low, they re-ordered, and all this material will be arriving within the next month or six weeks. Having done no business for the past five weeks they will be unable to meet their bills, which is going to precipitate matters.

British Trade Conditions.

The reports from various manufacturing centres since the New Year opened have been rather more cheerful. The improvement so far is not very pronounced, but the receipt of a larger number of inquiries from export markets leads to the hope that many of these inquiries may lead to actual business. It now seems evident, however, that there is no likelihood of sufficient demand to justify the retention of the greater part of the extra plant installed to meet war requirements, and as this idle machinery involves its owners in overhead charges without producing any return, some extensive scrapping seems necessary in order to restore something like equilibrium between factory capacity and normal demand. Manufacturers have lost the fatuous optimism of the possibility of doing a much larger volume of trade after the War than before, and are at last alive to the fact that hard work and small profits are to be the order of the day for some time to come. The position in the iron and steel trade is still far from satisfactory. Here and there the outlook is perhaps a trifle brighter, but there are still a great many furnaces that have never been restarted since the coal strike of last spring. The recent reductions in railway rates were insufficient to stimulate trade, and the price of coke is still regarded as too high. Sheffield and other armament making districts are, of course, suffering severely from the present disarmament programme, and the lack of activity in engineering works all over the world is reflected in the paucity of orders. South African coal exporters will have to fight hard to retain any of their markets in the face of the keen competition from Wales. The report of the General Manager of the Sudan Government Railways for 1920 does not encourage the hope that South African coal will continue to find a market in that quarter. It is stated that although the large quantities of Natal coal imported for the railways enabled services to be satisfactorily maintained, the coal needed careful handling, and the General Manager recommends that in future Welsh coal should be purchased in preference, provided that it is available at a competitive price. Germany is sending orders to Britain for pig iron, indicating that the abnormal trade depression in the United Kingdom is ending. It is hoped that the holding of the British Industries Fair in London and Birmingham, from 27th February to March 10th, will mark a turn in the tide in regard to the trade of the country.

American Tariff Bill.

Great interest is being taken in the United States in the American Tariff Bill, says Mr. Stevenson, the American Consul here. He has received a cable that it may be several

months before the new tariff will be passed. It is quite probable, he said, that there will be great changes introduced into the Bill in respect of the American valuation system, but just what that form will be it is, of course, impossible as yet to tell. There is a tendency to make this tariff more flexible; the two fundamental things will be the world's comparative conditions and the value of the German mark in other countries—thus the tariff will be more on the bargaining basis. There is a very fair import trade between the Union and America, and this should be of interest to South Africa.

Paraffin and Petrol Prices: Further Reductions.

A notice in the *Gazette* fixes the maximum price of paraffin to the retailer at the coast ports at 15s. 3d. a case of large tins and 19s. 9d. small tins. At other places prices as above plus charges. Prices to the consumer: At the ports and less than 400 miles away 17s. 6d. per case and 22s. At places 400 miles from the nearest port and farther, 17s. 9d. per case or 8s. 11d. per tin or 22s. 3d. per case or 2s. 3d. per tin, plus charges. Bottle prices at the ports, 5d., elsewhere 6d.

The notice fixes the wholesale price of petrol (all brands) at the ports at 26s. per case; Shell brand, 29s. 9d.; Pegasus and Zenith at 29s. 6d. At other places prices as above plus charges. Retail prices: At the ports, 26s. per case (all brands) plus 15 per cent. on smaller quantities in bulk at the rate of 4s. per imperial gallon. Shell brand 4s. 7d. per tin; Pegasus and Zenith 3s. 7d. per tin. At other places 26s. per case plus 15 per cent., plus charges, or 4s. 8d. per imperial gallon. Shell brand 5s. 1d. per tin; Pegasus and Zenith 4s.

Strike of Railwaymen in Berlin.

The railwaymen at Frankfurt-on-Main have in consequence of a dispute over wages, ceased work, and the movement is extending to other places. Krupp's works at Magdeburg are closed owing to lack of coal. Gas and electric workers, builders and telegraphists in Berlin have also struck work, paralysing the activities of the capital. Berlin's essential services are held up and many factories have been obliged to reduce working hours, some indeed having closed down. Breslau and Frankfurt are isolated. In the south and south-west the situation is brighter. The Munich engine drivers refused to come out, while the Bavarian railways are almost normal as well as those in Wurtemberg and Baden. There appears to be no disposition to violence. The transport of foodstuffs and other necessities is being done by the use of the canals, while a staff of officials has been organised to drive and stoke the engines. The position appears to be becoming more serious, as the men in the railway repairing shops have joined their comrades. About a quarter of a million employees, it is estimated, are now out. In the meantime passenger and goods traffic in North Germany is at a standstill.

Effects of Rand Strike on Coast Factories.

All coast factories, says the *Cape Argus*, have been adversely affected by our labour dispute. Orders that were on hand have been cancelled, and no fresh orders are coming in. Hitherto the factories have been kept going on a normal scale, hoping for an early settlement, but stocks have accumulated to such an extent that operations must be curtailed. Short time has been inaugurated, and the retrenchment of operatives is imminent.

Trade Arrangement Between Union and Belgium & France.

A London cable says important arrangements have just been concluded by which a company has been formed at Antwerp, backed by a number of Belgian and French companies who control capital aggregating some £30,000,000 sterling, for the purpose of stimulating trade between South Africa and Belgium and Northern France. The new organisation comprises a number of leading Belgian and French manufacturers of iron and steel goods of all descriptions, railway rolling stock, mining requisites, etc. It is anticipated

that a wide outlet will be provided in the Allied countries for South African products—wool, hides, skins, mohair and wattle bark.

Reduced Wages on Scottish Railways.

The National Union of Railwaymen has accepted the award of the National Wages Board on the claim of the Scottish railway companies for a reduction of wages and the extension of working hours.

Electrical Goods.

Dealers report but very little business doing, and that things are going from bad to worse; with the exception of a few orders from the country of insignificant proportions, and the filling in of the usual replacement fittings and repairs, trading is practically stagnant.

Clyde Yards Busy.

The output of the Clyde shipyards for last month constituted a record, eight steamers, aggregating 52,000 tons, being launched. Nearly all of these steamers will use oil fuel.

Hydro-Electrical Material for New Zealand.

Mr. Massey, speaking in the House of Representatives, confirmed the report that the contract to supply hydro-electrical material had been given to a British firm, notwithstanding a tender lower by £13,000 had been received from an American company. Mr. Massey said, however, that this amount would have been reduced by the preference tariff to £7,000, and that the Cabinet had decided to take British machinery manufactured by British workmen.

Commonwealth's Telegraphic and Telephonic Services.

The Australian Commonwealth Government has decided to cease the manufacture of ammunition and expend the money thereby saved on the development of backward telephone service and the employment of returned soldiers. The Government contemplates asking Parliament to authorise a loan of £8,000,000 for speeding up telegraph and telephone construction work.

Commonwealth Line of Steamers.

Mr. Hughes, a Melbourne cable states, announced that, allowing for writing down of the whole capital cost of the line, the net gains for the past five years was £1,600,000. He said that with four additional steamers soon to be added the Commonwealth line would be able to give a regular and rapid service.

Dunlop Rubber Company.

The annual report of this company for the year ended August 31, 1921, disclosed the huge loss of £8,320,000. The loss is chiefly due to the enormous shrinkage of the market price of stocks of raw material, principally cotton and rubber. The company's reserve account now stands at £2,750,000.

The Moonta Copper Mine (Australia) is about to resume operations, the men having accepted reduced wages.

Big Hungarian Coal Strike.

A Prague cable announces that a strike has broken out on the coalfields in Czecho-Slovakia, 145,000 miners having ceased work.

Wireless.

The Belgian Government has decided to construct at Elisabethville a wireless telegraph station of great power, with a view to direct communication between Belgium and the Congo.

Metal Market.

Latest London quotations: Bar gold, 95s. 5d. per oz.; bar silver, 34½d.; standard copper, £61 12s. 6d. cash, £62 12s. 6d. forward; electrolytic copper, £68 cash, £70 forward; standard tin, £154 7s. 6d. cash, £156 7s. 6d. forward; foreign lead, £20 17s. cash, £20 15s. forward; quicksilver, £11 7s. 6d.

The South African Mining & Engineering Journal

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Established 1891.

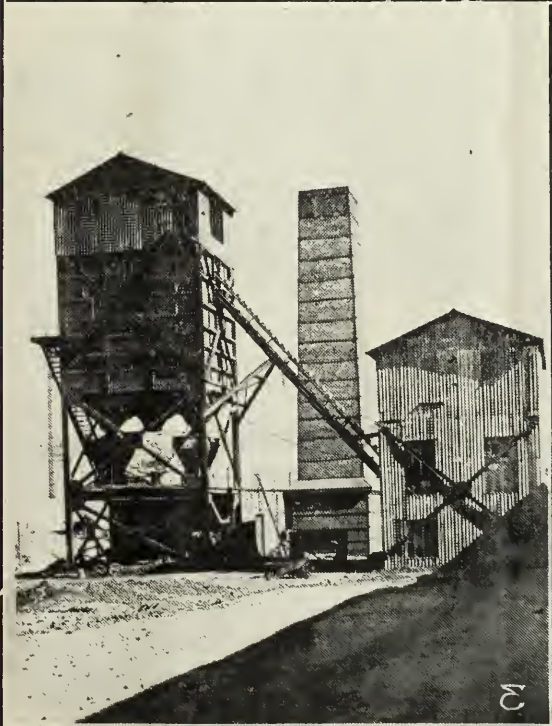
Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY,

FEBRUARY 18, 1922.

No. 158C

Scenes on the Katanga Copper Fields.



1. Workmen's Cottages. 2. Native Compound. 3. Coal Crushing Plant for Making Coke. 4. A View of the Kambove Mine. An important article dealing with the great Congo Copper Fields appears in this issue.

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THE GREAT STRIKE.

RESTARTING THE INDUSTRY—RESPONDING TO THE PRIME MINISTER'S APPEAL— ATTITUDE OF THE MINE OFFICIALS—EVENTS OF THE WEEK ON THE REEF AND AT WITBANK.

On Saturday afternoon a further attempt was made to effect a settlement by the Prime Minister, who issued the following statement:—

The strike on the Rand gold mines has now lasted for more than a month. The Government did everything in their power to prevent it, and subsequently spared no effort to bring about a settlement.

They brought the parties together in a conference; when the conference failed they negotiated separately with the parties with a view to bringing about a settlement. These negotiations also failed, and for some days now the strike has mechanically dragged on, to the serious loss and suffering of all concerned.

It is clear that the continuance of this unhappy state of affairs cannot be tolerated any longer.

Unless work is immediately resumed the loss to the workers through eventual unemployment would be many times greater than the sacrifices they were originally called upon to make in order that the low-grade mines might be saved.



General Smuts, Prime Minister of the Union, who has issued another appeal for the resumption of work.

Under such circumstances victory itself becomes meaningless, and the only course open is to end the strike without delay. It would be vain to waste further time in trying to obtain satisfactory terms of settlement.

The final settlement must be left to Parliament after impartial inquiry. And in the meantime work must be resumed so as to preserve means of employment and livelihood to as many as possible.

“ Call the Strike Off.”

I do not think better terms for the immediate resumption of work can be received than those which I advised the Federation to accept last week. That is to say, the Chamber's letter of January 29, plus the concessions in regard to the temporary maintenance of the *status quo* agreement on the high-grade mines.

I would ask the Chamber not to withdraw that concession if a general resumption of work can be secured on this basis.

I appeal to the Federation to call off the strike on that basis, and to the workers to go to work and leave the final settlement to Parliament.

The Government have promised, and will immediately appoint, an impartial board to review the issues that have been raised, and to frame a settlement for the consideration of the Government and Parliament.

The board will go into the questions of European employment, of the operation of the *status quo* agreement, of the fixing of some ratio of European to native labour, and of the finances and economical working of the mines.

They will inquire impartially into the sacrifices to be made, not only by the men, but also by the mine owners, in order to save a large part of the mining industry from extinction.

If, in order to save the low-grade mines, it is necessary to work them under a less expensive and more elastic system, it is only fair that the matter of overhead charges and office expenses should be reviewed *pari passu* with the sacrifices which are demanded of the workers. And impartial machinery should be established which will settle what



Mr. J. K. Addie, Manager of the Witbank Colliery, one of the leading coal propositions of the Transvaal.

are and what are not low-grade mines in order that none should have the power arbitrarily to move a mine from one class to the other.

Parliamentary Inquiry.

All these matters require careful inquiry for the guidance of Parliament, and the findings of the Board can be awaited in full confidence that Parliament will do its best to give a square deal to both parties.

In the meantime it is essential, in the interests of all, that work be immediately resumed. Even so, I fear large numbers of men will not be able to find immediate re-employment on the mines.

Many mines have flooded badly, all have had their native labour complement seriously reduced, and for some time the numbers of white workers to be re-employed will necessarily be restricted.

The Government have already given earnest consideration to the aftermath of unemployment which is certain to follow

on this strike, and schemes are being worked out for employing some thousands on afforestation, irrigation, and other public works.

In concluding this most earnest appeal to the men to return to work without any further delay, I wish to add that the Government will use all its powers to protect those who listen to this appeal, and the police have instructions, as from next Monday (February 13) to give protection to all miners who return to their former employment.

And I call upon the mine owners to re-start the mines in all cases where sufficient numbers of men offer to return to their work.

(Signed) J. C. SMUTS.

February 11.

Mr. Thompson's Views.

"This is something for us to get down to," said Mr. Joe Thompson, Acting President of the Federation, when interviewed at Witbank at 10 o'clock on Saturday night in reference to General Smuts' statement.

"It goes further than the one made at the conference," he proceeded. "But it has to be gone into very carefully; so I think we should call the governing bodies of the unions to go thoroughly into it."

Mr. Thompson then made the following announcement:—
"Regarding the Prime Minister's statement just received, and in view of the possibility of an attempt being made to start up the gold mines and other industries before it has been definitely decided to do so by the Federation, which is the authority on behalf of the whole of the workers implicated in the present dispute, I hereby, on behalf of the Augmented Executive of the unions concerned, definitely instruct all workers not to return to work until the Prime Minister's statement has been considered by the above body and a decision arrived at."

THE FEDERATION REJECTS PROPOSALS.

Immediately upon hearing of the announcements of the Prime Minister and of the Chamber of Mines in regard to the re-opening of the mines this morning, Mr. Joe Thompson, acting president of the S.A.I.F., who was at Witbank on Saturday, called a special meeting of the Joint Executives of all affected Unions at the Trades Hall on Sunday. The following official report, signed by Mr. J. Thompson, acting president, was issued to the Press on Sunday night:—

The letter of the Prime Minister was full discussed, and attention was specially directed to the two concluding paragraphs of his appeal, which read as follows:—

"In concluding this most earnest appeal to the men to return to work without any further delay, I wish to add that the Government will use all its powers to protect those who listen to this appeal, and the police have instructions, as from next Monday (February 13) to give protection to all miners who return to their former employment.

"And I call upon the mine owners to re-start the mines in all cases where sufficient numbers of men offer to return to their work."

It was decided as a recommendation to the Augmented E.C. of the Federation "That we accept General Smuts' challenge to the workers as contained in the last two paragraphs of his appeal, and that we recommend all men on strike to stand fast and carry on the strike to a successful issue, viz., the withdrawal of all ultimatums on which the ballot was taken."

The above decision was afterwards endorsed by the Augmented Executive, and is therefore issued as an instruction to all workers not to return to work until a settlement has been arrived at.



Typical Mine Boys in a Rand Compound during the Strike.

It was further decided to hold three demonstrations during the week.

Meeting at Town Hall.

The strikers' meeting at the Town Hall on Sunday afternoon was the most remarkable of the series since the strike began. Long before three o'clock the hall was packed to

A Witbank Resolution.

At a big meeting of Witbank strikers the terms on which the colliery employes are prepared to return to work were laid down.

It was declared that colliery workers could not consider a return until the personnel of the Board suggested by General Smuts was known and accepted by the workers.



Mounted Police Guarding one of the Mines.

the doors and every inch of standing room was occupied. Many inflammatory speeches were made.

MONDAY'S DEVELOPMENTS.

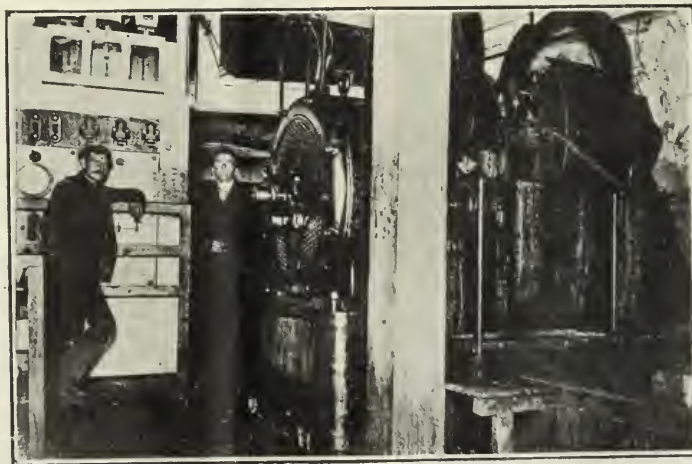
RE-STARTING THE INDUSTRY.

In response to General Smuts' appeal, all the gold mines on the Reef prepared to re-start on Monday, and preparations were made to have natives available for the resumption of operations.

Thirteen men were arrested at the Robinson Deep during Monday morning, 14 at the Village Deep, and 12 at the E.R.P.M., Boksburg. Bail was fixed at £40 each in the case of the Village Deep and Robinson Deep men. The Boksburg men were released on £10 bail.

At the E.R.P.M.

The largest number of men who returned to work on Monday was on the E.R.P.M. group, where about 100 signed on.



Carrying on Essential Services: Underground Pumping.

All mines had an adequate armed police guard for the protection of those men who desired to return to work, while the strikers had pickets on almost every property.

Picketing, whether peaceful or otherwise, being contrary to the Riotous Assemblies and Criminal Law Amendment Act, the police made numerous arrests in the central area and at Boksburg.

Other mines, both in the central area and the East Rand, started in a partial way with the services of underground and surface officials and any of the strikers who returned.

On the Central Rand few underground men presented themselves for work.

In the Supreme Court, Pretoria, application was made for the release on bail of Messrs. Shaw, Fisher, Wordingham, Spendiff and McDermid, who are charged with inciting to public violence, but after argument the Court declined to interfere with the Magistrate's discretion.

It was announced on Monday that owing to heavy losses the Knight Central would close down for good unless it could be restarted on Wednesday.



In a Rand Compound: Generally speaking, the mine boys have behaved admirably during the strike.

None of the four municipal employes on the Augmented Executive of the S.A.I.F.—Messrs. Thompson, Tom Matthews, Buxton and Hicks—returned to work on Monday, as ordered by the Tramway and Lighting Committee.

TUESDAY'S DEVELOPMENTS.

The situation with regard to the gold mines was officially reported on Tuesday night to be one of "steady progress." Several mines were restarting on a limited scale, principally



A Stack Smoking Again on the Far East Rand.

with the aid of officials. It is expected that with the withdrawal of pickets from the near vicinity of the mines many more workers will sign on in the course of the next few days. The Angelo mine (one of the E.R.P.M. group) dropped 30

stamps on Tuesday. Three further arrests took place on Tuesday. Mr. W. H. Andrews, the well-known Socialist and editor of the "International," organ of the Communist Party, was arrested and charged with inciting to public violence, and was remanded till February 22, bail being refused. At Boksburg Mr. H. E. Morgan was arrested and charged under the section of the Riotous Assemblies Act, which deals with "blacklisting," but was released on £50 bail. Another Boksburg miner was arrested for picketing and remanded, bail being fixed at £30.

Underground Officials Attitude.

The Underground and Surface Officials' Association decided that as they responded to General Smuts's first appeal to keep the essential services going, they would continue that attitude, especially in view of the fact that they felt it would be to the interests of the mine workers themselves that the mines should be kept from being ruined, and as far as possible retained in a condition in which they could be worked at the earliest possible date when the strike is settled.

Position at Witbank.

Notices have been posted at the principal collieries in the district to the effect that only certain classes of labour are required to run the mines. There is an appreciable



European Miners on the East Rand in the Pre-Strike Days.

decrease in the number of artisans necessary, both underground and on the surface, according to the lists. It is also stated that up to Thursday, February 16, preference will be given to former employes seeking to resume work. Only

men who, in the discretion of the management, are considered suitable applicants, will be engaged. The terms of engagement are as laid down in the notices posted on November 29, subject to the engagement of men only as actually required. No holiday leave is to be carried forward.

Position on the Coal Fields.

The notices issued on the coalfields in regard to the re-employment of men makes it clear that a drastically diminished number of workers will be taken back when the present industrial trouble ends.

The Witbank Colliery now offers employment to only seven miners, and a total underground complement of 13 men; and it may be taken for granted that the curtailment of operations will be even greater on other properties. The surface mechanics are rather better off.

Altogether about 700 men came out on strike; and under the arrangements indicated in the final offer of re-employment, it is clear that only considerably less than half of them can go back. In fact, it is estimated that at the moment the offer is only open to about 100 men.

Since the strike started, it is well known that big orders have been lost by the colliery companies; while another important factor is that even while the men are on strike, the pits have somehow managed to produce a tonnage very closely approximating present requirements. A "rearrangement of underground work" has evidently been found possible, with very striking success.

An Important Meeting.

A meeting of the Executive Committee of the Engine Drivers' and Firemen's Union was held in the New Trades Hall on Tuesday evening, and was addressed by Mr. A. Crawford at considerable length.

The meeting was largely the outcome of the meeting of the Germiston Strike Committee some weeks ago, when an attempt was made to force the pace by arranging a deputation to meet General Smuts.

It may be remembered that the meeting between the Premier and the Germiston Committee did not take place, but a deputation from the Augmented Executive of the S.A.I.F. subsequently proceeded to Pretoria and held a conference with the Premier, which proved abortive after an agreement had nearly been reached.

A feeling is said to have arisen that the time has arrived for an entirely new set of men to take matters in hand on behalf of the Federation with a view to re-opening negotiations with the Government and the Chamber of Mines.

It is this movement within the movement that has been the cause of many references at strike meetings to the danger of swapping horses while crossing a stream and why votes of confidence in the Executive are so frequently proposed in order to test the feeling of the strikers.

The movement for more progress in the settlement of the strike either by the present Executive or by a new set of negotiators is expected to culminate in a demand by several of the unions for a ballot to test the feeling of all members of the Federation as to their confidence in the present Executive.

Wednesday's Developments.

Several mines resumed operations on Wednesday on a limited scale, and on others cleaning up went forward vigorously in view of an early restart of general mining operations.

A feeling of cheerfulness was apparent among the mine managements, who appear to be highly pleased with the work of the officials and the few strikers who have resumed work.

A huge demonstration was held in Johannesburg, some 10,000 miners and sympathisers assembling on the Union Ground, where resolutions in favour of continuing the strike were unanimously carried.

Mr. J. Thompson, Acting President of the S.A.I.F., said South Africa had now an opportunity of setting an example to humanity throughout the world as to what the conditions of life should be, and the conditions under which the production of wealth should be carried on.

Natal Collieries.

EMPLOYEES AGREE TO WAGE REDUCTIONS.

Employees of the Natal Coalfields have come to an agreement with the colliery owners regarding the scale of wages to replace the agreement which expired on January 31. A Conciliation Board sat on January 30, when representatives of the employees agreed to recommend the acceptance of rates of pay as from January 31 on the following basis:—

(1) That the standard rate of pay per shift for the months of February and March shall be 24s. 6d. instead of 28s. per shift.

(2) That the standard rate of pay per shift on and after April 1 and until otherwise arranged shall be on the basis of 2s. per shift below the rate operative in the Transvaal collieries as fixed by the colliery section of the Transvaal Chamber of Mines.

(3) That all rates of pay less than 28s. per shift be reduced pro rata to the reductions made in the 28s. per shift standard rate of pay.

(4) That reduced rates of pay shall apply, as has been the custom in the Natal collieries, to all employees whether members of the Natal Mine Workers' Association or not, including winding engine drivers, fitters and other mechanics, blacksmiths, carpenters and employees generally, whether working above ground or below ground.

These proposals were submitted to a meeting of the men a week ago, when it was decided to take a ballot upon them, and during the week a telegram was received from Hatting Spruit announcing that the majority of the men had balloted in favour of the acceptance of these proposals, which will presumably now come into force.

It may be explained that prior to December 31 the rate in the Transvaal mines stood at 2s. per shift above the Natal rate, and it is for this reason that that figure has been adopted in clause 2 of the agreement.

Up to the beginning of the week the strike had lasted 35 days. The price of gold has declined from 97s. 5d. to 95s. 1d., the lowest reached being 94s. 9d. The yield of gold in December last for the Rand was 664,935 fine ounces. The value of this total at 97s. 5d. when the strike began was £3,238,785, and on the 35th day at 95s. 1d. was £3,211,851 or a loss of £26,934 on the yield. As the premium is operating on a time mark, any failure to take advantage of the premium in operation cannot be recovered. The number of natives sent back to their homes during the 35 days was 42,000. In 1920 some 175,980 were paid £6,014,428 or about £35 per year. The loss of wages from 42,000 men would be £1,470,000 or £122,500 a month. On the first day of the strike the loss of wages to miners was estimated at £35,000 per day, and 35 days brings up the loss under this head to £1,225,000. The working costs for 31 days in December last in the Transvaal gold mines were £2,493,809; and the declared revenue £3,183,267. The loss to the general community was estimated at the beginning of the strike at £90,000 a day, which would amount to £3,150,000.

Lonely Reef Ore Reserves.

The Lonely Reef Gold Mining Company announces that the ore reserves at 31st December were 204,249 tons of an estimated value of 18.1 dwt. per ton. On the 30th September, the tonnage was computed at 202,033 and the average value at 18.79 dwt.

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FINANCES BEING REORGANISED—PROCURING CAPITAL FOR FURTHER DEVELOPMENT—HYDRO-ELECTRIFICATION PROJECTS—THE NEW TREATMENT PLANTS—IMMENSE PRODUCTION FORESHADOWED.

In the whole history of mining there is no more romantic chapter than that which may be written of the development of the great copper fields of the Katanga region of the Congo—the copper Rand of the world as it has rather aptly been termed.

When, just after the Boer War, the promoters of Tanganyika Concessions declared that their prospectors, led by the late Mr. George Grey, had located in the Katanga region of the Belgian Congo one of the greatest mineral fields on earth, the world merely smiled. But the smile is with Mr. Robert Williams and his Belgian associates to-day. In the face of enormous difficulties the moving spirits of the Union Minière-Tanganyika group have doggedly persevered, and the position to-day is that one of the greatest copper belts known—perhaps the greatest copper belt on earth—has been opened up, equipped, linked up with ports by railways, and brought to a state of production on an immense scale.

Unrecorded History.

Not so many years ago a very prominent mining engineer inspected the Katanga copper discoveries, and made a voluminous report, which was of a decidedly pessimistic nature in regard to the production of copper from the Katanga Mines. This report came into the possession of the *South African Mining Journal*, and we sought permission



M. Jean Jadot,

President of the Union Minière du Haut Katanga.

to publish it. We were threatened with legal action if we allowed the report to appear in print, and the views of the very eminent engineer were therefore never published.

The optimistic opinions held by the Union Minière-Tanganyika directors have since been fully confirmed, and the eminent engineer's premises have been demonstrated to be unsound in regard to the metallurgy of the great Congo copper belt.

The work that already has been carried out in Katanga is colossal; the magnitude of the development projected is simply staggering.

The development of the great Katanga copper belt of the Southern Congo Free State has taken much time and toil

and has called for the expenditure of colossal sums of money. The operations of the Union Minière and its associate the Tanganyika Concessions have during the past few years been hampered by the War, the influenza epidemic, and more recently by labour troubles and a reorganisation of the administration. Despite all these hindrances, however, the ambitious scheme of development laid down by the Anglo-Belgian directors is proceeding apace, whilst at the same time the mines continue to produce large quantities of copper.

M. Jadot's Review.

As an indication of the magnitude of the ambitious projects which the Union Minière Committee now have in view, reference may be made to the speech of M. Jean Jadot, President of the Union Minière's Board, at the extraordinary general meeting of the Company held in Brussels the other day.

M. Jadot's address dealt with the raising of the ordinary share capital of the Company to 26,000,000 francs, and the authorised issue of 150,000,000 francs 6 per cent. preference shares, carrying 25 per cent. of profits after 1927.

M. Jadot dwelt on the satisfactory condition of the Company's huge assets and the convention with the Comité Spécial du Katanga, and he also referred at length to the treatment of copper ores and the employment of hydro-electric power.

The Chairman's speech showed that in spite of the low price of copper, the Company's operations are covering expenditure.



On the Katanga Copper Fields.

In the course of his speech M. Jadot remarked:—In his speech at the general meeting of July 11 last our President informed you that the negotiations which were being carried on had a double aim: to find at once the resources necessary to relieve our financial position which had been adversely affected by the existing industrial crisis, and to secure by a practical scheme the financial resources which are indispensable to carry out our plans for the treatment of our low-grade ores.

The views which were then expressed to you on this subject have received the concurrence of the Colonial Minister, as can be seen by the Explanatory Memorandum which accompanied the new Convention when it was submitted for the approval of the Colonial Council.

We would remind you that our original Convention of 1906 stipulated that at every increase of our share capital an equivalent number of dividend shares must be created and handed over without payment to the Comité Spécial du Katanga; that Convention also made it a condition of the extension of our concession after 1936 that the Company should increase its share capital by 30 per cent. and hand over to the Comité Spécial du Katanga an equivalent number of dividend shares, together with a sum in cash equal to the nominal value of the additional capital shares.

Already, in 1912, our communications and reports indicated to you the impossibility of finding, under the onerous conditions of our Convention, the resources necessary to deal

with our average or low-grade ores which constitute the great bulk of the copper deposits in Katanga.

In 1913 we informed you that negotiations were proceeding for the constitution of a subsidiary company for the treatment of our ores by the leaching process. Indeed, as far back as 1912, the excessive cost of the coke and coal we imported had led our engineers to endeavour to take advantage of the waterfalls which we had the right to work under our Convention, and we contemplated adopting the only known process which could utilise hydraulic power for the treatment of ores. After tests of electric smelting made in Europe, we hoped that the comparatively low cost of the power would enable us to treat our low-grade ores with economy.

The negotiations with the Colonial Minister and with the Comté Spécial du Katanga for the constitution of a subsidiary company resulted in an agreement in principle, and we were hoping to get this subsidiary company established during the year 1914, when the war broke out.

The Treatment of Copper Ores.

Between 1914 and 1918—that is, during the period of the War—copper metallurgy made serious progress, not only in the domain of smelting properly so-called, but also in connection with the application of electricity to the treatment of certain classes of ore which were not suitable for smelting. For instance, plants were erected in Chili and in the United States which utilised hydro-electric power, not for the smelting of ores but for an electro-chemical process (leaching), which has since given excellent results.

In 1914 we engaged a consulting engineer, whose duties consisted mainly of following up the progress made in the United States and of investigating the application of the new process to our ores, the characteristics of which were somewhat unusual.

