

THE ENGINEERING AND MINING JOURNAL

Pyrites Mining and Milling in Virginia.

BY ROBERT K. PAINTER.*

The unit of weight employed in this business is the long ton of 2,240 lb. It need hardly be stated that the total cost per ton of clean ore (f. o. b. cars or vessels at shipping point) will depend upon the distance of the mine, the size and quality of the deposit, and the policy of the operator in regard to general expense and management. I give some average costs based upon the "ton of mine-dirt" hoisted, cleaned at the mine, and loaded ready for transportation to the final shipping point.

For a deposit where the lenses measure some hundreds of feet in length and breadth, with an average thickness of 5 ft., the table given herewith may be taken as representing good Southern practice for a mine hoisting about 4,000 tons per month from moderate depths.

COST OF MINING, PER TON HOISTED.

Labor.....	\$0.77
Timber.....	.01
Powder, etc.....	.12
Drill parts, pipe.....	.01
Fuel.....	.06
Oil and waste.....	.08
Tools and supplies.....	.03
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	\$1.07

DISTRIBUTION OF MINING COSTS.

Constant (power, foremen, engineers, etc.)....	\$0.26
Mining (stopping, tramping, timbering, etc.)....	.51
Development (sinking, drifting, etc.).....	.30
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	\$1.07

COST OF ORE-DRESSING, PER TON HOISTED.

Labor.....	\$0.41
Fuel.....	.04
Supplies.....	.02
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	\$0.47

GENERAL EXPENSE, PER TON HOISTED.

Superintendence, supply house clerk, watchman, etc.....	\$1.10
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SUMMARY.

Mining.....	\$1.07
Dressing.....	.47
General expense.....	.10
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	\$1.64

These figures will be increased by the cost of transportation to, and loading upon, cars or vessels; taxes; depreciation; selling ore, etc.; these will give the total cost. This figure will be increased in direct proportion to the amount of waste in the mine-dirt hoisted. Thus ore from which only 50% is dressed would cost for the above operations for which figures are given, \$3.28. It will be seen, then, that unless a mine be situated favorably with regard to shipping facilities or contains orebodies of large size, it should produce ore running not less than 50 to 60% pyrite to be attractive.

No satisfactory way of loading ore into box cars has as yet been devised for these mines. Most ore is shipped in box cars to avoid wetting *en route*. Wheelbarrows

running over platform scales are very generally employed for loading. The cost by this method is 10c. per ton. The attempt to load through chutes from weighing hoppers has not been successful, due to the excessive amount of fine formed in loading spall-ore, and the impossibility of reaching the ends of the cars with a chute. Box-car loaders are at present made only in sizes which greatly exceed the capacities of our pyrite mines.

The value of a pyrite deposit also depends upon the physical characteristics of the orebody as a whole; that is: whether the dip is favorable to cheap mining; whether the pyrite is disseminated or in solid bodies; whether the vein is much faulted and wet, or whether the reverse holds true. The larger the proportion of ore of a grade to make spall-ore, the more valuable the deposit. Ore which decrepitate in the burner is not desirable, as it causes the formation of excessive dust. Cupriferous ore may command a substantial premium.

In regard to the size of concentrate: where the mixed portion of the vein is of such a nature that crushing to a minimum size of 1 in. will make a large proportion of pieces of clean ore and clean gangue, it will be found profitable to use "pebble-ore" jigs to make a separation. When the pyrite is more finely disseminated in the gangue, it will be necessary to crush and screen by successive steps down to a size that will allow the separation to be made. Middling will be recrushed and passed to a finer jig. The concentrate made will then be marketed as "fines." Fines should not contain grains larger than $\frac{1}{8}$ in., nor any large proportion of very fine grains (say less than 0.01 in.). It will be found difficult to jig ore exceeding 15 inches.

Ore is sold in the three sizes described in the former article.¹ It is usually sold under contract for a certain period of months or years, with some guarantee as to the minimum-sulphur content allowable at the stipulated price. Occasional sales are made of special lots for immediate delivery. Prices obtained are substantially as quoted in this JOURNAL.

Certain work in dressing iron pyrite and other ores consisting of one heavy mineral in a light gangue (such as galena in limestone) has led me to question the economy of the design of a good many mills. It will be conceded that the greatest capacity in a Harz jig is obtained under conditions where it is possible to discharge concentrate both from the bed through automatic gates, and also from the hutch at more or less frequent intervals. In general practice, this is when a jig is fed with material having a comparatively great range in size. Sieves are used which have an aperture smaller than the minimum particle which it is desired to discharge through the gate; the smaller grains are jiggled through the bed thus formed. In

many instances, good work cannot be done in this way, and mills are designed to size the feed for jigs discharging in one way only; for the coarse jigs, from the bed; for the fine jigs, from the hutch.

I would not absolutely insist on the following suggestion (where complex ores are treated); but it seems to me that, in the case of simple separations, the foregoing scheme (of separate jigs for each screen size) has been somewhat blindly followed. In cases where several sizes are made (as, for example, 1, 2, 3, 4, 5, 6), why not unite 1 with 4, 2 with 5, and 3 with 6, passing each mixture of two sizes to a jig with a sieve proportioned to pass the smaller size easily and retain the larger, making it possible to do the ordinary work of two jigs upon one?

The advantages are apparent: one-half the jigs; one-half the floor space, and little over one-half the power for jiggling. As there would be no particles of the same size as the sieve openings, the sieves would not clog up and a lively efficient bed would result, in which a good separation should be possible.

Open-Hearth Steel.

In a paper on this subject read by P. Ocker before the Metallurgical Congress at Liège, the following conclusions were arrived at:

Charging open-hearth furnaces with liquid pig-iron is so convenient and economical that it should be adopted; with this view, new open-hearth plants should always be erected in the vicinity of blast-furnaces. The advantages from this selection of site are:

(1) Economy of labor in handling the output of the blast-furnaces and in charging the steel furnace.

(2) The time of working a charge being diminished by using liquid pig-iron, the production per furnace can be increased.

(3) The manufacture of steel is independent of the quality or cost of scrap, of which the percentage proportion per charge can be adjusted to suit the supply.

(4) Steel works can reap the advantage accruing from the use of the waste blast-furnace gases for power purposes.

(5) The fuel economy is considerable.

When ores containing not too much phosphorus are available (as at Jurjewka) the ordinary process of charging liquid pig-iron may be followed; with ores higher in phosphorus, but containing less than 1.8%, the Bertrand-Thiel process may be tried; when a mild steel is required, the Talbot and Surzycki processes give good results. As long, however, as ores (and, consequently, pig-irons) high in phosphorus are found abundantly, open-hearth process in general will have a worthy rival in the basic Bessemer process.

The wolfram deposits at Thornborough, and Bamford (Queensland) support between 700 and 800 men, all of whom are making good wages.

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¹This JOURNAL, July 29, 1905, p. 148.

Uniformity in Technical Analysis.

BY W. C. EBAUGH.*

Notwithstanding the fact that quantitative chemical analysis had its birth prior to the time of the Declaration of Independence, its aid was only partially utilized in the industrial world (except so far as it incidentally related to the preparation and purification of the so-called "heavy" and "fine" chemicals) until about a half century later. Indeed, Andrew Carnegie claims that he was the first iron-master in America to employ regularly a chemist at a blast-furnace, and many of the old smeltermen of the West can remember the time, not so far back either, when a chemical laboratory was a thing unheard of in the equipment of a plant. As a matter of fact, some of the older employees about blast-furnaces (especially of iron blast-furnaces) used to regard the chemist as an intruder, and esteemed his reports of analyses as being but little, if any, better than their rule-of-thumb deductions. The application of quantitative analysis to many important industries (covering cement, glue, leather and food-stuff manufacture, dyeing, sewage disposal, water purification, etc.) has been accomplished during the last two or three decades, and there seems to be no limit to the number of kinds of business activity that may ultimately make use of its assistance.

In spite of its vast importance, the work of a chemical laboratory is sometimes discredited. Two sources of trouble are manifest: (a) the analyst and (b) the method of analysis. Concerning the former we can say but little in this paper. All competent persons agree that the ideal training for an analyst is the preparation one gets in a strict technical school followed by experience in practical work preferably, for a while at least, under the supervision of an expert chemist. Even in a school where special emphasis is laid upon the courses in chemistry, it is impossible to give those details of manipulation and "short cuts" that make the work of a skilled technical analyst appear to the freshly graduated youth more like legerdemain than real analytical work. Unless there is something organically wrong, it will not take the recent graduate long to master the *minutiae* of technical analysis; with a sound knowledge of the underlying principles of the science at his command, he is in a far better position to secure rapid advancement than is his less favored brother who obtains all his knowledge in the laboratory by the apprentice system. The personal equation is just as potent a factor in the laboratory as elsewhere.

A second source of trouble (the method of analysis) should be of as vital interest to the management of the plant as is the personality of the analyst; this should be a matter of paramount importance to the

analyst himself. It is this source of error (and some means for its eradication) that we wish to discuss.

The use of a number of different methods for the determination of a given constituent is objectionable because (a) non-concordant results are obtainable from the same sample by the same analyst using different methods. The "sulphur by evolution and titration" and "the sulphur by direct oxidation" of the iron chemists, and the "wet leads" and "fire leads" of the smelter laboratory, respectively, give results far from concordant. Then, too (b), non-concordant results are sometimes obtained even when the same general method is used but when the details of manipulation are varied. Probably the cyanide assay for copper is the most notable illustration of this fact. Finally (c), it is almost inevitable that if different chemists use different methods of analysis, the results will not necessarily check.

The question arises: What is the remedy for this unfortunate condition of affairs? Immediately the reply comes: Adopt standard methods of analysis, and have all chemists use these methods, following them out to their minutest details. Our confrères in the United States Department of Agriculture, in the various State experiment stations, in fertilizer works, food-stuff factories, etc., have perfected a number of methods which have been adopted as "standard" by the Association of Official Agricultural Chemists; others are under trial as "provisional" methods. Wherever a fertilizer is analyzed, from one end of our land to the other, an official method is used and there is no excuse for an analyst obtaining an erroneous result on such a substance.

In other lines of work the desired uniformity in analytical methods is sadly lacking. To correct this evil, two of our chemical societies have appointed committees on uniformity in technical analysis. The American Chemical Society has already done much good work in connection with portland cement and zinc ores. Mr. Waring's paper upon the determination of zinc (*Jour. Amer. Chem. Soc.*, Vol. 26, 1904) should be studied carefully by all chemists who may have to determine this element. At present the committee of this society, Dr. W. F. Hillebrand, United States Geological Survey, chairman, is awaiting returns upon a sample of argillaceous limestone that it has sent for analysis to the instructors and professors in a number of our colleges and schools.

The Western Association of Technical Chemists and Metallurgists has appointed a committee (consisting of Hermian Fleck, Colorado School of Mines, Golden, Col.; W. C. Ebaugh, University of Utah State School of Mines, and J. G. Lang, Greenwood, B. C.) to study the methods used in metallurgical works in the West;

it recommends the supposedly best methods for the determination of each constituent, and points out the possible sources of error. This committee has prepared a standard sample of a sulphide ore containing the heavy metals; it would like to have this sample analyzed by the chemists and assayers of the West, the methods to be used being those recommended by the committee and those ordinarily employed by the chemists themselves. In the May (1905) number of the *Western Chemist and Metallurgist* will be found provisional methods for the determination of copper, lead and zinc, as suggested by the committee. Portions of the sample can be obtained upon application to any member of the committee. In order to secure the benefit of the knowledge and experience of as many analysts as possible, the committee urges all chemists who can do so to co-operate in this work. Without such co-operation the labors of the few will be robbed of much of their value.

If the results obtained by the Western Association of Technical Chemists and Metallurgists should prove to be as productive of good as were those of the Association of Official Agricultural Chemists, the great mining and smelting fraternity will reap an abundant harvest. Between the mine owner or smelter manager and the chemist there will develop a greater degree of confidence than now obtains; the number of disputes about settlements, with their attendant "umpire analyses," will be reduced to a minimum. Surely this is a condition for the attainment of which we should all strive.

Electrical Power in Mining.

Prof. Paul Habets, of Brussels, writes as follows in *The Electrician*: The ever-increasing application of electricity to mining machinery and the economy resulting from centralizing the generation of energy required in large undertakings, has not been kept back for want of finding means for working hoisting machinery electrically. When it is a question of underground mechanical haulage, the electric transmission offers advantages over all other systems (steam, compressed air) with regard to economy and facility of installation. But the exaggerated fear of introducing electric plants into explosive mines, the cheapness of machines worked by compressed air, and also the possible utilization of existing compressed-air plants, have retarded the development of electric haulage in underground workings. Even in the case of main hoisting engines, which can be placed close to the boilers, during the last few years, electric driving has been introduced with the object of reducing the consumption of steam. However, the loss due to the transformation of electric energy may, in fact, equal the unfavorable conditions under which a steam-hoisting engine is working if the latter be an economical condensing engine.

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The Pratt Ore Sizer.

BY A. H. WETHEY.*

One of the most satisfactory devices installed at the Butte Reduction Works in recent years has been the Pratt ore sizer for separating fine and coarse material leaving the fine jigs. Formerly the whole of this material went to Chilean mills, but so large a proportion of the material was already fine enough to go to concentrating tables without grinding in Chilean mills,

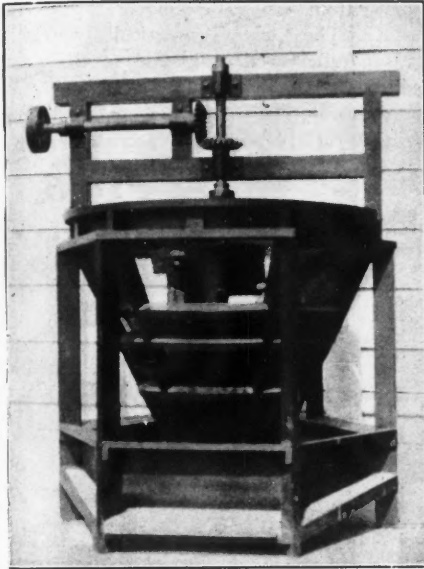


FIG. 1.

that we set about devising some means of taking out this fine material and sending it direct to the concentrators, thus avoiding running it into the Chilean mills and there grinding it smaller than it already was. After some experiments we devised the ore sizer here described. Fig. 1 represents this machine with the interior exposed. Fig. 2 shows the machine with the outside housing partially in place. The material coming from the jigs is elevated high enough to run into the top of the machine. The material delivered to the machine contains 47%, which is sufficiently fine to pass a 16-mesh screen.

At the Butte Reduction Works we have four of these machines handling the tailing from the fine jigs. Each machine treats from 145 to 150 tons per day. On the basis of 150 tons, there are 70 tons of fine material already sufficiently small for treatment on the concentrating table. Of this amount, about 60 tons pass through the screens on the sizing machine, the balance going with the oversize. The oversize contains about 11% of fine material.