At the same time we decided to erect a test plant, properly equipped for the investigation of mechanical concentration, as well as of various new methods of treatment. This plant, although of small capacity, was on an industrial scale, included, in addition to a very complete equipment for mechanical concentration, a reverberatory furnace, with which we produced in 1917 a certain quantity of refined copper, and also, since the discovery of coal at Sankishia, carried out some interesting smelting tests.

Further, as we have stated in several of our reports, the question of the agglomeration of our fine ores has continued to be the object of our investigations.

Lastly, we have erected an experimental plant for the process which appears the most suitable for the economic treatment of all our low-grade ores, whatever their texture and composition. This plant has just started work, and the first results obtained have been very satisfactory. They confirm that the most practical method for the treatment of the bulk of our ores is the leaching process. This method,

however, requires a vast plant for the captation of waterfalls and also for the leaching works proper.

Hydro-electric Power.

The detailed surveys of the N'Zilo and Lufira Falls which are now being made show that these falls are capable of producing a very considerable volume of power, which will amply cover all our power requirements during the whole period of our concessions. The Lufira Falls, which are the nearest to the region in which we have so far carried out our principal operations, constitute in themselves a most valuable asset, and will, in all probability, supply a substantially higher volume of power than that previously estimated; their utilisation for the treatment by leaching will enable us to produce a larger tonnage of copper than that anticipated, and the output from this source is now estimated at round about 50,000 tons per annum.

We intend to commence with the captation of the Lufira Falls and the erection of a leaching plant at the Panda to be worked by electric power derived from those falls. The execution of this project will require first of all a considerable tonnage of cement, and this, we hope, will be supplied by a works which a company now being formed propose to establish very shortly in Katanga.

We must, however, repeat that the large schemes contemplated will require a considerable expenditure. We hope, nevertheless, that by the time the work is begun, say, in about eighteen months from now, the economic conditions will have so far improved and become more settled as to reduce our further outlay to a reasonable figure.

Now that we are confronted with important decisions for the realisation of our programme for the treatment of our low-grade ores, we are, thanks to the numerous tests carried out over several years, in possession of results which enable us to state that we have solved the problem of treating the whole of our ores without distinction."

Leeuwpoort Tins, Ltd.

It is rumoured that this mine is going to be started shortly. It is stated that the company has in sight several million tons of ore equal to 1 per cent. of cassiterite, but at the present price of tin the yield is unpayable. The life of the mine is about 25 years.

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AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

WIT. DEEP FINANCES.

A Cable from London—Promotion of the Union Mining Finance and Investment, Ltd.—Alleged Transactions—Co-operation of Shareholders Invited.

The "control" of the Wit Deep Company was recently wrested from the Corner House, and for the last year or two the concern has been administered by an independent board. Those shareholders who expressed pleasure that the administration of the company had been changed can scarcely now feel pleased with the conduct of the company's business, as revealed by the following cable, which appeared in the local Press the other day:—

The *Financial Times* gives prominence to the "unprecedented position" of the affairs of the Witwatersrand Deep Company, and criticises the action of the majority of the board at Johannesburg in forming a union with the Mining and Finance Investment Company, to which the Wit. Deep Company subscribed £49,000. It draws attention to the action of the meeting of shareholders in London, at which a committee of three was appointed with the object of securing liquidation of the finance company and the restoration of any Wit. Deep funds paid to it by the chairman and committee.

In connection with this we have been approached by Messrs. Catesby Holland and Barker, and we publish hereunder the contents of a letter written by the solicitors of these two gentlemen to the Press. The letter states:—

Sir,—With reference to a cablegram dealing with Wit. Deep Finance, as solicitors for Messrs. Catesby Holland and Barker, we shall be glad if you will publish the following for the information of shareholders.

The facts are that a majority of the board, consisting of Messrs. A. E. O'Flaherty (chairman of the Wit. Deep, Ltd.), Gamble, Deeble, Ellis and McAllister, on November 22 last, carried resolutions promoting a company called the Union Mining, Finance and Investment, Ltd., having a capital of £50,000, divided into £1 shares, towards which, at such meeting, the Wit. Deep, Ltd., agreed to subscribe a sum of £49,000, and authorised Messrs. O'Flaherty and Deeble to sign the memorandum and articles of association accordingly. The sum of 2s. per share has been called up.

This transaction was carried through without previous consultation with, and during the absence of, the joint-managing director, Mr. F. Catesby Holland. The minority directors mentioned below had received no previous notice that any such scheme was to be placed upon the agenda, and despite the emphatic protests of Messrs. Rosenzweig, Barker and Pickard (alternate for Mr. Holland), the resolutions were carried and put into effect by the votes of the majority above named, who are now directors of the new company. In spite of repeated requests at the meeting for time to be allowed for consideration of so important a transaction, the proceedings were rushed through and the company became an accomplished fact.

Some of the Clauses.

It was subsequently ascertained by our clients that the following clauses appeared in the memorandum and articles of association of the Union Mining, Finance and Investment, Ltd.:—

(1) The company is a private and not a public company. Shareholders can ascertain for themselves the important legal distinctions involved.

(2) The objects of the company, as stated in the memorandum, are wide enough to enable the directors to do all things in heaven or on earth or in the waters under the earth, or elsewhere, if necessary.

(3) The directors of the company have power to appoint any three of their number as life directors.

(4) If life directors are appointed, the shareholders have no power, even in general meeting, to alter the memorandum or articles of association of the company without the written consent of two out of the three life directors.

(5) Directors are expressly given the power to vote upon contracts with the company in which they are personally interested for their own profit and benefit.

(6) Neither insolvency, nor even a voluntary or enforced permanent absence, incapacitates a director from continuing to hold office as such.

For the present we desire to say no more. Until the arrival in South Africa of a representative of the European interests, shareholders in the Wit. Deep, Ltd., may rest assured that the gentlemen on whose behalf we sign will maintain an attitude of vigilance, meanwhile inviting shareholders to co-operate with them and the committee formed in London for the purpose of dealing with the situation on its merits. Any communications may be addressed to the undersigned, at whose office a copy of the memorandum and articles of association of the Union Mining, Finance and Investment, Ltd., may be inspected.—Yours, etc..

ALEX. S. BENSON & SMITS,

Solicitors for Messrs. F. Catesby Holland and R. E. Barker.

In the light of the information which has reached us we consider that the circumstances of the formation of the Union Mining, Finance and Investment, Ltd., and of the finances of the Wit. Deep, Ltd., require most searching examination.

In connection with this matter it is only fair to point out that a representative of *The Star* called on Mr. A. Gamble on Wednesday morning and was informed that as far as Mr. Gamble was personally concerned, Messrs. Catesby Holland and Barker were quite at liberty to apply to the courts for an interdict with reference to the formation of "The Union Mining, Finance and Investment Co., Ltd." Last November, a paragraph appeared in the local Press taken over from the London Press in which it was stated that the probable course to be followed in the case of enemy shares would be that the companies concerned would register either investment trusts to hold their own particular block and to subscribe the necessary capital. Some time previous to this the matter of enemy shares had been discussed by the directors of the Wit. Deep. Mr. Gamble explained that a sub-committee had been formed, of which Mr. Catesby Holland was one, to go into the matter. This sub-committee subsequently reported in favour of the formation of a Trust company, the main object of which was to deal with such enemy shares.

In order to allow of freedom of action on at least a part of the directorate of the Wit. Deep, which consists of eight directors, it was agreed that the directorate of the new trust should be limited to five, and it was merely the fortune of war that the three gentlemen named were not elected to the directorate of the Union Mining, Finance and Investment Company.

Mr. Gamble stated that he was quite satisfied that if the three gentlemen named had also been on the directorate of the company, referring more particularly to Messrs. Catesby Holland and Rosenzweig, no objection would have been raised to the new venture. As it was, he deplored the fact that they should rush into print in the absence of the chairman of the Wit. Deep, Mr. A. E. O'Flaherty, and before the publication of the annual report of the Wit. Deep Company which would appear in the course of a week or two and would contain a full and satisfactory explanation of everything that might not be at present understood by the gentlemen in question or by the other shareholders of the company.

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EDITORIAL.

THE BREAKING OF THE STRIKE.

At the time of going to press, the outlook for the resumption of work by the gold mining industry is considered to be very satisfactory. One mine is already dropping 100 stamps and is feeding the mill bins with broken ore from the mine. Various other propositions at several points along the Reef are crushing, and at most mines a certain number of men are drifting back to work.

The strike on the Transvaal collieries has now lasted for nearly seven weeks and that on the gold mines for nearly six weeks. The direct loss to the workers is already getting on for a million and a half in wages, and to date more than five million working hours have been lost. It is going to take the industries involved a very long time to regain the industrial positions which they had attained to before the South African Industrial Federation called the strikes on false issues.

People have yet to realise the cumulative effects of the strike on the community at large, and they have yet to appreciate the extraordinary ramifications of the business. Tremendous damage has already been done, and it can be asserted without fear of contradiction that the mines in answering the appeal of the Prime Minister to reopen have saved the country from well-nigh irretrievable disaster in

the nick of time. In this connection the decision of the officials to stand by the industry and to do their utmost to save the situation is worthy of the highest praise. The men on strike will realise this sooner or later, however much their leaders may declaim the officials' efforts at present.

Some of the British colliers condemned the blue jackets who kept the pumps running during the last great British coal strike. But many of the colliers who are now out of employment openly express the wish that all the blue-jackets of the British Navy had been at work to save the miners from their own folly.

It is difficult to gauge the situation accurately, but we believe that by the time our next issue is published we shall be able definitely to state that the backbone of the strike has been broken.

BRAVO! MINE OFFICIALS.

During the trying and critical period of the strike the officials of the mines have stood loyally by their employers, and their conduct and allegiance to the industry is deserving of the very highest praise. Members of the mines staffs employed both underground and at surface have shown a fine spirit of courage and of perseverance in the face of very trying conditions, and we think that shareholders in the mines should fully appreciate the fact that the services of these men have been of incalculable value. They have indeed proved themselves to be the backbone of the industrial army of the Witwatersrand, and when the present calamitous days are over their services should be recognised by all sections of the community. Had their loyalty to the mines been less whole-hearted permanent injury might have been done to the mines and therefore to the whole country, and although it is hardly to be expected that in the present heated atmosphere the men themselves will recognise this fact we feel sure that when more moderate counsels prevail the rank and file will realise that by maintaining essential services the staffs of the mines have rendered signal services to the employees of the industry as well as to that much-slandered organisation, the Chamber of Mines.

Not only have the mine staffs been threatened and intimidated; they have also had to withstand innuendoes from well-intentioned persons who, in seeking to find a way out of the present impasse, have hinted that one of the troubles of the industry is the high rate of pay of officials, and who have urged that in the reconstruction of the industry the officials should be paid salaries which bear some fair relation to the rate of pay made to miners. As a matter of fact one of the great grievances of the Reef has been that many untrained and little educated miners have been drawing wages very considerably in excess of the salaries paid to the mine officials, many of whom are qualified technical men with Schools of Mines' experience. Others are highly educated clerical officials, and it must often have come as gall and wormwood to their souls to have to make up cost sheets or to pay out cheques for amounts very greatly in excess of their salaries to men whose education has cost them nothing and whose only recommendation is that they belong to a trades union.

This journal has for long pleaded the cause of the mine official, and particularly that of the shift boss and the junior mine captain. We have consistently argued that there should be more adequate recognition of the value and services of this type of official, and that he should receive the full support of the management in the execution of his highly responsible and often difficult duties. We believe that after this strike is settled the services of the mine officials will receive such recognition. And we believe, too, that in seeking to modify the underground contract system the Chamber of Mines is endeavouring to remove one of the greatest anomalies on the Reef—an anomaly which has often caused a good deal of justifiable dissatisfaction among the staff employees who in this trying period have proved so faithful and worthy of the trust reposed in them.

RELIEF SCHEMES.

According to ministerial statements the Government has under consideration large afforestation and irrigation projects with a view to relieving the unemployment problem which has been rendered very much more acute in consequence of the strike. General Smuts made reference to this Government project in his appeal for the restarting of the industry. Colonel Reitz, Minister for Lands, stated at Port Elizabeth during the week that he had been travelling for ten days in connection with the Government relief scheme for unemployment.

"The Government realises," said the Minister, "that the unemployment problem will be much accentuated by the strike in the Transvaal, and steps are being taken to deal with the position at once. We have already ordered material for hundreds of buildings for workers on an afforestation scheme at Zoutpansberg." Colonel Reitz added that other similar projects were afoot for Natal, and probably at Knysna and George. Work on railways and harbours and irrigation development would also be utilised in the alleviation of unemployment.

We are heartily in accord with the Government relief schemes, provided that they are framed on a sound economic basis; that is to say, that they do not partake of the nature of doles which are only State premiums on laziness. The kind of relief work which this country requires is work which will be reproductive, and reproductive at an early date. Afforestation and irrigation are certainly admirable undertakings which will secure abiding assets for the country, but some considerable period of time must elapse before either of these methods produce very much in the way of revenue, and in so far as irrigation is concerned it may be pointed out that unless a rate of progress substantially more rapid than that attained in connection with the Hartebeestpoort scheme is made, the country will have to wait a considerable time before any financial return is derived.

To our way of thinking the Government would do well to pay particular heed to the question of roads. The unemployed want work. It is no use squandering the Union's slender financial resources on doles and on useless relief work. But employment for the growing army of the out-of-works upon a main trunk road system traversing the whole country from Table Bay to the Limpopo would be the commencement of a step which would ultimately give to the Union an asset of vast value. Such an undertaking would, with its feeder lines acting in consort with the railways, give a tremendous fillip to commerce, and we believe that it would speedily show tangible and large returns because of the benefits it would confer upon the farmers in the more rapid and economical marketing of their produce.

Construction and maintenance of this main trunk road would provide our collieries with an immense market for the inexhaustible quantities of tar which they could produce from low-grade and waste coals. We have frequently observed in the course of visits to the coal fields of the Union that a vast amount of low-grade and fine coal is being dumped as waste. According to the managements of these collieries, there is no sale for this coal. Frequently we have been told that the collieries would be only too glad if some one would take the waste coal away. They could have it for nothing.

When it is pointed out that this coal contains valuable by-products, and particularly tar, the invariable reply is: "And who is going to buy the tar? The market for tar in South Africa is exceedingly small. If we put up a tar plant we could not sell what we produced." The point is that an enterprising road policy would provide an ample market for innumerable tar plants. The main trunk road and its branches must be well metalled and a good surface maintained. Here, then, is an undertaking which would not only give useful employment to the out-of-works of the Union, but would also provide a profitable market for many

thousands of tons of coal which are to-day going to waste. And of the advantages of such a road system to the country at large there can be no question whatsoever.

In addition to the points mentioned above, it would have a great strategic value, and in the case of transportation trouble it might well prove the salvation of the Union. In England the great railway strike of 1919 was broken by the employment of mechanical transport on the excellent roads of the Island Kingdom. How much more important is it to the inland centres of the Union, situated at great distances from the coasts that there should be a valued coadjutor of the railways in normal times; an adjunct which could if need be take the place of the railways during any possible period of industrial unrest.

There is another direction in which the Government might well look for a profitable method of solving our unemployment problems. On the outlying sections of the Witwatersrand there are large auriferous areas, many of them with small gold content which on a reasonable basis of working expenditure might at an early date be able to supply several small batteries with ore which would yield a profit. And in this connection we would repeat what we said in our issue of a week or two ago on the subject of the special geological mission, which includes Dr. Molengraaf. This mission is now visiting South Africa, and its presence affords an unique opportunity to the Union Government to secure an independent and unbiassed opinion on the vexed question of the reef series of the Far East and South-East Rand, on which there has been so much controversy during the past few years. At a time when there is so much talk of a dwindling Rand it seems the duty of the Government to leave no avenue unexplored which may lead to the discovery of an extension of our gold mining industry, and thus afford a substantial field for the growing ranks of the unemployed, many of whom are men with some experience of mining.

The Labour leaders are so obsessed with the pathetically foolish idea of "winning" an industrial battle which can hold no victory for either side, and the general public are so staggered at the devastating effects of the stagnation resulting from the Federation's refusal to face the economic facts of the position, that the continued and serious decline in the price of gold is being overlooked. The selling value of the product of the mines of the Witwatersrand, upon which the prosperity of South Africa so largely depends, has fallen to 94s. 9d. per oz. It is, in fact, now only 10s. per oz. more than it was two and a half years ago when as a result of the chaotic conditions resulting from the War, the metal was sold in a free or open market, and the price broke away from the standard value to which it had for so long been tied. Since the strike was declared, the price of gold has fallen by three shillings per ounce. If this decline be applied to the returns of the mines for the month immediately preceding the strike period, that is to say, for the month of December, 1921, it will be more than ever brought home to one that the majority of the mines operating on the Witwatersrand could not possibly continue working on their former basis of costs.

Notes & News.

Orange River Oil Shales.

Much interest, says a message from Kimberley, is being evinced in the development of oil shales on the Orange River. Shale has, it is said, been struck at about 93 feet.

* * *

West End Diamonds.

During the quarter ended 31st December, 1921, very material progress has been made with erection of permanent plant. The various units are practically complete. We understand that washing operations will commence about the end of this month.

Port Natal's Coaling Business.

Contrary to general expectations the coaling business at Port Natal has not increased in volume as a result of the trouble elsewhere, but has shrunk to smaller proportions than usual during the last few weeks. The total sales for cargoes and bunkers were just under 16,500 tons last week, which is much below the port's usual weekly average. This week, however, is showing an improvement, as the total order in hand up to now aggregate 11,600 tons for bunkers.

* * *

British Export Coal Trade.

Writing on the present position of the British export coal trade, Sir D. M. Stevenson, Bart., of Glasgow—who was chairman of the Committee for the Supply of Coal to the Allies from its formation in 1916 until it was disbanded at the end of 1919—gives in the current issue of *The British Trade Review* a brief survey of the trade's vicissitudes in 1921 and concludes that it may not be long before British coal-exporters win back their former oversea markets. Sales of coal by America to the Continent have now practically ceased, the writer states, adding that whereas during 1913 British coal exports (excluding Germany, Russia, and Austria) amounted to nearly 60 million tons, they have been at the rate of fully 40 million tons in recent months on practically the same basis.

* * *

Pretoria Silver Lead Co.

It will be noticed from our advertising columns that this company has extended the options for three months to the 21st June. Work is proceeding satisfactorily on the property; the No. 2 shaft is now approaching 100 feet and no difficulty has been experienced in sinking. The lode at the point of intersection was tested by borehole, when it was found to be 10 feet thick and of excellent value. It will be noticed that the board is requesting shareholders to register their shares so as to consolidate the certificates.

* * *

A Big Industrial Law Suit.

A big claim for a refund brought by the Cape Explosives Works against Lever Bros. and the S.A. Oil and Fat Industries failed in the Supreme Court at Capetown on Tuesday. During the War the defendants agreed to supply plaintiffs with crude glycerine for conversion into dynamite glycerine at a fixed English price. In 1917 the defendants complained that prices did not leave them a sufficient margin of profit, but the whole position was suddenly altered by the news that the British Government had decided to raise the controlled price for both crude and dynamite glycerine by more than fifty per cent. Thereafter defendants supplied plaintiffs on the basis of the increased price. It was later discovered that when the British Government raised the issue price of glycerine it did not interfere with the requisition price, and the plaintiffs contended that they had overpaid the defendants to the extent of £27,000. Sir John Kotze and Mr. Justice Van Zyl, however, came to the conclusion that there had been no misrepresentation on the part of the defendants, and granted absolution from the instance with costs.

* * *

New Deep Water Diamonds.

The directors of the New Deep Water Diamonds, Ltd., and the Tributaries, Ltd., report that they have received a letter from the manager at the diggings stating that on the afternoon of February 7 he found a $5\frac{3}{4}$ carat diamond of a very fine quality, the value of which he estimates at £90. The directors add that the last two months of 1921 were spent in prospecting operations, in the course of which two small stones were found. In January no digging was possible owing to the abnormal rise in the river. Hauling commenced again on February 4, and the stone now found was discovered at a depth of six inches under the surface.

Explosives and Chemical Works

IMPORTANT FORTHCOMING PUBLICATION.

The "S.A. Mining and Engineering Journal" has now in preparation a special illustrated supplement dealing with explosives and chemical works of the Union. Several of the principal firms having factories of this nature are giving their active support to the publication, which will be issued as a supplement to the ordinary weekly issue of the journal. Special commissioners are now visiting the various works, and the results of their investigations will be published in the supplement in the form of full, descriptive and illustrated articles. The supplement will also contain valuable data as to the quantities of explosives, fertilisers, chemicals, etc., produced in the Union, methods of manufacture and details as to markets and consumption. Prospective advertisers and manufacturers of chemicals, etc., interested in this supplement are advised to communicate with this office at the earliest opportunity.

Case of the Messina Mine.

The gold and coal mines are not the only mining ventures in South Africa which have suffered, and suffered severely, by reason of increased costs, largely through inordinately high wages and trades union restrictions during the past year or two. Take, for instance, the case of the Messina Copper Mine. The position from the point of view of the company has been clearly stated in the columns of the local Press by the chairman, Colonel Grenfell. Adverse conditions have been such that to work at a profit has become impossible. High working costs have been the chief factor, and taxation has also helped materially to make the mine unremunerative. "The Messina Mine," remarked Colonel Grenfell, "can be run with a complement of fifty white men and eighteen hundred natives, and before it was closed the company was forced to employ one hundred and seventy white men at wages fifty per cent. above those prevailing in 1914." Apart from high wages, therefore, it is contended, the ratio of white to coloured labour must be altered. According to Colonel Grenfell, the company has ready for extraction on the Messina mines alone over 600,000 tons of ore containing 20,000 tons of metal, of an approximate value of £1,400,000, the production of which would certainly entail an expenditure of over £1,000,000 locally. For the electrification of the Natal railway thousands of tons of copper will be required, and South Africa's own metal will not be available.

Railway Electrification Contract.

In reference to the acceptance of the English Metropolitan Vickers Electrical Company's tender for the electrification of a section of the South African Railways, it is ascertained that though it is not intended to publish the terms of the contract at the present moment, probably not before the meeting of Parliament, it is possible to state that the statements made by "Bene van Rippir" appearing in the Bloemfontein *Friend* are quite without foundation. It is possible, further, to add that not only was the contract British, but it was the lowest submitted and considerably lower than either of those submitted by its German rivals. Incidentally it was for 70 engines and not 85, as erroneously stated in the letter referred to.

The men cannot possibly get improved terms by remaining on strike. In fact, the longer the strike continues, the less favourable must be the terms. Even if the Chamber, and the Government, and the public and Parliament wished the men to have better terms, they could not possibly be given. If they were, only the few rich mines could make ends meet.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Electrical Engineering in 1921.—*The Engineer*, Jan. 20, p. 73.

Electrification of the St. Gothard Railway.—*The Engineer*, Jan. 20, p. 68.

The Dielectric Strength of Solid Insulating Materials.—*The Electrical Review*, Jan. 20, p. 77.

Methods of Handling Very High Pressures.—*Compressed Air Magazine*, Jan., 1922, p. 17.

Mining.

Diamond-Drill Sampling Methods.—*Canadian Mining Journal*, Dec. 30, p. 1014.

Underground Loading Devices in Metal Mines.—*Canadian Mining Journal*, Dec. 30, p. 1016.

Coal.

How San Francisco Company Handles Coal.—*Coal Trade Journal*, Jan. 11, p. 42.

Fuel Economy.—*Iron and Coal Trades Review*, Jan. 20, p. 75.

Dust Explosions.—*Iron and Coal Trades Review*, Jan. 20, p. 88.

Metallurgy.

Metallurgy at the California Rand Silver Mine: Concentration by Flotation.—*Mining and Scientific Press*, Jan. 7, p. 11.

Metal Market Report.

Messrs. H. A. Watson & Co., Ltd., report under date 23rd January, 1922:—

Standard Copper.—The improved outlook to which we were looking forward with the turn of the New Year has not yet shown itself, and prices for metals generally are lower. Lack of interest and absence of demand by consumers has caused a weakening tendency during the past fortnight. After closing on the 10th inst. at £65 10s. cash and £66 5s. three months the market only moved slightly, until the 18th inst., when the day's close was £64 10s. cash and £65 5s. three months. There was a sharp recovery on the 19th inst. to £65 7s. 6d. cash and £66 2s. 6d. three months, values again falling on the 20th to £65 cash and £65 15s. three months, at which they remain to-day. Closing quotations for manufactured copper are as follow: Strong sheets, £96 per ton; best select, £67 to £69 per ton; electrolytic, £71 to £73 per ton. Quotations for best select during the past fortnight were as follow: January 10th, £69; January 13th, £69; January 17th, £68; January 20th, £68.

Standard Tin.—The market looked like recovering some of its lost ground when values touched £167 5s. cash and £169 three months on 12th inst., but liquidations by tired holders, coupled with absence of real demand, brought a downward tendency and prices fell away, until on the 17th inst. the close was £163 10s. cash and £165 three months. A slight recovery on 18th-19th was followed by a drop to £162 15s. cash and £164 5s. three months on 20th inst. To-day's close records a further heavy fall following considerable sales in the East. Large quantities were thrown on the market and values dropped £4, closing at £158 15s. cash and £160 5s. three months. Tin ores: There is a fair inquiry for good clean ores.

Sulphate of Copper.—£27 to £28 per ton.

Spelter.—To-day's close is £26 to £26 7s. 6d.

Lead.—The closing prices are £23 spot and £22 17s. 6d. forward.

Bismuth.—Remains at 7s. 6d. per lb.

Nickel.—Remains at £180 per ton.

Quicksilver.—Price advanced to £11 per bottle.

Bar Silver.—Closes at 34½d. spot and 34½d. per oz. forward.

Manganese Ores.—Value nominally 1s. 1½d. per unit.

Antimony.—Prices unchanged, viz.:—English regulus, £34 to £39 per ton. Chinese £23 to £24 10s. Crude, nominal, £14 to £16.

Wolfram.—To-day's value is nominally about 11s. 6d. per unit for ore of 65 per cent. W.O.

Bank Rate.—Reduced to 5 per cent. on 3rd November.

PENROL FUEL.

The report of the directors of Penrol Motor Fuel, Ltd., for the year ended 31st December, 1921, to be presented to the shareholders at the first annual general meeting to be held on the 10th March, 1922, states, *inter alia*:—The original capital was £7,000, which was privately subscribed in cash. Thereafter the capital was increased to £32,500 to provide for vendor shares and 4,000 reserve shares. The present capital is £32,000, divided into 32,500 shares of £1 each. The "Penrol" patents in the (a) Union of South Africa, (b) Rhodesia, (c) Great Britain, and (d) the Commonwealth of Australia were purchased for the sum of £23,000, payable as to 21,500 shares of £1 each and £1,500 in cash. The patents were all duly transferred to the company and the purchase price paid. The Union and Rhodesian patents were sold to "Penrol (South Africa, Limited)" for 60,000 fully-paid £1 shares in that company. The Australian patent was sold to "Penrol (Australia, Limited)" for 1,000 shares of £5 each, of which 300 shares were paid to the promoters, leaving 700 shares as the net return for the sale of the patent. The subsidiary South African company has made arrangements to start the manufacture of Penrol almost immediately. The buildings and plant are approaching completion, and it is hoped that by the time this report reaches the shareholders Penrol will be actually on the market. A good deal of expense has to be incurred in placing the article on the market, but it is hoped that the result will prove to the eventual satisfaction of shareholders. The matter of distributing shares in "Penrol (South Africa, Limited)" remaining after payment of commission under agreement with Penrol Share Agency, when received, will have to be dealt with at the general meeting. The directors propose to hold the shares of the Australian company in the meantime. As manufacturing companies are formed this company will receive its quota of shares, when distribution to shareholders will be considered.

ANSWERS TO CORRESPONDENTS.

A.B., Durban.—(1) We do not regard these shares as a good investment at the price you mention. They are, in our opinion, a speculation with moderate prospects. (2) In the case of (a) yes, (b) probably not. (3) We cannot say without going into the matter in great detail. Perhaps reconstruction on the basis of four new shares for the old one will take place.

T. Holdsworth, Tinfields, Ndanga, Fort Victoria.—We regret that we possess no information concerning the mine you mention, but will endeavour to obtain particulars.

ENGINEERING SECTION.

“Broken Tools.”

SOME OF THE CAUSES OF SPLINTERING AND CRACKING OF HARDENED STEEL.

(Specially written for the “S.A.M. & E.J.” by J. A. Holden.)

If a tap breaks in the hole or a tool is found to be cracked after grinding there is some excuse for the ruffled feelings of the mechanic, but with whatever vehemence he may blame the hardener or the steel-maker, it is unlikely that a real understanding of the cause of the failure will result unless a thorough investigation is made. At one time considerable prominence was given to the injurious effects of impurities and the difficulties in the working up of steel were summarised in the phrases “sulphur makes it red short and phosphorus makes it cold short.” Even to-day these expressions are sometimes used with dogmatic conclusiveness. But methods other than chemical analysis have been developed and they have shown that failures occur which are in no way associated with the elements

because of the natural laws which govern the solidification of such liquids there is great difficulty in securing an absence of segregation, not only an absence of segregation of the impurities but also of one of the chief constituents—that is, carbon.

Taking as an analogy a solution of brine; the presence of the salt depresses the freezing point and when the solution is gradually cooled it deposits pure frozen water (*i.e.*, ice). Meanwhile the mother liquor gradually becomes more and more concentrated ice separating all the time until the temperature—22.4° C.—is reached and then the concentrated brine solution freezes without water or salt separating. This freezing of the pure crystals followed by

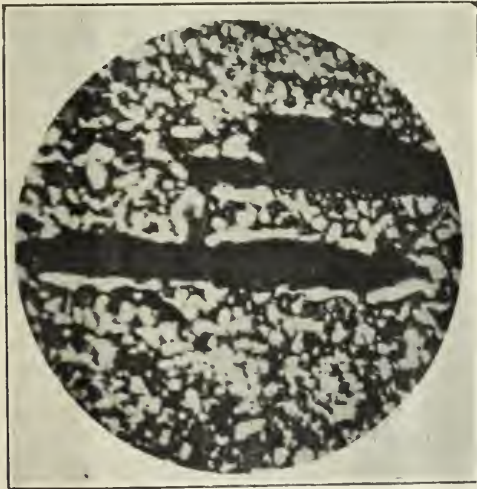


Fig. 1.—Massive Slag Inclusion. ×1000 diameters.

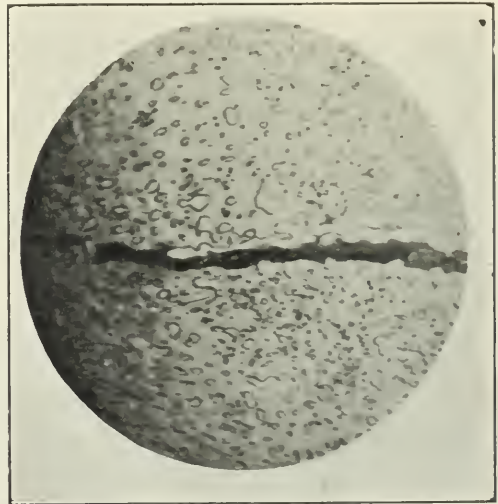


Fig. 2.—Fine Slag Line with Adhering Carbides. ×1000 diameters.

sulphur and phosphorus. Since the application of microscopical investigations, coupled with carefully controlled heat treatments, very valuable information has been obtained. It is perhaps unfortunate that the micro-constituents of iron and steel have been given rather complex names, but the subject itself is not by any means so complicated as we might suppose from the terms used.

Correctly made tool steels and special steels do not contain impurities except in very small quantities, and when such impurities are uniformly distributed throughout the metal they exert but a negligible influence. Such ideal conditions, however, cannot always be attained in practice, for liquid steel behaves in a precisely similar manner to other liquids made up of two or more components, and

the freezing of the impure water (*i.e.*, brine) is a more or less exaggerated example of what happens to liquid steel. In the case of liquid steel which of necessity (when cast into chill moulds) freezes with great rapidity there is but a limited period for the purer crystals to freeze in advance of the mother liquor; in very small ingots there is little or no chance for such phenomena to occur, but in large ingots it becomes a very disturbing factor.

The effect of such segregation may lead to very serious consequences, particularly if it occurs in bars which are hardened by quenching in either oil or water. For in badly segregated steel the carbon content may vary between the outer surfaces and the centre by as much as 40 per cent. The

writer actually came across some bars of supposed .80 per cent. carbon steel which varied from .50 per cent. to .90 per cent.; when quenching this steel for hardening, the difference in the carbon content in various parts of the bars set up such unequal strains that rupture followed. Here it may be added that by suitable preliminary heat treated such variation in carbon content can be considerably reduced, *i.e.*, the carbon in the more concentrated areas can be made to diffuse into the more diluted areas. It is occasionally found that a fractured piece of steel presents an appearance almost akin to torn timber; this is more com-

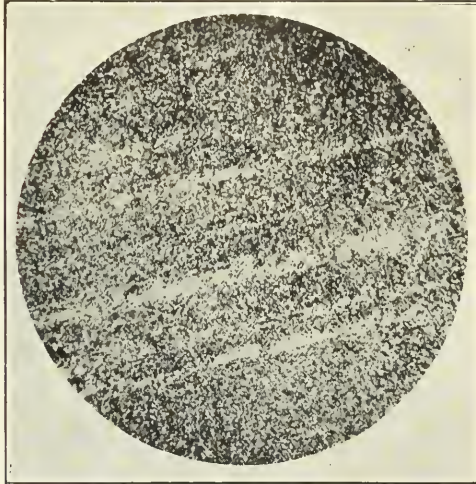


Fig. 3.—“ Ghost Lines ” in Tool Steel. $\times 100$.

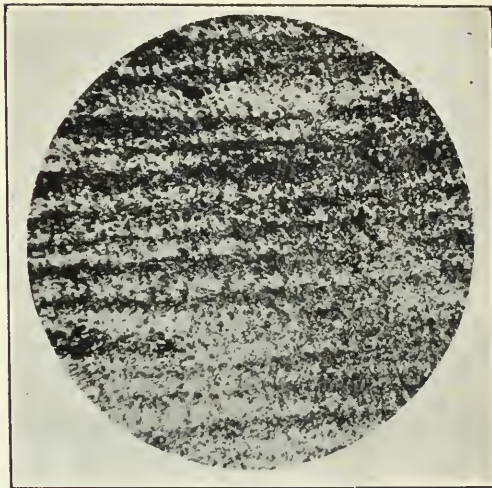


Fig. 4.—Banded Structure in Chrome Steel. $\times 100$.

monly found in steel broken at right angles to the direction of rolling or forging—that is, in what are known as transverse tests. Although “woody” structures are troublesome in certain classes of work such as, for example, in gun steels (here it may be mentioned that transverse tests are methodically carried out in armament works); it is but a rare occurrence in tool steels. There are, however, formations of a similar character common to certain kinds of tool steels and these are known as “banded” structures and “ghosts” or “ghost lines.” They were given the latter name because the lines could be discerned by the unaided eye upon well polished surfaces.

When steel is made in large quantities it must necessarily contain slag inclusions, which may consist of a product of the refining reactions, or mechanical erosions (such as fluxed ladle brick). In the ingot mould the globules of slag have the property of acting as crystallisation centres; in hard tool steels the slag acts as a nuclei for cementite (the micro-name given to free carbides) and in the case of mild steel the slag attracts the ferrite (the micro-name given to the chief constituent of mild steels and which consists of practically pure iron).

Eventually these minute islands of slag become drawn out under the influence of either forging, pressing or rolling and with them of course the adhering ferrite or cementite. As tool steels only are being considered here the latter type of inclusion will be dealt with.

The resulting form of such inclusion with adhering free carbide (or to give it the usual micro term—cementite) is depicted in Figs. 1 and 2. Fig. 1 shows massive slag inclusions surrounded with cementite—in this case the slag

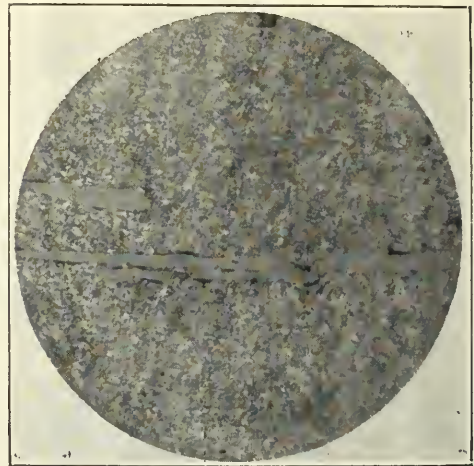


Fig. 5.—Sulphide Inclusion. $\times 1000$ Sulphur in the steel .039 per cent.

consists of ferrous silicate and the steel is acid Siemens open hearth of exceptional purity. Fig. 2 shows a fine slag line with adhering islands of carbide of iron and chromium.

When a tool contains a pronounced banded structure or it is full of “ghost lines,” such as in Figs. 3 and 4, it makes the material very prone to crack during hardening, particularly if water is used as the quenching medium. In steel balls and ball races it is one of the common causes of splintering and scoring, for under the combined stresses of load and speed the minute streak, if on the surface of either a ball or a race, becomes ultimately dislodged and scoring of the balls rapidly follows and the bearing fails.

As so much has been written about the sulphur content of steel, the writer shows a micro photograph (Fig. 5) of a streak of sulphide of manganese in a tool steel. Although the percentage of sulphur is in excess of the usual amount in good quality tool steel it may be mentioned that this material gave good results in practice.

(To be continued.)

NEW GRIQUALAND WEST RAILWAY.

It is understood that construction work in connection with the Kimberley-Barkly West-Borrellskop railway will be started next week, and will give relief to Kimberley unemployed. While dealing with railway matters, it may be mentioned that the Chamber of Commerce have asked for the railway line to be continued from Koffyfontein to Modder River, a distance of about 35 miles, which would bring Kimberley about 50 miles nearer the coast than at present.

Transport Marvels of the Congo.

A SHIP THAT LEAVES THE WATER.

The following interesting article recently appeared in the "South African Railways and Harbours Magazine":—

Belgium has just decided upon a wonderful new scheme of transport that will make the Congo continuously navigable for hundreds of miles where now the journey has to be done in stages, involving much delay and expense.

The mighty African river, one of the world's greatest waterways, is navigable from its mouth to Matadi, a distance of 110 miles, and then for the next two hundred miles there are cataracts and waterfalls that prevent any boat travelling on the river for any great distance.

Either the goods must be unloaded from one boat, carried round the cataract, and loaded up on another for the next stage, or the original boat, after being unloaded, must be dragged out of the river, drawn round the cataract on dry land, and then launched and loaded up again on the other side.

Conquering the Cataracts.

This, of course, is a serious hamper to commerce, and the delay is enormous as there are no fewer than 32 big cataracts and falls, besides many minor rapids. When

Saving Time and Trouble.

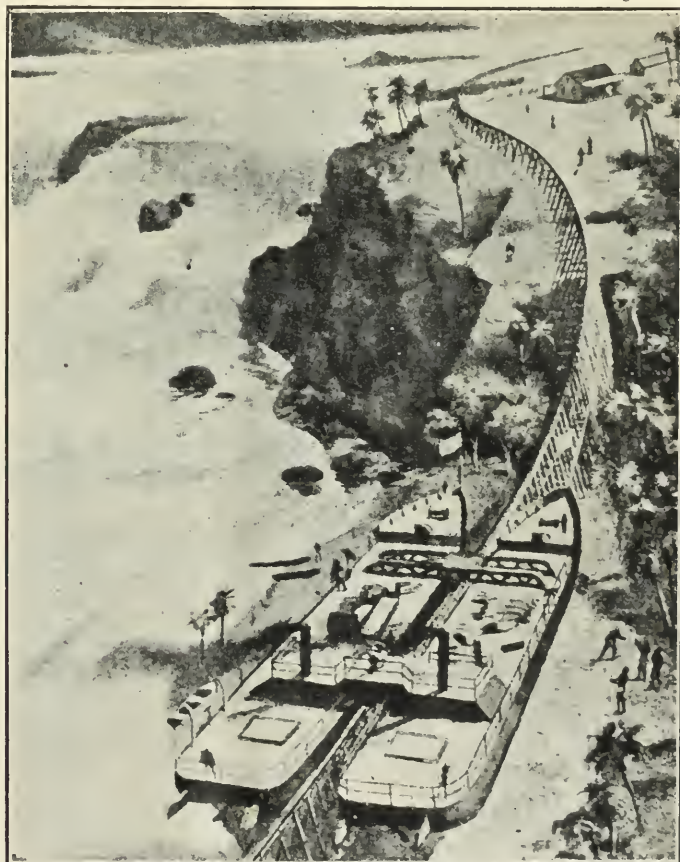
The vessel will proceed up the river as far as the cataracts in the ordinary way, each hull having its own engine and propeller and rudder. Then, when it gets to a cataract, it will run on to a mono-rail built on girder trestles in the river and running right over the cataract into the river on the other side.

This mono-rail will be racked with teeth, and between the twin hulls of the boat will be a series of powerful toothed wheels. The engines of the vessel, when the boat mounts the rail, will no longer work the propellers, but will be switched over to turn the toothed wheels. These will grip the racked rail and carry the boat up and over the cataract, and down into the river on the other side. In this way the delay and expense of unloading and reloading the goods at each cataract will be avoided.

Ship Becomes a Train.

It is a wonderful idea, yet very simple. Already it has proved successful in a series of elaborate tests carried out

HOW THE "PUKKA PUKS" WILL RIDE UP THE CATARACTS.



The natives of the Congo Bas'n call the stern wheel steamers that ply on the great river "Pukka Puks."

these are once passed the river is navigable for a thousand miles.

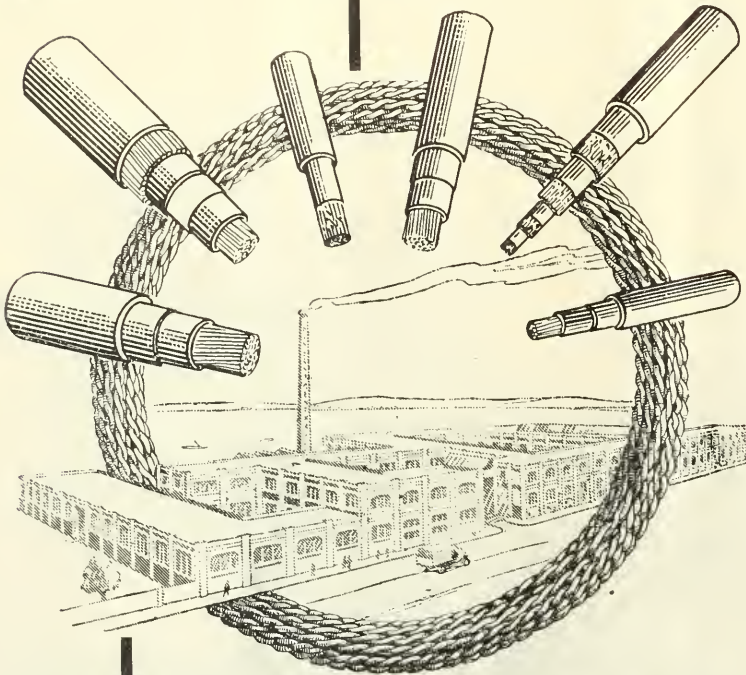
The Belgians have now solved the difficulty of navigating the Congo over the two hundred miles. They are conquering the cataracts, not by blowing up the rocks, which would involve an expenditure of many millions of pounds, but by a novel scheme never tried before.

The boats that will navigate the Congo will be built with twin hulls connected down their whole length with girder brackets. They will, in fact, be very much like the twin engines and carriages used on the famous Lartigan mono-railway at Ballybunion, in Ireland.

on canals near Antwerp, and the work of building the mono-rails over the cataracts on the Congo is to be begun at once.

What will really happen is that the ships will steam up the Congo for just over a hundred miles, and then suddenly change into railway trains. Again they will become ships, then change back into trains, and so on till the two hundred miles are passed.

If the scheme proves as successful as the tests in Belgium and the prospects on the Congo suggest, it will no doubt be extended to other rivers that have similar difficulties, such as the Nile, Amazon and Yukon.



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Organising a Blast-Furnace Plant.

THE BUNKER PLANT—CAR DUMPERS—BOILER HOUSE.

(By E. E. Buttner, D.Ch.)

The Bunker Plant.

The bunker plant of a recently erected Continental iron works is made of iron construction throughout and consists of two parabolic bunkers, side by side, divided at intervals by cross-partitions. It is covered by a roof carrying bracket supports for several lines of ropeway, some full and some empty. Underneath the bunkers, which have electrically operated slutes, are tracks for the electric charging trucks. At the end of the bunkers is a truck repair shop served by a traverser. On the further side of the bunkers from the furnaces is a crane shed in which railway borne coke can be filled directly into the furnace skips. Any surplus coke beyond the daily consumption is discharged into the bunkers as a reserve stock in the event of any unforeseen stoppage of the regular supply, a point that taught a great lesson at the Pretoria iron mines during railway congestions. This model plant is also provided with electric ore supply trucks fitted with turntables, and electric coke trucks equipped with cranes, and also without cranes. Under the horizontal section of each hoist is an auxiliary crab. The charging platform carries an emergency charging truck and a travelling gantry crane for charging, repairs and replacements at the furnace tops.

In the case of a recent American plant, stock from the ore yard is delivered to Hoover Mason ore and coke bins, consisting of 10 double stock pockets spaced 14 feet on centres and one central coke bin located directly above the furnace skips. The bins are of heavy type steel construction with double louvres and 5 foot drums on each side. Two double compartment scale cars are used, equipped with doors at the bottom made of manganese steel. The cars are operated with railway type motors with standard drum controller, and are furnished with standard indicating and recording apparatus.

Car Dumpers.

The raw material is received on cars by a movable car dumper electrically operated at one of the most economically constructed plants at Midland, America. The track on which the car dumper travels runs parallel to the ore bridge yard. The car dumper is arranged for handling all types of open top railway cars. Interference due to the overhang of the ore bridge is eliminated by discarding the usual housing, which embraces the entire machinery floor, and covering only the motors and adjacent machinery with a small housing. In order to provide for the possible use in future of longer cars than those used at present, the framework of this machine may also be modified to the extent of making the distance between end posts several feet greater than would usually be designed. To reduce the travel of the ore bridges to a minimum and to enable the car dumper to deposit the stock directly opposite the stock piles, the stock must be unloaded from the car dumper into a concrete receiving pit running parallel to the entire length of the runway, whence it is removed by travelling bridges to the respective stock piles. In charging the bins at the furnace the bridge is placed over the pile of desired stock, and the bucket deposits its load into an ore transfer side dump car which travels on an elevated steel trestle above the yard level, the tracks of which are an extension of those on the stock bins. A long track should extend the full length of the trestle to the coke bin at the coke oven plant. After

the coke is delivered to this bin from the coke ovens, it could be conveyed to the central coke bin at the furnace by means of a one side delivery coke car. This car also could be electrically operated and provided with railway type motors, and have a cab on each end for housing the operator and control equipment. The coke from the central bin enters the skip buckets through chutes which contain manganese screen plates. The coke breeze is collected below the screens on one side of the skip bridge by a receiving hopper, which also receives the breeze from the other side by means of a belt conveyor, crossing under the skip bridge. From this hopper, the breeze passes into a bucket which in turn deposits its contents into a skip tub, which can be elevated on an inclined runway by means of an electrically operated hoist, and the breeze dumped into a storage bin placed alongside and above one of the cinder car tracks. When enough breeze has collected, it is discharged into a car through chutes with gates controlled by hand levers operated on the ground level. The hoist control should be so arranged that one pressure of the button results in a complete cycle of operation, consisting of raising, dumping and lowering the tub, and the automatic filling of the bucket. This method saves a whole gang of labourers.

Boiler House.

Each boiler usually is equipped with superheaters giving 100 deg. F. superheat to the steam, with perforated brick chimneys to remove the flue gases from the boilers. Soot cleaners also make valuable accessories for boilers, as well as recording flue-gas temperature gauges and draft gauges. The flue gas is analysed by an automatic recording C.O. instrument. Recording steam pressure and temperature gauges should be installed on each head if the header is designed so that the coke oven plant may be operated with two or three boilers separate from the rest of the plant, so as not to receive the steam pressure fluctuation due to change of blast furnace and mill operations. All boilers are fitted with feed-water heaters and travelling grates. To utilise the exhaust heat from the gas engines, there are waste heat boilers.

We have only mentioned those factors in organising a blast furnace plant which make for the strictest economy, as is the case with the most recent plants constructed by firms whose total experience ranges through scores of years. If such establishments practice the utmost economy in production, it behoves all South African iron works to certainly take hints, as it is a case of the one competing against the other. So far from local steel works competing against each other, their combined efforts could barely hold the field against overseas combines nowadays.

MINES DEPT. EXAMS. CERTIFICATES AWARDED INSTITUTE.

MANAGERS' EXAM., September, 1921

We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S. A.	3	2	5
Total for S. A.			17

OVERSEERS' CERTIFICATES (Metal).

So far as we know we have only had 6 failures this year (1921) and have secured two-thirds of the certificates issued in S. A.

TUITION (Metal or Coal) by class, correspondence or privately

Mining Institute (Prof. Yates),

St. James' Mansions, Eloff St. Johannesburg

THE "PASSING" OF THE DIAMOND INDUSTRY.

To the Editor, *S.A. Mining and Engineering Journal.*

Dear Sir,—In your issue of the 4th instant one perused an article under the above heading, to which I was pleased to note that you had added a footnote to the effect that you did not endorse the writer's views. Diamonds are admittedly a luxury, but in spite of this, if "Engineer" will condescend to pay Kimberley a visit again, just twelve months from date, he will again find all the mines there working and things there very much as he found them on the occasion of his first visit there.

If he will go along the River Diggings to-day he will find that diamonds are still being purchased, and at quite good figures, too; prices approximating to those ruling in 1916, not boom prices, of course. I wonder if "Engineer" has ever watched the faces of a group of people, people in no way interested in the diamond industry, round a sorting table? Watch the expression of tense expectancy on those faces, watch the involuntary movement of their hands when a stone is unearthed, then talk to us about the "passing" of the diamond industry.

Again, take up your station in a large jeweller's store, opposite the diamond trays, just before Christmas time. Watch the expressions on the faces of the fair sex, all grades, overhear their remarks. There is only one conclusion one can come to, and that is, that as long as there is a woman in the world to wear diamonds and a man to purchase them for her, just so long will the demand for diamonds exist.

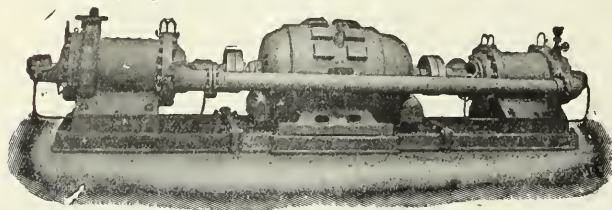
The diamond industry has felt the effects of the world-wide slump, exactly the same as the wool or hide markets have. Wool has recovered a bit and so have diamonds for that matter. Even though poor old Kimberley is a one industry concern, her mines will be running before the end of this year, and prosperity will again be the order of the day there.—Yours truly,

W. B. COLLINS.

Goedgedacht, Postmasburg, C.P.,
9th February, 1922.

**SULZER
HIGH-LIFT CENTRIFUGAL
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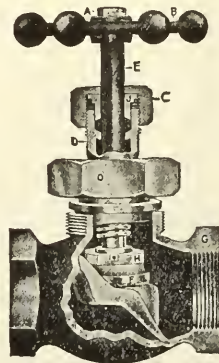
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The Week in the Sharemarket.

A BETTER TONE—BUYING FOR INVESTMENT—DIAMONDS IMPROVE.

In some quarters it is anticipated that the market will fall on the definite settlement of the strike, but we are of opinion that the exception may prove the rule in this case in view of the fact that the recent buying of good shares has been chiefly for investment and not for speculation. A certain amount of speculation has, of course, been taking place, but the "profit-taking shares" thrown on the market from this source will probably be easily absorbed.

With the satisfactory settlement of the industrial trouble the whole position of the Union, both mining and commercial, will be on a sounder basis, and, although immediate financial difficulties have undoubtedly to be overcome, the eventual result will be beneficial by reason of the attraction of capital to this country, enabling the extension of present, and the opening up of future, concerns.

The market during the week has shown slight fluctuation. The general opinion is that the strike will collapse at an early date.

An easier tendency has been noticeable, due, perhaps to speculators realising shares bought for a turn the previous week in the hope that a sudden collapse of the strike would take place.

Modders fell from 66s. 6d. to 64s. 9d.; Areas from 77s. 6d. to 75s. 6d.; Modder Deeps from 38s. 3d. to 37s. 9d.; Gedulds from 48s. 3d. to 47s. 9d.; and other stocks more or less in proportion.

Diamonds continue to show small activity, the leader, Consolidated Diamonds, fluctuating between 15s. and 16s. West Ends showed a slight easing from 24s. to 22s. 6d.

Thursday Morning.—The market again shows a hardening tendency, particularly in diamonds. Consolidated Diamond Debentures, buyers, £110; sellers, £117 10s. This stock is considered to be worth considering at this price. West Ends have improved to 24s. buyers.

	Fri. 10th.	Sat. 11th.	Mon. 13th.	Tues. 14th.	Wed. 15th.	Thurs. 16th.
Anglo-Amer. Corp.	18 6	18 4*	18 6	18 3*	18 1½*	18 6
Apex Mines		7 0†				
Bantjes Cons.	6 3*	6 3*	6 3*	6 3*	6 1½*	6 3*
Brakpan Mines	44 6*	44 6*		45 0†	45 0†	44 0†
Bushveld Tins						6 6*
City and Subs.	2 2*	2 0*	2 2	2 2*	2 2*	2 2*
City Deeps	40 6	41 0	40 0*	40 6	40 0*	40 0*
Con. Diamonds	15 0	15 0*	15 7½	15 10½	15 6*	16 4½
Con. Investments	22 6†	20 0*				
Con. Main Reefs	8 0	7 9	8 6†		7 9	7 9*
Coronation Colls.		30 0*		30 0*	30 0*	
Do. Freeholds			0 6*		0 6*	
Do. Syndicates	4 7	4 7	4 6*	4 3*	4 3*	4 8†
Crown Diamonds	3 1*	3 7*	3 6*	3 6*	3 6*	3 6*
Crown Mines	30 6*	32 6*	32 0*	33 0*	33 0†	33 0†
Crown Mines Deb.	£105†					
Daggafontein Mines	2 6	2 4*	2 3*	2 6	2 3*	2 3*
E.R. Coals	1 8	1 7*	1 7*	1 6*	1 6*	1 6*
E.R. Deeps	0 9	0 8*	0 8*		0 6*	0 9
E.R. Props	4 9*	4 9*	4 9*	4 6*	4 6*	4 6*
E.R. Debentures	£80*	£80*	£80*	£80*	£80*	£80*
Eastern Golds		0 7*	0 7*	0 6*	0 6*	0 7*
Frank Smith Dmds.	3 9	3 9	3 7*	3 10	3 9*	3 8*
Geduld Props.	18 3	48 3*	48 3*	47 9a	47 3*	48 0*
Glynn's Lydenburgs	7 0*	7 6†	7 0*		7 0*	7 6†
Govt. Areas	77 6	77 6*	77 0*	75 6*	75 6*	76 6
Hume Pipes		9 0*	10 6†	8 0*	10 6†	
Knight Centrals	4 4*	4 4*	4 4	4 4*	4 3*	4 3
Lace Props		7 3*	7 3*	7 3*	7 3*	
Leeuwoort Tins	6 6*	6 6*	6 6*	6 9*	6 6*	6 9*
Lydenburg Farms	4 6	4 8	4 4	4 6	4 4*	4 6*
Meyer and Charltons			65 0†			
Middelvllei Estates	1 0*	1 0*	1 0*			
Modder B.'s	24 6*	24 6	24 6	24 6	24 0	24 3
Modder Deeps	38 3	38 6a	38 3	38 0	37 9	37 9
Modder Easts	5 9*	5 10	5 11	5 10	5 10*	5 11
Natal Navig. Colls.	26 3*	26 3*	26 6*	26 3*	26 3*	26 9*
National Banks			220 0*			
New Eland Dmds.		22 6*	24 0*			23 0*
New Era Cons.	5 9†	5 9†				
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*		1 4*
New Kleinfontains	4 7*	4 6*	4 6	4 9	4 6*	4 6*

	Fri. 10th.	Sat. 11th.	Mon. 13th.	Tues. 14th.	Wed. 15th.	Thurs. 16th.
New Modders	66 9	66 3*	66 0*	65 6	64 6*	66 0
New Primrose	4 3*	4 3*			4 3*	
New Unifeds	3 0*	3 3*	3 3*		3 0*	
New State Areas	23 6	24 6	24 3*	24 6	24 6*	25 3
Nigels	5 3*	5 3*	5 3*		5 0*	5 3
Nourse Mines	9 0	9 0	9 1	9 3	9 0	9 7½
Pretoria Cements	41 0	41 0*	41 0	40 9*	40 0	40 0*
Princess Estates	1 0*	1 2	1 0*	1 1*	1 2*	1 2*
Rand Collieries		0 6*				
Randfontein Centrals	9 0*	9 6		9 0*	10 0†	9 3
Randfontein Est.	15 9	15 6*	15 9	15 6	14 9*	15 1½
Rouxville Diamonds	1 1*	1 2*	1 6	2 0	1 9	1 9
Roberts Victors	8 6*	9 0*	9 0a	9 6†		9 0*
Rooibergs			3 3*	3 0*	3 6†	3 6†
Simmer and Jacks.	2 11*			2 9*		2 9*
S.A. Lauds	4 0*	4 1*	4 0*	4 1	4 0	3 11*
Springs Mines	36 3	36 3	36 0	36 3†	34 9	35 3†
Sub-Nigels	9 6*	9 3*	9 6*	9 9*	9 9	9 9*
Swaziland Tins	7 6†	10 0†		9 0†		
S.A. Alkali	12 6*	12 9	12 6*	12 6	12 9†	12 9†
S.A. Townships	8 6*	8 3*	8 6	8 3*	8 3*	8 3*
Trans. G.M. Est.	7 0*	7 0*	7 0*	7 0*		7 0*
Transvaal Silvers	21 3*	21 3*	21 6	21 3*	21 3*	21 6†
Tudors	0 6*			0 7*	0 7*	
Van Ryn Deeps	61 9*	61 6*	62 0	61 0*	60 6*	59 0*
Village Deeps		7 6*		5 6*	5 6*	
West Springs	6 6*	6 11	6 9	6 7*	6 6*	6 0*
Western Rand Est.	3 0	3 0*	3 0*	3 0*	3 0*	3 0*
Witbank Colls.	34 0*	33 9*	33 9*	33 9*	33 9*	33 9*
Wit. Deeps	8 0	8 0	8 0*	8 0*	8 0*	8 0*
Zaaiplaates Tins	2 9*	2 9*	2 9	2 9*	2 9*	2 9*
Union 5 per cent.	£100*	£100*	£100*	£100*	£100*	£100*

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Mining Men and Matters.

OBITUARY.

Lieut-Colonel Gordon Sandilands.

We greatly regret to have to record the death of Lieut.-Colonel Gordon Sandilands. Colonel Sandilands had for long been associated with the social and mining life of the Witwatersrand. He was universally liked and respected, and the news of his death from heart seizure on Friday of last week came as a shock to a very wide circle of friends.

Lt.-Col. G. Sandilands came of a military stock. He was a grandson of Lieut.-General Phillip Sandilands, R.A., and third son of Major-General P. H. Sandilands, R.A. He was educated at Canterbury, and subsequently for some years in Germany. He was gazetted to the Royal Scots, his regiment then being stationed at Capetown. He took part in the Zulu Rebellion of 1888. He returned to England with his regiment and studied at the Staff College under Lieut.-General Sir Henry Hillyard, K.C.B. He was a contemporary of Field Marshal Earl Haig and a close friend of the late Sir Hamilton Goad Adams, a former Lieutenant-Governor of the Orange River Colony, and of Lord Allenby, at present High Commissioner in Egypt.

Colonel Sandilands took part in the Jameson Raid, and after the cessation of hostilities in the Anglo-Boer War he entered the mining and commercial life of the Rand, joining the Corner House. Subsequently he became associated with the Anglo-French Navigation Collieries and other companies, and ultimately joined the Sir Abe Bailey group, with which he was connected up to the time of his death.

He raised and was commanding officer of the Transvaal Scottish Volunteer Battalion, and during the late War, at General Botha's special request, he raised and commanded the 2nd Regiment of the Transvaal Scottish.

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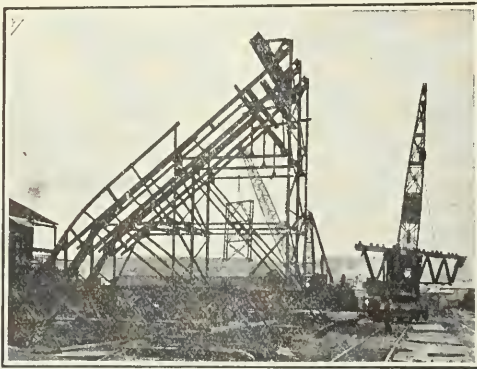
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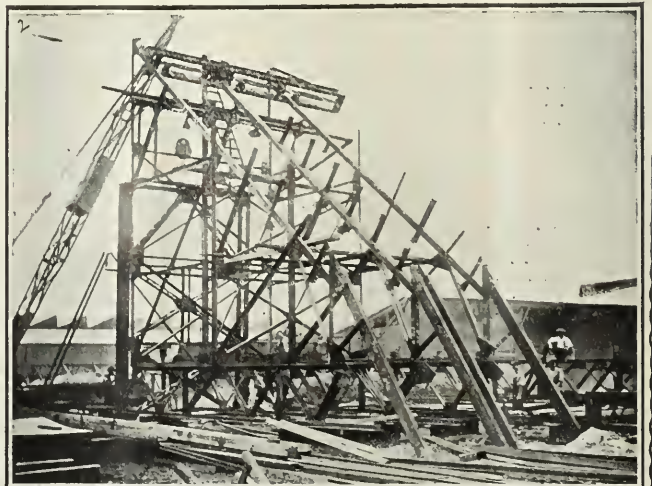
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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

GRADUAL RETURN OF MINERS AND RESUMPTION OF INDUSTRY PREDICTED—IRON AND STEEL—SCOTTISH IRON AND STEEL TRADE IN 1921—UNION'S GRAIN ELEVATORS—TIMBER AND BUILDING MATERIALS—GOLD INDUSTRY PAYS OUT 50 PER CENT. AS AGAINST 20 PER CENT. BY OTHER INDUSTRIES—BRITISH TRADE RETURNS FOR 1921—OILS AND OIL SHALES.—WIRELESS.