The machine consists of a cast-iron distributor provided with six discharges, which distribute the pulp, by centrifugal force, over the surface of a perforated stationary screen. The material which is too coarse to pass through the screen runs

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down to a diaphragm (which is situated midway in the height of the machine) and is collected and run into a second distributor made on the same plan; this screens the material a second time. The fine material is driven against the screen with sufficient force to pass through the perforations. It is necessary to house in the machine (Fig. 2) in order to keep the fine material and water from being scattered in all directions. The coarse material (which fails to pass through the screen) runs out of the center, and is taken to the Chilean mills, where it is re-ground. There are perforated screens on the Chilean mills through which the material passes after being re-ground; it then goes direct to the concentrating table. The fine material and water which pass the screens on the ore-sizing machine are taken direct to the concentrating table.

The screens used on the sizing machine are of sheet steel punched with 1.5-mm. round holes (equivalent to a 16-mesh).

The coarsest material going to the sizing machine is 4 mm. The screens last about three weeks, when they have to be replaced. The pulp discharges against the screen with sufficient force to drive the fine material entirely through—no trouble has ever arisen from the screens "blinding."

The installation of these sizing ma-

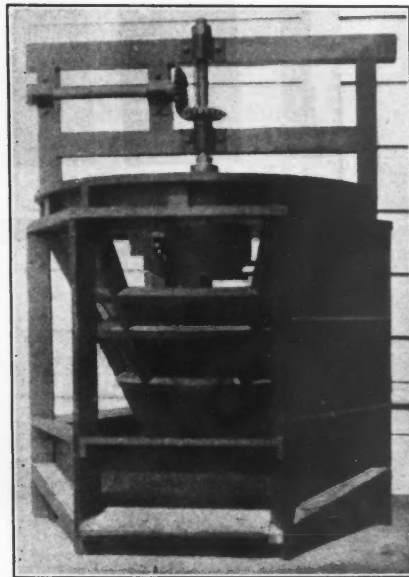


FIG. 2.

chines has enabled the concentrating plant at the Butte Reduction Works to treat all its tailing from the fine jigs with less grinding machinery than would otherwise have been necessary.

Pounding in the water end of duplex pumps is usually caused by the water valves being raised too high and suddenly slammed down on their seats when the piston reaches the end of its stroke. Too high a lift is due to overspeed or weak valve springs.

Wood Absorption of Gold Solution.*

BY S. HERBERT WILLIAMS.†

The following data are from a cyanide mill in New Mexico, having an output of 300 tons per day: On each ton of pulp, approximately one ton of solution was used; this was pumped to the precipitating room and distributed to precipitating boxes arranged in series of fours. The solution before entering the boxes assayed \$3 per ton, and after passing through zinc shavings an extraction of 96% was obtained, leaving the liquor with less than 3 cents.

From the precipitating boxes the liquor flowed into a wooden launder which conveyed it to a sump for further use. The launder was in use seven months, during which time it received and passed to the sump 63,000 tons of solution, having a total value of \$1,890. The strength of solution was 0.007% KCN.

After seven months' use, it was decided to replace the wooden launder with one made of sheet iron. The size of the original launder was: length, 75 ft.; inside depth, 10 in.; inside width, 8 in. On being discarded, it was dried and burnt in an ordinary box stove thoroughly cleaned for the purpose. The ashes, after cooling, were collected, cleared from nails and screws, and were found to weigh 159 pounds.

From this two assays were taken, which gave the following results:

No.	Gold.		Silver.	
	Oz.	Value.	Oz.	Value.
1.	33.17	\$663.40	385.40	\$231.24
2.	36.44	728.80	431.32	258.79

The average of the samples shows that the ashes contained 2.766 oz. of gold and 32.464 oz. of silver; and as the launder contained 15.5 cu. ft. of wood, it thus held an average value of \$60.65 per cubic foot.

A recent analysis of refined, desilverized American lead, reported in the *Brass World*, is as follows: Lead, 99.99249%; antimony, 0.00127%; bismuth, 0.00308%; copper, 0.00022%; silver, 0.00020%; zinc, 0.00075%; manganese, 0.00021%; iron, 0.00178%; sulphur, none. The brand of this lead is not stated.

Aluminum paper, which is ordinary cellulose, coated with powdered aluminum, is now manufactured in Germany, as a substitute for tinfoil. It is said to possess favorable qualities for preserving food, for which it is used as a covering. The paper employed is a sort of artificial parchment, prepared by treating ordinary paper with sulphuric acid. The sheets are then spread out and covered on one side with an even coating of a solution of resin in alcohol or ether. This forms the basis upon which the powdered aluminum is applied, the paper being finally subjected to a strong pressure. It is said to be much cheaper than tinfoil.

*Abstract of a communication in Bulletin No. 11, Institution of Mining and Metallurgy, Aug. 17, 1905.

†Mining Engineer, Worcester House, London, England.

The Bengal Coal-Fields of India.*

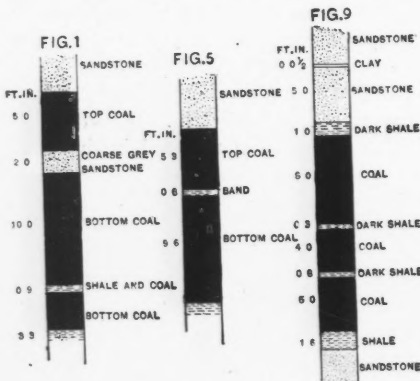
BY GEORGE A. STONIER.†

The coal output of India has wonderfully increased during the last 23 years. In 1880, only 1,020,000 tons were raised; while for 1903 the output totals 7,374,000 tons, valued at 21,754,000 rupees (\$4,524,-



832) and the industry employed nearly 88,000 persons daily. Coal-bearing strata in India are of various geological ages: Cretaceous and Tertiary beds yielding 4½%; and the Gondwana beds (Permian-Triassic), 95½% of the output of this mineral.

In 1903 the province of Bengal furnished nearly 6,298,000 tons (or 85½% of the total output for India) entirely from the Gondwana beds, which may be



conveniently divided into an Upper Coal Series (or Raniganj) and a Lower Coal Series (or Barakar). The former yielded 2,230,000 tons and the latter contributed 4,068,000 tons. Four companies mined 31% of the production; 82% was mined from European and 18% from Indian-owned collieries.

At most of the mines the roof is good, the floor and coal are hard and the dip is small. Gas has been detected in small quantities at five collieries. One seam is 95 ft. thick, and the portions worked vary in thickness from 2½ to 45 ft. Long-wall working was attempted some years ago

*Abstract of paper in *Trans. of the Inst. of Min. Eng.*, Vol. XXVIII, Pt. 4.

†Late Chief Inspector of Mines in India.

in the Raniganj coalfield, but was discontinued.

As a rule, a quarry is commenced at the outcrop; and, as it pays to remove a large overburden from thick seams, a number of huge open excavations have been formed. When the cover overlying a seam is too thick to be economically removed, or when the seam is thin, galleries, from 8 to 12 ft. wide, are driven, both on the dip and along the strike of the seam. It is usual to start from the top of the seam with a height of 6 ft., and after this drive has advanced some distance, to deepen it to the full height of the seam by cutting out the remainder of the coal in successive steps. The pillars of coal left between the galleries vary from 12 to 40 ft.,

The seam has been cut into pillars, averaging 60 ft. square with galleries 12 ft. wide, and they are now being removed in two systems, varying according to the thickness of the band.

(1) Thick Band.—The seam, 21 ft. thick, with a strong sandstone roof and shale floor; the section of this seam is shown in Fig. 1. The band, 2 ft. thick and forming a safe roof, was not excavated, and the pillars of the top coal have been left vertically over the pillars of the bottom coal. The cover is 250 ft. thick. The cleat is practically vertical, and parallel to the dip and to the goaf edge.

The pillars in the bottom coal are worked in the manner described below,

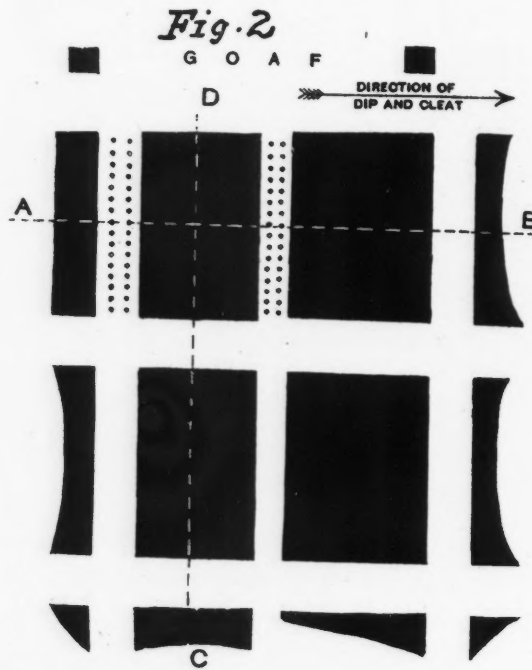
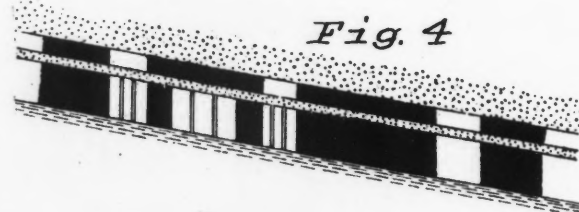
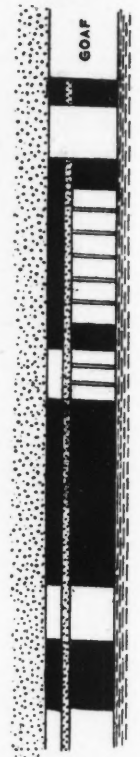


Fig. 3.



REFERENCES.

- PILLARS
- ▤ PROPS

KHOOLDIA COLLIERY—THICK BAND SYSTEM. FIG. 2, PLAN. FIG. 3, SECTION ON LINE C-D. FIG. 4, SECTION ON LINE A-B.

and occasionally are 100 ft. square, the larger pillars being left in the case of thick seams or thick cover. They are being drawn or worked at several mines, and the following notes refer to the methods adopted at several European-owned collieries:

(A) *Khooldia Colliery: Giridih Coal-field, Lower Coal Series.* The seam, from 15¼ to 21 ft. thick, has a band (5 ft. from the roof) of coarse grey micaceous sandstone, 2 ft. thick at one part, and a dark siliceous shale, 6 in. thick, in another portion of the colliery. The dip is 1 in 7.

and the top coal is dropped, as shown in Figs. 2, 3 and 4. When the galleries surrounding a pillar in the bottom coal have been timbered with props (7 in. in diameter) and lids (cap pieces) placed 3 or 4 ft. apart, the pillar is worked toward the goaf, leaving stoöks (pillars) at each corner 8 ft. square and the full height of the bottom coal. The latter, 14 ft. thick, is taken in two benches each of 7 ft. In starting the upper lift, holes (1½ ft. deep and 3 ft. apart) are cut in the coal to receive one end of horizontal timbers, which are also bound by rope to the props, and

support horizontal planks, forming a platform (or *machan*) on which men can stand. When the face has advanced 3 ft.,

the process of pillar formation. The section of the seam and the method of working are shown in Figs. 5, 6, 7 and 8.

allel to the cleat and dip, at a cost of 16c. per ft. The remainder of the top coal was then worked from this drive, by two faces parallel to the cleat and timbered. The mining of the bottom coal followed closely upon the working of the top coal. A stook, to indicate the pressure of the roof, was occasionally left at one corner of the pillar. It will be noted that there were numerous working places for the miners, and no danger from overhanging coal; and, in the case of crushed pillars, a large percentage of lump coal could be obtained.

Sodepore Colliery: Raniganj Coal-field, Upper Coal Series.—The seam, 17 to 17½ ft. thick, with a dip of 1 in 7, has the section shown in Fig. 9.

The cleat is practically parallel to the dip. Pillars are formed 40 ft. square, and the galleries are made 12 ft. wide. The cover is 380 ft. thick. The method of mining is shown in Figs. 10, 11 and 12. Each pillar is treated on its merits, but as a rule two or three pillars are attacked parallel to the dip and worked toward the goaf. Timber is set, 3 ft. apart, in the roadways, and men, who stand on wooden stools, start a cut (8 ft. high and the full length of the pillar) in the upper portion of the seam near the roof, setting timber, and leaving, if necessary, 2 ft. of coal below the roof. When the cut has advanced 6 ft, the bottom coal is taken up, and the short timbers are replaced by long props, set 3 ft. apart. The whole of the pillar is removed, with the exception of a rib, 4 or 5 ft. wide, left against the edge of the goaf, which makes an angle of about 10° with the cleat of the coal. On the withdrawal of the props, the roof generally falls at once, but occasionally a second line of pillars is taken out before the roof comes in. About 72% of the coal is lump.

Fig. 6

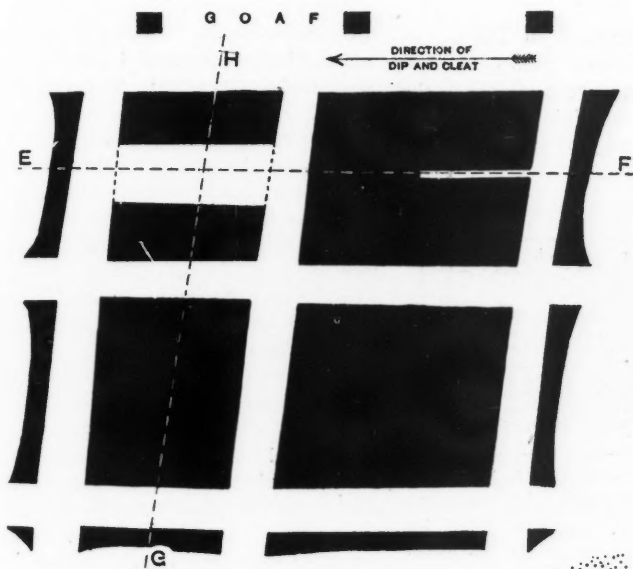


Fig. 7

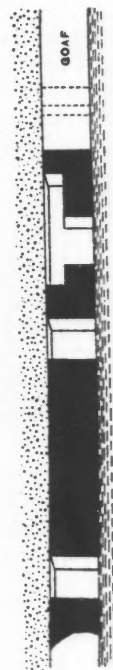
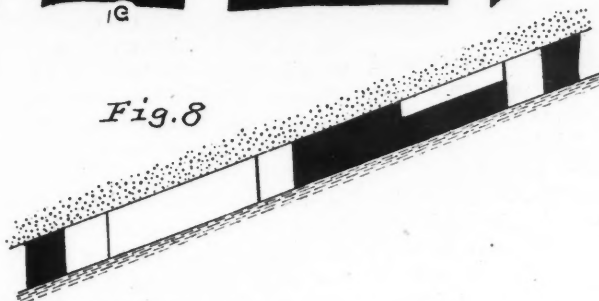


Fig. 8



KHOOLDIA COLLIERY—THIN-BAND SYSTEM. FIG. 6, PLAN. FIG. 7, SECTION ON LINE G-H. FIG. 8, SECTION ON LINE E-F.

the *machan* is removed. The lower bench is excavated, either by the men who cut the upper bench, or by fresh parties of miners. Occasionally a rib, 5 ft. thick, is left against the goaf, instead of two stooks. Props are set while the upper lift is being worked, and are replaced by long timbers as the lower portion of the coal is mined.

The large lumps of coal are removed by the miners, who are paid 8c. per car of 13 cwt., as soon as coal has been cut; and after two or three pillars have been worked the dust is removed by *haziri* coolies, paid daily. Holes are then drilled in the stooks and charged with dynamite, the timber is withdrawn and the shots are fired. The band and top coal fall and the latter is loaded into cars. The coal forming the stooks and covered by the fallen bandstone is also recovered. Props are placed about 30 ft. apart, and *chowkidars* (8 ft. square) are left about 200 ft. apart to indicate the pressure on the roof. The goaf is carefully and constantly examined, and, in the case of heavy pressure, the miners are withdrawn from the mine until the roof has fallen.

(2) Thin Band. The section of the seam differs from the preceding in the thickness and character of the upper band, which is weak and is excavated in

At one time work was commenced from the floor, but the method was soon abandoned in favor of the one about to be de-

Fig. 10

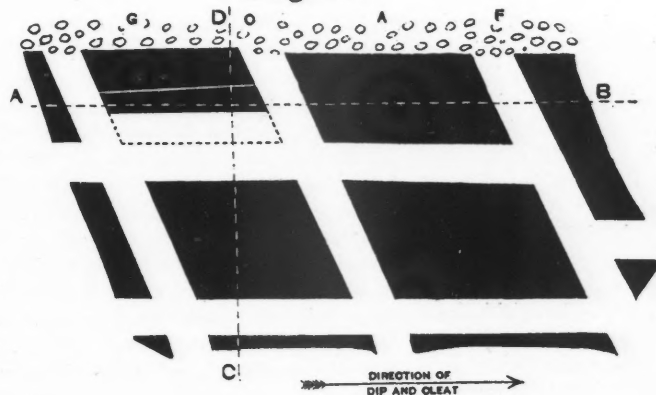


Fig. 11

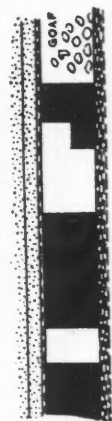
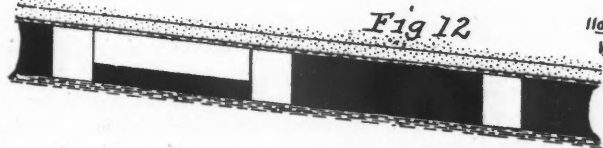


Fig. 12



SODEPORE COLLIERY. FIG. 10, PLAN. FIG. 11, SECTION ON LINE C-D. FIG. 12, SECTION ON LINE A-B.

scribed. A road (5 ft. wide and 5¼ ft. high) was driven in the top coal, through the entire center of the pillar and par-

[In the discussion of this paper, it was pointed out that the working of pillars was the exception and not the rule in any

of the Indian coalfields, and that from 15 to 25% of the coal was being absolutely wasted. It was quite evident that pillars 60 to 120 ft. square were too small for the proper working of the pillars afterward; and, almost without exception, pillars that were left were cracking and breaking away at the corners, owing to their being made too small to withstand the roof pressure.

The pillar-working methods at Khooldia appear to be rendered possible solely by the abnormally good roof which prevails. The absence of danger from overhanging coal is a great advantage, and with a capital roof the above system seems the safest way to work the seam at Khooldia colliery. It was not stated what thickness of sandstone occurred in the main roof, which is a very important matter.

At the Sodepore colliery, the roof, next the seam, appears to be bad, and the changing of the short props in the wide work seemed to be somewhat risky. Here, again, it was not stated what thickness of sandstone occurred in the main roof.

The method of taking out the pillars at one colliery was rather different from that noted by Mr. Stonier, inasmuch as the pillars were taken out from the dip, parallel to the strike, or nearly so, instead of parallel to the dip. This had been found to work well, the weight coming on at more regular intervals. The system of splitting the pillars in halves and quarters, and working the stooks near the goaf first, was still adhered to.

In the system in operation in Sodepore colliery, ribs, 4 or 5 ft. thick, were left in a seam 17 ft. high. These could serve no useful purpose, and must be a source of danger to the people working close by them.

At Khooldia colliery the main roof, a thick and strong sandstone, was a very safe one; when the goaf gave indication (which it did clearly) that it was about to fall, the miners were withdrawn from the district where the roof was settling; and, when the area was a large one, from the mines altogether, as in some cases the "air blast" was strong enough to do great damage in the mine, blowing out stoppings, breaking cars, destroying the shaft timbering and even the shaft and surface headgear. The yield from the system described was found to be very satisfactory, very little coal being lost, where the pillars taken out had been left of a sufficient size in the first working; small pillars, which had been left for some time were "overridden" and crushed under big goaf-falls. The timbering was set by a gang of native timber men; and all props were drawn by the same men under the personal supervision of the European assistant in charge of the pit. The miners in this field were the best class working in the coalfields, and had been used for robbing pillars for many years.

The use of packing was exceptional in

Bengal; but it is being used, at the time of writing this paper, for the support of a railway line. In the past, small areas, where bungalows were located, had also been packed.]

Australian Mining in 1905.

SPECIAL CORRESPONDENCE.

The following statement discloses the position of the gold-mining industry in Australia for the half-year ended June 30, 1905:

	First Half Year 1904.	First Half Year 1905.	Changes.
	oz. fine.	oz. fine.	oz. fine.
Western Australia.....	984,615	965,373	-19,242
Queensland.....	310,201	290,478	-19,723
New South Wales.....	141,682	111,869	-29,813
Victoria.....	368,885	338,746	-30,139
South Australia.....	14,500	15,000	+ 500
Tasmania.....	31,363	34,000	+ 2,637
For Commonwealth.....	1,851,246	1,755,466	-95,780
New Zealand.....	241,090	238,087	- 3,003
Australasia.....	2,092,336	1,993,553	-98,783

In all the important states decreases are recorded; as the output for 1904 was much lower than the previous year, the decline in the yield is thus all the more pronounced.

Western Australia has contributed nearly 50% of the total production; the decrease of 19,242 oz. was practically confined to the month of June. With the completion of the work now in hand, the large mines at Kalgoorlie should be able to increase the output materially; this, in conjunction with the satisfactory developments recently reported, should result in a speedy making good of the deficiency shown in this state. The largest decrease occurs in the yield from Victoria; for this the falling off from the Bendigo field is mainly responsible. The production of the Ballarat field is slightly in excess of the average, while satisfactory returns have been secured by the various dredges.

The output from Queensland still continues to exhibit a shortage. The returns from the Charters Towers field compare unfavorably with the preceding periods; there is a marked decrease in the value of the ore now being raised. On the other hand, the *grade* of the ore now being treated from the Gympie, Mount Morgan, and Ravenswood fields shows an improvement; and is particularly noticeable in the case of the Ravenswood, where the value has risen from \$22.8 to \$24.2 per ton. The yields from several outside centers are assuming good proportions, and promise to affect materially the aggregate production of the state.

The yield from New South Wales exhibits a considerable shrinkage; the industry in this state is not followed with the same energy as in the sister states; moreover, the opportunities offering in other districts (such as the demand for skilled miners at the Broken Hill mines) have led to a suspension of operations by small parties of miners working on the goldfields.

The returns from New Zealand are

satisfactory; the present prospects of the industry would seem to warrant the opinion that the deficiency now recorded will soon be made good, and that by the end of the year an increase will be shown.

The value of the silver and silver-lead ore exported from New South Wales during the half year (ended June 30, 1905) amounted to \$5,777,889; the production of the silver-lead mines bids fair to be the largest during the last decade. It is estimated that the mines at Broken Hill at the present time have about 12,000,000 tons of ore in reserve, apart from the millions of tons of zinc residue lying at the surface.

A creep, apparently more extensive than that of the year 1902, has occurred at the Central mine, Broken Hill (the property of the Sulphide Corporation), but fortunately without loss of life. The area most affected lies between the 400- and 500-ft. levels in the mine; a portion of the main shaft has been carried away, some 1,100 men thus being thrown out of employment. At the time of writing, the extent of the damage underground is not known, but it is thought that some of the working stopes are more or less seriously affected. The surface plant and machinery have also suffered considerable damage. Some three or four weeks must elapse before the work of production can be resumed. The movement has not affected the adjoining mines, but the men working in the stopes on the boundary have been withdrawn.

The half-yearly report of the North Broken Hill Co. shows that the profit made during the period amounts to \$70,786, of which \$52,512 was paid in dividends. The ore raised amounted to 34,689 tons, and averaged 19.5% lead, 7 oz. silver, and 14% zinc, per ton.

The high price ruling for tin has stimulated mining for this metal. On all the fields, work is being vigorously prosecuted. A substantial increase should be shown in the aggregate production. Attention is being directed to the exploiting of the deep stanniferous leads in the New England district, New South Wales; the formation of a company with a substantial working capital is announced. The mining for wolfram in the State of Queensland is still followed with much energy; during the past quarter, ore to the value of \$121,318 was obtained. The output of scheelite from the Hillgrove field (N. S. W.) is also being well maintained, and several large consignments have recently been shipped. The enhanced value of antimony has led to a revival of interest in the lodes on the Hillgrove field; a considerable area of ground has lately been acquired for mining this metal.

Hot water is hard on rubber valves, and metal valves should be used. This is usually easy to do, as pumps for this service are commonly of slow speed.

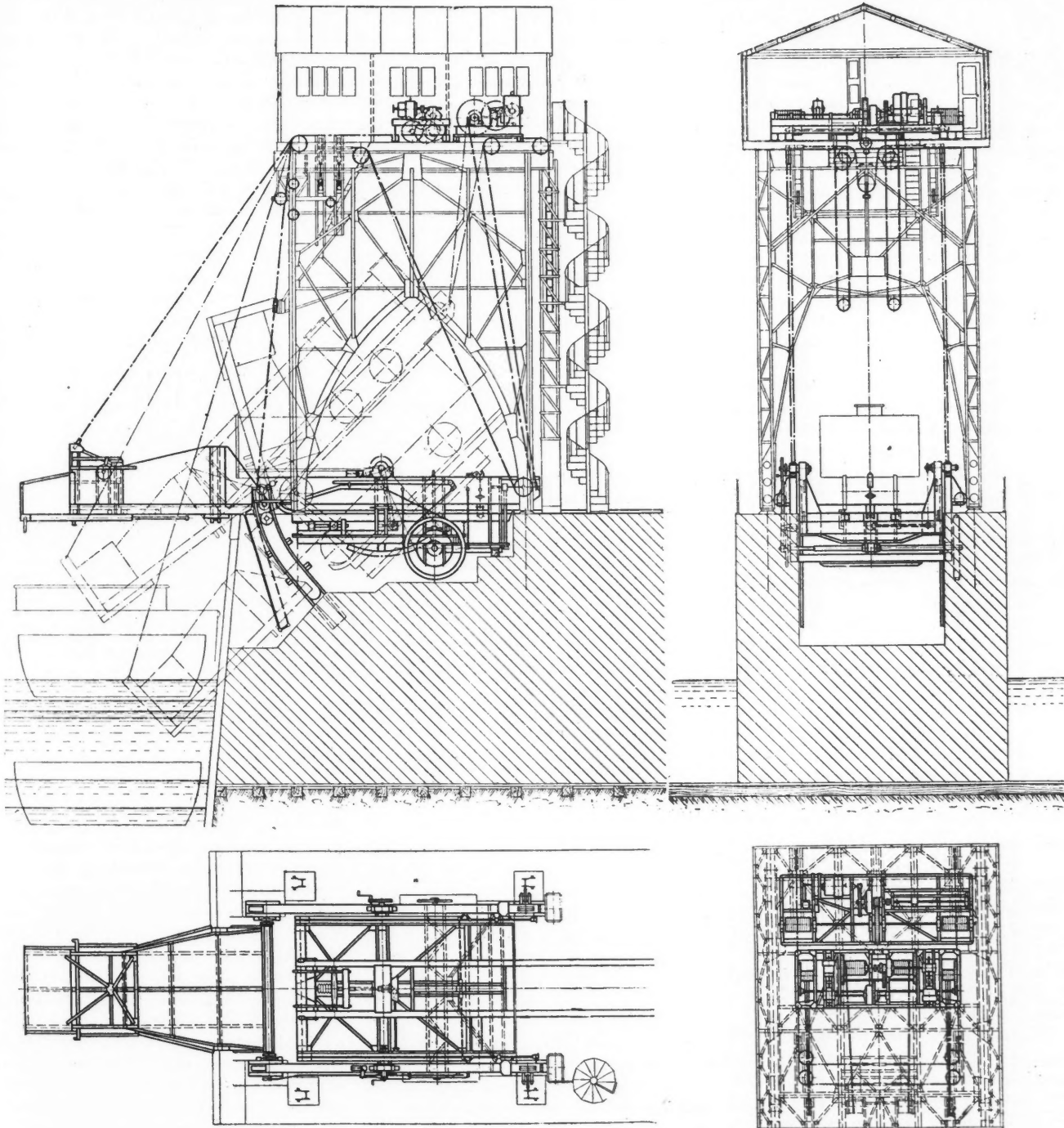
Coal Unloading at Hamburg.

In *Zeitschrift des Vereins Deutscher Ingenieure* (1905, No. 30, p. 1221) there is a description of two coal unloaders of interesting construction. These were erected 230 ft. apart on the dock of the Hamburg-American line at Hamburg. These unloaders serve to discharge coal, straight from the railway car down a

platform until its front axle is gripped automatically by the weight of the load, and is used at low water; and an outer unit, worked by electric power, and used at high tide.

The platform, upon which the car is run, is common to both units. When the inner is used, the platform swings on two pivots resting on the frame-work of the

platform until its front axle is gripped automatically by a catch-hook; the rear coupling hook of the car is secured to an adjustable hook at the land-end of the platform; the front board of the car is lowered, and the brake released. Since the center of gravity of the system lies in front of the axis of suspension, the platform, together with the car upon it,



CAR DUMPERS—SIDE AND END SECTION AND PLANS.

chute into barges and lighters below, and are adapted for work both at low and at high tide, the difference between the water level at these two periods, respectively, being 13 ft. 9 in. Accordingly, the mechanism is made capable of two different movements, as will be understood by reference to the accompanying drawing.

outer unit. When the outer is used, the platform is bolted fast to that frame-work. A toothed-wheel segment (concentric with the pivots mentioned) engages with a gear, the axle of which runs in bearings forming part of the outer frame-work. This gear is controlled by a band-brake worked by hand. The car is run forward on the

tilts forward. By setting the brake, it is held at a suitable angle (anywhere up to 45°), until all the contents are unloaded. Finally, on again releasing the brake (the center of gravity being now behind the axis of support), the platform swings to its first position.

By means of this inner unit, cars hav-

ing a length from wheel to wheel of 8 to 13 ft., and carrying a load of 10 to 20 metric tons, can be dumped automatically. The hooks holding the car are adjustable, so that the latter, according to its length, can be placed in the position giving the best working moment.

When the outer dumper, which is worked by electric power, is to be used, the platform is coupled with the outer frame-work by means of a bolt operated by a hand-wheel. This frame-work is pivoted at the end nearest the water, while at the land-end it rests upon wooden ties. The whole of the dumper is surmounted by an iron frame-work which supports a platform for the engine-room above. In the latter are located the windlasses (for electrically operating the outer dumper and the chute) and the requisite switches.