General.

Despite the rejection by the Federation of the Premier's appeal to restart the mining industry, not a shadow of doubt exists in the mind of the community that, freed of restraint of leaders and unions, the majority of the miners would gladly return to work. A secret ballot on this issue would, it is confidently felt, at once establish the truth of this oft-repeated assertion, but for reasons which are perfectly obvious to the man in the street, the Federation will have none of it. Discretion is, of course, a very laudable quality and cannot be too highly commended, except in such cases where the motives underlying such action, or rather inaction, are so transparently evident. It is generally conceded that the golden bridge offered by General Smuts was, under the circumstances, the best possible solution of the present impasse. Nor, in the opinion of those best qualified to judge, will such appeal ultimately fail of success. During the past week a number of miners have already returned to work, and with the help of mine officials, a tentative effort has been made towards restarting the industry. Whether the present dribble of returning miners will, as time passes, assume larger proportions and eventually be the means of stopping the disastrous struggle remains, of course, to be seen, but the consensus of opinion in the commercial community undoubtedly is that it will, and that, without any fuss or formal declarations on the part of the S.A.I.F. the industry will shortly be enabled to resume operations on a scale, which, though it is bound to fall short—unfortunately, on account of the aggravated economic factors which have intervened during the strike—very short of the level obtaining before the 10th January, will still hold out hopes of steady and increasing improvement. General Smuts has intimated the intention of the Government to provide employment for thousands of the workers thrown idle by inexorable economic laws, by the undertaking of large railway, irrigation and other public works, which should go far towards relieving a great part of the hardships caused by the steady decline in the price of our gold product and its automatic effect on the cost of production. A leading commercial man thought that the acceptance by the Natal colliery workers of a cut of 3s. 6d. in wages would be an object lesson to our miners, and he had no doubt whatever that the men would return to work in ever increasing numbers; in fact, he was sanguine that the coming week would see the break up of the present impossible position, and with it, of course, the disintegration of the Federation. The workers, he said, would fall back upon General Smuts' appeal and make that the basis of the final settlement. He thought that there was no doubt about there being a very rocky road ahead of us for some months, but that eventually we should emerge from our present difficulties and progress towards better and more stable conditions. The 10th of this month was the first time for many a long day that no output was declared by the industry. The price of gold during the five weeks and more that the strike has lasted has declined about 3s. per fine ounce, with the certainty of still further falls in the near future. What effect this will have on many of our gold mining propositions, in the absence of very drastic reductions in our production costs, it is unnecessary to dwell upon. Several acts of sabotage have been reported,

but the precautionary measures adopted by the police appear to be very effective, and although several strikers have been arrested, no serious trouble, as was at one time thought probable, has as yet occurred.

Prices generally all round, in the absence of all activity, are inclined to sag somewhat. Timber comes very firm in prices from oversea, but locally there is no appreciable change in quotations.

Iron and Steel.

A prominent importer of mining material says that during the whole time of the strike small quantities of bar iron and steel have been going out, of course not of any great magnitude, but still, under the present untoward conditions, of a rather surprising quantity. During the past week there have been rather more inquiries. Quite a number of tenders are being called for. The S.A.R. tenders for the supply of copper tubes and boiler and other steel for their yearly requirements, approximately about 222 tons, closed on the 16th inst. A large importer said one redeem-

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ing feature of the position was the strength of the share market, showing confidence in financial quarters that things were after all not so bad as some people imagine. He personally thought that about the middle of the year things were going to be bad here; that a lot of men would be out of employment, and that the failure of some of the smaller firms might be expected, but that for those firms which succeeded in weathering the storm business would gradually improve.

Latest nominal quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corporation, Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{3}{8}$ in. to 2 in., 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{2}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{1}{2}$ d.; $\frac{1}{4}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 30s. to 35s.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d. to 67s. 6d.; pick handles, 21s.; hammer handles, 14 in., 7s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb., 13 $\frac{1}{2}$ gauge, 22s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb. 27s. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 19s. per coil, 100 lb.; 12 gauge barbed wire, 25s. retail. Screening, 3s. to 9s. 6d. per sq. yd.; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.; asbestos, white, $\frac{3}{8}$ in. to $\frac{1}{2}$ in., £35 per ton; $\frac{1}{2}$ in. to $\frac{3}{4}$ in., £50 per ton; $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., £80 per ton; 1 $\frac{1}{4}$ in. to 2 in., £175 per ton; Blue, No. 3, £25 per ton; No. 2, £34 per ton; No. 1, £45 per ton; short, £20 per ton. Tin plates (L. C. Cokes), 20 in. x 14 in., per box f.o.b. Swansea, 19s. 3d. Galvanised sheets, 15 $\frac{3}{4}$ d. to 16d.

Second-hand Machinery.

There has practically been nothing done since last week in second-hand machinery on account of the strike, but it is hoped that there may be better news next week. It will, it is generally admitted, take some time for the works of the different mines to be in operation, and when, as is expected, other mines close down, there will be a lot of spares to be had and batteries and other parts of machinery. There have been several inquiries for machinery for industrial concerns and also inquiries for small batteries for up country, and for working some of the dumps along the Main Reef. Small batteries are practically unobtainable. The second-hand dealers in machinery, like others, have had a rather bad time, and are hopefully looking forward to the restarting of the mines.

Projected Huge Iron and Steel Industry in South Africa.

Mr. Stanley R. Kay, mining and civil engineer and an iron and steel expert, has been investigating the possibilities of establishing an iron and steel industry in the Union on a

big scale. Mr. Kay, who has left for England, represents an influential group of ironmasters in England, and without going into details, has assured interested parties in the Union that the establishment of a huge industry will shortly take concrete form. Mr. Kay's researches and tests of ores available for the production of high-class iron and steel have been very successful, and huge reserves, capable of carrying on the industry for 50 or 60 years, have been proved, while other sources will, no doubt, be developed. The ore Mr. Kay has submitted to the test is, he says, entirely free from deleterious ingredients and carries a high percentage of metallic iron. The experience already gained by the Union Steel Corporation at Vereeniging in the production of steel goods for the market, has been remarkably successful, and foreshadows potential success for the establishment of the industry on a much larger scale. The difficulty in the past, says Mr. Kay, has been mainly the lack of sufficient capital to develop the industry, but in this instance that trouble will not arise. Given sympathetic treatment by the Government—and that is of the utmost importance—such an industry can be established with every prospect of success.

The Broken Hill Proprietary's steel works at Newcastle, Australia, which recently suspended operations, are now re-opening, says *The Times*, on a basis which will reduce the number of employees from 5,500 to 1,800. The reasons for the step are the rapidly increasing importations which the new tariff is ineffectual to restrict, and the increase in wages and decrease in hours of work through the decisions of the Arbitration Courts. The high cost of coke in Australia and the heavy local rates for transport are contributory causes.

Review of the Iron and Steel Trade of Scotland during 1921.

1921 has been one of the most depressing and unsatisfactory years within memory. Business in all directions has

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been very flat, with the result that prices have been continually on the down grade. It has been a year of especial difficulty for manufacturers, and its close finds them accepting business in many cases at a loss. The Continent has been a formidable competitor during the past year, aided as they have been by the incidence of exchange. It has been a trying period, but it is thought that the worst is now over, and that with prices on a more competitive level, 1922 will see a gradual recovery.

Pig-iron.

The year opened with the pig-iron trade just recovering from the strike of the coal miners and the inroad of Continental pig-iron, making the sale of the local product more difficult week to week. Some of the ironworkers had not thought the inducement to start sufficiently bright, and many of the furnaces therefore were either closed or damped down awaiting better times. The further miners' strike which started on April 1 and lasted for three months naturally brought the pig-iron industry, along with the other iron and steel-producing plants, to a complete standstill. It was not until several weeks after the settlement that one or two of the iron masters ventured to blow in some of their furnaces once more.

By this time, however, the Continental grades of pig-iron had been firmly established, and, in spite of continued reductions on the part of local sellers, it was obvious that this competition could not be met. Reductions in wages and cheaper raw material have since enabled producers to name lower prices, but coal and railway rates will require to be further reduced before ironmasters are able to stem the inflow from Continental sources. The pig-iron industry is wholly dependent on the demand for finished iron and steel, and these branches of industry are at present very much depressed. While evidence is not wanting of slight improvement, with inquiries increasing, the volume of business is insufficient to keep more than half-a-dozen smelters going. At the beginning of 1921 No. 1 foundry pig-iron was about £15, while to-day it is £6.

Steel.

At the beginning of 1921 the Association prices were £25 10s. and £24 10s. respectively for ship-plates and angles, and these figures were 40s. and 20s. under the highest points reached in 1920. Business was dull to start with, and as work on hand was finished, makers found difficulty in getting specifications to keep the mills going. Reductions made in prices from time to time had not much effect in bringing forth or encouraging business, chiefly on account of the fact that trade in all lines was becoming increasingly slack, and very little material was required. In the shipyards, for instance, the wholesale cancellation and suspension of ships which took place at the end of 1920 had left most of the builders with large stocks of plates and sections on their hands, and these were naturally used up first before ordering new supplies. In addition to this, the Continental works were offering ship and boiler plates at very much lower figures. In all, the reductions made by the Association up to the date when prices were freed totalled £13 in the case of ship plates and £12 10s. in the case of sections, making the prices in October last £12 10s. and £12. Boiler plates were not reduced so quickly nor to the same extent as ship plates, this being due to some extent to the fact that boiler plates could not be made from British hematite, the latter remaining at a very high price owing to the high cost of coal and the recurring labour troubles.

For ship plates, on the other hand, makers could use the Continental basic pig-iron, which was very much cheaper. The total reductions in price of boiler plates amounted to £17 10s., making the price at the close of 1921 £14. Up to now the local Scottish works have not made such drastic cuts as the English makers. The present average home prices, which are about £10 for ship plates and £9 10s. for sections, are probably unprofitable for the market, and business is only taken to meet on-cost charges, keep machinery running, and give employment.

Manufactured Iron.

As in the case of steel, 1921 opened with iron prices on the down grade, the price of Crown iron for home delivery being £27 10s., or 50s. under the top figure for 1920. For the earlier part of the year the bar-iron works had about enough to keep them running, but makers later on began to feel the pinch, as for the little new business offering the Continental works were outbidding them all the time. During the coal strike April-June the works had to close down almost entirely for lack of fuel, the Continental makers meanwhile reaping the benefit. Since the settlement the works have only been running on a reduced scale. The price of Crown iron at the close of 1921 was £12 10s. for home delivery. The steel branch of this industry has had even a more trying time, as they have had severe Continental competition, and had it not been for the large importation of Continental semi-finished material, they would have been pretty well out of business. The present basis price of steel bars is about £10 5s. The Continental works are far from satisfactory in the matter of deliveries, and this is a favourable factor for the British works. It is hoped that the darkest hour has been passed, and that 1922 has better things in store.

Black Steel Sheets.

The sheetmakers have had rather a better year than the other branches of the trade. They were early affected by the falling off in export business, and at the beginning of the year their prices had already been reduced from the highest level by £9 10s. per ton to £29 basis. Frequent reductions were made in prices, and for export the makers cut to the very lowest. Later on in the year the export trade improved somewhat, as the Continental works had fairly well-filled order books. At the moment the prices of light British sheets are practically the same as the Continental prices, and the thinner gauges can be bought more

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HIGHEST GRADE

advantageously in Britain. The present basis price is £12 5s. for $\frac{1}{8}$ in., which shows a fall of £16 5s. on the year. Scrap.

1921 was an extremely poor one for the scrap trade. Prices have declined steadily, which, of course, is in keeping with the fall in selling prices for new products. Export business was practically non-existent for the greater part of the year, but during the last few months there has been some revival of trade with Far Eastern markets. Heavy malleable iron was selling at the early part of the year around £7 to £8, but to-day 60s. per ton is considered to be about proper value. Steel scrap is in just the same position, having fallen during the year from £6 to about 47s. 6d. per ton. Turnings and borings are now about 30s. per ton, as against £5 in January, 1921. All other scrap materials have been similarly affected, and buying has been on a very restricted scale. Looking forward to 1922, it must be said that although no material improvement has yet taken place, a more hopeful feeling prevails. It is thought probable that in the near future railway rates will be reduced, which will mean lower manufacturing costs. Coal is considered still at too high a figure, and the price will have to be considerably modified before manufacturers can regain a sound competitive position.

The Union's Grain Elevators.

The *Times* says the completion of the works should place South African maize growers in a most favourable position to compete with rivals in other countries by the time the 1924-5 harvest is ready for export.

The *Manchester Guardian* states that the consensus of opinion is that under the new system of the grain trade the Union will save fully £500,000 per annum, after making adequate provision for interest charges on capital expenditure, depreciation, and all working costs. "It is a foregone conclusion, says the *Guardian*, that the enterprise of the South African Government will be repaid manifold within a short time, and the maize exports especially will soon reflect altered conditions in transport." As regards the contracts for these elevators, the only orders given to firms other than British were to American houses for the supply of driers and automatic weighers and sacking weighers. All other work of this description is to be carried out by the firms of Messrs. Leyland and the Birmingham Rubber Co., which are supplying the conveyor and elevator belting. The total length of the various belts required in connection with the conveyor is, it is stated, 17 miles, the width varying from 12 to 30 inches. These belts form the actual bearing service for the conveyance of maize, and must be capable of sustaining a considerable tensile strain within the narrow limits of elongation.

Messrs. Ruston and Hensby, of Lincoln, are reported to have secured a contract for 38 heavy oil engines to be supplied to the South African Railways and Harbours Board for driving grain elevators and for electric lighting purposes in different parts of the country.

Germany's Trade with America.

A Washington message states that the annual report of the United States Department of Commerce for 1921 shows that the exports of steel by American and European countries during the year were as follows:—United States, 2,309,000 tons; Germany, 1,250,000 tons; Britain, 1,650,000 tons; France, 130,000 tons; Belgium, 90,000 tons.

Germany is not only competing with the United States in the world's markets, but is selling to the United States more iron and steel than any other country; thanks to low prices and prompt delivery.

Timber and Building Materials.

Business is practically at a standstill as regards the building operations, although a few odd jobs here and there are being proceeded with. The market for timber remains very firm at home. Corrugated iron is slightly weaker.

Prices.—3 x 9 deals, 1s. to 1s. 1½d.; scantlings, 11d.; beaver boards, 4½d. to 4¾d.; floorings, 6¾d. to 6¾d.; ceilings, 4¾d. to 4¾d.; Oregon, 7s.; pitch pine, 8s.; corrugated iron, 8½d. to 9½d. Furniture timber: Burmah teak, 18s. to 19s. 3d. per cube here for first quality, 16s. 6d. for second at the coast; American oak, 1 in., 10d.; 1½ in., 11d.; 2 in., 11½d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1½ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per foot. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

The second-hand iron and timber yards are still marking time awaiting a settlement of the strike. Timber remains at 8d. to 9d., iron at 6d. to 7d.

Production Statistics.

Outlays of other industries compared with gold industry—20 per cent. as against 50 per cent.:—Wages, White, 1916 £6,739,966, 1920 £13,922,258; other, 1916 £2,172,891, 1920 £5,196,832; materials, 1916 £22,315,587, 1920 £53,851,256; products, 1916 £40,434,882; 1920 £92,919,844. The total salaries and wages paid were £19,119,090 out of a gross output of £92,913,000, as compared with a total of £17,363,000 paid in salaries and wages out of a total output of £34,653,000. While industries paid out 20 per cent. of the output in wages and salaries, the gold mines paid out 50 per cent.

Rand Wages.

Apart from gold mines and quarrying, the Rand pays out in wages to all employees £7,523,000 a year, as compared with £3,517,121 by the Cape Peninsula and £2,168,701 by Durban. Of this total £6,148,036 is paid to whites and £1,374,972 to coloured. The following is the list of concerns on the Rand which contribute to paying out £7,523,000 a year:—Raw materials treated, £12,903; processes in stone, clay, etc., £307,819; woodworking, £193,151; metal works, £3,160,911; food and drink, £481,635; clothing, fabrics, etc., £308,354; books, printing, £482,554; vehicles, £241,447; furniture, £144,649; drugs, chemicals, £235,491; surgical, dental, etc., £6,605; jewellery, etc., £28,476; heat, light, power, £863,346; leather, £67,100; house building, £933,843; other industries, £54,724. The average wage paid to whites in the above industries in the Union is £244 per year, as

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MICA

WANT quotation (with samples) for Dark Colour or Stained Mica selected to cut sizes $1\frac{1}{2}$ x $6\frac{1}{4}$, $3\frac{1}{2}$ x $6\frac{1}{4}$,

—also—

Clear Ruby Mica selected to cut size 5 x 8 and larger. I am also interested in purchasing $1\frac{1}{2}$ in. to be cut from first and second quality Ruby Mica.

JOHN BURMESTER,

68, SHORTMARKET STREET, CAPETOWN.

compared with £295 on the Rand; and the average wage to coloured is £46 in the Union and £44 on the Rand. The value of South African raw materials used in the Transvaal is £8,634,645, out of a total of £17,699,000, and the total output is £33,225,833.

British Trade Returns—Big Slump.

Startling figures showing the slump in British trade are disclosed in the full return by the Board of Trade of the accounts of the United Kingdom for December and for 1921. The following figures for exports reveal the position on a comparison of the last two years with 1913:—703 millions in 1921, 1,334½ millions in 1920, and 525¼ millions in 1913. The present value of money is, of course, lower than in 1913, but is higher than in 1920. Imports also seriously declined, as the following figures show:—1,086¼ millions in 1921; 1,932½ millions in 1920; 768¾ millions in 1913. The decreases of exports and imports last year, therefore, were:—Exports, £631,500,000; imports, £846,000,000. Towards this decrease grain and flour contributed £93,550,914, white dutiable food and drink added another £75,645,605. Under the head of raw materials and articles mainly unmanufactured, the largest decrease was in raw cotton and cotton waste, where the falling off was £183,348,972, while other big decreases were wool, raw and waste, and woollen rags, £49,693,984; and oil seeds, nuts, oils, fats, resins and gums, £43,961,492. The only increase is coal, which was up by £12,103,318. The exports decrease for the year show that by far the largest item was cotton, in connection with which there is a reduction of £222,710,360. Woollen and worsted yarns account for another £79,755,281, while iron and steel show a decrease of £65,134,908. The only substantial increase is in machinery, the amount being £11,198,127. The exports for December, as compared with that month in the previous year, are down by 37¼ millions, and the imports were down by over 57 millions.

Oils.

Turpentine is going at about 96s. a case, 8 imperial gallons; white lead at about 76s. 6d. per 100 lb.; linseed oil at about 7s. per imperial gall. A cable received early this week announced a rise of about 8d. a gallon in the latter at home, which will have the effect of hardening the price here slightly. Oil is to-day standing at the lowest figure it has reached for a long time.

Ship Yards and Shipbuilding.

The firm of Armstrong, Whitworth & Co., Ltd., are at the head of the list of British shipbuilders for merchant tonnage launched during 1921. Fourteen vessels, of an

aggregate tonnage of 98,390, were launched by the firm during the year.

More than half the shipyards of Britain were lying idle from March to December last year. Only 160,000 tons were laid down compared with 620,000 in the corresponding period of 1908, which was the worst pre-war year record. These facts notwithstanding, a proposal to abolish the war bonus forthwith in order to regain work for the yards was rejected unanimsly by the trade unions in conference with the shipbuilding employers. This living bonus amounts to 26s. 6d. a week. The Unions refuse to agree to the reduction, even by instalments, declaring that wages fell last year by 17s. 6d. per week.

Wireless.

The Marconi Company has made an offer to India similar to the one to South Africa for a direct wireless communication. Great Britain has, as a matter of fact, for the past month or so been in direct communication between London and India, and the results of the trial have been declared quite satisfactory.

Canada, Australia and India want direct wireless communication with Britain, and it is believed that if the South African Government took the same line as the Government of Australia, the British Government would drop the Imperial wireless chain scheme, especially in view of the heavy cost involved; but there can be no direct wireless communication between Britain and South Africa until the necessary licence is granted by the Imperial Government, and there are powerful influences at work to prevent this.

Cost of Living still Declining in Britain.

The official *Labour Gazette* says there was a reduction of seven points in the official cost of living index in December, 1921. On December 31 the figure was 92 per cent. above that of July, 1914, being the lowest recorded since March, 1918. It compares with 165 per cent. on January 1, 1921. A net reduction of about £6,000,000 occurred during the year in the weekly full-time wages of over 7,000,000 people in these industries, where the pay was governed by the cost of living figures. In 1920 the net advance was £4,800,000 for 7,700,000 workpeople.

Projected Railways Amalgamation.

According to the *Manchester Guardian*, the directors of the London and North-Western Railway, which has already amalgamated with the Lancashire and Yorkshire, are now negotiating for amalgamation with the Midland Railway, whose issued capital is 160 millions, the largest of any British railway.

THE HYDROGEN, OXYGEN & PLANT CO., Ltd.

(REGISTERED IN ENGLAND).

99, PARK ROAD, NEWTOWN, JOHANNESBURG.

Manufacturers of
Hydrogen and Oxygen in
bulk for Industrial and
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Sole Representatives and Stockists
for the
Alloy Welding Processes,
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THE TRANSVAAL CONSOLIDATED LAND & EXPLORATION CO., LTD,

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS OF EXTRAORDINARY GENERAL MEETINGS.

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of the Shareholders in the above-named Company will be held in the Board Room, Second Floor, The Corner House, corner of Commissioner and Simmonds Streets, Johannesburg, on Thursday, the 20th day of April, 1922, at Noon, for the purpose of considering, and if thought fit passing, with or without modifications, the following resolution, viz.:-

"That the Capital of the Company be reduced from £728,410 10s., divided into 971,214 shares of 15s. each, whereof all are issued as fully paid to £607,008 15s., divided into 971,214 shares of 12s. 6d. each fully paid, and that such reduction be effected by returning to the holders of the 971,214 shares the sum of 2s. 6d. per share in cash, and by reducing the nominal amount of all the said 971,214 shares from 15s. to 12s. 6d. each, and that the Chairman for the time being of the Company or of the confirmatory meeting be and he is hereby authorised to apply by petition to a competent Court for confirmation of the said reduction."

AND NOTICE is also hereby given that a further Extraordinary General Meeting of Shareholders in the said Company will be held at the same place on Friday, the 12th day of May, 1922, at Noon, for the purpose of receiving a report of the proceedings of the first-mentioned meeting and of confirming, if thought fit, the said resolution as a Special Resolution pursuant to the provisions of the Companies' Act, 1909, Transvaal.

The Share Transfer Books of the Company will be closed from 14th to 20th April, 1922, both days inclusive, and from 6th to 12th May, 1922, both days inclusive.

Holders of Share Warrants who desire to be present or represented at the Meetings must deposit their Share Warrants at the places and within the times following:-

- (a) At the Head Office of the Company, in Johannesburg, at least three days before the time appointed for the holding of each meeting.
- (b) At the London Office of the Company, No. 1 London Wall Buildings, London, E.C. 2, at least 30 days before the date appointed for the holding of each meeting.
- (c) At the Office of the Crédit Mobilier Français, 30 and 32 Rue Taibout, Paris, at least thirty days before the date appointed for the holding of each meeting. Only Share Warrants bearing French stamps can be deposited at the Crédit Mobilier Français.

And shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such deposit a Certificate, with Proxy Form, will be issued, under which such Share Warrant Holders may attend the meeting either in person or by proxy.

By Order of the Board,

H. J. SUMMERLEY, Secretary.

Head Office,
The Corner House, Johannesburg,
1st February, 1922.

Witbank Colliery, Limited.

(Incorporated in the Transvaal.)

DECLARATION OF DIVIDEND No. 34.

A DIVIDEND of ten (10) per cent. 2/- (two shillings) per £1 share has been declared by the Board for the period ending 28th February, 1922, payable to shareholders registered in the books of the Company at the close of business on the 28th February, 1922.

The Transfer Books will be closed from the 1st to the 7th March, 1922, both days inclusive. Dividend Warrants will be despatched to shareholders on or about the 4th April, 1922. Warrants despatched from the London Office to persons resident in the United Kingdom will be subject to a deduction of English Income Tax.

By Order of the Board,

RAND MINES, LIMITED,
Secretaries.

per S. C. STELL.

Head Office: The Corner House,
Johannesburg,
14th February, 1922.

CHARCOAL

FOR

Suction Gas Producers

and other purposes.

PRICE **£3 : 10 : 0** PER TON
F.O.R. SEVENOAKS.

Bags charged at cost price and credited in full on return.

WOOD TAR

SUITABLE FOR ALL PURPOSES.

PACKED TO SUIT CUSTOMERS' REQUIREMENTS.

Prices F.O.R. SEVENOAKS.

1 GAL.	4/-	4 GALL.	£ 0 15 0
40 "	(including £2 for Drum)		£ 9 10 0
90 "	(" £3 " ")		£18 15 0

(Drums will be credited in full on return).

Manufactured by:-

WOOD CHEMICALS (S.A.) LTD.

2, HILL'S COURT, SMITH STREET, DURBAN.

also Manufacturers of

METHYL ALCOHOL PITCH, CRUDE CREOSOTE.

PRETORIA SILVER LEAD

COMPANY, LIMITED

(INCORPORATED IN THE O.F.S.)

EXTENSION OF OPTIONS.

As the Silver Lode in the No. 2 Shaft is not expected to be cut until March next and the present options expire on the 21st of that month, the Board of Directors, having considered the advisability of extending the options

NOTICE IS HEREBY GIVEN that the above mentioned options have been extended for a period of three months from 21st March next to 3 p.m. on 21st June, provided that during the said period the Company shall not be obliged to accept notice calling upon them to issue shares in satisfaction of the option rights, except by or on either the 21st March or 21st June, 1922.

Also that the price at which the shares may be taken up has been reduced from 25/- per share to 20/-.

The holders of Shares in small denominations, not registered in their own names, are requested to register their holdings without delay.

BY ORDER OF THE BOARD.

THE PRETORIA SILVER LEAD CO., LTD.,

Chas. A. O. Bain & Co., Ltd.,
Secretaries.

Bain's Buildings,
Commissioner Street,
Johannesburg,
P.O. Box 184.

9th February, 1922.

The Week's Strike Developments—
"Small Mines" on the Rand—Finance and Engineering Features.

The South African Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

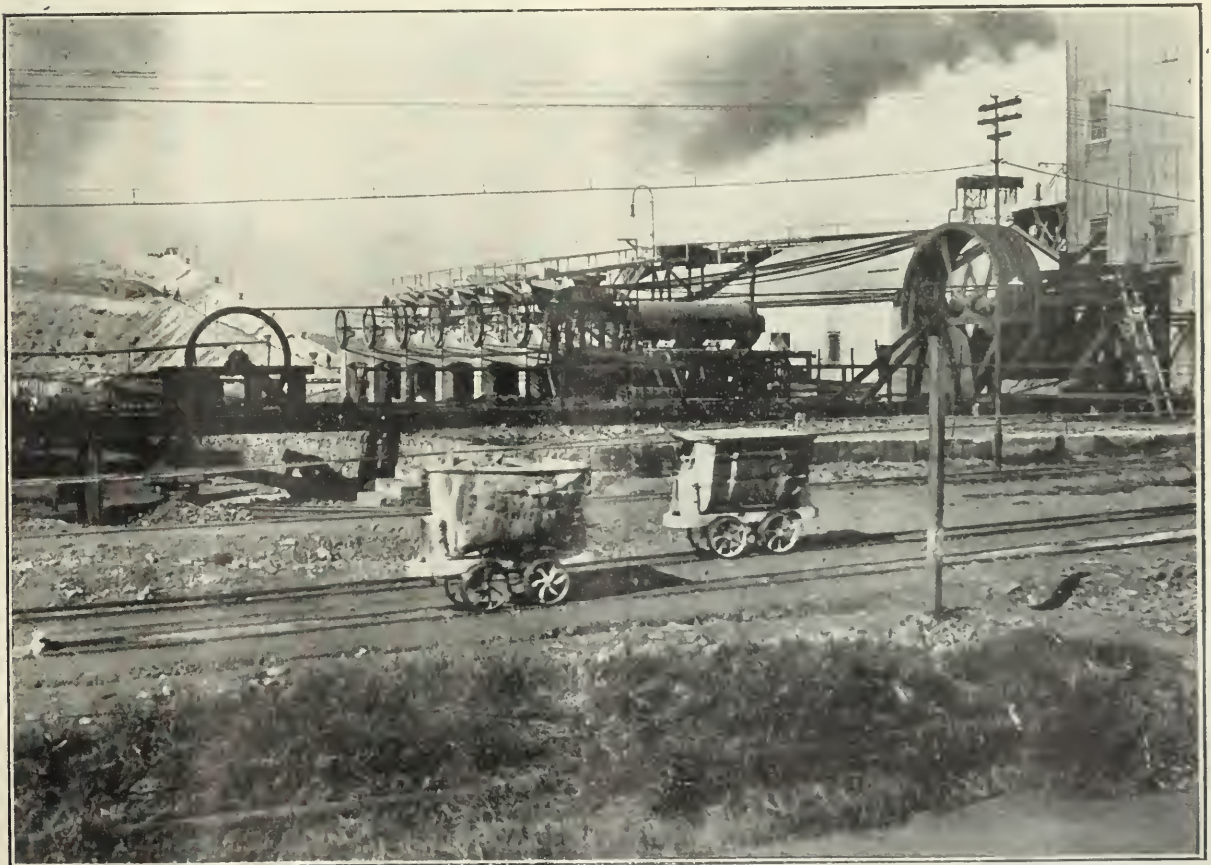
Established 1891.

Vol. XXXII., Part II

JOHANNESBURG, TRANSVAAL, SATURDAY, FEBRUARY 25, 1922

No. 1587.

AT WORK ONCE MORE.



A scene on a Rand Reduction Plant. In response to the Prime Minister's request, the industry has resumed working and, despite the intimidation campaign of the strikers, a large number of stamps are dropping.

The Week's Strike Developments.

STRIKERS NEW TACTICS — VIOLENCE AND INTIMIDATION — ONE QUARTER OF THE NATIVE LABOUR FORCE GONE — POSITION AT VEREENIGING.

During last week-end the attitude of the strikers towards the men who were returning to work assumed a rather ugly complexion, and on Monday and Tuesday unmistakable signs of a tendency towards violence were to be observed, particularly in the central area, at Germiston, and in the neighbourhood of Benoni.

Disagreeable Incidents.