From the two drums of the windlass which serves to tilt the dumper, wire-ropes pass over pulleys set in the rear end of the dumper, and thence over equalizing pulleys. The drum shaft is actuated by means of a 50-h.p. electric motor. At the land-end of the dumper, a pair of pulleys, running against the iron frame-work, guide its motion while tipping. The weight of the other dumper is balanced by two compensating weights suspended in shafts behind the frame on either side. To tip the cars through 45° takes about 30 seconds; the movement is checked within the proper limits by a mechanism which works automatically.

The same engine-room also contains two other motors, one of 4.5 h.p., the other of 7 h.p. These serve for handling the front and rear ends of the chute, respectively, to adjust them according to the height of the water-level and the position of the lighter. The chute is sufficiently large to hold an entire car-load. At the front end (which tapers out somewhat) are two adjustable flaps, by means of which the rate of flow of the coal can be checked. There is also at the front end an extension controlled by hand, by means of which the length of the chute can, if desired, be increased from 6 m. (19 ft. 8 in.) to 7.5 m. (24 ft. 7 in.). The rear end of the chute (which projects into a recess in the dock-wall) is provided with rollers running in a curved track fixed to the masonry.

The operator's post for working the apparatus at low water is on the ground level, near the dumper and on its left. For working the chute and the dumper in its high-water position, he takes his stand in the engine-room, at a window opening out on the water, where the starting levers and the requisite indicators are placed. There is also in the engine-room a switch-board, from which the power is distributed to the motors and lights. The tension of the direct current supplied from the mains is 440 v. By the electric action, one such dumper

unloads about 15 carloads (10 to 20 tons each) per hour; and about 20 carloads by the automatic action. However, this is not the maximum attainable.

Cyaniding Silver-Gold Ore, Palmarejo—IV.*

BY T. H. OXNAM.†

(Concluded from page 389.)

Method of Treatment.—The accumulated slime, after having been dried in the slime pits as much as practicable, is conveyed to the agitation vats in ordinary half-ton ore cars by means of a small, friction-gear hoist. Each agitation vat is provided with an iron grizzly (measuring 3 ft. 3 in. by 9 ft., and having 1.25-in. openings), which is suspended over to one side of the center. The content of the car is dumped onto this grizzly and the portion that does not pass of its own weight is trampled, or otherwise forced through, by boys. For some time the material being treated averaged from 20 to 25% of moisture and in this condition

greater will be the mechanical consumption of cyanide. The complete drying of the slime by some cheap process, followed by powdering before charging into the agitation vats, should be productive of improved results. A charge equivalent to about 15 tons of dry slime gives more satisfactory results than does a heavier one.

Before commencing to charge the slime, about 35 tons of solution from the strong solution sump (usually of a strength between 0.12 and 0.15 of KCN) is pumped into the vat and the attached centrifugal pump started. From 75 to 100 lb. of slaked lime is added and the charging of the slime is commenced. After the required quantity of slime has been added, a sample of the material passing through the pump is taken, filtered and the clear solution titrated. The necessary quantity of cyanide to bring the solution up to strength is then added. Experiments have been made with various strengths of solution in the agitation vats; the results thus far show the 0.2% solution to give more

TABLE III.—SETTLING RATE OF SLIME PER HOUR, WITH ADDITION OF LIME.

	Settlement (in inches) of Slime.						
	Test No. 1.	Test No. 2.	Test No. 3.	Test No. 4.	Test No. 5 (c)	Test No. 6 (c)	Test No. 7.
Proportion of solution to slime.....	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1	3.3:1
Lime added per ton of slime (a).....	2 lb.	3 lb.	3 lb.	3 lb.	3 lb.	None (b)	4 lb.
1 hour.....	11.0	10.5	10.0	16.0	14.0	15.0	22.0
2 ".....	21.0	19.0	16.5	25.0	21.0	24.5	36.5
3 ".....	27.5	26.0	23.5	33.0	30.0	33.5	41.5
4 ".....	33.0	32.0	30.0	40.0	39.0	40.0	54.0
5 ".....	36.0	35.5	36.0	42.0	43.0	42.0	57.0
6 ".....	38.0	38.5	40.0	43.0	47.0	43.0	58.0
7 ".....	39.5	40.0	41.5	44.0	48.5	44.0	59.0
8 ".....	40.5	41.0	42.5	44.5	48.5	44.5	59.5
9 ".....	41.0	41.5	43.0	45.0	49.0	44.5	59.5
10 ".....	41.0	42.5	43.5	45.0	49.0	45.0	59.5
11 ".....	41.5	42.5	43.5	.....	.....	45.0	.....
12 ".....	41.5	43.0	.....	.....	.....	.....	.....

(a) This quantity of lime was added in addition to the lime already contained in the solution; sufficient lime usually being present in solution that the addition of 5 c.c. of strong lime water to a titration (with silver nitrate), for strength of solution, would make no difference in the titration.

(b) See note (a).

(c) Tests No. 5 and No. 6 were on material from near the head of slime pits, and which therefore contained a larger percentage than usual of fine sand. (Each 2 in. of solution equals one ton.)

was lumpy and cohesive. During this period the agitation was unsatisfactory and the percentage of extraction was low. Difficulty was experienced in discharging the vats; the unagitated portion of the charge would remain in the pointed bottom of the vat as a tough, putty-like mass, after all the liquid portion had been discharged, and could only be washed out by means of a stream of solution or water under pressure. Experience demonstrates that the best condition of the material is such that when dumped on the grizzly, it will run through of its own weight. In this state the slime carries from 30 to 35% moisture. It is desirable that the percentage of moisture contained in the slime when charged shall be as low as possible, compatible with satisfactory agitation; the greater the percentage of moisture contained in the slime, the

satisfactory results than the use of a weaker solution. The solid cyanide is placed in perforated buckets or cans and suspended in the charge. It is found that unless the receptacles containing the cyanide be frequently agitated about in the charge, the cyanide dissolves exceedingly slowly. The less the proportion of solution to solid matter present, the more noticeable is this tendency of the cyanide to dissolve slowly. It is also noticed that the thicker the charge, the slower is the action of the cyanide on the silver and gold contained in the slime. During agitation it is best to keep the screen at the end of the suction pipe just as near the surface of the charge as possible, without allowing the entrance of air. By so doing, the material passing through the pump always contains a minimum quantity of solids, and the wear on the pump is consequently lessened. In addition to this, the movement or circulation within the charge is then greatest, since the suction

*Abstract of paper read at Washington meeting, May, 1905, Am. Inst. Min. Eng.

†Mining engineer, Palmarejo & Mexican Gold Fields, Ltd., Chihuahua, Chihuahua, Mexico.

and discharge points are then most separated. It is quite probable that a considerable portion of the heaviest and coarsest part of the material treated does not pass through the pump at all; as, owing to its

of the imprisoned air immediately on being expelled from the discharge pipe. The air bubbles breaking, on reaching the surface of the charge, caused a splendid surface movement that might be easily

from the agitation-vat not fill the decantation-vat, enough precipitated solution is pumped up from the strong-solution sump to fill it; after agitation for half an hour, the charge is allowed to settle. Should the addition of this extra solution be unnecessary, the charge is not agitated, but allowed to settle as long as practicable, the clear supernatant solution being meanwhile decanted off. After the first settling and decantation, the vat is pumped full of weak, precipitated solution, which is usually of a strength approximating 0.1% of KCN per ton, and the charge is agitated for an hour or two by means of the 3-in. centrifugal pump connected with the vat, about 25 lb. of slaked lime being added during the agitation. The pump is then stopped and an additional quantity of slaked lime, usually about 10 lb., is sprinkled evenly over the top of the charge. After settling a few hours, the decantation-pipe is lowered and the settling and decanting of clear solution continued as long as practicable. As many washes and decantations as possible within the time limit of the treatment are given in this manner. When permissible, the last wash given is of clear water, though a few of the charges have to be washed entirely with weak solution.

TABLE IV—DETAILED RECORD OF SLIME TREATMENT.

Charge No. 29. Vat No. 1. Net weight of slime charged, 18 tons. Moisture in slime as charged, 31.5%. Proportion of solution to slime present, 2:1. 100 lb. lime added at commencement of charging. Assay value of slime per ton as charged was \$4.34 of gold and 19.23 oz. of silver.

TREATMENT IN AGITATION VAT.

Date and Time.	Agitation. Hours	Assay of Solution.		Values Extracted by Solution.		Assay of Tailing.		Extracted as per Solution-Assays.		Extracted as per Tailing-Assays.		Strength of Solution in KCN. Sample Taken at		Remarks.	
		Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Vat (a)	Pump (a)		
		Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.		
Sept. 29.															
4 p. m.	\$0.95	0.85	0.11	Commenced charging, 7 a. m. Finished, 4 p. m. Added 90 lb. of cyanide (NaCN = 12% per cent. of KCN), at 4 p. m.	
4 p. m.	.....	0.90	0.96	.....	.....	.....	.....	.....	.....	.....	.....	0.09	.....	
6 p. m.	2	1.05	1.01	\$2.10	2.04	.....	.....	48.4	10.5	.....	.....	0.40	.....	
6 p. m.	2	1.15	1.45	2.30	2.90	\$2.06	16.10	53.0	15.1	52.5	16.2	.....	0.16	
10 p. m.	6	1.20	2.13	2.40	4.26	.....	.....	55.3	22.2	.....	.....	0.30	.....	
10 p. m.	6	1.30	2.42	2.60	4.84	1.44	14.66	59.9	25.2	66.8	23.7	.....	0.22	
Sept. 30.															
2 a. m.	10	1.50	3.35	3.00	6.70	1.24	13.20	69.1	34.8	71.4	31.3	0.23		Added 30 lb. of lime.
2 a. m.	10	1.55	3.73	3.10	7.46	1.14	11.78	71.4	38.8	73.7	38.7	.....	0.23	
8 a. m.	16	1.60	3.99	3.20	7.98	1.03	10.98	73.7	41.4	76.3	42.9	0.19	.....	
8 a. m.	16	.....	4.28	.....	8.56	1.03	10.68	.....	44.5	76.3	44.4	.....	0.19
2 p. m.	22	1.95	4.65	3.30	9.30	.....	.....	76.0	45.4	.....	.....	0.22	.....	
2 p. m.	22	1.60	4.75	3.20	9.50	0.92	10.14	73.7	49.4	78.8	47.2	.....	0.22	
8 p. m.	28	1.70	4.76	3.40	9.52	0.82	10.34	78.3	49.5	81.1	46.2	0.19	.....	
8 p. m.	28	1.65	4.67	3.30	9.34	0.82	10.22	76.0	48.6	81.1	46.8	.....	0.18	
12 p. m.	32	1.70	4.83	3.40	9.66	0.82	10.26	78.3	50.3	81.1	46.6	0.18	.....	
12 p. m.	32	1.80	4.80	3.60	9.60	0.92	10.04	82.9	49.9	78.8	47.7	.....	0.18	
Oct. 1.														Commenced to discharge into decantation-vat. Discharging in 1 hour.	
4 a. m.	36	1.70	4.94	3.40	9.83	0.82	9.85	78.3	51.4	81.1	48.7	0.17	.....	
4 a. m.	36	1.75	4.81	3.50	9.92	0.82	9.70	80.7	50.1	81.1	49.5	.....	0.17	

(a) Vat sample taken from surface of charge, in vat. Pump sample taken from discharge-pipe, near pump.

greater weight, it may never be raised to the height of the suction screen. The agitation of the mass seems to depend chiefly on the fact that the discharge issuing from the drop pipe tends to keep the point of the conical bottom free from any settled deposit of slime, and the thickened material, constituting the lower portion of the charge, keeps constantly sliding down the inclined sides toward the bottom point. The product issuing from the discharge pipe, being drawn from the surface of the charge, must pass upward through the entire mass above, before it can again pass through the pump.

The percentage of solid matter contained in the material passing through the agitation pumps is determined from samples taken through the bib-nosed pet-cock tapping the discharge pipe a few inches above the pump shell. The pulp passing through the pumps will carry 25% by weight, of solids.

A thorough oxygenation of the mass is found to be an essential feature; it becomes more necessary as the proportion of solid matter to solution present increases. At the commencement of the operations, the small air cock, *e* (Fig. 5¹) was used to permit the continuous admittance of air to the suction pipe of the pump. This practice, however, was soon abandoned, because the agitation was seriously affected by it. The entrance of air into the suction pipe had a detrimental influence on the capacity of the pump, and the effect was found to be injurious to the best agitation. Perhaps the chief trouble was due to the rapid rising to the surface

mistaken for the thorough agitation of the entire mass without effecting a proper scouring of the bottom point of the vat. The present practice is to allow the entrance of a smaller quantity of air into the mass, through the small air-cock, *l* (Fig. 5).

When treating charges containing the equivalent of 15 tons of dry slime, usually four settlings and four decantations can be effected within the 48 hours of treatment, each decantation averaging about 22 ton of solution; hence about 90 ton of solution is decanted in treating a 15-ton

TABLE V—TREATMENT IN DECANTATION VAT.

Date.	Time.	Solution Decanted.						Remarks.
		Quantity.	KCN	Assay-Values		Total Assay-Value.		
				Gold.	Silver.	Gold.	Silver.	
Tons.	Per Ct.	Ozs.	Ozs.	Ozs.	Ozs.			
Oct. 1	5 a. m.	.....	.....	.....	.....	.....	.....	Finished receiving charge from agitation vat. 20 lb. lime added while being charged. Let settle for 3 hours. Commenced decanting.
Oct. 1	8 a. m.	18.0	0.18	\$1.70(a)	4.84(b)	\$30.60	87.12	
Oct. 1	3 p. m.							Finished decanting. Added 18 tons 0.10 per cent. KCN solution and 40 lb. lime. Agitated for 2 hours. Let settle for 6 hours. Commenced decanting.
Oct. 1	11 p. m.	18.5	0.14	0.91	2.56	16.83	47.36	Finished decanting. Added 18.5 tons of 0.11 per cent. KCN solution and 40 lb. lime. Agitated for 2 hrs. Let settle for 4 hrs. Commenced decanting.
Oct. 2	4 a. m.							
Oct. 2	10 a. m.	19.0	0.11	0.48	1.44	9.12	27.36	Finished decanting. Added 19 tons of 0.09 per cent. KCN solution and 40 lb. lime. Agitated for 2 hrs. Let settle for 5.5 hrs. Commenced decanting.
Oct. 2	3.30 p. m.							
Oct. 2	11 p. m.	18.0	0.09	0.09	0.88	5.40	15.84	Commenced decanting. Finished decanting. Discharged vat.
Oct. 3	3 a. m.							
Totals	.....	73.5	.....	.....	.....	\$61.95	177.68	

(b) In all these decanted solution samples, the value of the solution, as added to charge, has been deducted.
 NOTE.—Assay of discharged residue (unwashed): \$1.03 of gold, 9.52 oz. of silver. Extraction, 76.27% of gold and 50.47% of silver.
 Assay of discharged residue (washed) \$0.62 of gold, 8.38 oz. of silver.
 Moisture contained in discharged residue, 51.4%. Assay value of solution was \$0.40 of gold and 1.24 oz. of silver. Strength, 0.09% of KCN.
 Extraction indicated by value in decanted solutions; 79.30% of gold and 51.36% of silver.
 Total time of treatment: In agitation-vats, 45 hours; in decantation vat, 48 hours.

Ordinarily a charge is agitated in the vats from 40 to 44 hours, after which it is discharged into the corresponding decantation-vat, where it is usually given a two days' treatment. Should the charge

charge, and each decantation removes approximately 58% of the total solution present. Assuming the wash-agitation to be perfect, the four decantations should then theoretically contain about 97% of

¹ See this JOURNAL, Sept. 2, p. 387.

the total value dissolved at the time the washing was commenced. The settled pulp is discharged through the bottom valve and the 4-in. discharge-pipe into the waste launder.

Table III shows the rate of settling per hour, determined at various times on several different charges.

The pulp, ready for discharging, carries 50% of moisture, the contained solution averaging 0.07% of KCN, and having an average value of approximately \$0.40 of gold and 1.50 oz. of silver per ton. These values are higher than would be expected to remain in the solution after the several decantations and dilutions effected; yet (as has already been recorded by several different parties operating similar slime-plants) the solution of value from the slime does not cease at the completion of the agitation proper, but continues throughout the washing; the value of the wash-solution is thus being constantly augmented. This feature, however, is more noticeable with the silver than with the gold, and the maximum extraction of the gold is obtained earlier. For these reasons, the solution contained in the discharged pulp will always carry more values than it should according to calculation based solely upon successive dilution and assuming the agitation to be perfect.

A portion of the sample of the pulp ready for discharging (together with its proper proportion of contained solution) is dried, the assay results being taken to represent the value of the discharged slime. Another portion of the pulp is washed and then assayed. On an average the washed sample will run about \$0.40 of gold and from 1 to 2 oz. of silver per ton lower than the unwashed sample.

The 3-in. centrifugal pumps connected with the decantation vats are the ordinary pumps commonly used for pumping solutions; the only alterations being that the bearing nearest the pump shell is tapped with a 1/4-in. pipe, which supplies the bearing with solution under pressure. These pumps run about 4 hours in each 24, and have given excellent satisfaction, the only repair work being an occasional re-packing of some of the stuffing-boxes.

Tables IV and V, giving a somewhat detailed record of the treatment of one charge, may be taken to represent the usual practice. The usual charge is now but 15 tons of slime (dry weight), while the proportion, by weight, of solution to slime has been increased to 2.5 : 1.

Precipitation.—All solution leaving the decantation vats is passed through the zinc boxes before being re-used. The zinc boxes have to be watched closely; owing to the excess of lime present in the solution, difficulty is experienced in obtaining good precipitation. Records are kept of the quantity of solution daily passing through the boxes, together with the assay values of the solution before and after precipitation. These records show

that, during the last 3 months, an average of practically 48 ton of strong and 117 ton of weak solution, or a total of 165 ton, was passed through the boxes daily; the average assays of the solution were as given herewith (Table VI).

TABLE VI.

	Strong Solution.		Weak Solution.	
	Gold.	Silver.	Gold.	Silver.
	Ozs.		Ozs.	
Entering zinc-boxes.	\$1.05	2.90	\$0.60	1.70
Leaving zinc-boxes..	0.10	0.40	0.10	0.35

The zinc boxes have a combined total shavings capacity of approximately 120 cu. ft.; the rate of flow of the solution through the boxes during 1904 averaged 1.37 ton per cu. ft. of shavings per 24 hours.

The highest-grade precipitate yet recovered from the slime plant assayed approximately \$6,800 gold and 17,300 oz. of silver per ton.

Tonnage, Percentages, etc.—The normal capacity of the plant, while treating 15-ton charges, and allowing a two days' treatment in both agitation and decantation vats, is 30 ton per day. During the last quarter of 1904 approximately 2,550 ton of slime (net dry weight) was treated, and the extraction during this period (shown by the differences between assays of the charge and of the residue) was 74.9% of the gold and 49.2% of the silver. During this period the assay value of the slime averaged \$4.35 of gold and 19.25 oz. of silver. During the last two months (March and April, 1905) 3.56 lb. of sodium cyanide (equivalent to 4.40 lb. of potassium cyanide) was used per ton of slime treated. The average extraction of silver for the last three months has been 51%. The consumption of cyanide, zinc and slime per ton of dried slime treated during this time was: Sodium cyanide, 4.42 lb.; zinc, 0.957 lb., and lime, 13.95 lb. The sodium-cyanide consumption is equivalent to 5.52 lb. of potassium cyanide.

Table VII gives the operating costs per ton of slime treated.

TABLE VII. SLIME COSTS PER TON.

Cyanide (4.42 lb. @ \$0.63).....	\$2.785
Zinc (0.957 lb. @ \$0.30).....	0.287
Lime (13.95 lb. @ \$0.0118).....	0.165
Other supplies.....	0.238
Lubricating.....	0.033
Labor.....	0.491
Salaries.....	0.748
Assay office (labor and supplies).....	0.066
Power (ditch, maintenance and supplies).....	0.621
Miscellaneous (lighting, etc.).....	0.092
Management and general expenses.....	0.179
	\$5.615

\$5.615 Mexican currency during this period was equivalent to \$2.66 gold. The cost of realization on the precipitate is not included in the working cost; these expenses are high. The average cost of realization on the precipitate produced in the slime plant, per ton of dry slime, is: Government taxes, \$0.856; treatment charges (including transportation expenses), \$1.202; total, \$2.058.

The production of cement in Denmark in 1904 was 564,000,000 pounds.

Asphalt in the Indian Territory.

BY W. R. CRANE.*

Two general types of asphaltic compounds are found in the Indian Territory: The so-called natural—or bituminous—rock asphalt, and grahamite or albertite. The former is in a liquid or a semi-liquid state, and occurs in beds of sand, sandstone and limestone, which have been more or less impregnated with it; the latter is in the solid state, occurs in fissures, and is commonly known as "asphaltic coal." The workable deposits of asphalt in the Indian Territory, so far discovered, are largely confined to the Chickasaw and Choctaw nations, although thorough and systematic prospecting is yearly showing the existence of many new and extensive deposits outside of these areas, even extending into the neighboring States of Texas and Arkansas, while traces are found in Kansas and Missouri.

The natural—or bituminous—rock deposits, as a rule, are found in the less disturbed portions of the above-named sections, lying in the extreme southern part of the Territory, although a few extensive deposits have been located considerably further to the north. The asphaltic coals—the solid forms of asphalt, more properly called asphaltites (albertite, grahamite and imponite, all closely related) are, on the contrary, found where the formations have been more or less disturbed by orographic movements, as evidenced by the folded and fissured condition of the strata. In fact, the asphaltites occur in fissures only, and, as a rule, in none except the very steeply pitching ones. So closely do the asphaltites of this section resemble the semi-anthracite coal, which occurs in large quantities a short distance to the north, that prospectors are often mistaken as to its identity, especially where considerable excavating is necessary to make clear the relation and association of the strata. That the government maps, of recent date, indicating the segregated asphaltic lands, are not to be relied upon, is shown by the frequent taking up of asphaltic lands outside the areas so set aside. The large coal companies are especially active in discovering and acquiring such properties.

Bituminous rock deposits have been prospected and worked at Dougherty, Tar Springs, Ravia, Ardmore, Elk, Marietta, Page, Emet, Oakland, Saint Jo, and Coalgate, but especially at the first four mentioned localities. The Tar Springs deposits are typical of the sandstone variety, while those at Ardmore and Dougherty are chiefly in bituminous limestone. The former deposits are largely made up of beds of loose sand and sandstone, interstratified with several feet of yellow and red clay and shales, and must be excavated as earth, while the latter are solid beds of limestone and can be quarried. As the bituminous-rock foundations, espe-

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cially the sandstone variety, outcrop or are exposed, over large areas, the expense of removing the overburden and loosening and excavating the asphaltic materials is slight, seldom exceeding 10c. per cubic yard.

Attempts have been made, and are still in progress, as at the Tar Springs locality, to separate and refine the asphalt, but so far with little success. The main difficulties appear to be the safe removal of the accompanying heavy oil (petrolene), which ranges from 8 to 30% of the total content of the sand and sandstone, and the cooling of the concentrated asphalt.

After being separated from the containing sand, which is usually accomplished by the aid of hot water and hydraulic classifiers of the spitzlutte type, the oil and liquid asphalt are passed through tanks, heated by steam coils, in which the

The principal use to which the natural-rock asphalts have been put is in paving streets and sidewalks. A mixture of finely ground asphaltic sandstone and limestone or other broken rock, in the proper proportions, which will vary somewhat with the character of the asphaltic material used, will, when properly mixed and placed, make an excellent street covering. In fact, in the regions where they are found, these materials are often placed in the roughest possible way, and yet they make quite durable wearing surfaces.

The localities in the Indian Territory where asphaltites have been found in economic quantities are surprisingly few, and some of those, even that were considered of considerable importance, have, on development, proven of little value. Workable deposits have been opened up at Antlers and Loco, and others have been

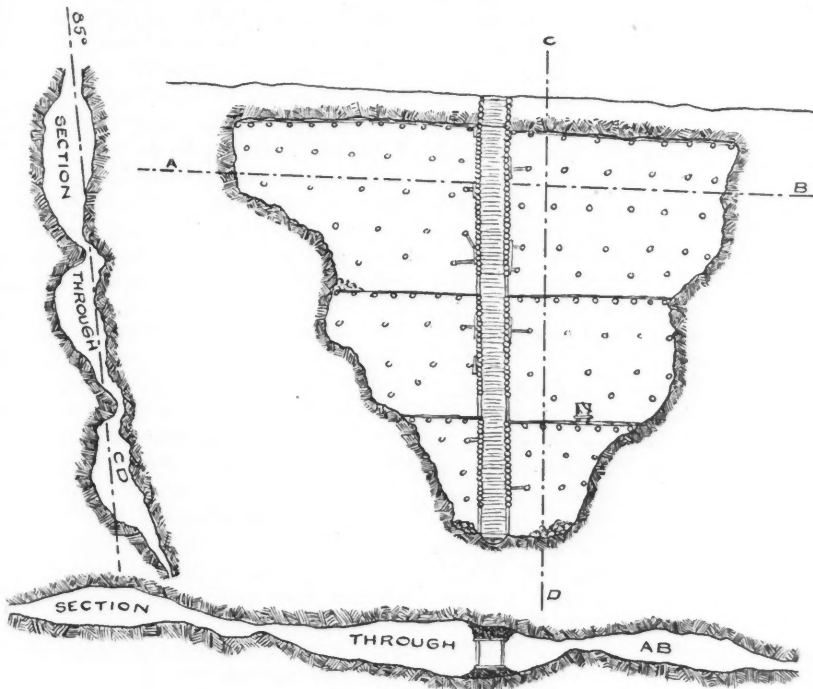
which is the rule rather than the exception, much trouble is experienced from caving, especially during the wet seasons; surface and underground waters combine to soften the walls of shale and clay as fast as they are exposed by the mining operations. Under such conditions it is necessary to place the shafts quite close together, say from 60 to 150 ft. apart, and to work out the mineral adjacent to them as rapidly as possible. Underhand stopping is the method of mining usually employed; this keeps the working face dry, and, with the shafts close together, requires little or no underground handling except shoveling. Hoisting to the surface is done entirely by bucket. Most of the deposits so far worked have pinched out at a depth of 100 to 150 ft., and it is a subject of much speculation as to their possible continuance. Prospect drilling, which has been rather extensively employed in certain localities, has not thrown much light on the subject.

There is little doubt that all asphalts are the products of natural distillation of petroleum with asphaltic bases. The natural- or bituminous-rock deposits were formerly oil pools which have been brought close to the surface by erosion. The loss of the lighter hydrocarbons would be the result of such loss of cover, and the heavier oils and asphaltic base would remain. In the case of the asphaltites, fissures tapping deep-seated oil pools would be filled, wholly or partially, and natural distillation would be hastened by pressure of the fissure walls on the enclosed oil. That the contents of the fissures were formerly liquid is evident from the condition of the country rock, which is more or less charged with asphalt, usually the liquid form, and for a distance of fully half a mile in many instances.

The output of all asphaltic materials from the Territory during the year probably has not exceeded 1,000 tons, the greater portion of which has been grahamite. The price paid for grahamite is \$15 per ton and the market is good. The cost of transportation by wagons over rough country roads, for distances ranging from 15 to 25 miles is about \$3 per ton. The cost of mining is very close to \$1.50. The profit, then, per ton placed on the cars is about \$10. With increased railroad facilities the output could be greatly enlarged and a very profitable industry built up.

Transformer losses appear as heat, and as such must be dissipated. They are of two kinds—the iron loss and the copper loss. The former is due to hysteric action, and the latter to the reluctance and resistance of the windings.

It does not ordinarily pay to overload an air compressor with more drills than it is designed to carry, and it never pays to use a main pipe so small as to reduce the air pressure materially.



METHOD OF MINING GRAHAMITE.
LOCO, IND. TERR.

water and the lighter oils are gradually eliminated by evaporation. The process is continued until the proper consistency is reached, when the residual asphalt, still in a liquid state, is cooled and barreled. So far the experience of asphalt refining in the Indian Territory has been an unbroken series of explosions, fires and similar disasters. In California the problem has practically been solved, and open distillation, as practiced in the Indian Territory, is a thing of the past.

Probably no better quality of natural-rock asphalt has been found in the United States than is available in immense quantities in the Indian Territory, but so far the cost of production in paying quantities has been excessive. Probably the chief hindrance to the development of these deposits is lack of railroad facilities.

reported near Howe. These and similar deposits are found in the Arbuckle and Ouachita mountains. The uplifts and disturbances accompanying them were responsible for the fissuring of the formations, thus forming receptacles for the asphalt. The asphaltites occur in fissures cutting beds of sand, sandstone and shale; they have a pencillate cleavage perpendicular to the walls of the fissures; they are hard and glossy black, and rapidly disintegrate on exposure to air and moisture. The fissures are extremely irregular in both dip and strike, especially the former; they are very pockety, seldom reaching a depth of over 150 ft., and range in width from a few inches to 10 ft. The vertical and lateral extents of the individual pockets are seldom over 25 or 30 ft. When the deposits have clay walls,

The Eight-Hour Day.

BY R. W. RAYMOND.

Mr. John Mitchell has given the public a surprise by announcing, six months in advance, the demands which, as the representative of the Mine Workers Union, he intends to present next April to the coal operators of the anthracite region. Hitherto he has declined to say whether he would at that time call for any change in the terms fixed by the Roosevelt Strike Commission, under which both employers and employees have enjoyed a season of such peace and prosperity as had not been known since Mr. Mitchell and his union entered upon the scene. In fact, only two parties have suffered under that philanthropic settlement—the public, which has had to pay for anthracite the increased price required to cover the higher wages kindly granted by the Commission at the desire of the operators, and the officers of the National Mine Workers' Union in the anthracite region, who have seen their local membership dwindle to comparative insignificance in the withering atmosphere of general contentment and peaceful industry. We might add that the anthracite trade has suffered an irreparable injury through the invasion of its territory by bituminous coal, favored by the coal famine, and the subsequent higher prices, caused by the strike. Experience teaches that from such an invasion bituminous coal never wholly retreats; and the murky air of New York city, during the present summer, shows how many consumers, driven from anthracite to bituminous coal, have not gone back. For this blessing in impenetrable disguise, the public has to thank primarily Mr. Mitchell and his union, and, secondarily, Mr. Roosevelt and his Commission.