An incident, indicative of the dangerous mood of some of the strikers towards the so-called "scabs," took place on Monday afternoon in Victoria Avenue, Benoni. It seems that a man who is working at Modder B had loaded his household furniture on a trolley with the object of having it conveyed to the property, where he intended to reside. Knowing the risk that existed in the circumstances, he was afforded police protection, but the crowd which had collected began to swell to alarming proportions. A number of women and children stood in front of the horses, when a man stepped forward, and before the police realised his motive succeeded in throwing something inflammable on the furniture and setting it alight. Detectives Whittow and Foley, who were eye-witnesses of the incident, rushed forward and secured the man. They hurried him away, whilst the excited mob were kept at bay by the police. They were no sooner out of range when the Benoni commando intercepted them. The two detectives were captured, during which time they were roughly handled, so much so that Foley had

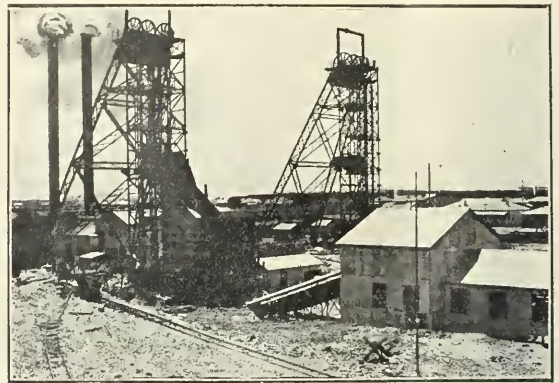


At Springs Mines in the Pre-Strike Days.

subsequently to be conveyed to hospital. Incidentally, the man who tried to destroy the furniture escaped. Foley and Whittow, in spite of their bruised and battered condition, were marched through the streets by the commando to the Workers' Hall. In the meantime police reinforcements were sent to Victoria Avenue, where the crowd was dispersed and the trolley, with its load of furniture, escorted to a place of safety. After the affair with the commando the police reinforcements cleared the street, and a mixed body of

mounted police went to the Workers' Hall, which was practically surrounded. A huge crowd collected, and there was intense excitement, but eventually Mr. Harry Day, chairman of the Benoni District Strike Committee, spoke to the police and apologised for the manner in which the two detectives were treated.

Three officials employed at the Van Ryn Deep were way-laid on Monday whilst on their way to the Benoni Hotel to lunch. They were assaulted, and one in particular is said to be in a serious condition.



On the Far East Rand—The "Cockpit" of Industrial South Africa.

Trouble at Fordsburg.

Fordsburg passed a feverish Monday night. The disorder originated in violent speeches, increased to an alarming extent when strong detachments of police swooped down and laid siege to the local "trades hall," and reached its climax on the Fordsburg commando, that had been hastily assembled, being reinforced by a mob from town; then thousands of lungs were strained in a vain endeavour to drive the police from the neighbourhood.

Fracas at Fordsburg.

A section of the strikers were not long in taking the hint of the Central Strike Committee issued on Monday evening. The Central Strike Committee wrote to the Tramway and Lighting Committee stating that it had come to the notice of the committee that police were escorting "scabs" to work and using the trams for the purpose. The Strike Committee informed the Tramway and Lighting Committee that it had passed a resolution stating "That all tram motormen and conductors are hereby requested to refuse such passengers, and that your association issue instructions to your members to carry this into effect." A copy of this resolution was forwarded to the Town Clerk, the Tramway and Lighting Committee, and to the Tramwaymen's Union. What might be called a sequel to this resolution was forthcoming on Tuesday morning, when the Fordsburg commando stopped two trams on the way to Crown Mines and pulled a man from each of them. It was subsequently ascertained that the Fordsburg commando at the beginning of its march to Germiston, stopped two tramcars travelling to the Crown Mines, and took a "seab" from each of them, despite the fact that both were attended by an escort of six policemen. Entering Germiston a notice-board was taken off a mine property and the words "We are two scabs" scribbled on them. This board the two men were forced to carry. In Germiston the Fordsburg commandos joined the others, and a demonstration was held in the vlei between Joubert and Victoria Streets. Speeches were being delivered when presently six mounted police

under Lieut. Whelan arrived and tried to rescue the two "seabs." The strikers charged them, hurled stones at them, and finally drove them from the ground. Lieut. Whelan was hit with a stone on the thigh. Sergt.-Major Hennings was struck on the temple and unseated. While he was on the ground in a semi-dazed condition he was surrounded by strikers. Trooper Lourens seeing his plight galloped into the mob, and with amazing swiftness lifted Hennings into his saddle, and rode off with him. Hennings was deprived of his revolver by the mob. He was removed to the Germiston Hospital. His condition is serious.

Men Returning to Work.

Despite these incidents, the "return to work" movement was steadily maintained on Monday. On one mine on the Far East Rand as many as 22 men came to sign on. On another property 18 put in an appearance, while in a third instance the mine increased its complement by 16.

The "return" at one of the Central Rand mines was ten, while the rest of the total of a hundred all told was made up of batches of five or six, there being hardly a mine which did not receive a few.

The mining industry looks upon this rate of return complacently, for the average is maintained steadily at a level of something like a hundred men a day. Thus the position from the point of view of the continuance of the industry becomes stronger every day, and (it is held) that of the strikers weaker by reason of this depletion of their ranks and the progressive contraction of the number of jobs which are available.

Where the strikers lost ground most notably, however, was at Vereeniging. The reports received from this centre during Monday morning were that the V.F.P. Company's power station had started the previous day with a full complement of about 30 men, including drivers, firemen, greasers, and other grades.

At the Cornelia Colliery there was also a rush back to work, and the company was reported as being in full operation, having taken on all the men it required, and even being in a position to pick and choose.

The position, as reported on Monday, on the Crown Mines is that they are managing to pull about 2,000 tons of rock daily. Everything was quiet. There has been no pulling-out on the property, but some men have been interfered with on the way to and from their work, and it is alleged that threats have been used to some miners' wives. Intimidation of this description is located chiefly round Brixton. The natives are working with a will on the Crown Mines.

On other properties of the Central area the situation on Monday was reported as being unchanged. The Robinson Deep reported a very good day's operations, and a satisfactory number of men returned.

Another Suggestion from the S.A.I.F.

Late on Monday night the special sub-committee of the Joint Executives prepared another utterly futile scheme for the settlement of the strike. The scheme asked for a Commission similar to the Sankey Commission in Great Britain and contained several preposterous demands upon the mining industries for the re-employment of strikers.

Returning Natives.

Quite a large number of travelling endorsements for mine natives were signed by the Native Department on Monday, the figure being 405. This brings the total of the mine exodus up to 44,246. Attention was called by an official of the Department to the fact that this figure means that the mines have now been deprived of one-fourth of their ordinary working native complement since the beginning of the strike. Even though the strike still continues, the mines have evidently employment for the boys left, for they are re-engaging any who do not wish to go home, and are also able to give employment to other boys who make application from outside sources.

Wednesday's Developments.

Colonel T. G. Truter issued a notification that "gatherings such as commandos or gatherings of smaller bodies of persons for unlawful purposes, such as interference with men who have returned or wish to return to work, or with their households, or attempts to damage any mine or other property, are unlawful assemblies under the common law." All law-abiding citizens are requested to assist the authorities by immediately giving information of any unlawful acts or contemplated acts by such gatherings.

The office of the Miners' Union, Ford-burg, was raided by the police at about 3 o'clock in the afternoon. A big crowd gathered outside, but no interference was offered the police, who, with the exception of two officers, seemed to be unarmed. No arrests were made.

The charges against four strikers of alleged picketing in Jeppe on Tuesday "to compel other persons to abstain from their work" were withdrawn in "E" Court, Johannesburg.

The total number of mines and works natives who had left the Rand labour districts from the period January 16 to February 21 was 44,622. The exodus is now lessening.

It was stated that four engine drivers on the Geduld Mine have returned to the ranks of the strikers, also one engine-driver from the New State Areas.

The engine-drivers and firemen who returned to work at the V.F.P. generating station at Vereeniging on Monday,



Police on Strike Duty on the Rand.

and ceased work again on Tuesday, did so, it is stated, on the ground of victimisation of those who had taken a prominent part in the strike movement.

Evidence was taken in "A" Court, Johannesburg, before Mr. J. C. Juta, against P. Fisher, alleged to have incited to violence in speeches at strikers' meetings. He was remanded till March 13 on £100 bail. Five other cases connected with the strike were remanded to the same date, in one instance bail being fixed at £100, and in the others £25 each. In a seventh case, that of Jeffery, the bail was made £50. Wm. Jolley and John McKerrell were remanded to Germiston.

On Thursday it was announced that the Sub-Committee of the Joint Executives of the unions concerned in the strike is now out of session for the time being, having completed its labours.

The Augmented Executive of the South African Industrial Federation will now be brought up to its full strength by the return of a number of its original members and will proceed to discuss the work of the Sub-Committee and the tentative solutions it has put forward for a settlement of the strike, after which it may be anticipated that an authoritative statement will be made as to whether or not these proposed solutions can be officially put forward on behalf of the Executive.

There is also other important business on hand to be transacted by the full Augmented Executive concerning the strike.

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Telephone : 408 Central

Telegrams : "SIEMENS."

“The Crisis on the Rand Gold Fields.”

THE CASE FOR THE CHAMBER.

A VALUABLE BROCHURE—INCONTROVERTIBLE FACTS.

“The Crisis on the Rand Gold Fields” is the title to a brochure which has been issued by the Transvaal Chamber of Mines, which should be read by every person in South Africa. It has been printed in both official languages, and it sets forth in clear and lucid style what is termed “an outline of the case for the Chamber of Mines in its dispute with the South African Industrial Federation.” Within the 30 pages of this little book are set forth in moderate but convincing language all the essential facts and figures which are required for a proper understanding of the more recent history of the industry, the plight of the low grade mines, the dependence in large degree of the whole of the Union upon the gold mining industry, the remedies proposed by the Chamber, and the attitude of “blank negation” adopted by the S.A. Industrial Federation and the intimate concern of the whole community in the acceptance of the Chamber’s remedies. On its opening pages the pamphlet contains the following extracts from the report of the Low Grade Mines Commission:—

The Low Grade Mines Commission found—

That the Witwatersrand Gold Mines were the sole support of at least a quarter of a million whites and a million natives;

That in every part of South Africa there are people who are more or less directly dependent for their living on the spending power of the money put into circulation by the mines of the Rand;

That as regards the Government revenue, of the total Union General and Railway revenue of £27,700,000 in 1914, £12,000,000 was traceable to the mines of the Witwatersrand.

The brochure then goes on to state:—The Transvaal Chamber of Mines, observing that the facts and issues of the present industrial dispute on the goldfields of the Witwatersrand have been disguised by a multitude of misunderstandings and misrepresentations, believes that members of the Union Parliament will welcome a plain statement of the true facts and of the reasons for the Chamber’s action in connection with the strike. The Chamber does not, of course, claim to be unbiassed in the matter, but it does assert, with a full sense of responsibility, that every fact and figure contained in this brochure can be supported by overwhelming evidence, and it submits with confidence that the reasoning based thereon will, upon examination, be found to be sound.

We regret that the space at our disposal is not sufficient to enable us to print the contents of this illuminating pamphlet in full, but we give hereunder a few extracts from the publication, and additional excerpts will be found in other portions of this issue.

A Much Misunderstood and Misrepresented Agreement.

The Chamber’s statement of its attitude in regard to the *status quo* agreement is as follows:—The *status quo* agreement had no existence until September, 1918. It was one of the many fortuitous agreements forced upon all industries during the war—one of the makeshifts to enable production to be continued uninterruptedly. At the time it was made, certain work (for example, drill sharpening) was on some mines carried on by Europeans and on others by natives. The Mine Workers’ Union demanded that the natives employed on drill sharpening should be dismissed and their places taken by Europeans. The Chamber refused to agree to this, and it was arranged that, for the time, the jobs held by coloured employees should be continued to be so held, and *vice versa*. That is to say, if a coloured man was at September 1st, 1918, employed on a mine on drill sharpening or other work, the Unions could not claim that the work should be done by a white man, and conversely, if a white man was at that date employed on the adjoining mine on drill sharpening or other work, the mine could not claim that the work

should be done by a coloured man. Such was the whole of the *status quo* agreement. Obviously this was not an arrangement which could stand the test of time. There was nothing logical or permanent about it; it was the merest temporary makeshift. This arrangement has, however, been interpreted to mean that if, for example, two separate gangs of natives, each under the charge of a separate “boss boy,” were each also under the nominal supervision of a separate European, the industry was debarred from dismissing one of those Europeans and putting both gangs under the charge of the other European. In other words, although a number of Europeans on the mines became in the course of time superfluous and redundant, the industry was prevented from discharging those superfluous and redundant men by reason of the *status quo* agreement. In order, therefore, to have a free hand in getting rid of these unnecessary and useless employees, it was necessary to denounce the agreement. In doing so, the mines are merely claiming the right, which no one has ever dreamed of denying the farmer or the commercial man when revenue falls off, of retrenching employees and thus improving efficiency while economising expense and conserving the industry.

Attitude of the Federation.

The attitude of the South African Industrial Federation has throughout been one of blank negation. While refusing entirely to accept the Chamber’s proposals, they have no alternative to put forward. Since as long ago as May, 1921, they have been talking at large about producing their own schemes, but they have never laid before the Chamber any constructive proposal whatever. It is true, about two months ago, there appeared in the Press two schemes which purported to emanate from the Federation, but on examination these proved to be merely accounts of methods of working which were already being experimentally tried on certain mines. Those methods were devised by the managements, not by the unions, and were perfectly familiar to the Chamber.

Throughout December the Chamber was in correspondence and conference with the Federation without result; and all the time the price of gold was falling. Seeing that it was necessary to take early action in order to save certain mines, the Chamber at the end of December gave the month’s notice required by the Transvaal Industrial Disputes Prevention Act, 1909, that it proposed to put the indicated changes into effect on 1st February, 1922, at the same time expressly informing the Federation that this notice was without prejudice to the negotiations then going on. This was the so-called “ultimatum.”

Negotiations had then been going on for six weeks, and the Chamber’s notice allowed a further five weeks for discussion. The Federation, instead of availing themselves of this opportunity, put off the further conference (a date for which had actually been fixed), took a strike ballot, and, on January 9th, demanded the withdrawal of the notice under threat of a strike on the following morning. This the Chamber, of course, refused, but in order that the postponement of the conference (although caused by the Federation) might not prejudice the negotiations, the Chamber offered to extend the notice to a full month from the date of the meeting. The Federation rejected this offer, broke off negotiations, and called a strike.

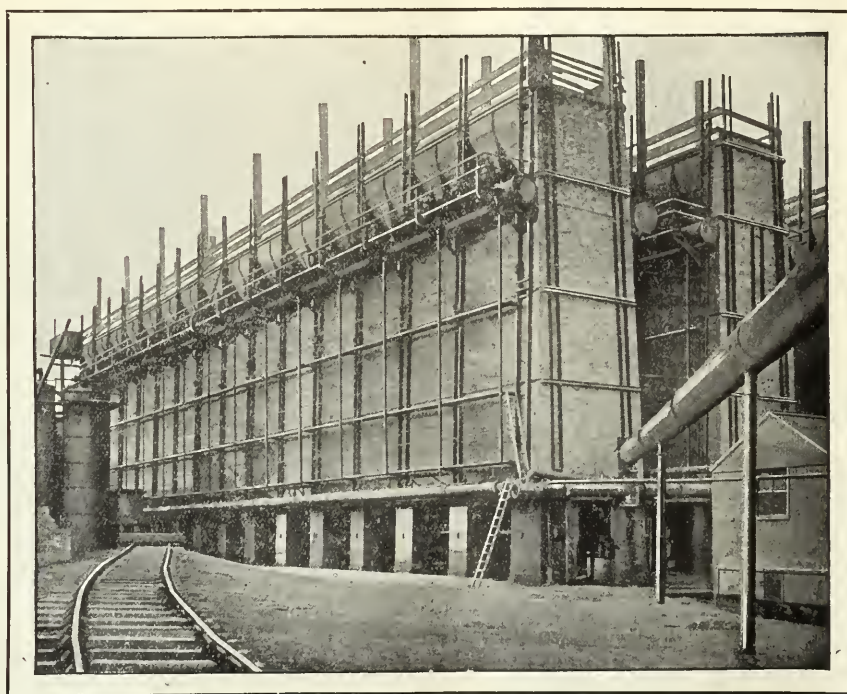
Campaign of Calumny.

Since then the Federation has initiated and continued a campaign of calumny, principally centring around the assertion that the Chamber is attempting to abolish “the colour bar.” A more untrue statement it would be difficult to imagine. The colour bar is brought about by the mining regulations. Whatever may be said of the rights or wrongs of the colour bar, the industry is not attempting to alter it. But let Members of Parliament picture for themselves their

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The Problem of the Low Grade Mines.

(By J. Everard Anderson, M.I.Min.E., Lydenburg.)

Much has been written about the low-grade mines of the Witwatersrand, but the steady fall in the price of gold renders their position daily more precarious. A large number of the people of the country, probably do not realise the urgent necessity of making a strenuous effort to keep the mines going, or what a serious matter for the country the closing down of some 25 mines would be. Every thinking man must know that it would be nothing short of a disaster, and that this disaster may happen almost at any time. Gold may drop to 85s. per fine ounce in a month's time, for anything anyone knows to the contrary, and if any workable scheme is to be evolved, now is the time to make the effort, not after the event has taken place.

The only solution is to reduce working costs—to talk of a subsidy is wasting time. Why should a gold mine, unable to produce its product below the market price, be subsidised

Year.	White Wages.	Native Wages.	Native Food	Stores	Total
1914	5/6	4/-	1/6	6/1	17/1
1920	9/2	4/10	1/6	10/2	25/8

The percentage of costs for 1920 is given below—

White wages	36%
Native wages	19%
Native Food	6%
Stores	39%
	<hr/>
	100%.

It will be noted that the heaviest item of cost and the one which shows the greatest increase is stores. Stores, including native food, constitutes 45 per cent. of the total cost, but it is reasonable to suppose that the year 1921 will



The S.A. Institute of Medical Research, Johannesburg, where men are examined for phthical complaints. In this article our correspondent claims that white men should not work in the gold mines.

from the public funds, any more than any other industry? The suggestion is unsound, and those mines which cannot produce gold at a profit, without a subsidy, will undoubtedly have to stop working.

While the State should not subsidise, it should be willing to help by every means in its power. This can best be done by a careful consideration of the railway rates, and the removal of all artificial barriers which militate against the chance of success of the low-grade mines. The following figures taken from the report of the Government Mining Engineer for the year 1920 may be of interest.

The average value of the gold recovered on the mines of the Witwatersrand for the year 1920, estimating the gold at £4.24773 per fine ounce, was £1 7s. 11d. per ton treated. The average working cost for the same year was £1 5s. 8d. per ton, thus showing an average profit of 2s. 3d. per ton. As is well known, had gold been at par, the majority of the mines would have been run at a substantial loss.

The distribution of the costs per ton treated on the Witwatersrand is roughly as follows—for the two years 1914 and 1920:—

show a marked decrease in the cost per ton of this item of expenditure.

White and native wages shown an increase of 3s. 8d. and 10d. per ton respectively, but the efficiency of both whites and natives shows a very marked decrease:—

Year	Tons per head per annum.	
	Whites.	Natives.
1914	1,302	164
1920	1,216	145

a decrease of 84 tons per head per annum for the whites and 19 tons per head per annum for the natives.

In the opinion of the writer this inefficiency is largely due to phthisis. The life of a white man underground on the Witwatersrand mines at the present time is probably from three to eight years, and, knowing this, there is little inducement for the day's pay man to become any more efficient than is absolutely necessary for the retention of his billet. The inefficient white miner cannot be expected to get efficient work out of the natives under his supervision, hence high mining costs.

The native, owing to the fact that, generally speaking, he is an intermittent worker, stands a far better chance of resisting phthisis than the white worker. The majority of natives work for six or twelve months, after which they return to their kraals for at least several months before again resuming underground work. The native can, as a rule, retire from active work before he is forty; by that time the "lobola" for his daughters is beginning to come in and his sons are earning money. The white man, on the other hand, has to work all his life, and when he is turned out of the mines with phthisis, he must still find work on the surface or on some of the outside mines. How difficult this is, many residents in the outlying districts, and many an unfortunate phthisis man who has tramped through the Middelburg coal fields, and the goldfields of Lydenburg and Barberton without success, can tell.

If it were only realised by the Government and people of this country, that it is a waste of our young manhood—the greatest asset any State can possess—to encourage them to work underground on the Witwatersrand mines, there would be no objection to the abolition of the colour bar, so far as the underground workings of the Witwatersrand mines were concerned.

But the white man at present working underground would require to be provided with some other occupation—one which he could follow for all his working life should he so desire. The resources of this great country of ours are almost untapped, and there are vast fields for the employment of our rising population, which only require to be started. To give only one instance: The Union of South Africa imports annually some £6,000,000 worth of cotton goods, on which a 25 per cent. *ad valorem* import duty is imposed. Cotton is being grown here successfully, we have

an ample supply of coal, and in many places waterfalls on fair-sized rivers which could be utilised for power, cheap land, and cheap unskilled labour, and yet there is not a cotton factory in the country. Instances such as this could be multiplied—but sufficient has been said to show that there are other and better outlets for our young manhood than the underground workings of the Witwatersrand mines.

If some scheme were adopted whereby the white men who would be gradually drafted out of the mines were placed in some other employment, it would greatly benefit, directly or indirectly, every man, woman and child in the Union of South Africa. The white men who were drafted out of the mines would exchange an unhealthy occupation which they inevitably would require to give up in a few years at most, for a healthy occupation which they could follow all the working days of their lives. The Government and the people generally would benefit by the working at a profit of a number of low-grade mines and the entry into the country of fresh capital for exploitation. The reduction of the white wages bill and the large saving of phthisis payments would so reduce working costs that a very low grade of ore would pay to work. There is another feature which must not be lost sight of, and that is that the intelligent native who follows mining would have an inducement to become efficient, and an opportunity of advancement.

In conclusion, if decentralisation were adopted, it would be much to the benefit of individual mines, and probably mean a considerable reduction in stores and administration charges, and freedom from industrial disputes.

ANSWERS TO CORRESPONDENTS.

X. Y. Z.—We do not think that any firm in this town can supply you with the information required. We think you will have to apply to London for this.

STANDARD BANK OF SOUTH AFRICA, LIMITED.

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Authorised Capital	- - -	£10,000,000
Subscribed Capital	- - -	£8,916,660
Paid-up Capital	- - -	£2,229,165
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Small Gold Mine Enterprise in the Transvaal.

OUTPUT AT THE RATE OF £100,000 PER ANNUM—FIGURES FOR DISTRICTS—SMALL MINE ENTERPRISE AND THE TRADES UNIONS.

Considerable activity in regard to the reworking of mines of the Witwatersrand which have passed out of the aegis of large limited liability companies is being displayed at various points on the Reef. Numerous old tailings dumps are also being retreated. Several syndicates, backed by fairly substantial sums of capital, are operating on these propositions. The development rock at the Ginsberg is, we understand, to be milled, and with this object in view a 10-stamp proposition is to be erected.

The Spes Bona is being taken over again by a syndicate, and the old Durban Roodepoort workings are being reopened by a syndicate in which influential Randites are interested. In the vicinity of Luipardsvlei a good deal of work is being done on old tailings dumps and waste rock dumps. Some of these rejected accumulations of the early days contain quantities of gold which can be made to yield a profit under the modern methods of treatment.

Government Returns.

It may here be of interest to state the amounts of gold recovered by what are classified as "Small Mines," "Alluvial Diggers," and "Old Tailings and Reduction Sites" in the Transvaal according to the returns of the Government Department of Mines for the month of December, 1921. The figures were as under:—

MINING DISTRICT AND PROVINCE.	SMALL MINES.		
	No. of Concerns Declaring Gold.	Fine Gold.	Value.
		3	£
Witwatersrand Area	1	149,580	636
Heidelberg	2	170,270	723
Klerksdorp	—	—	—
Ottoshoop	—	—	—
Pretoria	—	—	—
Barberton	2	185,585	788
Pilgrims Rest	14	859,808	3,652
Pietersburg	2	48,430	206
Transvaal	21	1,413,673	6,005

MINING DISTRICT AND PROVINCE.	ALLUVIAL DIGGERS.		OLD TAILINGS and REDUCTION SITES.	
	No. of Concerns Declaring Gold.	Value. £	No. of Concerns Declaring Gold.	Value. £
Witwatersrand Area	1	1	12	1,922
Heidelberg	—	—	1	13
Klerksdorp	—	—	1	66
Ottoshoop	—	—	—	—
Pretoria	—	—	—	—
Barberton	—	—	—	—
Pilgrims Rest	12	233	—	—
Pietersburg	1	23	—	—
Transvaal	14	257	14	2,001

It will be seen from this that the output of gold from what may be described as small mine concerns in the Transvaal has been at the rate of about £100,000 per annum.

The Trades Union Factor.

Expansion of small mine enterprise in the Transvaal would seem, however, in large degree to be dependent upon the attitude adopted towards such propositions by the labour unions. Numerous instances could be recorded of small mines which have been broken by the application of Trades Hall methods to their slender resources, and it is clearly evident that if small man mining in the Transvaal is to prosper it is not so much a remodelling of the Gold Law as freedom from the industrial tyranny of the trade unions, which is required.

Conditions in Rhodesia.

The gold mining industry of Rhodesia has been built up largely by means of the operation of small mines. On the Rhodesian mining fields there are no grotesque laws which compel a mine to employ so many white men, whether they are required or not. And anyone who has ever seen much of Rhodesian mining will not deny the fact that if Transvaal Labour methods and preposterous ideals had been applied on the gold fields of Matabeleland and Mashonaland instead of there being 138 mines declaring gold outputs as at present, not half a dozen properties would be working in the whole of the country.

WIT. DEEP FINANCE.

To the Editor, S.A. Mining and Engineering Journal.

Sir,—Referring to an explanation of the Wit. Deep finance by one of this company's directors, I ask what was the need for forming a separate finance company to buy the enemy-held shares, when the Wit. Deep Company itself is empowered to do so under the Enemy Trading Act; and why for buying and distributing these shares should each of the five directors in the newly-formed finance company be entitled to remuneration (which I understand is for life) of fees amounting from £250 to £400 per annum? I only trust that other companies in which I am an investor will not follow this example, and will consider the interests of the shareholders to a greater extent, or all confidence will be shaken.—Yours, etc.,

SHAREHOLDER.

MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.
MANAGERS' EXAM., September, 1921
 We obtained 12 out of a total 17 certificates awarded in South Africa

	Metal	Coal	Totals
Ours	8	4	12
Rest of S.A.	3	2	5
Total for S.A. 17			

OVERSEERS' CERTIFICATES (Metal).
 So far as we know we have only had 6 failures this year (1921) and have secured two-thirds of the certificates issued in S.A.
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NEW LINES SUGGESTED—MINERAL AND AGRICULTURAL WEALTH.

(By a Correspondent.)

For some months past in the Kimberley papers a controversy *re* railway extension has been raging, every little backveld dorp in these parts agitating for a railway to be brought into their backyards. Why not take a broader view of the matter and look ahead a bit, and construct a line that will open up one of the healthiest and most magnificent parts of the Union, as well as one of the most highly mineralised? The two routes most agitation has been going on about are: (1) the Belmont to Douglas extension, a line (justly described as from "Nergens" to "Nowhere") that would never pay even officials' salaries, much less running costs. It would be an imbecile Government that would pass a vote for building this line in the present hard-up state of the country. The other is (2) the Kimberley-Borrel's Kop line with possible extension to Kuruman, for which little more can be said than the Belmont to Douglas line, as it also would end at "Nowhere" and be as great a white elephant as most of the Union's branch lines from a revenue point of view. Now, there remain two points from which revenue-producing lines could be built, cheaply, with little or no engineering difficulties, and which would open up a grand stock country, superior in many respects to the Karoo, and be a main trunk line, in fact a trans-continental line, enabling passengers and mails to reach the Rand at least three days earlier than by the Cape route. Besides that, these would open up the South-West Protectorate and place the settlers there in direct touch with the Rand market, instead of having to go that tedious long journey round *via* De Aar. In addition, they would open up that healthy,

does in a range over 40 miles long. It is almost pure hematite, free from titanic or phosphoric acid, running 80 to 90 per cent. and very easily smelted. Besides these, diamond mines producing the very finest quality stones, such as the West End mine and mines controlled by the Diamond Fields of Africa (D.F.A.), Ltd., Postmas, Makganyene, Bowden and Smuts, other minerals such as salt, gypsum, galena, nitrates, etc., exist in quantities, and only await railways to develop; gold also in a blanket formation, running strong through the so-called desert, that only requires prospecting to possibly create a second Rand. I've had samples assaying 4 dwts. In fact, here we have a country with vast possibilities, in both mining and pastoral wealth, lying idle for want of railways and direct communication to coast and coalfields. Continually one hears there is a dearth of good building stone in South Africa; here we have vast deposits of the most beautiful jasper and marble, that would pay handsomely to even export. I do not suppose that these particulars or this letter will have the slightest effect in securing either of these lines being built, dominated as we are by Cape coast politics. Capetown, Port Elizabeth, and East London clamouring for all the import and export traffic. But may the day come soon when our present parties, S.A.P., Nationalists, and Labour, are done away with, and the only two possible parties for the good of South Africa as a whole come into power, *viz.*, Inland v. Coast.

T. L. H. SHONE, Capt.,
Mineral and Gem Explorer.



Opening up a Diamond Mine near Postmasburg.

for man and beast, part of the Union known as the Kalahari Desert, quite a misnomer. The whole of that portion known as the game reserve could be cut up into farms, and it would become the finest ranching part of the Union. "Water?" I hear someone say; well, I have been over a large portion of it, and I am certain that water can be struck in most parts at depths of from 60 to 200 feet in practically unlimited quantities. Now, the first of these lines, and the one I favour most, would be from "Pudimoe Junction" to Kuruman, thence between the iron and asbestos ranges of hills. These run almost parallel with each other to Postmasburg, thence to link up with the present line at Upington. The other is from Fourteen Streams to Postmasburg, thence to Upington. Either of these lines would be trans-continental, but of the two I favour the Pudimoe route as the one that would open up the larger area of country, and do the most good, placing us in direct touch with the Transvaal coalfields and enabling us to work the vast asbestos and iron deposits in these parts at a profit. While here, I may state that we have the finest as well as the largest deposit of high-grade iron ore, I should say, in the world, extending as it

TRANSVAAL CONSOLIDATED LAND & EXPLORATION CO., LTD.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS

NOTICE IS HEREBY GIVEN that the Twenty-Seventh Ordinary General Meeting of Shareholders for the year ended 31st December, 1921, will be held in the Board Room, The Corner House, Johannesburg, on Friday, 12th May, 1922, at 12.15 p.m., for the following business:—

1. To receive and consider the Balance Sheet and Accounts for the year ended the 31st December, 1921, and the Reports of the Directors and Auditors.
2. To confirm the appointments of Mr. F. R. Phillips and Mr. W. H. A. Lawrence as Directors of the Company in place of Mr. F. H. Wallers and Mr. J. R. Leisk, C.M.G., respectively, resigned, and to elect Directors in place of those retiring in accordance with the provisions of the Company's Articles of Association.
3. To determine the remuneration of the Auditors for the past audit, and to appoint Auditors for the ensuing year.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which is brought under consideration by the Report of the Directors.

The Share Transfer Books of the Company will be closed from the 6th to 12th May, 1922, both days inclusive.

Holders of Share Warrants who desire to be present or represented at the Meeting must deposit their Share Warrants at the places and within the times following:—

- (a) At the Head Office of the Company, in Johannesburg, at least three days before the time appointed for the holding of the meeting.
- (b) At the London Office of the Company, No. 1 London Wall Buildings, London, E.C. 2, at least 30 days before the date appointed for the holding of the meeting.
- (c) At the Office of the *Crédit Mobilier Français*, 30 and 32 Rue Taitbout, Paris, at least thirty days before the date appointed for the holding of the meeting (only Share Warrants bearing French stamps can be deposited at the *Crédit Mobilier Français*).

And shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such deposit a Certificate, with Proxy Form, will be issued, under which such Share Warrant Holders may attend the meeting either in person or by proxy.

By Order of the Board,

H. J. STIMMERLEY, Secretary.

Head Office,
The Corner House, Johannesburg,
14th January, 1922.

Caving Systems of Mining.

(By J. Parke Channing, Vice-President, Miami Copper Co.)

The following important article on underground practice by a well-known American engineer appears in the January number of "Mining and Metallurgy":

The caving system of mining is that method of removing the ore from an underground body in which the top is first attacked and mined out and the capping, or roof, as the case may be, is allowed to fall in or "cave" and fill the space formerly occupied by the mined ore. It is applicable, generally, to large orebodies where the ore is relatively soft. We may say, within moderate limits, that when ore is removed the surrounding ground either caves in or remains open. For example, in mines like the Lake Superior amygdaloid copper mines, when the lode is removed there is left a void which remains open for many years; on the contrary, mining a Lake Superior soft hematite ore, however carefully it may be done, always produces a caving of the surrounding rocks. We may say, with propriety, therefore, that the caving system is applicable to that type of ore deposit in which the surrounding rock readily caves.

Another factor which governs the use of the caving system is the value of the ore itself. Admittedly, any form of caving will not extract 100 per cent. of the ore, and in the case of a very rich orebody it is often desirable to get out every pound of the ore with as little dilution as possible. Under these conditions, some other method of mining, such as that by square sets and filling, is indicated and should be followed. We may say, however, that, looking at it broadly, in the United States the caving system of mining is generally used for the removal of soft hematite and for the so-called "porphyry" coppers. In both cases this method is used where open-pit mining is not possible.

Three Caving Methods.

Caving systems of mining may be divided into three general classes; top slicing, sub-drift caving, and block caving. In top slicing, successive layers, usually about 10 ft. in thickness, are taken, beginning at the top of the ore and so on successively down. In sub-drift caving, the ore is taken in thicker slices; say, for example, from 14 ft. to 22 ft. thick, of which the lower 8 ft. is taken out with timber and the upper 6 to 14 ft. is pulled down and drawn on the retreat. The block caving system is one in which slices are anywhere from 35 to 100 ft. in thickness and in which the ore, after suitably breaking up, is drawn out through a multiplicity of chutes in a series of drifts driven at the bottom of the slice.

In attacking a new orebody whose outline has been sufficiently determined, in the two cases first mentioned, it is frequently the practice to establish a level near the top of the ore body, but below the deepest irregularity of the capping, and mine out the first slice by square sets. This is done with a two-fold purpose, not only to give enough reach to the capping so that it may break and settle down, but also to establish a flat surface from which the slicing or sub-drift caving below may proceed in a regular manner. Great care must be taken in this preliminary operation, so that a cave may not occur with a sudden rush of air, with its resultant damage. This method is not always used, but has been found desirable and necessary in several of the Lake Superior hematite mines.

Caving Introduced from Lancashire.

It is well to consider first the sub-drift caving system, as this was the first method introduced into the United States. In 1881 or 1882, George W. Wallace was in charge of the Cleveland Hematite mine near Ishpeming, Mich. The orebody was a soft hematite which was being mined with square sets. There came to the mine two miners from Dalton-

Furness, Lancashire, England, who were expert in what was known as the caving method and who explained it to Captain Wallace. He realised its good points and introduced it into the Cleveland Hematite, or old Nelson mine, as it was frequently called. I am not able to say whether the method used there was sub-drift caving or top slicing, but I am inclined to think that it was sub-drift caving. Captain Wallace wrote a description of the method about 1910, but it was never published and the manuscript was lost when he moved to the west.

The first time I saw the sub-drift caving system was at the Brotherton mine at Wakefield, Gogebic County, Mich., in 1886. John Pengilly was in charge of the mine, having been sent there by D. H. Bacon, who was at that time general manager of the Cleveland Iron Mining Co., and under whom Captain Wallace was mining captain at the Cleveland Hematite. The Brotherton hematite was a rather soft ore and the orebody was of somewhat irregular shape, varying in width from 20 to 40 ft. and dipping probably at an average angle of 45 degrees, though at times the irregular foot wall was steep and at other times nearly vertical. The main levels were about 60 ft. apart and each lift was mined out in four successive layers of 15 ft. each. Raises were put up 50 ft. apart along the strike, and these were connected with sub-drifts, leaving in each case a 6- to 7-ft. back. Therefore, when a level was opened, these successive layers of 15 ft. were opened, with drifts along their bottom.

Stoping or mining was started at the far end of the top lift, gradually drawing back toward the shaft crosscut, timber being used for the bottom 8 ft. and the top 7 ft. being drawn or caved as retreating continued toward the shaft. A description of this may be found in an article written by myself.¹

It is interesting to note that at about the same time Guy R. Johnson adopted a very similar system at the mines of the Longdale Iron Co. in Virginia.² Probably very soon after this a similar method was used in mining the orebodies in Lowmoor, Va., as described by W. S. Hungerford.³

I think the first time that we on Lake Superior realised that this work was being done in Virginia was when the late Guy R. Johnson, Sr., visited the Menominee Range in 1887-88, to examine the Chapin mine, and told us what he was doing. It shows how frequently the same problem is solved in a similar manner in different parts of the world. Since that time the sub-drift caving method has been in continuous use throughout the United States in various classes of mines and is to-day a good standard method. The thickness of the slice removed depends entirely on circumstances. If reduced to the mere height of the regular drifts, the method is the top-slice system, and when the thickness becomes 35 or 40 ft. or over, the method merges into the block caving system.

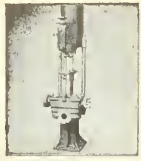
Factor of Success of Sub-drift Caving.

The success of the sub-drift system depends very largely on the building up of a "mat" of crushed timber between the ore and the broken capping or "gob." Even at the best this "mat" is never perfect and when the ore from above the timbers of the extraction drift and below the "mat" is drawn out, waste material invariably trickles down through it and dilutes the ore. At times rushes of the "gob" come and some of the ore is lost. In hematite mining, where very frequently the "gob" is a low-grade iron ore, the dilution does not amount to much, but often in the mining of "porphyry" ores, where the ore may run 2

¹Mineral Industry (1894), 3.

²Trans. (1891), 20, 96.

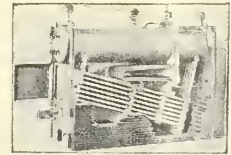
³Trans. (1888-9) 17, 103.



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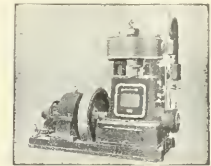
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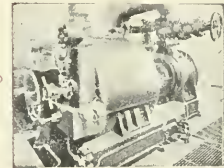


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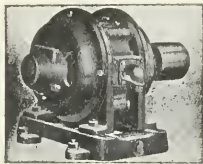


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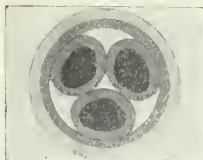
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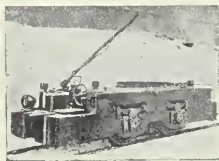


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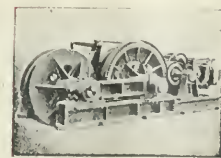
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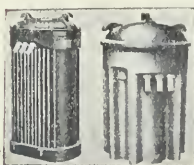
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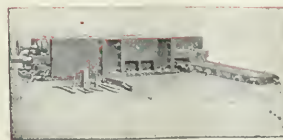
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per cent. in copper and the "gob" only 0.2 per cent., this dilution and loss is of importance. It is evident, however, that the thicker the slice in the sub-drift method, the less ore has to be breasted out or actually mined, and more ore is cheaply won by caving the upper part. Only the results of careful experiments and calculations can show the proper mean. There are many modifications of the sub-drift caving system and these are well described in the numerous articles in the *TRANSACTIONS* of the A.I.M.E.

In the top-slice system, haulage levels are put at any convenient distance apart, usually 100 ft. vertically. The haulage drifts themselves are sufficiently numerous and are so spaced that raises from them can reach the top of the orebody at points not more than 50 ft. apart from one another, the object being to avoid too much tramping to these raises in the slices. The usual thickness of one of these top slices is 10 ft., this being the distance from the bottom of the post to the top of the lagging, though sometimes the height may be only 8 ft. and at others it may be as high as 12 feet.

Advantages and Disadvantages of Top Slicing.

In taking out this top slice, various plans are used, dependent on the area of the orebody. Frequently a system similar to the long-wall retreating method of coal mining is used and a long face, the full width of one dimension of the orebody, is kept constantly open. The ore is removed in a drift along this face, perhaps two sets wide, then the further drift timber is blasted in and a new one driven back of the one left opened. This method, however, is often difficult to maintain, and a successful modification of it has been described by E. G. Dean.⁴ In this case the slice is divided into 250-ft. squares with a central supply raise to each square and the usual number of raises down which the ore is dumped.

In any method of this kind, hand-tramming is necessary, to transfer the ore from the place where it is broken to the raise; this is done either by direct shoveling, by wheel barrows, or by small cars of one-ton capacity. Endless belts and scrapers have been tried, but without success. Great care must be taken, in this method of mining, to insure ventilation, as open drifts are not as numerous as in the sub-drift method. Good ventilation can be maintained, however, by a careful system of plenum and suction drifts which are not interconnected.

An interesting modification of the top-slicing method is that of making the floor of the slice inclined. This obviates to a large extent the necessity for shoveling and hand-tramming. Its use in the Coronado mine in Arizona is described by W. G. Scott,⁵ but it is well to note that in the Coronado mine the orebody is relatively long and narrow and it is questionable whether this method can be successfully employed in a large orebody where it might be necessary to divide the slicing area into 250-ft. squares.

The advantage of the top-slicing system is that one has a practical control over the mining of the ore. It is in reality all breast stoped with, of course, an increase in cost as compared with the sub-drift system, but with the advantage that nearly all the ore is removed and the admixture of waste is reduced to a minimum. In case of any unexpected caving, in which a block of ore is temporarily lost, its position can be accurately determined and a large part of it may be taken out on the next slice, either by square-setting or by drawing. In this connection, it will be desirable for the student to read the paper on Methods of Iron Mining in Northern Minnesota, by F. W. Denton. On page 383 he refers to the Genoa mine, which, in the year 1897, mined about 300,000 tons by the top-slice method at a total cost of 41 cents a ton, including all underground and surface expenses, taxes, etc. This, I believe, is the record for underground mining on Lake Superior. I have not any unit costs on the Mesabi Range for that time, but I do know that the cost of timber and plank was extremely low because at that time the pine in the district was being cut and marketed.

It is interesting to note the comparison Mr. Denton gives between top slicing and sub-drift caving, where he says, "Ore by such a method (sub-drifting) is, of course, much more cheaply broken than that which is sliced or broken out, but it is a question of both gain and loss."

⁴Trans. (1916) 55, 240.

⁵Trans. (1918) 59, 303.

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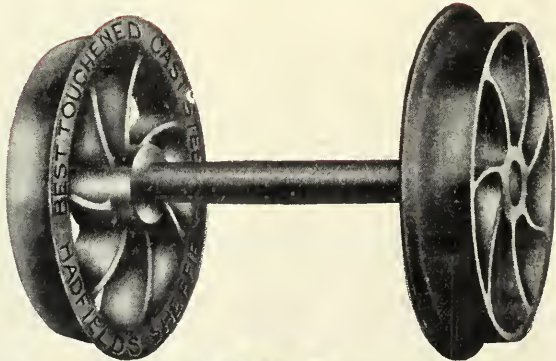
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Crown Diamonds.

A BIG REVIVAL IN SHARE VALUES—IMPORTANT DEVELOPMENTS—TEST WASHINGS GIVE GOOD RESULTS.

A feature of this week's operations on the local share market has been very heavy buying of Crown Diamonds shares. This property, formerly known as the Lace Diamond Mine, has been a proposition of fluctuating fortunes, and it is a proposition of unhappy memories for a large number of people. The outlook for the concern is, however, now considered to be much more hopeful in view of developments just recently obtained in the mine.

In view of the revival of interest in the company's shares, the board have decided to publish the following statement, as drawn up by the Company's Consulting Engineer, Mr. C. B. Kingston. During the year 1921 attention has been concentrated upon exploratory work in the western end of the open mine, as the best returns have always been obtained here. A mass of mixed material, largely hardibank, has always presented an obstacle to mining in this section, but the blue ground has been worked out round it. An exploratory tunnel has been driven through this mass, at the 160 ft. level, and good ground has been found behind it and beneath it.

ground in this new area. These drives have now reached points vertically below the exploratory drives at the 160 ft. level. All three faces are still in blue ground, and are being pressed on to determine the extent of the new area. When the work has been carried further, test washings of the blue ground in the new area will be made. Until the new area has been clearly defined by the exploratory drives, and the value of the ground determined by test washings, it is impossible to gauge the value of this discovery. The blue ground in the new area is mixed with pebbles and small boulders, but on the whole is cleaner than the ground in the old mine at the same horizon. One small body of hardibank has been found in the new area, but the main drive has passed through this into blue ground. The prospects at present are encouraging, but the exploratory work and the test washings must be completed before any definite statement can be made about the real value of this new find. Plans have been prepared for remodelling and increasing the treatment plant to deal with 50,000 loads per month. The whole plant will be erected on a new site, so that a better method of handling the tailings may be adopted.



The Crown Diamond Company's Washing Plant.

Test Washings.

The following test results have been obtained from this ground:—1,090 loads=11.78 carats per 100 loads; 458 loads=16.7 carats per 100 loads; 541 loads=20.01 carats per 100 loads. A winze under the hardibank at an inclination of 5 degrees has been carried down a short distance in blue ground, while a drill hole bored near the mouth of the exploratory tunnel passed out of hardibank into blue ground at 34 feet. It is clear from this evidence that this mass of hardibank does not extend downwards, but that it lies on blue ground. The drill hole was carried down to 202 feet in blue ground, and then encountered basalt. Exploratory drives put in at the 440 ft. level in 1919 exposed basalt in the walls of the pipe and the drives were driven along the contact exposing the basalt in the western section. A large body of basalt was found in the exploratory drives at the 160 ft. level, which must have been thrown up from below, because there is only one sheet of this amygdaloidal basalt known to exist in the mine.

Blue Ground Encountered.

From this fact, coupled with the result of the diamond drilling, it appeared that blue ground might be found by driving west through the basalt at the 440 ft. level. A drive was started, and after passing through basalt for 113 feet, broke into blue ground. This drive has been extended, and two other drives have been carried, one right and one left, along the contact between the basalt and the blue

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EDITORIAL.

"PRIDE OF LABOUR."

With the gradual breaking up of the strike movement the Rand will again be able to breathe a certain amount of healthy industrial air. One can only hope at any rate that after the settlement of this disastrous business there will be peace on the Reef and that the managements of the mines will be able to do the best they can towards establishing this low-grade mining field on a sure and safe basis. But this cannot be achieved unless the men themselves co-operate with the managements in a real endeavour to save an industry that has been waning for years from a further large contraction. No one with any vestige of authority has attempted to deny that there was most urgent need for a substantial reduction of working expenditure. Even the Labour leaders themselves have admitted this. But where Labour disagreed with the management of the mines was in regard to the methods to be adopted. It is difficult to conceive any ways and means by which working expenditure could be reduced except along the lines upon which the Chamber has taken tardy action.

It was clear that working expenditure was far too high and working efficiency was far too low. It was clear, too, that the selling price of the product of the mines was declining; indeed leading bankers and financial authorities

in Europe are anticipating a return to parity between British and American currencies (which implies the total elimination of the premium) much quicker than most people anticipate. There may be—there are almost sure to be—fluctuations of a more or less important nature in the incidence of the British exchange rate with America, and therefore in the price of gold. But the direction which the price of gold is taking is clearly indicated by the trade and financial sign posts overseas, and therefore it will be unsafe in any calculations as to Rand outputs and profits to base figures on more than standard price. This being so, it is very clearly the duty of the managements of the mines to bring about a change in the economics of this gold field, a change which will admit of all mines being run on a sound and stable basis, and the only basis upon which gold mining or any other industry can be run, is on the basis of earning profits commensurate with the capitals invested.

Whether all the reforms proposed by the Chamber will secure this or not remains to be seen. Personally speaking, we doubt whether such reforms will be adequate to compensate for a decline in the price of gold to normal unless the employees willingly co-operate with the managements in a supreme effort to bring working expenses down to a figure which will admit of six or even five pennyweight ore being worked at a profit. This can, we believe, be done by the employment of the best men and by a whole-hearted and willing attempt on the part of all the employees of the mines. The whole conception of organised labour on the Rand is wrong. In the words of one of the great political economists, labour on these fields has "become soulless, ceasing to minister to fulness of life." The old quality of "Pride of Labour," the pardonable conceit which a man took in his own craftsmanship and handiwork, has been smothered by a surfeit of trades unionism, antagonism towards employers, antagonism towards the Government, and antagonism towards the community at large, and by preposterous restrictions upon individual effort. If members of the trades unions would only take their own inspiring motto to heart—if they would only realise that "*Labor omnia vincit*" has a grandeur of truth when interpreted in its purist sense! If, instead of reading into those three words a conception of perpetual militancy towards the real co-partner of Labour, which is Capital, they would subscribe towards the practical demonstration of the truth of Labour's omnipotence in relation to the rock of golden content from which all of us on the Reef earn our daily bread, then indeed would there be a roseate prospect of a return of prosperity in which all would share.

THE FINANCIAL OUTLOOK.

Whilst everyone on the Rand, and to a considerable degree throughout South Africa is at present obsessed with settling the strike, to the exclusion of every other thought, the financial aspect of the situation and its effect on the monetary position of the country generally must not be overlooked.

In this connection the statements in the House of Assembly on Monday by the Minister of Finance and the Minister of Railways make anything but cheerful reading. On general revenue there will be a deficit of nearly £2,000,000, including the deficit for the financial year 1920-21 of £255,000, which was carried over. The actual deficit for 1921-22 is considerably over £1,000,000 in excess of the deficit for which Mr. Burton budgeted in March last year. In addition to the decrease in Customs there has been a substantial decline in revenue from excise, diamonds, native taxation, etc., to set against the increases from income tax and direct profits tax. During last year the financial position became steadily worse, and since the beginning of the year the mining strike has gravely accentuated the crisis. Mr. Burton estimates the shrinkage of revenue owing to the strike at the enormous figure of £750,000 a week. The railway position is also most serious, despite the admirable and untiring efforts of Sir William Hoy and his staff to tide over a period of exceptional

adversity. The last financial year closed on March 31, 1921, with an accumulated deficit of £2,598,000, the deficit on 1921-22 being estimated at £693,000, or a total shortfall of £3,291,000. In spite of the most rigid economies the total accumulated railway deficit at the end of next month will not fall very far short of £4,000,000. The actual deficit for 1921-22 is about one and a quarter millions, and but for the very considerable savings in maintenance, travelling expenses, and running expenses the loss on the current year would have been £1,859,000.

It is becoming painfully clear that rigid economy in Government services will have to be practised or else that large sums of money will have to be raised by further taxation, and where such money is to come from is indeed a poser. For private individuals as well as industrial concerns (and particularly the mines) of the country have all well-nigh reached the point of saturation as far as taxes go. In other words, they can carry no more.

THE PREMIER'S SPEECH.

The speech made by the Prime Minister in the House of Assembly on the strike is a plain, straightforward and courageous exposure of the Federation's mishandling of the labour position and of the pantomimic escapades of some of the political opportunists who have been coquetting with the Trades Hall officials. The speech shows clearly that the Labour leaders who have expected that Parliament would effect a settlement of the strike in a manner satisfactory to their futile cause have merely made another colossal blunder.

In the course of his speech the Prime Minister proceeded to deal with General Hertzog's motion in regard to the colour bar. He said that legislation was not necessary because they had the statutory position. In regard to the *status quo* agreement he was sure there were very few members who would like to see it the law of the land. He had been trying to think how the proposal of the hon. member could be carried out. The Select Committee would be appointed and would bring a report before the House, and they would say that such and such steps ought to be taken, and Parliament would then have to create a statutory body to settle the strike. They had to give compulsory powers of settlement to that body and say, "Go ahead and settle the strike." They were asked to create a dictatorial body and give them compulsory powers of arbitration.

The Prime Minister said he was sure General Hertzog did not know what he was proposing. If his plan were adopted Parliament would have to pass a law creating a statutory body armed with dictatorial powers to settle strikes. The law would be similar to that in Australia, where there was compulsory arbitration. A court had to be constituted, and it would adjudicate on a strike, and its decision would be the law of the land. "If," exclaimed the Premier, "I know one thing about the temper of the people of this country I say they will never submit to any such law or court.

"The only countries which have compulsory arbitration are Australia and New Zealand, and in those two countries the system is a ghastly failure. The accounts published show that it is one of those devices which is wrecking the whole industrial system of Australia. There is no country in the world where strikes are more rife and the industrial position is more unsound."

General Smuts maintained that the only way of dealing with the strike was the way adopted by the Government. The men were advised to go back to work, when the Government would appoint an impartial tribunal to investigate all the issues that had been raised by both sides in the dispute. That body would try to work out from the evidence before it permanent lines of a solution, and the report would be submitted to Parliament and dealt with in due course during the session.

The Premier explained that a judge would be chairman of the Commission, which would be composed of impartial gentlemen of the highest standard, with a representative of the employees and a representative of the employers. "If," said General Smuts, "they go into the matter of the ratio of coloured and European, finance, more economical working, and so forth, we shall have before us material on which Parliament can act and pass such legislation as it deems fit, but we are not going to trust any outside body with arbitrary powers to settle the strike."

The Premier wound up by declaring that the Government could agree to no other scheme than that he had just expounded. Anything else would be unsafe and dangerous, because the Government thought it was the only policy the country would agree to. They would abide by it, and that side of the House would vote against General Hertzog's motion and the amendments.

Pressure on space prevents us from quoting the Premier's speech in full, but the following telling paragraphs from his peroration are worthy of particular note.

Do not say anything against the coal miners. They are a good body of men, but they have made a ghastly mistake for which not only themselves but the whole country is going to pay very dearly. . . . Those men think they are on strike. They are not on strike: they are unemployed. . . . They have for the present destroyed this industry.

There are thousands of workers in the (gold) mines who look upon the industry not as their main industry in life, but as their enemy. When I look at the action they took with regard to essential services, it seems as if they were anxious to destroy the industry by which they were kept going. . . . The Government stepped in and kept the mines going. . . . If matters had been dependent on the action of the men, there would not have been a gold industry in South Africa to-day.

It is unnecessary for me in this House to point out to the members and to the country what the Witwatersrand means to South Africa as a whole. It not only supports the largest industrial population in South Africa, it is not only the largest centre of population in South Africa, but it is the market for all our producers in South Africa. Farmers and producers of whatever stuff is produced in South Africa look to Johannesburg as their main market, and if that community were to collapse, if half of the Witwatersrand were to decay and the mines were to stop, the result would be a terrific, a cataclysmic blow not only to the Witwatersrand but to the whole of South Africa.

The *status quo* agreement has been confused even to-day in this House with what is called the colour bar, and I want to make it perfectly clear that the *status quo* agreement is one thing and the colour bar another. The colour bar is a legal statutory bar, a line of colour, a line which is drawn in the Mining Regulations of the Transvaal. . . . There is no proposal to touch that colour bar at all.

I don't think the action of the men has been in the interests of the white position, whatever they may think. Rather is it clear to me that if the *status quo* agreement were to remain, a very much larger number of white men would be in danger.

We must not set up a false standard which this country cannot maintain. I am for the white standard, and I hope we shall have the white standard as an ideal and that this community will build itself up a white civilised basis and make this white community as strong as possible in South Africa; but, if an attempt is made to bolster this white basis on a false economic standard, the whole effort is bound to end in a ghastly failure.

Talk about the white standard! Come to our farmers to-day all over South Africa. The coal miners at Witbank would not accept 25s. a day. I should like to know how many farmers in this South Africa of ours make 25s. a day from one year to another?

Notes & News.

Orange River Oil Shales.

A Kimberley correspondent writes:—

The manager in charge of the shaft at Elandsdraai, Orange River, reports by wire that he has struck the oil shales at about 93 feet depth. The band of shale is 8 feet thick, and of an analysed value of not less than £3 per ton. The payability of these shales may, therefore, be accepted as an indisputable fact.

That a vast quantity of the shales exist may be gathered from the fact that the borings proved the presence in an area of 50 acres of 1,250,000 tons. The property embraces some 25,000 morgen in the direction in which the oil shale is known to extend.

The importance to the Union of such a discovery can hardly be over-estimated. It proves most conclusively the existence in the Cape Province of oil shales of a highly payable nature.

Considerable activity is now foreshadowed in the direction of prospecting for these shales by boring on adjoining farms, and there is little reason to doubt that satisfactory results will be obtained by systematic and careful work in the right direction.

* * *

Gem Tariffs in U.S.A.

The following note taken from the *Jewellers' Circular of America* should be of interest on account of its possible bearing on the South African diamond trade:—

Retail Jewellers' Association of Greater New York Asks Senate for Lower Gem Tariff.

Supplementing the appeal made by the American Jewellers' Protective Association for a revision of the gem traffic, Emil W. Kohn, as president of the Jewellers' Association of New York and vicinity, has written letters to Senator Boies Penrose, chairman of the Finance Committee of the Senate and to other members of the Committee, asking that the new tariff bill put the rate of duty on gems at 10 per cent. and admit uncut gems free.

President Kohn's letter to the various Senators reads as follows:—

December 30, 1921.

Hon. Boies Penrose, Chairman,
Committee on Finance,
United States Senate,
Washington, D.C.

Dear Sir,—As President of the Retail Jewellers' Association of Greater New York, I desire to urge you to use your great influence in bringing about a reduction in the duties on diamonds and other precious stones.

We desire the restoration of the former duties, namely, ten per cent. on cut diamonds, pearls and other precious stones, and the admission of rough (uncut) diamonds free of duty. We believe that this change will benefit our entire industry and result in increased revenue to the Government.

The present high rate of duty is an incentive to smuggling on the one hand, and incidentally an incentive to people of wealth to make their purchases abroad.

On the other hand, the admission of rough (uncut) diamonds, free of duty, will be a great encouragement to the further development of the cutting industry in this country, and furthermore a reduction of the present duty on cut diamonds, etc., from twenty to ten per cent., will check smuggling which is now carried on to a considerable extent.

Trusting that this matter will receive your favourable consideration,—Yours very truly,

EMIL W. KOHN, President.

Mining Men and Matters.

It is notified for general information that Arthur James Shaw, Responsible Clerk, has been appointed Acting Mining Commissioner for the Mining District of Boksburg, vice J. P. E. Douglas, with effect from the 1st February 1922

* * *

Mr. W. D. Robinson, manager of the Export Department of the Chicago Bridge and Iron Works and its subsidiary, the Horton Steel Works, Limited, is on a visit to the leading centres of South Africa, with a view to looking over the field and establishing local agencies. Mr. Robinson is on a tour round the world on behalf of his company, which are large manufacturers of steel tanks, towers, stacks, flumes, plate work and bridges, with three plants in America and Canada. Any firms interested in getting in touch with Mr. Robinson can do so through the office of the American Trade Commissioner in Johannesburg.

The farmers in Australia at first adopted towards wages disputes on the mines and in the town industries of that country very much the same attitude as that which farmers in South Africa have taken up in recent years in connection with the activities of labour unions here. It is probably correct to say that up to the present the agricultural community of South Africa has been, on the whole, rather inclined to side with organised labour because of a vague feeling that the men are struggling to prevent themselves being exploited by self-seeking foreign capitalists—a doctrine which labour leaders everywhere are constantly and insistently preaching. It was only after the government of the country had been handed over to the Labour Party that the farmers of Australia realised what a disastrous mistake they had made. There is a lesson in the recent history of Australia, which the farmers of South Africa would do well to study and ponder over.

ROBINS "PERFEX" BALANCED SCREENS.

Give favourable results on the fine screening of a variety of materials—Coal, Coke, Fertiliser, Sand and Gravel, Slag, Stone, etc.

They supplement the Robins Rotary Grizzly, and have its characteristics—low power consumption, freedom from vibration, high efficiency and capacity, small headroom.

Moreover, they have a positive screening action on damp or wet material, and cannot plug up.

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THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Producer Gas Power Plants.—Iron and Coal Trades Review, Jan. 27, p. 113.

Electrical Engineering in 1921.—The Engineer, Jan. 27, p. 103

Electrification of English Main Railways.—The Engineer, Jan. 27, p. 103.

Coal Handling by Suction.—Iron and Coal Trades Review, Jan. 27, p. 117.

Coal.

American Coke Oven Practice.—Colliery Guardian, Jan. 27, p. 213.

Utilisation of Waste Heat.—Electrical Review, Jan. 27, p. 115.

Chemistry, Geology, etc.

Chemistry of Platinum at High Temperatures and Pressures.—Economic Geology, Dec., 1921, p. 524.

Brakpan Mines.—Report for Quarter ended December.

The linear development amounted to 5,423 ft., of which 2,893 ft. were on reef, averaging 8.72 dwt. over a reef width of 36.01 in. Of the footage on reef, 1,190 ft., equivalent to 42 per cent. of the sections sampled, were payable, and averaged 16.94 dwt. over 35.91 in. In addition to the above footage, development work was continued from the circular shafts, details of which are given below. Total working costs, £226,648 4s. 7d. (per ton milled, 26s. 11.783d.). Working profit, £109,438 10s. 6d. The payable ore reserve as at December 31, 1921, was estimated at 2,423,230 tons, of an average assay value of 8.61 dwt. over an average stoping width of 68.13 in. When compared with the reserve as at 30th June, 1921, the estimate shows a decrease of 126,395 tons, the average value a decrease of 0.16 dwt., while the average stoping width is narrowed by 1.65 in. No. 3 circular shaft: During the quarter under review the main station crosscut was advanced 256 ft. A point in line with the main incline from No. 2 shaft was reached, and a commencement was made with the connecting incline, which was styled the main incline north. A total of 127 ft. was accomplished in this heading, all the work being off reef. At the end of the year the distance remaining to be traversed to effect the connection was about 330 feet. No. 4 circular shaft: The details of the quarter's development at this shaft, together with a summary of the work so far accomplished, are as follow:—

Working Place..	Total Footage.	Footage on Reef.	Footage Sampled.	Reef Width, inches.	Assay Value, Dwts.
East haulage	140	—	—	—	—
South haulage	231	—	—	—	—
West haulage	208	208	205	68.2	2.5
North haulage	127	31	25	48.2	7.7
Crosscuts	183	—	—	—	—
For quarter	889	239	230	66.07	2.95
Previously reported	1,377	147	140	33.79	2.91
Totals and averages	2,266	386	370	53.85	2.93

Of the footage sampled during the quarter, 40 feet, or 17 per cent. of the sections sampled, gave payable assays averaging 7.57 dwt. over 47.25 in. The capital expenditure during the quarter amounted to £29,232 19s. 5d. The estimated premium on gold recovered during the quarter

was calculated by taking the price of gold as follows:—October, 103s. 0d. per fine oz., £20,137 3s. 8d.; November, 102s. 0d. per fine oz., £19,848 0s. 10d.; December, 95s. 6d. per fine oz., £11,868 4s. 10d.; less estimated exchange premium on remittances, £3,773 0s. 1d.; total, £48,080 9s. 3d. The actual premium on gold for the three months ended 30th November, 1921, was £8,896 7s. 11d. short of the amount estimated. The directors' report for the quarter ended 30th September, 1921, notified shareholders that the Court had given judgment in favour of the company in its action to recover from the Union Custodian the amount due from the above bank, and that the Custodian had noted an appeal. The appeal was dismissed, whereupon the Custodian noted a further appeal to the Appellate Division. This appeal has not yet been heard.

West Springs.

No. 1 shaft: During the quarter good progress was made in the east haulage, which was advanced 624 ft., while the haulage from Springs Mines was driven 312 ft. The holing was effected on the 3rd of January of the current year, thus completing the connection with the No. 2 shaft of Springs Mines. The details of the quarter's development, together with a summary of the work so far accomplished by Springs Mines, Ltd., in your company's property under the working agreement, are as follows:—

Working Place.	Total Footage.	Footage on Reef.	Footage Sampled	Reef Width, Inches.	Assay Value, Dwts.
For quarter	1,154	255	255	24.35	7.04
Previously reported	4,162	2,782	2,760	27.20	7.88
Totals and averages	5,316	3,037	3,015	26.96	7.82

Of the footage sampled during the quarter, 65 ft., equivalent to 25.5 per cent., showed payable assays, averaging 18.85 dwt. over 26.15 in. Development from No. 1 shaft, West Springs:—

Working Place.	Total Footage.	Footage on Reef.	Footage Sampled.	Reef Width, Inches.	Assay Value, Dwts.
For quarter	2,761	1,668	1,625	22.4	4.4
Previously reported	1,808	283	260	25.75	5.73

Totals and averages 4,569 1,951 1,885 22.9 4.6
Of the footage sampled during the quarter, 115 ft., equivalent to 7.1 per cent., showed payable assays, averaging 8.5 dwt. over 37.3 in. During the period under review, a call of 2s. per share was made on all partly-paid shares, and advance payments were made in respect of 5,250 shares, making them fully paid up. At the 31st December the capital of the company was as follows:—452,419 shares fully paid up; 947,581 shares 16s. per share paid up.

Considerable activity is observable on the Klein Letaba Goldfields of the Northern Transvaal. The Golden Hill prospecting venture has been taken over by a Johannesburg company, and another proposition known as the Letaba Eclipse is starting on a fairly large scale in April.

The effects of the Rand strike are being felt not only in the Union itself, but even so far away as India, to which country, according to messages from New York, American bankers have arranged to ship 800,000 dollars worth of gold bars to Bombay.

Finance and Information for Investors.

AN EXAMINATION OF BALANCE SHEETS AND REPORTS—DATA FOR SHAREHOLDERS.

In response to the request of numerous readers we have commenced a new feature of the journal. In these pages we shall endeavour to compress reviews and criticisms of balance sheets, to examine Government, Municipal and other loans, to note dividend declarations, to analyse new prospectuses, and to examine the financial results and prospects of mining, commercial and banking companies concerned with trade, industry and finance in the Union and Rhodesia.

The Maintenance of Sterling.

Another valuable, and from the public point of view welcome, criticism and review of the present business position in Great Britain and the price of gold was given in London in mail week by Sir William Goschen. Presiding at the annual meeting of the National Provincial and Union Bank of England, Sir William Goschen had something to say on a matter with which, above all, he is familiar, for if anybody may be credited with understanding "Goschen's Law" of monetary movements and their causes and effects, he assuredly may. Since the beginning of 1921 the £, in relation to the U.S. dollar, has gone up, as he recalled, from \$353 to \$421½. It is a substantial and gratifying rise; not can it be questioned, to quote his words, that the rise is fully justified by our general position and the state of our currency." The figures he gave are really significant. At the end of 1920 the net total of fiduciary currency over and above the cover in gold coin and bullion was £348,126,000, or 68·7 per cent. of the £492,560,000 of notes in circulation. At the end of 1921 the net total of fiduciary currency over and above the gold coin and bullion cover was £293,084,000, or 65·1 per cent. of the £450,648,000 of circulating notes. The decrease of £55,042,000 in a year, and that year presenting the features of 1921, is really an important, and, what is more, a wholesome sign. Is it remarkable that the £ has gone up in relation to the dollar, when there is this evidence of the growing credit behind the £? And if there is that growing credit, advocates of devaluation of the £ are plainly left without a leg to stand upon. To devalue the £ by reducing the gold content of the sovereign, either in weight or fineness, or both, has appeared to some to be an easy way out, since, among other things, it means, to the extent of the devaluation, a final repudiation of national and public debt whether internal or external. Were the sovereign "devalued" down to, say, 15s., we should nationally do our creditors out of 5s. in the £; we should not pay what we have solemnly promised to pay. But this applies not only to public debts; it applies to every kind of private debt at home or abroad payable in sterling. The moment the effect on the country's credit is considered, the incidental loss is seen to be out of all ratio to the gain. The gain would be limited; the loss without limit, either in total or in time. Credit would sustain a crushing blow, and the place of this country in the world's business, more especially its place as the clearing-house of the world's finance, would be lost, and probably for ever. For that place has been gained by honour, and it can be held on no other terms. Compared with so shady a device as devaluation, the restoration of the £ to pre-war parity is ease and simplicity itself. On points like these there are times when words have to be plain, because the restoration of the £ to parity means both restoration of national earnings and the rise of those earnings in real value at the same time. In brief, the road of honour and the road of prosperity are one.

Bank of England Returns.

London, February 16.—The following is the weekly return of the Bank of England issued to-day, together with figures for last week and the corresponding week of last year:—Reserve of notes and coin, £25,460,000, £24,530,000, £18,946,000; coin and bullion, £128,760,000, £128,750,000, £128,306,000; public deposits, £14,910,000, £14,720,000, £15,563,000; other deposits, £137,460,000, £154,410,000, £114,042,000; other securities, £80,570,000, £80,430,000, £85,202,000; proportion of reserve to liabilities, 16½ per cent., 14½, 14½; private discount, 3 per cent., 3½, 6½; bank rate, 4½ per cent., 5, 7; deposit allowances, 2½ per cent., 5.

Industry's Tax Burden.

According to a London cable dated February 16, a reduction of the income tax by 2s. in the £, the abolition of the corporation profits tax and proportionate adjustments in super tax by private firms, and also the advisability of permitting posterity to bear its share of the nation's indebtedness, were the principal requests advanced by an influential deputation representing the principal industries which waited on the Chancellor of the Exchequer to-day. The deputation, which was headed by Colonel Armstrong, President of the Federation of British Industries, strongly impressed on the Chancellor the necessity to reduce taxation. Sir Robert Horné requested that his reply be treated confidentially, but he promised sympathetically to consider the arguments presented.

"Bantjes" Liquidation Value.

In reply to several inquirers, we give the following information:—

The issued capital of the company is £502,306 in shares of £1 each. In the last balance sheet the equipment stands in the books at £381,881 16s. 10d., and the company's cash assets stood at £100,332 6s. 5d., made up as to:—

Cash at Bankers and in hand	£1,399	3	4
Union of South Africa Treasury Bills	10,000	0	0
£50,000 English Treasury Bills	49,576	7	5
Deposits, fixed, on call and on loan			
bearing interest	39,356	15	8

The last quarterly report issued, *i.e.*, that for quarter ended June 30th, 1920, showed a profit from clean-up, etc., of £3,128, in addition there is a credit to capital expenditure for plant, etc., sold, totalling £2,162, and the report stated: "In view of the clean-up being practically completed, the Board has decided to discontinue the issue of quarterly reports. Particulars, however, of the footage driven and values obtained in the exploratory drive will be published quarterly in the Press for the information of the shareholders."

A circular dated January 16th stated: "In view of the very small percentage of payability disclosed throughout this drive, the consulting engineer, Mr. H. Stuart Martin, has recommended to the Board that the work should cease. Having given the matter full consideration, the directors are satisfied that there is no hope of discovering payable values. They are also of opinion that any attempt to re-open the mine (which was closed down at the end of 1918) for the purpose of working the small remaining ore reserve is not warranted, by the reason of the heavy expenditure involved in dewatering the mine and the general reconditioning of plant. Accordingly they have now decided to discontinue the drive referred to and to call meetings of shareholders to consider resolutions for placing the company in voluntary liquidation. The notices convening such meetings will be issued to shareholders at an early date. The company would appear to have liquid assets representing about 4s. per share.

The present value of the plant in a liquidation market is very hard to determine. In our judgment gravity stamp



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What will guard you against wasteful friction? Correct lubrication—and that only. The subject is well worth your most serious thought.

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This increased power means increased production without added power cost. It means improved profit. It will protect your pocket-book from friction theft.

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installations have had their day on the Rand (New State Areas is to be equipped without stamps), and in view of the fact that numerous properties will probably be suspending operations in consequence of the strike or because of depletion of ore contents the realisable value of the Bantjes equipment may not perhaps exceed 3s. per share, or, say, not more than 7s. per share for investments and equipment. The value of the mining area is in our estimate negligible. This is only a rough and hasty calculation, but it may be of some value to those who are interested in the liquidation prospects of Bantjes.

There are 1½ million whites and 7 million natives in the Union, and the whole population exists in large degree upon the Rand, which produces about £40,000,000 per annum. Of this, 14s. in the £ remain in the country. Nearly

sixty per cent. of the general revenue of the country is derived from the Rand. This flow of economic life blood has dried up for seven weeks because 20,000 miners have been on strike. Three-quarters of these men wish to return to work. Some hundreds have already returned. The others are being prevented from returning by a few hundred extremists. Shall a few hundred extremists dictate to and ruin 1½ million Europeans and 7 million natives?

Your fortunes are wrapped up in the Rand. It doesn't matter whether you live at Capetown or Ceres, or in Durban or Tembuland. No matter whether you are a farmer, railwayman, storekeeper or clerk, the strike on the Rand is costing you money. And you are losing this money because the extremist leaders are deterring the men from going back to work.

The Union's Expenditure.

The following is an official abstract of the estimates of additional expenditure of the Union Government to be defrayed from revenue and loan funds during the year ending 31st March, 1922:—

VOTE.	Original Estimates, 1921-22.	Plus Grant from Vote No. 36.	Revised Estimates 1921-22.	Less Savings * not available to meet excess expenditure.	Additional amount to be voted
	£	£	£	£	£
<i>Expenditure from Revenue Funds.</i>					
1. His Royal Highness the Governor-General	25,971	300	26,271	—	—
2. Senate	28,586	—	28,586	—	—
3. House of Assembly	92,142	1,075	93,217	—	—
4. Prime Minister	72,363	—	38,463	33,900	—
5. Treasury	96,777	3,550	100,327	—	—
6. Public Debt	7,682,820	—	7,788,720	—	105,900
7. Pensions	1,607,000	—	1,926,000	—	319,000
8. Provincial Administrations	4,643,291	300	4,694,591	—	51,000
9. Miscellaneous Services	144,221	—	121,221	23,500	500
10. High Commissioner in London	73,729	12,000	87,729	—	2,000
11. Inland Revenue	109,824	9,500	119,324	—	—
12. Customs and Excise	208,713	16,500	232,313	—	7,100
13. Audit	72,709	2,000	74,709	—	—
14. Justice	75,940	5,000	80,940	—	—
15. Superior Courts	215,168	8,760	237,978	—	14,050
16. Magistrates	547,850	38,200	586,050	—	—
17. Prisons and Reformatories	921,194	—	881,820	42,027	2,653
18. Police	2,894,220	—	2,894,220	—	—
19. Defence	1,345,049	—	1,196,049	144,000	—
20. Interior	283,304	6,475	321,554	—	31,775
21. Mental Hospitals and Lepet Institutions	610,461	7,184	617,725	—	80
22. Printing and Stationery	348,827	7,223	393,783	—	37,733
23. Public Health	274,669	4,000	278,669	—	—
24. Native Affairs	434,884	22,500	457,384	—	—
25. Mines and Industries	333,884	8,332	347,468	—	5,252
26. Higher Education	278,225	900	279,125	1,500	1,500
27. Child Welfare	102,695	3,600	126,295	—	20,000
28. Agriculture	745,861	28,573	803,732	—	29,298
29. Agriculture (Education)	169,170	—	165,738	3,432	—
30. Forestry	206,828	2,000	208,828	—	—
31. Posts, Telegraphs, and Telephones	2,923,878	168,000	3,227,678	—	135,800
32. Public Works	783,890	6,000	830,190	6,000	46,300
33. Lands, Deeds and Surveys	220,516	12,920	237,850	—	4,414
34. Irrigation	224,170	—	214,170	10,000	—
35. Unemployment Expenditure	300,000	—	450,000	—	150,000
36. Adjustment of Salaries, Wages and Allowances	450,000	—	—	75,108	—
Total	29,543,829	374,892	30,168,717	339,467	964,355
	Net Increase	—	£624,888		
<i>Expenditure from Loan Funds.</i>					
A.—Railways and Harbours	4,500,000	—	4,900,000	—	400,000
B.—Public Works	785,000	—	685,000	147,240	17,240
C.—Telegraphs and Telephones	450,000	—	500,000	—	50,000
D.—Lands and Settlements	613,000	—	446,000	119,000	24,000
E.—Irrigation	850,000	—	1,010,000	—	160,000
F.—Local Works and Loans	2,180,800	—	2,014,800	226,000	60,000
Other Votes	2,353,000	—	2,305,000	48,000	—
Total	11,731,800	—	11,860,800	582,240	711,240

ENGINEERING SECTION.

"Broken Tools."

SOME OF THE CAUSES OF SPLINTERING AND CRACKING OF HARDENED STEEL.

(Specially written for the "S.A.M. & E.J.," by J. A. Holden.)

II.

There are banded formations which are in no way dependent upon the presence of slag inclusions; certain micro formations in high speed steel belong to this category.

The free carbides in such material may appear in the form of lines, particularly in material which has been forged considerably; more often commercial high speed steels are not forged excessively, and the carbide segregations take an irregular form, like a roughly shaped Z.

In a modern high speed steel the carbides are very complex, consisting of iron, chromium, tungsten, and sometimes molybdenum. If during hardening the free carbides are not diffused it is certain that the tools will give disappointing results. There are certain carbide segregations which cannot be broken up during hardening, and a number of trepanning tools made from this material yielded very poor service. In the case of fine edged tools and complex milling cutters, where it is impossible to harden from the very high temperature usually employed for high speed steel, because of the danger of destroying the teeth, it is important to avoid using steel containing certain structure for material of this kind would furnish defective tools fit only for the scrap pile.

At one time the hardening of steel was done without the aid of scientific instruments. In some dark corner of the forge the hardener would judge by the colour of the object when the correct hardening heat had been reached. Although the well trained eye of a highly skilled hardener may rarely be at fault, it is doubtful whether it is possible to run a large hardening shop without the aid of pyrometers. For it must be remembered that some steels (such as those containing chromium) are very susceptible to overheating, and in consequence very little latitude is allowable in the quenching temperature, and the operator who works with the eye alone cannot keep within the very narrow limits which are sometimes mandatory. Where by reason of initial expense or a limited amount of work a pyrometer cannot be installed a very efficient substitute can be used in the shape of either a "Seger" cone or a "Sentinel" cylinder. These are made from silicates or salts, and each one has a known and fixed melting temperature.

The exact temperature at which a piece of carbon steel may be hardened (by quenching) can be determined experimentally, or it may be obtained from what is known to metallurgists as the equilibrium diagram. A complete description of such diagrams will not be given here, but as the steel diagram is so useful to the hardener it will be briefly dealt with.

It will be necessary to describe a phenomenon of very great importance, and that is the spontaneous absorptions or evolutions of heat which occur during the heating or cooling of the steel. These are usually called critical points.

If we take a piece of mild steel and heat it very slowly, recording the heat of the specimen with a delicate pyrometer and taking the steel up to a temperature of 900°C, we find the following critical points (that is, points where a spontaneous absorption of heat occurs):—720°C, 760°C, and 870°C. Upon cooling from 900°C we find the following critical points (that is, points where a spontaneous evolution of heat occurs): 850°, 760°C, and 700°C. Thus a mild steel containing .10% of carbon has six critical points. Those obtained on heating are called the AC1, AC2, and AC3 points (where "C" is a contraction for the French word *chauffage*, meaning heating), those obtained on cooling are called the AR1, AR2, and AR3 points (where "R" is a contraction for the French word *refroidissement*, meaning cooling).

When a steel contains about .35% carbon the two critical points AR2 and AR3 (and also AC2 and AC3) merge into one. As a result the steel has but two AR points and two AC points. When the carbon in the steel exceeds .5% the metal has only one critical point on heating and one on cooling, and which are denoted as AC1, 2, and 3, and AR1, 2, 3.

(To be continued.)

Employees on the gold mines receive privileges in many respects far in advance of those given to employees in any other industry in the world. The working hours are 48 per week, over a six days week; overtime is paid for at time and a half; every employee receives paid annual leave, averaging three weeks per annum; Christmas Day and Good Friday are holidays; the companies have spent huge sums on recreation halls, swimming baths and other welfare measures for their employees; a large proportion of the employees are granted housing accommodation on the mines at very low rents, and so on.

GOVERNMENT EXAMINATIONS.

METAL.	RESULTS, 1921.	COAL.
Total METAL MANAGERS Certificates		
Granted in S.A., 1921	..	36
Secured by Students of Messrs. LUCAS & WOLFE	..	21
Balance for S.A.	..	15
7 COAL MANAGERS Certificates obtained in 1921.		
Total OVERSEERS Certificates (Metal and Coal)		
Granted in S.A., 1921	..	61
Secured by Students of Messrs. LUCAS & WOLFE	..	25
Balance for S.A.	..	26
Total SURVEY Certificates		
Granted in S.A., 1921	..	11
Secured by Students of Messrs. LUCAS & WOLFE	..	9
Balance for S.A.	..	2

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Electrification of Natal Railways.

COLENZO TO BE AN IMPORTANT CENTRE.

Colenso has been chosen by the South African Railways management as the best site for the new electricity works which will generate the power for the electrification of the railway line, for which, as announced recently, the engines have already been ordered. For some time past surveys have been made with the view of finding a locality that will meet the requirements of the line under its new conditions.

Besides being about midway between the two termini of the electrified section—Glencoe and Maritzburg—Colenso has other advantages which helped the authorities in coming to a definite decision. We are not able to state at the present time what area the new works will occupy nor the probable amount of skilled labour to be employed there. But, considering that the electrification of the line, when it has been put into operation over the one section, is likely to be extended, it may be taken for granted that Colenso is bound to become a very important centre.

Two or three weeks ago mention was made of some of the principal advantages of electric locomotives over steam locomotives, as expressed in a lecture given in Durban by Mr. H. Clark, B.Sc., and particularly when applied to the gradients and curves of such a line as that in Natal. Railwaymen who are familiar with steam locomotives and know how often they require repair (if only in the shape of special treatment to the boilers) will be interested in a comparison drawn by Philip Dawson, from the data of suburban steam locomotives on the British railways: Mileage per annum, 20,000 miles; mileage between serious repairs (average), 40,000 miles. For the electric train Dawson claims an annual mileage of 50,000 on suburban services and a mileage of 250,000 between serious repairs.

The Prussian Government estimated that for equal work with an equal number of reserves 36 per cent. less electric locomotives are required than would be necessary if steam

locomotives were employed. It was found that these need always 22.5 per cent. of their steam locomotives in the repair shop, and that there were more than 54 per cent. of their steam engines in service at any time—some were being got under steam, others were being boilers cleaned or fire-tubes cleaned, etc.

The question of train resistance, as is familiar to those who know such sections as near Stryden, where the gradient is 1 in 36 and the curve radius 200 feet, or Eskdale, where the gradient is 1 in 40 and the curve radius 600 feet, and where laymen can appreciate the statement that whereas the maximum draw-bar pull of the S.A.R. 14th class locomotives is 35,000 lb., the electric locomotive has a pull of 96,000 lb.

A little consideration will show that extravagantly high wages to European workers in the municipal services, in mining, and in other industries on the Witwatersrand are harmful to the whole country, and are a potent cause of the parlous position of the South African farmers to-day. A wage standard has been set up on the Witwatersrand which the Railway Administration and employers of European labour elsewhere in South Africa have had to follow to a considerable extent, or otherwise face constant dissatisfaction and trouble amongst their men. The result is an unduly high level of wages generally, which means high railway rates, high rents, and high charges for all services by Europeans to the detriment of the farmer and other producers who cannot transfer to the consumer any additional burdens they may have to carry because the prices of most of their products are fixed in Europe and not in South Africa.



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Combustion of S.A. Coals in Boiler Furnaces.

Abstract of a paper read by E. P. Reim, B.Sc., before the Chemical, Metallurgical and Mining Society of S.A.

Spontaneous Combustion.

From Mahler's researches we see that oxidation of coal takes place at ordinary atmospheric temperatures, and this would apply particularly to coals high in volatile matter. If the coal is not in a confined space the action will not be cumulative; if, however, the conduction away of the heat generated is restricted the temperature will increase, and the oxidation will become quicker, until finally the coal will ignite. Thus the grade of the coal is an important factor, for if it is large and irregularly shaped the exposed surfaces and the surfaces in contact are small, so the heat can be readily conducted away; but if there is much small coal and duff present, even if only the surfaces of the coal are covered, with duff, then heat conduction is hindered, and so the cumulative action is increased. When pyrites are present in a finely divided state, especially in the presence of moisture, oxidation of that takes place and so increases the effect. This action takes place even when coal is stored under the most favourable conditions, for samples of pyrites kept in a reasonably dry room for some months showed distinct signs of sulphating. The presence of occluded gas in coal must also have some effect in accelerating spontaneous combustion, as it contains free hydrocarbons and oxygen. From a paper read by Mr. James Lomax before the Institute of Mining Engineers I gather that certain coals, no matter in what size or condition, are liable to spontaneous combustion, and these are not always those with the highest percentages of volatile matter or pyrites.

The Choice of Coal for Steaming.

To a great extent the choice of a coal for steaming, and the design of the boiler furnace in which it is to be used, depend on one another. The higher the percentage of volatile matter in the coal the larger must be the combustion chamber. If this is too small the gases will not be completely burned when they reach the boiler tubes, the cooling from which will prevent their further combustion, and apart from the loss in furnace efficiency when this effect is excessive, it will lead to soot being formed around the boiler tubes and so necessitate frequent cleaning. A coal very high in volatile matter, say, above 35 degrees, will require for complete combustion a combustion chamber whose size will render it costly in erection and maintenance, and its

large external surface will mean a correspondingly large loss through radiation and conduction. A coal very low in volatile matter will burn with a very low intense flame, such as with anthracites, and this will mean excessive heating of the grate links with attendant high upkeep expenses. The speed of combustion also will be slower, and this will particularly be the case with the Natal anthracites, where the ash percentage is fairly high (12 per cent. to 15 per cent. against the Welsh anthracites containing 4 per cent. to 5 per cent. of ash, and often less). Thus the most suitable coals for steaming purposes are those coming between these two, namely, the semi-bituminous. Then there is the consideration of the resulting ash, which should break up readily to allow the combustion of the carbon to take place. In semi-bituminous coals one gets bands of both of these types, and one then has to form an idea of the suitability of the coal as regards the mechanical distribution of the constituents, by estimating the ratio in which these two types are present.

Another point to be considered in the choice of a coal is that of the ash, forming slag and so clinkering. With furnace temperatures under 1100 degrees C., the slag chiefly consists of the bisilicate of iron, which has a melting point of 1065 degrees C.; but at higher temperatures the slag includes more of the bisilicates of calcium and aluminium, whose melting points are about 1400 degrees C., but which when mixed with iron bisilicate will have lower melting points depending on the proportions in which they are present. With furnace temperature less than 1000 degrees C. due to local higher temperatures immediately around the coal, to fuse the coal pieces together and so form an open clinker.

The bi-silicates usually have the lowest melting points of the silicate slags, and so it is they that are usually formed. Their compositions are:— $2 \text{FeO} \cdot \text{SiO}_2$, $\text{CaO} \cdot \text{SiO}_2$ and $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$. The slag calculations for an ash will be as follows, the amount in which the actions are completed, depending on the furnace temperature:—

2FeS ₂ becoming 2 FeO requires for slag formation	SiO ₂	Silica.
2 (56 + 64) requires for slag formation...	28 + 32	
1 lb. of FeS ₂ requires for slag formation	60/240 =	.25 lb.
CaO, becoming CaO requires for slag formation	SiO ₂	
(10 + 12 + 18) requires for slag formation	28 + 32	
1 lb. of CaO, requires for slag formation	60/100 =	.6 lb.
Al ₂ O ₃ requires for slag formation	3 SiO ₂	
51 + 48 requires for slag formation	3 (28 + 32)	
1 lb. of Al ₂ O ₃ requires for slag formation	180/102 =	1.76 lb.

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The Week in the Sharemarket.

A GENERAL IMPROVEMENT FOLLOWED BY IRREGULARITY—DIAMONDS VERY ACTIVE.

The market has shown improvement during the week on the continued return of strikers to work. The numbers returning gradually increased until last Wednesday, when the position was slightly reversed owing to the unions declaring a policy of intimidation. This has called forth strong representations from the mining houses to Government, and it is generally anticipated that early steps will be taken to put a stop to this dastardly action.

Cables indicate an appreciable rise in the London market; practically all descriptions have become active, and in the general business Kafirs have been carried into more favour. The week's business has increased materially, all sections, the public, professionals, and London, taking a hand in the general improvement.

Gedulds are still favoured, rising from 49s. to 51s., receding again to 50s. 3d., while the London quotation on Wednesday last was 54s. 4½d. (cum Div. 2s.) buyers. Modders and Modder Deeps have been very firm, but show only slight fluctuation. Government Areas rose from 77s. to 79s. receding again to 77s. 6d. on the intimidation movement. Good business was done in Nourse Mines between 10s. and 11s. Diamonds continue firm, the feature of the week being Crown Diamonds rising from 4s. 9d. to 7s. 9d., and receding to 6s. 4d.; the improvement is due to new developments on the property, which, with the assistance of capital, may be turned to good account. West Ends and Thurons remain at about 24s. and 16s. respectively. Consolidated Diamonds continue active at about 16s. 6d.

	Fri. 17th.	Sat. 18th.	Mon. 20th.	Tues. 21st.	Wed. 22nd.	Thurs. 23rd.
Anglo-Amer. Corp.	19 3	18 10*	18 6*	19 0	20 0	19 3
Bantjes Cons.	6 3*	6 4*	6 4*	6 6*	6 7*	6 6*
Brakpan Mines	43 0*	—	—	—	44 6*	45 6†
British South Africa	—	10 0*	12 0†	10 0*	11 3*	—
City and Subs.	2 3*	2 3*	2 3*	2 2*	2 3*	2 3*
City Deeps	40 6*	41 0*	—	41 6	42 0*	42 0
Con. Diamonds	17 3	16 9*	16 6	16 6	16 6	16 0
Con. Investments	—	—	—	21 0*	20 0*	—
Con. Langlaagtes	12 6*	—	12 6*	12 6*	12 6*	—
Con. Main Reefs	8 0*	8 2*	8 3*	8 6	8 7½	8 6
Con. Mines Selection	—	—	10 0*	11 0*	—	—
Coronation Colls.	30 0*	—	—	30 0*	—	30 0*
Do. Freeholds	—	0 7*	0 6*	9 7*	0 7*	0 7*
Do. Syndicates	—	4 0*	4 6	—	4 1	4 0*
Crown Diamonds	3 9	4 0	4 9	7 6	6 7½	6 4
Crown Mines	31 6*	32 0*	32 6*	34 0	—	—
Daggafontein Mines	2 1*	2 6*	2 5*	2 7	2 6*	2 6*
E.R. Coals	1 9	1 7*	1 6*	1 7*	1 7*	1 7*
E.R. Deeps	0 10	0 9*	—	0 9*	—	—

	Fri. 17th.	Sat. 18th.	Mon. 20th.	Tues. 21st.	Wed. 22nd.	Thurs. 23rd.
E.R. Props.	4 0*	4 6*	4 6*	4 6*	4 6*	4 6*
E.R. Debentures	£80*	£80*	£80*	£80*	£80*	—
Frank Smith Dmds.	3 9	3 9*	3 10	4 3	4 1½	4 0
Geduld Props.	48 3	49 0	49 3	49 9	50 9	50 3
Glynn's Lydenburgs.	7 0*	—	7 0*	7 0*	—	7 0*
Government Areas.	77 0a	77 6	77 0*	78 0*	78 3	77 6*
Hume Pipes	7 6*	8 0*	9 0*	9 0*	9 0*	8 6*
Knight Centrals	4 1½*	4 1*	4 1*	4 3*	4 3*	4 3*
Lace Props.	7 6*	7 3*	7 6*	8 0	8 1½	7 6*
Leeuwpoot Tins	7 0	6 9*	6 9*	7 0	6 10*	6 9*
Lydenburg Farms.	4 8	4 9*	4 10*	4 11	4 10*	4 10*
Meyer and Charlton	60 0*	60 0*	—	60 0*	—	60 0*
Middelvet Estates	—	1 0*	1 0*	—	1 0*	1 0*
Modder B.'s	24 3	24 7½	25 0a	25 0*	25 3	24 6*
Modder Deeps	38 0	38 9	38 6	38 9	38 6	38 7½
Modder Easts	6 0	6 0	6 1½	6 0	6 3	6 1
Natal Navig. Colls.	27 0*	27 0*	27 0*	27 0*	27 0*	27 0*
National Banks	—	222 6	225 0	222 6	222 6†	225 0*
New Eland Dmds.	21 0*	25 0*	26 0*	26 6*	—	—
New Era Cons.	—	1 4*	—	6 0	6 3†	—
New Geduld Deeps	1 4*	—	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins	4 11	4 9*	4 11	5 3	5 3*	5 0*
New Modders	66 3	66 3*	66 6	67 0	67 0*	66 9
New Primrose	—	—	4 3*	—	4 3*	—
New State Areas	25 6*	26 3	26 3	26 9	27 0	26 6
Nigels	5 1*	—	5 0*	—	5 1*	5 1*
Nourse Mines	10 3	10 3*	10 4½	10 10½	10 6*	10 1*
Pretoria Cements.	40 6*	40 9*	40 6*	40 6	40 0b	40 0
Randfontein Centrals.	9 6*	9 3*	9 3*	9 3*	9 6*	10 0†
Do. Estates.	15 6	15 3	15 3	15 9	15 9	15 6
Rouxville Diamonds	1 3*	1 0*	1 3*	1 2*	1 2*	1 1*
Roberts Victors	9 0a	9 6*	9 6	9 9*	10 0	—
Rooibergs	3 0*	—	3 0*	3 6	3 3*	3 3
Simmer and Jacks	2 9b	2 10†	—	2 9†	—	—
S.A. Lands	4 1	4 0*	3 10*	4 0*	4 0*	4 1*
Springs Mines	37 0	37 0	37 0	38 0	37 6*	37 6
Sub-Nigels	10 0	10 4½	10 6	11 0	11 9	11 6†
Swaziland Tins	10 0†	9 6†	—	9 0†	—	—
S.A. Alkali	12 6*	12 6*	12 6*	13 0	13 0*	12 9*
S.A. Townships	8 9	8 6	8 6*	8 7*	8 3*	8 6*
Transvaal Lands	15 0	14 6*	—	—	—	—
Trans. G.M. Est.	7 9*	7 0*	7 0*	7 0*	—	—
Transvaal Silvers	20 0	18 0*	19 6	21 3	21 3	20 3
Tudors	0 9†	0 9†	—	0 9†	—	0 9†
Van Ryn Deeps	60 6*	61 0*	61 0*	61 3*	62 3	62 0b
Village Deeps	—	6 3*	—	6 3*	6 6*	6 6*
West Springs	6 10*	7 3	7 3	7 6	7 3*	7 3*
Western Rand Est.	3 3	3 1*	3 1*	3 3*	2 3*	3 6*
Witbank Collieries	33 9*	35 6	35 0a	35 3*	35 3*	35 6
Wit. Deeps	8 0*	8 0b	8 0*	8 0b	8 0*	8 0b
Zaaiplaats Tins	9 9*	9 9*	9 9*	9 9*	9 9*	9 9*
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Letters to the Editor.