But the public is not actively complaining, and certainly it does not yearn for any change which would make anthracite still dearer for the benefit of Mr. Mitchell's mine workers. It continues to be largely dominated by a feeling of gratitude to Mr. Roosevelt for his interference in the last strike, and would doubtless be quite satisfied with the indefinite continuance of the settlement then made.

The avowed object of Mr. Mitchell's campaign in the anthracite region was to recall deserters and gain new recruits for his sadly shrunken local unions. He was certainly not bound to give public notice, so long beforehand, of any intention to use such increased strength in numbers and money for the purpose of overthrowing the settlement and recommendations of the Roosevelt Commission. Nor would it have been wise to do so at a time when he was planning to get Mr. Roosevelt to appear in public as still his friend and ally. Until after the successful execution of that scheme, Mr. Mitchell professed to feel afraid that the operators would try next April to reduce wages, unless the unions were made large enough to overawe them; and it was chiefly, he

said, in order to guard against this danger that he wished, in time of peace, to prepare for war.

If Mr. Roosevelt believed these declarations, it was natural that he should favor a movement for the continuance of the plan devised under his own instructions by his own appointees, and possibly it was on this ground that he justified to his conscience the aid which he practically gave to Mr. Mitchell last month.

However that may be, the situation is now changed. Mr. Roosevelt has been utilized as far as is conceivably practicable, for the present. If he is to be needed again, it will be next year, after another strike has been inaugurated. Meanwhile, it is not necessary to consult his feelings, or to abstain from defying and attacking the findings of his Anthracite Commission.

Moreover, the article in the August number of the *North American Review* by President Wilcox, of the Delaware & Hudson Company, conclusively shows and authoritatively declares that no change of the present arrangement is desired or will be attempted by the operators next April. Everybody who was acquainted with the situation knew this before, and even Mr. Mitchell's ignorant and suspicious audiences apparently believe it now. For it is clear that his attempt to collect men and money for the alleged necessity of maintaining present conditions has failed.

There was but one means left to him. He must try to rouse a "noble discontent," expressed in contributions of money, by holding out the hope of extorting from the coal operators further advances in wages and advantages in terms of employment. And the two demands which he chooses to name at this early day, and probably deems best calculated to fire the enthusiasm of his followers, are the 8-hour day and the recognition of the Mine Workers' Union.

What does Mr. Mitchell mean by "the 8-hour day," which he now says he is going to demand next April of the anthracite colliery-operators?

What he consciously means depends, of course, upon how much he knows as to the actual conditions in the anthracite region. In this respect he made a poor showing before the Roosevelt Commission, confessing, in fact, an almost total ignorance; and his confession was confirmed by the report of the Commission, which declares his assertions as to the essential matters in controversy to have been unsupported by the evidence.

But we must at least believe that he has read that report and knows what it declares as to the facts. Hence he must be aware that at that time the contract miners were working, on the average, certainly not more than 8 hours a day (how much less, the Commission, so far as I have hitherto found in my latest study of its report, kindly forbears to specify),

and other employees only 7.6 hours a day. Has there been, in these particulars, any change? On the contrary, it is notorious that the contract miners will not regularly stay at work 8 or 7 or 6 or even 5 hours, but go and come as they choose. The significance of this lies in the fact that these men hold special licenses, under a State law, enacted at the dictation of the labor unions, under pretext of the extra hazardous nature of coal mining (though the far more dangerous mining of bituminous coal in Pennsylvania has received no such "protection"), which gives them a practical monopoly in their occupation. One would think that these specially qualified expert miners ought, in return for this monopoly, to stand by, at least (even if they do not actually labor), while other men incur the dangers they had been selected to deal with. But this is not their view of duty. They leave the laborers, whom they have hired, to run all the risks of this "extra hazardous" occupation, and betake themselves, after the shortest possible period of professed labor, to their homes or elsewhere, taking all their high-priced skill and experience with them.

Now, *these* men do not want an 8-hour day. If they would stay 8 hours underground, and employ as many laborers as they could make useful during that time, every competent one of them could take care of two or more breasts; their own pay would be increased; the cost of coal would be diminished, and everybody would rejoice—except those who want continually more pay for less work. From this standpoint the operators, not Mr. Mitchell, should press for an 8-hour day. His patter, about a man's doing as much good work in 8 hours as in 10, is quite beside the question; for the question is, whether a man could do more in 8 hours than he does in 4 or 5. In either case, however, it must be assumed that the man honestly works, not shirks—a highly important proviso; for the cardinal difficulty with the labor unions is not that their members want a shorter day of work, but that they do not give honest and loyal work for their pay, whatever it is.

Clearly, the 8-hour day is not to be demanded by Mr. Mitchell for contract miners.

On the other hand, there has been no important change since 1902 in the condition of the other employees, who were then working, on an average, 7.6 hours per day. It cannot be that Mr. Mitchell dreams of demanding that all those who work for a shorter time should be required to work longer. That is not a proposition upon which he could secure enthusiastic and liberal subscriptions.

Does he intend, then, to demand that everybody now working less than 8 hours shall not be required to work longer, while everybody now working longer shall have his day reduced to 8 hours, without, however, any reduction of daily pay? This

is a natural inference; but it affords, taken by itself, no adequate explanation, because the parties benefited by the change (whether it were just and wise or not) are not sufficiently numerous, or so connected with Mr. Mitchell's organization as to give him an inspiring war-cry.

No: what Mr. Mitchell calls for is mainly (though, perhaps, in addition to the change last suggested) the adoption of a new unit for the calculation of wages. The payment of many employees, who now work less than nine or ten hours, being now based upon a certain rate of wages for a full day's work (of 9 or 10 hours, as the case may be for their particular occupation), he means to demand that such employees shall receive per hour one-eighth of a day's wages, instead of one-ninth or one-tenth. This would be, for the wages now calculated on a 9-hour basis, an increase in wages of 12.5%; and for those now on a 10-hour basis, an increase of 25 per cent.

That is really what it amounts to—a demand for at least 12.5% increase in wages for the same work. All talk about 8 hours as a sufficient day's work is, in this connection, irrelevant and impudent humbug.

There is a good deal more to be said in detail on this subject which I may find opportunity to say later. Meanwhile, this very general statement suffices for my immediate purpose; and, postponing for a time such further discussion, I propose to take up in my next article Mr. Mitchell's threatened demand for "recognition of the union."

An Electric Combustion-Furnace.

The furnace commonly used in the chemical laboratory consists of a porcelain tube heated externally by gas flames, and through which the gases to be burned are passed. The life of the tube is short, generally lasting for but one determination. Prof. H. W. Morse, of Johns Hopkins University, has avoided this by constructing a simple, cheap and effective electric furnace out of materials to be found in every chemical laboratory. He winds a fine platinum wire over the porcelain combustion tube and incloses the heating element thus formed in a larger glass tube. The platinum spiral is heated by an electric current. The gases to be burned are passed in through the porcelain tube and returning around it are heated by the hot wire. The furnace is easy to manipulate, perfect and quick in action. The platinum wire lasts a long time, and the porcelain tube indefinitely. The furnace not only does its work better than the old type, but is less expensive, both as regards construction and operation.

Aluminum is used in the manufacture of certain explosives. One, for example, consists of ammonium nitrate (45 parts), di- or trinitrotoluene (19.5 parts) and aluminum (22 parts).

Chinese Concessions.

BY CHARLES D. JAMESON.

Today the Chinese, both Government and people, strongly oppose the granting of any further concessions for railways or mines to foreign syndicates. Not only this, but the Chinese Government is making an effort to cancel some of the existing concessions and to purchase others from the present owners. Broadly stated, the reason for this is, that not one of the syndicates holding concessions in China has conformed, in either letter or spirit, to the terms of the agreement under which the concession was granted.

Concessions in China are of most recent origin; none of them is yet 10 years of age, and the majority date from 1898. Of her own free will China never granted a concession to a foreigner, and never wished to do so. The existing concessions were obtained by pressure brought to bear upon the Chinese Government by the government representing the nationality of the syndicate, and by money paid to individual officials for their good will and influence. (There are exceptions to this, which I refer to later.) Thus China has been more or less forced into the granting of the existing concessions by the various European Powers in order to balance or counterbalance the political situation in the Far East. Even this condition of affairs might have continued possible if, after the concessions had been granted, the various syndicates had carried out the terms of their agreements and had developed the concessions in a *bona-fide* manner. In every instance, as soon as the original concession has been granted in accordance with a definite and written agreement as to terms, the syndicate has commenced a campaign to have the terms modified, and more modified—always to the betterment of the syndicate and the detriment of China.

In some cases this discussion has gone on for years. The syndicate was backed by its home government (whichever that might be) and eventually China has been obliged to yield. In the meantime no work is being done in the development of mines, nor in the construction of railways; China not only receiving no revenue from the concessions, but in some cases she is actually losing money in the yearly interest on the bonds she has been forced to guarantee (these bonds being issued by the foreign syndicate to raise capital to exploit the concession). The principle upon which all concessions have been obtained is, to "get the concession ratified in accordance with any terms possible, and afterward have the terms modified to suit."

The modification of the terms of a concession, in even the slightest degree, is a matter of far-reaching importance to China, when this is for the betterment of the syndicate. The reason is this: China is not as yet admitted to the Family

of Nations upon a standing of equality, and the intercourse between China and foreign governments (and foreigners) is regulated in accordance with the terms of international treaties. These treaties contain the so-called "favored-nation" clause; that is, any favor or advantage granted by China to any one nation or group of nations must also be granted to all other nations. Consequently, the effect is as follows: China grants railway concessions to France, Germany and England. The original terms are practically the same. France succeeds in obtaining a slight modification of some paragraph, not much in itself, but always for the betterment of the syndicate. Germany has another paragraph changed and England another. Then each claim the benefit of the favored-nation clause; the terms of all the concessions are very greatly changed, and China, as a nation, is a loser. This is Western diplomacy in the Far East. One can see at once what the combined result of these modifications may lead to.

Of all the concessions granted up to the present day, no serious work has been done on any of them, with the exception of the Peking-Hankow Railway, the German line in Shantung, and some work by the French Company on the Ching-ting—Tai Yuan Railway. The bonds of the Peking-Hankow Railway are guaranteed by the Chinese Government, and the road, which is now completed, has been built by a French construction company, which receives a fixed percentage on the total cost of construction and equipment. Money has not been spared.

The dissatisfaction of the Chinese with the methods of the Belgian syndicate is such that the Chinese authorities have memorialized the Throne for permission to purchase all the rights of the syndicate and to operate the road as a purely Chinese affair.

The German railway from Tsin-tao to Chinan-fu (the capital of Shantung) has been completed in a first-class manner; it is more or less a German Government affair, and it also opens a rich mining country of coal, gold, etc., to which the Germans have exclusive right.

The story of the Hankow-Canton railway concession to the American-China Development Company merits a rehearsal here. China feared the international complications which might arise from the granting of concessions to the larger European powers, owing to their lust for territorial aggrandizement. The Peking-Hankow line was granted to the Belgian syndicate (upon their plea that Belgium was a small power, with no territorial ambitions in the Far East). After the granting of this concession China's confidence in European powers was not increased, when it was found that the Belgian syndicate was three-quarters French; that the greater part of the money to be used was French, and that Russia had

satisfied the French investors as to the perfect security of the undertaking. Therefore the southern half of China's great trunk line was not given to the Belgian syndicate, although every effort was made to bring this about. This piece of railway (Hankow to Canton) was given to the American-China Development Company. This company had done but little work to obtain this concession, and probably no money had been used. China wished America to have it in order to save herself from others. In making this contract with the American syndicate there was a written and verbal agreement that the company and capital were to be *bona-fide* American.

In 1901 the American company had sold to the Belgians (or to those back of the Belgians) a majority of the shares which gave them the practical control of the affair; and, while the company still acted under an American charter with an American president and general manager, yet the actual management was the same as that of Peking-Hankow railway. American management in China has been most unfortunate.

When the predominance of Belgian control became evident to China, a threat was made by the Chinese to cancel the concession. Whether this would have been possible or not is now beside the question; they succeeded, however, in making things so unpleasant for the American company that China at last received notice that all the Belgian shares had been repurchased by a Morgan group of capitalists, and that the company was *de facto* American. This occurred in 1904.

During 1902 and 1903 some small amount of work was done at the Canton end; 35 miles of line was constructed and is now in operation. About the same amount of additional grading was done.

All the work is now more or less at a standstill, and negotiations are in progress (between the company and H. E. Chang Chih-tung) by which China is to pay the American company several million dollars and annul the contract. So much for American concessions in China.

The British-Chinese corporation holds concessions for the following railways: Kow Lung to Canton; Shanghai, Suchow, Chingkiang to the border of Shantung; Shanghai, Suchow, Ningpo; Chingkiang due west to Sin Yang on the Peking-Hankow railway. These concessions were granted in 1898 to this British syndicate, directly after the granting of the Peking-Hankow line to the Belgian syndicate, and were the result of pressure by the British Government on the Chinese, in order to maintain the "balance of power" in the Far East. With the exception of some grading between Shanghai and Chingkiang, no work has yet been done; but a constant fight has been carried on to have the terms of the concession modified and re-modified, always to the

advantage of the British-Chinese corporation.

The Peking Syndicate, Ltd., of London.—This concession was ratified May 1, 1898, and was the first bonafide concession for mining ever granted to a foreign syndicate by the Imperial Government of China. It gives exclusive rights for the mining of coal and iron in all the southern half of the Province of Shansi and that portion of the Province of Honan north of the Yellow river, an area of some 25,000 sq. miles. Also the right to construct the railways necessary for the transportation of the products of the mines to trunk lines or navigable waters. This section of country contains the largest known deposit of coal in the world, both anthracite and bituminous, and the largest deposits of iron in China.

For seven years this syndicate has held this enormous territory and not one ounce of coal or iron has it mined. The most available coal and iron deposits are in southern Shansi and northern Honan. In the district of Tse-chow, southern Shansi, there is practically an unlimited deposit of high-grade anthracite coal lying 3,000 ft. above the alluvial plain. This coal is so located that it could be mined by adits; it lies nearly horizontal and the adits would drain themselves. The thickness of the coal in the main seam is such that ordinary coal cars could be run to the face of the workings and the coal loaded for transportation at once. The coal is in such perfect condition and contains so little dust that no cleaning would be required.

But to reach this elevation of 3,000 ft. above the plain requires a railway of 30 miles, which for a standard steam railway complete would cost £500,000. The grade would be uniform, and the roadbed being mostly in rock the cost of maintenance would be low. But this railway has not been built and this immense, visible coal supply has not been tapped. An electric railway from Tse-chow to the plain would cost less than £200,000, and as coal would be very cheap the cost of operation would be low.

Between two and three years ago operations were commenced on the plains near the foothills. Shafts are being sunk there to tap a coal deposit probably 600 ft. below the surface. Some work was done with a diamond drill but only to a slight depth, and not to coal. A shaft was then started and sunk to a depth of 400 ft. At that depth the amount of water was too great to be handled by the powerful pumps in place, and the work on this shaft was stopped. Another shaft was sunk near the first one, to about the same depth. All of this work is now at a standstill, awaiting the arrival and erection of a more powerful plant now on its way from England.

No coal has as yet been reached, but the engineer in charge thinks that the main seam will be encountered at a depth of

600 ft. Even if coal is found of the quality and quantity expected, there will always be an enormous amount of water to be handled, and also the cost of lifting the coal to the surface of the ground. These items of expense will be done away with when the deposit at Tse-chow is utilized.

In addition to the work done at the proposed mine, the Peking syndicate has built and equipped about 90 miles of railway, running from the shafts to Tao-kou on the Wei river.¹ The only trouble with the Wei river, from a navigable point of view, is that it is very narrow (75 to 150 ft.), crooked and shallow. At low water the depth is some 24 in. or less at Tao-kou, and two months of the year it is closed by ice. The distance from Tao-kou to Tientsin is some 300 miles, and Tientsin is the nearest outlet for the coal. Only small native boats are feasible for this river, and these are tracked by coolies. Therefore, the amount of coal which can be sent by this route, when the mine is open, can never be a serious consideration. This is more strongly the case, as this anthracite coal will come in direct competition with the bituminous coal from the Tong-shan mines, 80 miles from Tientsin.

The Peking Syndicate coal, in southern Shansi and northern Honan, is a short-flame, smokeless, semi-anthracite. The railway, 40 miles from the shafts, crosses the line of the Hankow-Peking railway; to reach a market the coal must be shipped over this alien line some 400 miles to Hankow, and it is then three days by steamer from Shanghai. The Peking Syndicate has accomplished one good thing for itself during the last seven years; it has prevailed upon the Chinese Government to guarantee the bonds for its railway at 5%. The amount of the bonds is £700,000.

The only traffic on this railway will be the output of the mines, estimated at 2,000 ton per day, carried 40 miles. Either the coal or the Chinese Government will be heavily taxed to pay the operating expenses of the railway and the 5% on the £700,000.

For the last year the syndicate has been purchasing coal from the native mines and shipping by canal to Tientsin; the amount has been small and the price so great that it could only be used as a luxury or an experiment. None of the coal sent down from northern Honan has been mined by the syndicate.

There has been over £1,000,000 expended during the last seven years, and, of course, much of this has been expended in China. Thus indirectly China, or a very small portion of it, has been the gainer. Apart from this item the only difference the granting of this concession has made to China is that now the Chinese Government is responsible for the

¹The Wei river flows into the Grand Canal and thence to the sea by way of Tientsin.

regular annual payment of £35,000 as interest on the bonds of the Peking Syndicate railway.

From the standpoint of the Peking Syndicate shareholders there has been over £1,000,000 expended since the granting of the concession, and no coal or iron has as yet been mined. In the meantime, however, alien railways have been, or are being, constructed on the north, south and east sides of the ceded territory; none of the coal or iron can be put on the market without paying transportation rates over railways owning, directly or indirectly, competing mines of bituminous coal. None of the bituminous coal in the Peking Syndicate area is so located as to be marketable for many years.

Chinese Engineering & Mining Company.—This company was originally Chinese and for some 20 years worked the bituminous coal deposits in the vicinity of Tongshan, 50 miles from Tongku on the line of the Tientsin-Shanhaikwan railway (Imperial Chinese railway).



VEIN WIDTH AT TIMISKAMING.

The mines were worked by foreign methods and under foreign supervision. The acquirement of these mines in 1901 was by an English firm; their subsequent sale to a Belgian syndicate, the manipulation of the shares and the methods of control and management, have been an open scandal for the last three years. All of this has resulted in a lawsuit in London between the Chinese director-general and the British promoters of the affair, in which the decision on all points was given in favor of the Chinese.

While no royalties or profits have accrued to China as yet from the many valuable concessions granted by it to foreign syndicates, yet the original syndicates have reaped a rich harvest in the jugglery of the shares in the markets of London and Paris. These few examples of the methods pursued by foreign syndicates in China may explain the lack of desire and enthusiasm on the part of the

Chinese to the granting of additional concessions.

In conclusion, let me repeat that, from the beginning of concessions to the present day, not one syndicate doing business with the Chinese government has

Timiskaming.

BY FOSTER HEWETT.*

Though two accounts¹ of these interesting ore deposits have appeared in this JOURNAL, the developments of the present season may justify further attention. The

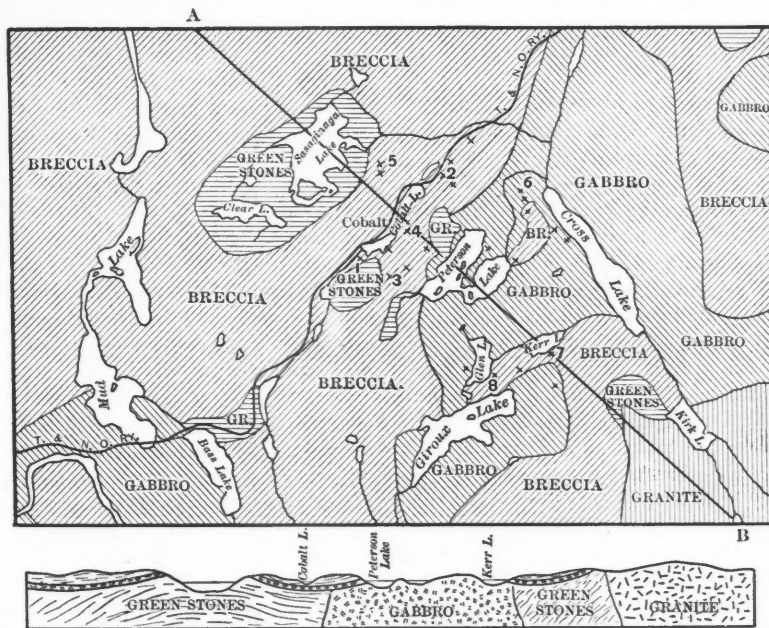


LA ROSE MINE.

conformed, in either spirit or letter, with the terms of its agreement. While it is understood that syndicates owning Chinese concessions are not philanthropic societies working for "sweet Charity's sake," still there is no reason why they should

following description is based upon a recent visit to the vicinity of Cobalt.

The first discoveries were made in August and September, 1903, upon locations JB1 and JS14, respectively; the latter is commonly known as *La Rose* mine,



SECTION ALONG A-B
GEOLOGICAL MAP—SCALE: 1 INCH = 1 MILE.

Mines now being worked: 1 McKinley-Darra, J. B. 1; 2 La Rose, J. 514; 3 Little Silver, R. L. 404; 4 Cobalt, R. L. 404; 5 Trethewey, J. B. 6; 6 Violet; 7 Jacob's; 8 Foster's.

not be held to a strict performance of the terms of their agreements, after they have once signed these. Unfortunately, China is in no position at present to enforce these agreements, and her safety consists in not granting these huge concessions.

being now the most important deposit in the district. Several of the veins of the

*Metallurgical engineer, Pittsburg, Pa.

¹"Cobalt-Nickel Arsenides and Silver in Ontario," by Willet S. Miller, geologist of Ontario, this JOURNAL, Dec. 10, 1903, p. 888; and "Timiskaming," by S. Dillon-Mills, this JOURNAL, May 25, 1905, p. 996.

RL404, which have since been highly productive, were discovered during the fall. Prospecting in the spring and summer of 1904 developed the rich veins of JB7 and JB6, now known as the Trethewey locations. The district at the close of the season of 1904 is credited by the Ontario Bureau of Mines with a production of \$400,000, the values being about 90% in silver and the balance in cobalt and nickel.

The present season has witnessed the influx of about a thousand prospectors. Among the recent discoveries of promise are those along the west shore of Cross lake; south side of Kerr lake, and along Glen and Giroux lakes. One vein discovered on the southeast side of Glen lake in June produced two carloads of ore, which returned more than \$60,000.

The district is included in the area covered by a report of A. E. Barlow² in 1899. According to the map accompanying that report, the district is in an area of diabase and gabbro, extending from Bay lake and lake Timiskaming, an error plainly due to the lack of detailed description.

Recently the provincial Bureau of Mines has issued a map showing the areal geology of the district as found by the investigations of W. G. Miller and assistants during the summer of 1904. It is the opinion of most of the engineers, who have visited the district, that the map is accurate; the experience of the writer confirms this; though in one locality, that south of Clear lake, the area of Keewatin rocks appears to extend further south than shown. But after one has tramped over the muskeg swamps and timbered hills, the difficulties of studying areal geology become apparent.

As interpreted by Mr. Miller³, the oldest rocks of the district, called the greenstones, and grouped as the Keewatin series, present a much disturbed and metamorphosed igneous complex. This was later intruded by masses of granite (known as the Lorrain granite), which was followed by the deposition of the breccia-conglomerate in which the ore deposits are found. The original thickness of this series can only be conjectured; the greatest probable thickness now is about 500 ft. The lower portion is characteristically a conglomerate, which, by the gradual addition of finer material, assumes the appearance of slate in the upper portions, though lacking a cleavage. A thin section of an intermediate variety shows it to contain quartz with orthoclase, plagioclase and a chloritic material. A portion of the feldspar appears to be secondary.

The extensive masses of diabase and gabbro are considered as intrusive into the foregoing members, and as producing the fissure containing the ores. The gabbro phase of this rock predominates, usually being coarsely crystalline. A thin section shows an excess of hypersthene;

a plagioclase very close to anorthite; small amounts of biotite, and a light pyroxene and accessory magnetite and pyrite. It is therefore a typical hypersthene-gabbro.

The exposures of gabbro and breccia-conglomerate in the vicinity of the mines present features which suggest that it is not necessary to consider the former as intrusive into the latter. Certain features of the ore deposits point to the conclusion that such is not the case. There are no marked contact phenomena, and some of the veins and fissures continue from the breccia into the gabbro. The general nature of the fissures suggests that they were formed by tension in the rocks, due to pressure from immediately below as might be produced by a laccolith. The recent discovery of a dike rock other than the gabbro masses tends to strengthen this hypothesis. It may be recalled that the Silver Islet vein cut the Aminikie argillaceous series, as well as the trap rock, though the ore was found only at the intersection with the trap dike.

The veins are small, varying from a mere knife-edge to 12 in. thick. The minerals are predominantly smaltite, niccolite, dyscrasite, and bismuth, probably with arsenopyrite, chloanthite, cobaltite, and gersdorffite. The upper portions of the veins contain erythrite, asbolite, garnierite, annabergite, and occasionally argentite and pyrrargyrite, which are plainly secondary. A vein recently discovered on RL404, exposed at the surface 12 inches of clean ochreous erythrite, which resulted from the oxidation of the smaltite.

An extremely interesting feature of the veins is the persistent association of the silver with antimony, native silver being extremely rare. A number of quantitative determinations with the blowpipe upon the silver mineral from four mines showed a content of silver varying from 80.5 to 91.1%, the balance in each case being antimony. Dyscrasite varies from Ag₃Sb, containing 72.9% silver, to Ag₅Sb with 84.3% silver. In several cases the dyscrasite was plainly of recent secondary origin, and the content in silver was higher than when it occurred in place.

Fragments from veins of several of the mines have been polished, etched and examined under the microscope by the writer. The order of deposition has apparently been as follows: dyscrasite, niccolite, smaltite; and lastly the gangue minerals, calcite or magnesite, with occasionally quartz. In some instances the conditions are wonderfully similar to the occurrence of some of the silver in the Silver Islet.⁴

It was previously thought that the veins would only be found in the breccia. The discovery of the "Violet" vein in the gabbro in May, however, has stimulated prospecting in the areas in this rock. However, it is well shown upon the ac-

companying map that the veins in the gabbro are near the remnants of the breccia. A recent writer⁵ has suggested that a certain vein in gabbro "looks like a case of arrested segregation." Upon this hypothesis, it would be rather embarrassing to explain the continuation of a vein from gabbro into breccia.

The same writer has suggested that an "intrusive dike of fine-grained diorite" lies on one side of the "Little Silver" vein of RL404. I have made a thin section of this rock and find it to be the breccia, continuous, moreover, from the adjoining member.

The deepest work to date is the La Rose shaft, about 100 ft. It is stated that the four veins which were followed in the upper 80 ft. have come together, making more than 30 in. of solid ore (grade, 2,000 to 5,000 oz. silver per ton). The shaft on JB7 is about 60 ft. deep, but work is being carried on in the surface trenches.

The camp has been characteristically a "poor man's camp"; in every instance a vein, once found, has proved enormously profitable. In one instance the cost of mining a vein one inch wide has been about \$200 per ton of ore, and yet operations have been profitable since the discovery. It has been extremely unfortunate that several groups of men have been able to blanket the most promising portions of the district with locations, which have in many instances not been in strict accordance with the law. This is, in a measure, due to the district having been unsurveyed until 1904.

It is too early to venture a definite prediction of the future of the district. Many rich discoveries have been made this summer, and there is every reason to believe that others will be made as the difficulties of prospecting are overcome. The mines, though rich, will be small and will never employ the number of men usually required in districts where the ores are lower grade.

If the ores persist in the gabbro (which is assured in several instances), it will be impossible to predict in general the depth to which they will go. From the developments to date, the veins must be judged upon their merits, the depths varying in a fairly constant relation to the horizontal dimensions. As a criterion, however, this is complicated by what appears to be assured, namely, that the ores are the result of several concentrations from above. There is, however, very little recent surface concentration, on account of glaciation.

A study of the Silver Islet vein leads one to the conclusion that it was formed in a similar manner. The deposits of Thunder Bay were quite different in some respects from those at Timiskaming; but the data to be gleaned from the developments of the latter region suggest that they will behave in a similar manner.

² Report Can. Geol. Survey, Part I, Vol. X, 1899.

³ Report Ontario Bureau of Mines for 1904.

⁴ Trans. Amer. Inst. Min. Eng., Vol. II, p. 91.

⁵ This JOURNAL, May 25, 1905, p. 996.

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EDITORIAL.

WE REFERRED RECENTLY to the dredging for stream tin, which has been successfully inaugurated in New South Wales. We learn now that the process has been also introduced in Queensland.

Concrete in Building.

It was to be expected that the Bricklayers' Union would sooner or later complain of the use of concrete, and endeavor to combat it. The New York branch of the union has recently raised its voice on that subject. It foresees in the increasing use of concrete in its various forms a replacement of brick and stone masonry, which will deprive the bricklayers and stone masons of their livelihood. It was to a large extent because of their exactions in the form of wages and other conditions, however, that engineers and builders turned to concrete.

The development of the cement industry has been largely due to the efforts of brains to overcome the tyranny of the labor unions, which has so materially increased the cost of building. When the cost of anything rises inordinately high, attention is inevitably directed to the employment of a cheaper substitute. Concrete was originally adopted for foundations and other massive work. The development of reinforced concrete and the various systems of hollow-block construction have extended its use to almost all the purposes for which brick and stone are available, and to a good many purposes for which they are not.

Matte Smelting in Colorado.

The failures of various independent smelting companies in Colorado, recorded during the last few years, which may have been immediately due to financial reasons, have been fundamentally due to the inauguration of the business in advance of guaranty as to the requisite ore supply. Under the present conditions of custom smelting in Colorado, any undertaking which is embarked in without the previous possession, or assurance by long-time contracts, of the supply of the essential ores, is almost certain to meet with failure. It is extremely doubtful if another independent smelting company in Colorado could successfully compete with the trust on a lead-smelting basis; certainly it could not do so if the necessary supplies of ore were not properly protected.