THE POSITION ON THE WITWATERSRAND.

Some Candid Criticism from Overseas.

To the Editor, *S.A. Mining and Engineering Journal*.

Dear Sir,—For many months I have been quite undecided as to the wisdom of saying anything which would add to the difficulties of those who are connected with the gold and coal mining of South Africa. Even as I write I am not certain that I am doing the right thing, but the fight which everyone on this side thought inevitable has come about, and the cables in this morning's papers do not seem very encouraging. I do not suppose for a moment that anything I say will matter much either way, but I have thought for a long time that the views of an outside observer who knows something of the inside might be of value to those who have been living for a long time in the "fools' paradise" of the Rand, more particularly as I meet from time to time all classes of Anglo-South Africans and on occasion South Africans who are visiting this country. And in this connection I may state quite frankly that I am on occasion the recipient of confidences which never, I imagine, reach the ears of the controlling directors or the higher officials. These, I need hardly say, will be respected. To clear the ground, however, I may say that I am not a holder of any gold shares. Apart from sentiment, my one interest is a small holding in a coal mining company, which has always paid me well, though I have very considerable doubts about the future of South African coal as a general proposition.

Now I think it is clear, and is indeed generally recognised by those who stop to think, that there can be no development in South African mining unless there is a steady flow of capital to South Africa from the outside. There has been none for a very long time, nor will there be anything worth speaking about until to-day's conditions are radically amended. You, sir, have done your part in endeavouring to awake the community to the imminence of the threatened disaster, though I personally don't always agree with what you have said, but the point I want to make is that, so far as I know, yours has been the solitary voice which has reiterated from week to week the fact that the whole community was approaching an abyss. I think, however, that you have erred somewhat in throwing an undue proportion of the onus on the men. To my mind, the three parties interested are all equally to blame—the Government, the mines themselves, and the men. I am no Solomon, but in the observations which follow I am endeavouring to voice not my own sentiments, but those of the large circle of friends with whom I am in contact. I need hardly say that to a very large extent I share them, though, as I have indicated already, the whole affair is in reality no concern of mine. I personally cleared out of my gold holdings, which were of the best, some considerable time ago, simply because I personally had no confidence in the Government, the men's sense of decency, or in the controllers of the industry. I shall consider these in their order after I have disposed of one point. There has been a controversy in your columns and elsewhere as to whether Johannesburg is a dwindling town or community. I shall not go into the pros and cons of the proposition, but I would merely repeat what I have said earlier in this letter, that when capital ceases to flow from England—for all countries will follow suit, America included—then Johannesburg will commence to die. If this proposition is accepted, then Johannesburg has already one foot in the grave. This should be proclaimed from the housetops, for it concerns everyone—the men who draw the big salaries as well as those occupying more humble spheres. There is just as bare chance that the foot will be lifted, but most heroic measures will be required.

Now I come to the Government. For years they have been warned of the danger, and beyond a few spoken platitudes they have done absolutely nothing to help. True,

the powers of a Government are somewhat restricted in matters of this sort, and on the whole they are better out of things. Had they remained passive, one could say very little, but since 1910 in particular their policy has been one continual putting on of additional burdens until to-day the load cannot be borne. In the pre-Boer war days, the mine owners complained of the exactions of the Kruger regime, whose methods were crude but understandable. The more scientific methods of the last two Governments in particular have, I should say, at a guess, about trebled the Kruger exactions, and no one has any idea where they are going to end, for the mines were, and are still, considered fair game. A 10 per cent. profits tax was a very simple affair, and moreover, the money was easily collected. The same applied to the special war levy on a commodity, if you please, which had remained constant in value while wages and everything else had gone up. I need hardly recall the fact that concurrently farmers, profiteers and speculators generally were making fortunes. Then came the provincial taxation, phthisis exactions, increased railway rates, mealies at 30s. a bag, and not one helping hand to the industry which General Smuts to-day states is carrying the country. That, however, is not the worst. In Parliament the industry had no friends; certainly the Government never indicated in any way that it had a friendly disposition. Those who did really represent it were, if not actually hounded out, told that they were there representing special interests. What of the farmers and the wine growers! Were they the only disinterested parties? Assuredly not. I shall not weary my readers, but this I can say with every assurance, that the attitude of the Government during the last twelve years has been one to frighten away investors. Their one interest was picking the pockets of the mine shareholders. The days of Government leases are gone never to return. What would have done a good deal to attract capital was the existence of one or two New Modders comparatively untrammelled by exorbitant taxation. Mining is after all a speculation, and if there were no plums there would be no mining. A crowning act of folly was the taking of the mint to Pretoria.

And now I must say something about the mine owners, though the term is a misnomer. Much fresh blood will require to be imported. The Rand is not, after all, the last word either in mining or in administration. There are quite good ideas to be obtained from other sources in all that appertains to mining, but it is a rare thing to hear of the importation of an important official. Most of the men occupying the principal positions on the Rand to-day have grown up there. Certainly they have gained their big experience there. Their outlook on life is the Rand, and naturally the younger men, whether from the colleges or training schools, know nothing else. Let me say at once that the Rand is an excellent school, but all of us want from time to time fresh blood and fresh ideas.

I come to the men. That they are behaving and have behaved like fools, that they are shortsighted, that they have been and still are being badly advised is admitted. They must know that if there is no profit they must lose their jobs when there are no other jobs going. They must also know and realise that it is better to accept a general reduction than to be without a job, yet they ignore all that is going on in this big world of ours. In this country wages of miners have been cut in two, and the process is not yet finished. It can only be stayed by the men working harder and putting in longer hours, simply because British coal cannot be sold unless it is something like the price which coal from other countries fetch. I said at the beginning that I thought an undue proportion of the blame had been put on the shoulders of the men, and for this reason. During the past seven years the men have got practically all they asked for. True there was sometimes a bit of a rumpus, but I take it that the men always started out by asking more than they expected to get, and in the end they got what they really wanted. There has been an entire lack of firmness in dealing with them. They have become so accustomed to get what they demanded that in the present trouble they no doubt anticipated another success. What

I mean is that the controllers of the industry have brought up the men to believe that they had only to ask to get. That is why I think the men are not so much to blame. If there had been greater firmness earlier, there would have been less trouble to-day. As a sincere friend of the working man I tell him he is living in a fool's paradise. The cuts suggested in his wages to-day are small. They will be bigger before long, but even then he will be about the best paid in the world, and there is certainly no other mining field in the world where he is so well looked after, both by the Government and the owners.

The plain English of the whole matter is that costs on the gold mines must come down by at least 6s. per ton before confidence is restored, *i.e.*, before the investor will put money in the mines. I am not going to say how this will be done. No single method will suffice. All the talk of potential riches on the East Rand or anywhere else won't alter things in the very slightest. The first essential is reduction of costs. Improvements in mining and metallurgical practice will no doubt help in this direction, but only to a minor extent. Better work and more of it is the big individual factor—in brief, greater efficiency.

Then again, the investor distrusts the Government. Be it right or wrong, he has come to think that the attitude of the Government to the mines is that of a pocket picker. All this must be changed. The mining regulations, among other things, must be amended. Taxation, direct and indirect, must be reduced; the farming community must be made to bear a portion of the burden; and the colour bar must go. I waste no words on this latter point, for I look upon it as inevitable and a simple act of justice.

As for the groups, I shall say no more except that it is high time they backed up their own men—the managers and the shift bosses. At whatever cost discipline must be reintroduced and maintained. Between the head offices, the Chamber of Mines, the Labour leaders and Government regulations, mine managers have had a devil of a time. No wonder they lost heart and followed the line of least resistance. I shall also admit in all charity that the controllers must also have lost heart, for it certainly has looked to them that if they were lucky enough to make good profits, the Government or the men, or both, would promptly step in and demand their whack.

I shall leave the men where they are, and I predict that they are going to get the surprise of their lives. They are going to be badly beaten, both on the gold and the coal mines, for they cannot override the ordinary simple axioms of economics. Not very long ago I received a very interesting letter from an old friend who is in the midst of all that goes on. He says, "I can see no hope for the industry as long as we allow the trades unions to dictate the policy of the mines. Should a subordinate official show any interest in efficiency, he at once becomes an object for a violent attack from the combined forces of the workmen's organisations, and (I say it with shame) he very seldom receives any support from his manager or consulting engineer. Time after time our capable officials have been thrown over to appease the labour wolves, and the natural consequence is that our officials are learning wisdom and showing the pace. Most mine managers are sick at heart over the whole business and are prepared to make any concession for the sake of a quiet life. Should they stand for increased efficiency and lower working costs, they know that they cannot count upon the support of the head office, and so the policy of drift, drift, drift." This letter does not, of course, stand by itself. I have many communications all to the same effect. Poor shareholders!

One last point and I am finished. There was a time when the technical societies of the Rand were a kind of forum where pressing questions were discussed without fear or favour. Debating blows were given and exchanged all in the best part, but something resulted. To-day without exception they are silent. I wonder why. Has Johannesburg at last become a big Kimberley? It looks very like it. The only men who can alter the present state of affairs are

the consulting engineers—all decent fellows and all good at their jobs, but the smaller men with ideas will never bring them forward until they know they are not going to be frowned on or, it may be, sacked.

"OLD JOHANNESBURGER."

London, January 17th, 1922.

[We have deleted certain portions of this letter (which has been written by a former resident of the Rand who occupied high technical and administrative positions) because we think that they would only tend to create bad feeling during the present crisis.—Editor, S.A.M. & E.J.]

ARTIFICIAL COAL.

To the Editor, *S.A. Mining and Engineering Journal*.

Sir.—As a regular subscriber of your journal, I thought it of more than ordinary interest to you to learn about a certain invention which has recently been made in Germany by Mr. Ludwig Prukner. Mr. Prukner was able to produce on a commercial scale artificial coal. I am sorry that I have not got the time to translate the article for you, but I am giving you the rough outlines of this invention as described in the article. He says he uses two kinds of rock which are plentiful in Germany, and he mixes it with another mineral and a few other chemicals which are cheap and plentiful. The whole thing is kneaded together, and the mass is ready to be pressed in any desired shape or form. Heated from 15 to 20 minutes by 60 degrees and the artificial coal is ready. The caluclative value of this coal has proved to be 7,995, and 9.9 lb. when burnt left a residue of 200 grams. And the artificial coal is in burning nearly odourless. Mr. Prukner makes a special point in his description that this artificial coal is no way connected with ordinary coal. About the price, he says that it will be possible to produce 110 lb. of coal, including everything, even depreciation of machinery, at 25 marks. Taking the mark at the present rate of 860 to the £, it will work out at 8d. for the 110 lb. Hoping that this article will be of a general interest to your readers.

Yours faithfully,

JOHN BURMESTER.

SWAZILAND TIN.

The following are the results of the operations of this company for the month of January, 1922: Concentrate recovered, 20.5 tons; estimated net profit for the month, including credit adjustments on previous shipments (taking tin at £150 per ton), £125.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material and Engineering Trades.

STRIKE GRADUALLY PETERING OUT—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—RAILWAY DEFICIT—RAILWAY DEVELOPMENT SCHEMES—COAL—BASE METAL CRISIS IN AUSTRALIA—BOARD OF TRADE RETURNS FOR JANUARY, 1922—INVESTMENT BOOM IN GOVERNMENT SECURITIES—METAL MARKET.

General.

None are so blind as those who will not see. The writing is on the wall. The initials S.A.I.F., under which is understood the South African Industrial Federation, are now more generally interpreted to mean "Strike And Its Failure." Opinion in commercial circles is now pretty unanimous that the end of the present disastrous struggle is in sight, and while some go so far as to measure the inevitable collapse of the strike by days, the least sanguine do not anticipate a much longer life. That it should lie in the power of a handful of irresponsible individuals to hang up such important industries as our coal and gold mining industries and at the same time paralyse the commercial activities of the country for a period extending over six weeks is, in the opinion of the vast majority of the community, not more a matter of astonishment than disgust. It is true that there are classic precedents for such mensate folly in the recent coal strike in Britain and in others which have preceded or followed it in other parts of the world, but this only emphasises the conviction of every right-thinking man that even in the twentieth century the relations between capital and labour leave plenty of room for amendment. The impression made on the community last Tuesday by the publication of the Chamber of Mines' very full and convincing statement of its case was profound. Not so, however, the modified proposals of the Federation to end the struggle. Such proposals, had they been made before the strike, might at any rate have afforded some ground for negotiation, but the continued fall in the price of gold since the 10th of last month and the economic factors which have occurred since the present strike began have now ruled such "terms" completely out of court. Nor, of course, has the repatriation of over 44,000 natives—approximately one-quarter of the mines' complement of native labour—helped matters, but very much the reverse. Still the mere fact that the Federation has at last awakened from its policy of masterly inactivity in so far as constructive action is concerned undoubtedly shows that certain pressure has been brought to bear upon their councils by the rank and file of the strikers and proves also that a more conciliatory attitude is now in evidence than has heretofore been shown by that body. It should therefore not be beyond the wit of the powers that be to find a satisfactory solution of the difficulty under the altered circumstances.

As a leading commercial man said this week, the most serious difficulty to be faced by the miners on returning to work will be the absolute impossibility of the industry to employ them in such numbers as were working in pre-strike times—a consequence of the suicidal policy adopted by their so-called leaders. Eventually the majority of the workers will be absorbed, but in the meantime a lot of unemployment is bound to occur, which the Government schemes in contemplation will only partially or, at any rate, only gradually relieve. The check to the commercial life of the Rand, he said, would undoubtedly be felt for many months to come.

Prices are, generally speaking, much about the same, with, however, some lines still inclined to recede. As a matter of fact, prices, my informant said, are now approach-

ing that level at which, as soon as the labour trouble has been settled, much of the work which has been held up for lower costs during the past few months can and will be tackled. He thought that the present comparatively low costs of stores and materials would, combined with the approaching lower white wages level and greater efficiency of the workers, enable many of our lower-grade mines to be worked at a profit and encourage the further exploitation of low-grade propositions. In fact, he was of opinion that provided costs of production were once and for all settled upon a true and economic basis in relation to the value of the gold product, we should see a much greater proportion of white labour working here than ever before.

Iron and Steel.

Business this week has naturally been but a reflection of the strike weeks which have preceded it—little or nothing having been done. Merchants are now in general convinced that the end of the present disastrous labour struggle is in sight, but are convinced that it will be months before anything like stable conditions prevail, and no very big recovery in business is anticipated for many months.

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British Output of Pig Iron and Steel in 1921.

The production of pig iron in Britain in December, 1921, amounted, according to *Engineering and Industrial Management*, to 275,000 tons, a figure slightly in excess of the production in November, when it was 271,800 tons. The furnaces in blast at the end of December numbered 77, compared with 85 at the end of November, 15 of the furnaces having gone out of blast during the month and 7 rebuilt. The production of pig iron for the year 1921 amounted to 2,611,400 tons, compared with 8,007,900 tons in 1920. This figure is lower than in any year since 1850, when the production of pig iron amounted to 2,219,000 tons. Of the production of pig iron in December, 92,400 tons were hematite, 81,500 tons were basic, 13,800 tons were forged, and 78,600 tons were foundry. The production of steel ingots and castings in December amounted to 381,000 tons, or 62,000 less than November. The total production of steel for the year amounted to 3,624,800 tons, compared with 9,056,800 in 1920.

Latest advices from Britain report that prices generally are maintained, with no material development in new business. In the pig iron trade consumers are looking for still lower prices and are disinclined to undertake large forward contracts.

Unmarked iron bars, 12 lb., No. 1 Cleveland, 95s.; No. 3, G.M.B., 90s. The agreement between the English and Scottish steel makers for a minimum home trade price has been restored. Galvanised sheets are being ordered by Australia in fair quantities.

Owing to the high cost of production, the Armstrong, Whitworth Co. announce the closing down of their steel works at Newcastle. Eight hundred men will be thrown out of employment.

Latest cables from America report that manufacturing conditions lack uniformity throughout the country. Financial circles predict rather pronounced irregularities during the early part of the year, with increasing stability later. The permanent tariff is not expected to be enacted before May 1. Iron and steel show a decrease, while textile mills are operating near capacity. The December export balance is below sixty million dollars, compared with 450 million dollars a year ago. The Steel Corporation shows a slight increase of unfilled tonnage for December. Plates are quoted 1.50 dollars base Pittsburg.

Latest nominal quotations.—Dunswart iron, 22s. per 100 lb. basis price; Union Steel Corporation, Ltd., 22s.; imported iron and steel, flats, small, 33s. to 40s.; larger sizes, 30s. to 38s.; $\frac{1}{4}$ in. and 5-16 in. rounds, iron and steel, 37s.; $\frac{3}{8}$ in. iron, 30s. to 32s.; $\frac{1}{2}$ in. and $\frac{5}{8}$ iron, 31s.; steel, 37s.; $\frac{3}{4}$ in. round iron, 30s.; steel, 33s.; $\frac{7}{8}$ in. and upwards, imported, round iron and steel, 30s.; channel and joists, 35s. 6d.; shafting, $\frac{3}{4}$ in. to 2 in., 6 $\frac{1}{2}$ d.; steel plates, 1-16 in. and $\frac{1}{8}$ in., 22s. to 23s.; 3-16 in. and upwards, 24s.; spring steel, 7 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. a lb.; bolts and nuts, hexagon, round, $\frac{3}{8}$ in., 9d. to 1s.; $\frac{1}{2}$ in., 45s. to 50s. per 100 lb.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 43s. to 48s.; hexagon nuts, $\frac{3}{8}$ in., 11d.; $\frac{1}{2}$ in., 10d.; $\frac{5}{8}$ in. and $\frac{3}{4}$ in., 9d. lb.; fish plates, bolts and nuts, $\frac{3}{8}$ in., 8d. lb.; $\frac{1}{2}$ in., 6d.; $\frac{5}{8}$ in., 5 $\frac{1}{2}$ d.; $\frac{3}{4}$ in., 5d.; dog spikes, 35s. per 100 lb.; rivets, $\frac{1}{4}$ in., 11d.; $\frac{3}{8}$ in., 9d.; $\frac{1}{2}$ in. and $\frac{5}{8}$ in., 45s. per 100 lb.; brass rods, round, $\frac{3}{8}$ in., 1s. 5d.; $\frac{1}{2}$ in., 1s. 4d.; $\frac{5}{8}$ in. and upwards, 1s. 3d.; brass rods, hexagon, 1d. lb. extra; copper rods, round, $\frac{3}{8}$ in., 2s. 4d.; $\frac{1}{2}$ in., 2s. 3d.; $\frac{5}{8}$ in. and upwards, 2s. 1d. lb.; tool steel, 3s. 6d. to 3s. 9d. lb.; brass sheets, 1s. 11d. to 2s. 1d. per lb.; copper tubes, solid drawn, $\frac{1}{4}$ in., 3s. 9d. per lb.; $\frac{3}{8}$ in., 2s. 11d. per lb.; 7-16 in., $\frac{1}{2}$ in. and 9-16 in., 2s. 9d. per lb.; $\frac{3}{4}$ to 1 $\frac{1}{8}$ in., 2s. 6d. per lb.; 1 $\frac{1}{2}$ in. to 2 in., 2s. 3d. per lb.; 2 $\frac{1}{2}$ in. to 3 in., 2s. 6d. per lb.; 3 $\frac{1}{2}$ in. to 4 $\frac{1}{2}$ in., 2s. 8d. per lb.; copper rods, $\frac{3}{8}$ in., 2s. 5d. per lb.; $\frac{1}{2}$ in., 2s. 4d. per lb.; $\frac{5}{8}$ in. to 2 $\frac{1}{2}$ in., 2s. 2d. per lb.; copper sheets, 2s. 2d. to 2s. 3d. per lb.; fire box copper, 2s. 5d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 2d.; ingot lead, £28 per ton; drill steel, 6 $\frac{1}{2}$ d.; hollow, 9 $\frac{3}{4}$ d.; 1 $\frac{1}{2}$ in., 9d. to 10 $\frac{1}{2}$ d.; wire nails, 30s. to 35s.; shovels, 52s. 6d. to 57s. 6d.; wheelbarrows, 47s. 6d.; picks, 37s. 6d.

to 67s. 6d.; pick handles, 21s., hammer handles, 14 in., 7s. 6d.; 18 in., 9s. 6d.; 24 in., 13s. 6d.; 30 in., 18s. 6d.; 36 in., 35s.; barbed wire, "Shorthorn," 69 lb. 13 $\frac{1}{2}$ gauge, 22s. per coil; plain galvanised fencing wires, No. 8 gauge, 100 lb. coils, 27s. per coil; No. 10 gauge, 100 lb. coils, 29s. per coil; No. 12 gauge, 100 lb. coils, 32s. per coil; bulb tee fencing standards, 14 lb., 27s. per dozen; 12 lb., 25s. per dozen; black baling wire, 14 gauge, 19s. per coil, 100 lb.; 12 gauge barbed wire, 22s. per coil 96 lb.; plain wire, No. 8 galvanised, 20s. 6d. per coil 100 lb.; fencing standards, 12 lb., 20s. per dozen; asbestos, short blue crude, £25 per ton, London. Screening, 3s. to 9s. 6d. per sq. yd.; cyanide, 1s. 7 $\frac{1}{2}$ d.; zinc shavings, 1s. per lb.

Second-hand Machinery.

Since several mines are restarting there have this week been a few orders received but mostly for second-hand material, such as pumps, small engines and boilers. The market is still depressed and there is very little otherwise doing in second-hand material, excepting to outside districts and towns an occasional order for building material and pumps and spares. It is felt that immediately the mines return to normal there will be a lot of inquiries in the market. It is understood that most of the batteries and machinery have been overhauled and defective and worn parts taken out and replaced. As most of the mines are endeavouring to work as economically as possible it is only natural that they are buying second-hand goods to replace. Second-hand timber and iron are still sought for in many instances by the strikers who have devoted their time to building operations, so that its an ill wind that blows nobody any good!

Timber and Building Materials.

There is little to report this week in this connection. Building operations, although being carried out to a limited extent, have not of course assumed any magnitude, nor are likely to until the labour trouble has been definitely settled. As soon as normal conditions have again been reached, active and extensive operations are confidently anticipated, as the amount of work held over pending the settlement is on all hands said to be very large. In the meantime merchants are putting little or nothing into stock.

Prices.—3 x 9 deals, 1s. to 1s. 1 $\frac{1}{2}$ d.; scantlings, 11d., beaver boards, 4 $\frac{1}{2}$ d. to 4 $\frac{3}{4}$ d.; floorings, 6 $\frac{1}{2}$ d. to 6 $\frac{3}{4}$ d.; ceilings, 1 $\frac{1}{2}$ d. to 4 $\frac{1}{4}$ d.; Oregon, 5s. 6d. to 6s.; pitch pine, 6s. 6d. to 7s.; corrugated iron, 8 $\frac{1}{2}$ d. to 8 $\frac{1}{2}$ d. Furniture timber: Burmah teak, 17s. 6d. per cube here for first quality, 14s. 6d. for second at the coast; American oak, 1 in., 10 $\frac{1}{2}$ d.; 1 $\frac{1}{2}$ in., 11d.; 2 in., 11 $\frac{1}{2}$ d., at coast; and Japanese oak, 1 in., 1s. 1d.; 1 $\frac{1}{2}$ in., 2 in., 1s. 2d., at coast; West African mahogany, 1 in. to 4 in. thick, 26s. 9d. to 27s. 6d. per cube at coast; Rhodesian mahogany, 9s. per cubic foot at mills; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12 here; American pine shelving, 1s. per ft. 3-ply wood, 3 m.m. up to 5 m.m., alder and birch, 4d. to 6 $\frac{1}{2}$ d. per sq. ft.; oak and teak, 3-ply, 11d. per sq. ft. Prices for bricks are: Mixed, 70s.; wire-cuts, £4 10s. to £5; and £5 for pressed per 1,000, at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; 8 lb. bag, 1s.; blue lime, 3s. 9d.; blue plaster lime, 4s. 9d.; cement, 11s. 6d. a bag; damp course and roofing, 36s., 54s. to 55s. for 1 to 3-ply.

Second-hand Iron and Timber.

Business in this section is practically stagnant, as it has been more or less during the period of the strike. The price of timber is 8d. to 9d., iron 6d. to 7d.

Roofing Tiles.

Owing to the heat generated by corrugated iron, attempts have been made in the Union to manufacture roofing tiles. Specimens of clay and sand from Uganda and of clay and diatomite from Kenya Colony have recently been under examination in London with a view to ascertaining their possibilities in the way of manufacturing roofing tiles. It

is stated that tiles of good quality can be made with a suitable mixture of the clays and sand from Uganda, whilst good tiles can also be made from mixtures of the washed clays with "grog," i.e., clay that has been burnt and finely ground. The clays from Kenya Colony are also found suitable for making roofing tiles. The results obtained with the infusorial earth or diatomite are of special interest, as this material, which apparently has not been employed previously for the purpose, furnishes tiles which are much lighter than ordinary roofing tiles. There are, it is stated, extensive deposits of infusorial earth in Kenya.

Electrical Goods.

A slight improvement falls to be noted this week in electrical wares, outside orders coming in more freely than for some time past. There are no alterations in prices to record locally, but, according to latest advices, the tendency is for British goods to come down and German wares to go up, owing to the raw material position on the Continent. British quotations are 10 per cent. to 15 per cent. lower, while German prices are 5 per cent. to 10 per cent. up. A large dealer in electrical appliances says contractors are to-day cutting prices very considerably. Some of these have been waiting for months for lower levels, but are now realising that prices will not go much lower, at any rate for some time, and are taking advantage of some of the men on strike, who are receiving their strike pay, and are paying them only half wages and undercutting things to such an extent that the larger firms are holding aloof from such business, which in many cases leaves no profit.

Railway Deficit.

Mr. Jagger, the Minister of Railways and Harbours, had the unpleasant task of announcing to the House on Monday last that the loss in working, up to December 31, was £1,106,000. He anticipated a further loss of £150,000 for January-March, making altogether an estimated loss of £1,250,000. The accumulated deficit was, he announced, £3,855,000.

Railway Development Schemes.

The *Cape Times* states that with a view to relieving the distress at Kimberley a railway from that town to Barkly West and Borrelskop along the Vaal River has been definitely promised by the Prime Minister. In addition, the Government has on its programme a railway from Belmont to Douglas, in order to open up the irrigation lands along the Orange River. Other probable lines are one from Oudtsboorn to Calitzdorp and Ladismith, and a line from Frankfort, in the Free State, to Balfour, in the Transvaal.

Union Coal.

Owing to continued competition from England, business for export has declined to 18s. 6d. per ton. The price of bunker coal is now 32s. 9d. as against 42s. 9d. for 1921. During the eleven months ended November 30 last exports amounted to 1,587,496 tons, valued at £1,777,635, as compared with 1,215,690 tons, valued at £1,337,840 during the corresponding period of 1920. Union sales and shipments for December at shown at 908,025 tons, valued at £351,599, and for the year ended December 31, 11,389,015 tons, valued at £4,989,028. Seventy-three collieries were producing in the Union during December, the total tonnage mined being 1,089,385 tons. 4,920 tons were converted into by-products, 2,020 tons of coke and 3,525 gallons of tar being produced.

Copper Mining Crisis in Australia.

A message from Adelaide (Australia) says that a crisis has arisen in the copper mining industry as a result of the employers' insistence on reducing wages. Although a section of the workers seceded from the unions in order to accept a reduction of 18 per cent. in wages, the necessary number of men is not obtainable to enable the continuance of mining operations.

The general position in Australia is in a very serious plight, and many of the principal base metal mines are closed because the miners decline to accept lower wages.

Board of Trade Returns for January, 1921.

Exports have increased by nearly £4,000,000 to £63,000,000 and are higher than for any month since March last. The principal increase both in volume and value are shown in iron and steel products, machinery, cotton and woollen yarns and apparel. The imports have declined by £9,000,000 to £76,500,000 and are much below any 1921 month.

Holland-South Africa Line.

This line's newest steamship, "Springfontein," is now about to make her homeward run to Europe after her maiden trip to South Africa. The ship is described as replete with every modern convenience for efficiency in handling cargo and for the comfort of passengers. She was built in Port Glasgow. Her net register is 5,494 tons, length 430 ft., breadth 56 ft., and depth 36 ft. She carries approximately 11,000 tons of cargo and steams up to 12 knots. For the homeward run the "Springfontein" has secured a full cargo of maize, bark and other Union products.

An Amsterdam message reports a rumour that important South German industrial groups are endeavouring to acquire financial influence in the Holland-South Africa line. It is stated that the leaders of German industry, in consequence of the loss of the German Colonies in South Africa, are doing their utmost to obtain a firm footing in the Union.

Big Investments in Government Securities.

The market in London for British and overseas Government stocks has been very active since the reduction of the Bank of England rate to 4½ per cent., and huge transactions have taken place at enhanced prices. One of the chief factors is the slackness of trade inducing people with capital to invest in high-class securities yielding more than is obtainable from the banks.

Railway Amalgamations.

The chairman of the Midland Railway Co. at the annual meeting confirmed the report that negotiations were proceeding for amalgamation with the London and North-Western Railway Co. and five other companies, with a capital of 527 millions.

Direct Sailings, Australia to Manchester.

The first direct sailings from Australia to Manchester are announced. In consequence of this development three New Zealand exporting firms have decided to open branches in Manchester for the disposal of produce.

Belgian Katanga Railway.

The Belgian Government has decided to push ahead with the construction of the final section of the route for the railway to connect Katanga and the Kasai River, thus permitting the exportation of Katanga copper *via* Matadi, in the Congo estuary.

Falling Cost of Living.

The cost of living in the United Kingdom declined during January four points to 88 per cent. above pre-War rate, due mainly to reduction in food prices. This figure has not been touched since January, 1918. According to a cablegram from the Minister of Labour the percentage increase in food prices in February, 1922, over pre-War prices is given as 79.

Johannesburg's Tramway Deficit.

Through the unfortunate suspension of the tramway service it is estimated that a deficit of £27,442 for the year ending June 30th will have to be made good by ratepayers.

Metal Market.

Latest London quotations: Standard copper, £58 cash and £59 forward; electrolytic copper, £64 10s. cash, £66 10s. forward; standard tin, £146 2s. 6d. forward; foreign lead, £19 17s. 6d. cash and £19 forward; quicksilver, £11 5s.; bar silver, 33½d.; and bar gold, 95s. 4d. per oz.









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