The aim has been, therefore, to compete on a copper-smelting basis, which under favorable conditions would be considerably more economical than the lead basis. The difficulty has been primarily, however, in obtaining a sufficient supply of copper ore, which is necessary to serve as the collecting agent for the gold and silver in the process. In spite of searching prospecting, Colorado has not yet given promise of becoming an important producer of copper ore. The various attempts at matte smelting have been short lived, and the outlook for their repetition in the future is not promising.

Lead Poisoning.

Lead-poisoning is a complaint which causes more or less trouble in American lead-smelting plants, but it is something which is hardly considered in our zinc smelteries. In Europe, however, the workmen in zinc smelteries are subject to this complaint, in the same way as are those in lead smelteries. The difference between American and European conditions is due to the difference in the general character of the ore smelted. American smelters do not, as a rule, treat very much ore of high lead content, or if they do, they treat it at a temperature so low that trouble from lead fume is minimized. In Europe the reverse condition exists.

The extent to which lead-poisoning is a consideration in zinc-smelting in Europe is indicated by the precautions which are prescribed by the Prussian Government, and by the provisions for lavatory and hospital accommodations, etc., which are provided by the owners of smelting works. For example, the owner of the Hohenlohe zinc works has provided a bath-house, costing \$37,000. The extensive use which is made of such provisions is indicated by the report for 1904 of the Prussian Inspector for Manufactures and Trade, in which it is stated that, according to information from several smelteries, about one-third of their employees, on the average, bathed daily. In one of the zinc works hospitals an electric-light bath has been installed, which has proved advantageous in the treatment of chronic lead-poisoning; rheumatic and kidney troubles, in particular, are favorably affected by that treatment.

The Debris Question and the Dredgers.

Sutter is one of the Sacramento Valley agricultural counties, which butts up

against two or three foothill mining counties, so it has always taken a leading part in all the steps toward prohibiting hydraulic and other forms of placer mining. In fact it is now the central point whence injunctions to stop gravel mining are hatched. Its old ally, Yuba county, having found by experience that it is best to encourage mining rather than stop it, has developed a strong mining feeling, especially since the discovery that extensive beds of dredging land lying between Smartsville and Marysville can be made so profitable. The mercantile and other business houses in Marysville will no longer bind themselves to aid any fight against the miners.

Sutter county is consequently playing a lone hand just at present; the latest effort is to work up a case against the dredge men at Oroville, Butte county, who are charged with muddying the Feather river. Of course it cannot be claimed that the few dredges (of the thirty or more at work) in that vicinity are putting anything into the river which was not there before, as hydraulic miners do in their operations; but they stir up the river bottom and muddy the water, and the Sutter county people consider themselves bound to engage in another mining debris fight.

Ex-supervisor L. P. Farmer, now of the State Anti-Débris Association, expresses the opinion that even during the palmy days of the hydraulickers the Feather river was never so discolored and thick with mud as at present. Supervisor E. J. White considers the matter so serious that he proposes to do dire things. He is firm in his belief that the Oroville dredgers are doing the mischief, because the Feather above Oroville is reported by good authority to be a clear stream of water!

Last week the Sutter County Board of Supervisors made a quiet visit to the Oroville dredging fields, to investigate for themselves. They found discolored water, but made no attempt to ascertain the amount of silt in suspension, or what damage, if any, is being done. It came out, however, that they were decidedly in favor of making a campaign against the dredgers operating in the river bed, and doubtless it will be commenced. The dredge men, however, have been prepared for something of the kind for some time. Those dredges working away from the river in landlocked basins can in no way

be affected by suits commenced by Sutter county. The Oroville miners are now securing lands farther down the river toward Gridley, and will protect themselves in various ways. The present question would appear to be much simpler in its aspects than the old dispute originating from hydraulicking.

The Hand-Hammer Drills.

One of the important recent developments in mining appears to be the introduction of the hand-hammer drills, which have now been in more or less use for about two years. Their employment has not yet become general, however, and it is still too early to determine just what their result in practice will prove to be. In all probability this will not remain long in doubt, inasmuch as the demand for a machine which will do what these are designed to do is so urgent that they will quickly receive trials under all the various conditions to be met in practice. Their field is, in brief, the use in narrow veins and in places difficult of access, wherein the large machine drills are at such disadvantage, for several reasons, that hand drilling has remained the cheaper method, notwithstanding the effort to meet the conditions by the one-man, or baby drill.

The hammer drill is a development of the familiar pneumatic riveting hammer that has been for a long time in successful use in machine-shop practice. From this was evolved the plug drill, which has found extensive employment for the drilling of small shallow holes for plug and feather work in quarrying, block-holing of boulders, large rocks, etc. Its employment in mining heretofore has been chiefly for such purposes. The new drills of this type which are now attracting attention, however, are designed for regular mining work, and it is to that application that interest is now chiefly directed.

The new drills are of light weight (only 15 to 20 lb.), and of simple construction. The working parts are few and easily kept in order. These are the chief factors in the usefulness of the machine. Incidentally the "helper" is dispensed with. The air consumption is comparatively large (approximately 20 cu. ft. per min.), and the maximum depth of hole is only about 3 ft. In drilling holes of 2 ft. depth in a fairly hard quartz the speed was a little more than 1 in. per min. Considering that no time is lost in changing position,

the hand-hammer drills are found to compare favorably with the work of a 2¼-in. machine drill on short holes.

The chief objection to the hand-hammer drills so far appears to be their inadaptability to all classes of rock, the latter presenting difficulties when either very dry or very wet and soft. These difficulties are both connected with the hole, extending longitudinally through the bit, through which the air is exhausted. In dry rock the dust blown out of the hole becomes such a nuisance as to preclude the use of this type of drill, in some cases at least. On the other hand, in certain damp, soft ground the hole in the bit becomes clogged so tightly after a few minutes of work that further operation is impossible; the only way to clean the bit in this contingency is to send it to the shop and have the dirt drilled out. This appears to be a more serious difficulty than the dust trouble, inasmuch as the latter can be minimized by the provision of a suitable dust catcher, and possibly may be overcome entirely by the application of some form of water feed.

There are other kinds of ground in which these drills have certainly given very successful results. They would appear to be at their best in compact, fine-grained, moderately hard rock; and especially in dry rock of that character if the dust difficulty can be obviated, when the use of this type of drill would be nearly ideal. At all events, the hand-hammer drill has doubtless come to stay. If for nothing else, it will be a valuable adjunct to the mining equipment for block-holing and breaking boulders, cutting hitches in walls, and squaring up development work. In many cases, if not in all, it will be useful in drifting and stopping, and in some cases it will afford considerable economy, as, in fact, it has already done. Experience has yet to show, however, to what extent it will prove an "all-around" tool, what are its limitations and in what ways they may be overcome.

The Position of Copper.

There has been recently a tendency, both here and abroad, toward a strong speculation in copper. In this country it has been checked by the rather conservative action of most of the large sellers, who have thought best to prevent too rapid a rise, which would surely be followed by a reaction. The statistical position undoubtedly warranted much of the increase

in price which has taken place, but a further advance, with subsequent fall, would be beneficial neither to producers nor consumers. It is well known that a sudden check, following a strong speculative advance, usually takes prices to a point as much (or more) below real values as they were previously above them.

The production of copper this year has shown a large increase over the great output of 1904. The opening of some new mines and the intense operation of the old ones have caused a gain in the Lake output; Arizona has increased its output largely, both from old and new mines; while Montana has made a fair advance over last year. Other districts have helped the three chief producers.

Although it is impossible to give exact figures, it is believed that the following is a close estimate of the copper production and consumption for the seven months ending July 31:

	Long Tons.
Stocks, Jan. 1.....	67,229
Production.....	236,493
Net imports.....	50,394
Total supplies.....	354,116
Exports.....	150,037
Estimated consumption.....	145,090
Total deductions.....	295,127
Stocks, Aug. 1.....	58,989

The net imports are the receipts from foreign countries, less the re-exports of foreign material.

The exports for the seven months were greater by 14,268 tons than in the corresponding period of 1904. This was wholly due to the large shipments to China, which amounted this year to 28,352 long tons. Thus, in the exports to other countries there was, this year, a decrease of 14,084 tons, as compared with 1904. We have heretofore referred to this Chinese trade, and we believe that there is little reason to consider the demand a permanent one. We may also say that such investigation as is possible, discredits certain reports that Chinese houses were accumulating stocks, which they might throw upon the market in the future. There is little probability that much of the copper thus sold will return to our market.

The domestic consumption is, of course, the most difficult to reckon; but it has been very large this year, according to the best informed authorities. The estimate above given is conservative.

With regard to the stocks, as we have frequently explained, the production reported from mines and smelters is not

ready for market when reported. The copper must be transported from the place of production, a large part of it must be refined and there are other delays. These consume from 45 to 60 days from the ore smelters to the final marketing of the metal. There is therefore normally a stock amounting to nearly two months' production; and this may be, and is at certain times, on hand, when hardly a pound is in marketable shape. It is only when the reported stocks are above this normal figure that there is a surplus on the market. At the present time the stocks are rather below than above the normal figure.

We do not believe in any prognostications of a "copper famine" and the like; nor do we believe in the equally sensational predictions of an immediate break to a low figure. Since the beginning of the year, copper has risen from 15 cents to about 16½ cents; but this is not as great an advance as was shown in the parallel period of 1904. It is an advance which has been fairly warranted by the situation, and the sales made for delivery over the rest of 1905 are a strong indication that most of it will be held.

Uniformity in Technical Analysis

Professor Ebaugh, writing in behalf of a committee of the Western Association of Technical Chemists and Metallurgists, calls attention anew to the necessity for standardizing methods. It is to be hoped that this latest effort will meet with strong co-operation. The decision of such an organization as he represents will be useful and influential in pointing out the methods which may properly be employed. However, we are of the opinion that the matter is of such extreme importance that it should be taken in hand by an international, or at least by a national, organization.

The quick methods for technical determinations that are in common use among the works and smelter laboratories have come to stay. It is idle to criticize them merely on the ground that they are careless and sloppy. They are not necessarily sloppy; and if they are so ill-designed as to be careless and inaccurate, it is a case for correction of the inherent error, not for discarding the methods entirely.

We appreciate the criticism that the chemist who has learned his trade by an apprenticeship in the laboratory is less able to detect the errors in the methods

that he employs than is the graduate chemist from the highest class of technical school or university, who has received a thorough training in the classic methods of gravimetric analysis.

The requirements of technical practice necessitate quick methods, and ultimate refinement in analysis is commonly unnecessary. The smelter who is having trouble with a furnace needs an analysis of the slag inside of an hour; it is useless to him if he has to wait for it two or three days, before which time that particular furnace campaign will probably have been killed or cured; similarly in the commercial valuation of ores, an error of a few tenths of a per cent is frequently immaterial.

Errors of method, however, that amount to 10 per cent of the total are not uncommon in the determination of certain elements—zinc, for example. The recent report of the committee of the Society of Chemical Industry, appointed to study that matter, indicated a condition of affairs (not only with respect to zinc determination, but also with respect to the determination of so simple an element as iron) which can only be characterized as disgraceful. Analyses which are made by such defective methods (as appear to be commonly employed) are of practically no value; and when an engineers finds it necessary to compare the results obtained by certain chemists with those reported by others he is not sure of his facts, on account of unpardonable discrepancies.

Such errors in methods are due, of course, to a poor understanding of the principles of chemistry, for which the present systems of teaching are largely to blame. We think that the departments of analytical chemistry in the great universities and technical schools also are to be blamed to some extent for failing to recognize that technology needs quick methods; and, in view of that requirement, for failing to study critically the methods which have come into use; eliminating and correcting their errors, and doing, in brief, what the committees of technical societies have tried to do. The societies have done in certain cases the best that could be expected. Some of the technical schools and universities have also made valuable contributions to the subject by causing certain of the quick technical methods to be investigated in thesis work. We shall have more to say later regarding this really vital question.

Metallics.

Yellow solders are composed of copper and zinc, and are known as the brazing solders. They melt at high temperature, the yellow solder of lowest melting point consisting of 50% copper and 50% zinc.

The Bower-Barff finish on steel ware is produced, by heating the articles in a closed muffle, into which steam is introduced. The steel is in that way coated with a protective film of magnetic oxide.

Concrete made of broken or crushed brick instead of stone gives excellent results for some purposes. However, it always requires a larger proportion of cement than when less porous material is used.

There is considerable danger of poisoning from arsenic fume in the use of impure hydrogen in the flame for lead "burning." This may be avoided by the use of arsenic-free zinc in developing the hydrogen.

Cadmium is now rather extensively used in the manufacture of sterling silver, being added as a deoxidant. It is customary to introduce 0.5% cadmium for that purpose. The cadmium renders the silver sound and the metal rolls well.

Ladders in mines should be strong and intact. In vertical shafts and in deep pitching inclines there should be landings not more than 20 ft. apart, and closely covered, except a hole large enough for a man to pass to the next ladder.

Zinc forms alloys with most of the common metals at temperatures sufficiently high to insure fusion. These alloys are usually white, crystalline, brittle compounds, and are of little importance, with the exception of the copper-zinc series.

In handling material the most direct transportation is necessarily the most economical. It is for this reason that the system laid out about a series of rectangular co-ordinates gives the maximum storage capacity at the minimum expense of handling.

Dynamite should be stored in a building separate and isolated from other buildings and from traffic. Caps and electric exploders and fuses must not, under any circumstances, be stored in the same building with the powder. They should always be kept apart until needed for preparing the charge.

Sand washers, made somewhat after the manner of the spitzkasten, are used on some construction work where the sand is loamy or too full of vegetable matter for ordinary purposes. Devices of the same character are used for washing the filtering sands at the Albany filtration plant and give excellent results.

The use of air instead of steam for drilling in all underground workings is advised. A drill using air is a great ventilator, driving out smoke and noxious

gases and furnishing pure air at the face workings. In some cases air-drills have taken the place of fans and they keep the mine well supplied with fresh air.

The suitability of zinc for graphical purposes may be ascertained by brightening a small spot with a finely ground scraper and examining the fresh surface with a microscope. The zinc appears as ashy, star-like scales, while the lead shows as bluish flecks. The presence of lead is objectionable in zinc to be used for this purpose.

In purchasing spelter for brass-making, iron and lead are the impurities which it is sought to avoid as far as possible. For some purposes, however, lead is required in brass, though not to any great extent. There are some special cases where iron is needed, but almost always it is best to employ spelter that is practically free from that element.

Birmingham is the chief center of the brass industry in Great Britain; and Ansonia, Waterbury and Bridgeport, in the United States. Brass was made originally direct from ore by the cementation process, but since spelter has been an article of commerce the manufacture of brass has consisted in melting zinc and copper together in the desired proportion.

The high speeds and heavy starting torque required of coal-handling plants of the tower type make one of the troublesome features of this class of work. Some plants have been operated at such extremes that the constant presence of an attendant, pouring water over the wood-lined hand-brakes, was required to prevent their catching fire from the heat generated by friction.

Storing of oil, waste, candles, etc., required in mining should be at a safe distance from the boiler house, engine-room and shafthouse, and a quantity of water should be stored at such place to guard against fire. All shafthouses should have ample fire protection, and the appliances should be kept in condition for instant use, as quick action will often save an entire plant from destruction.

The Huntington-Heberlein process has been installed at the Walther-Croneck-works, at Roszdin, Upper Silesia. It is also in use at the Friedrichshütte, Tarnowitz. At one of these works the waste gases are to be employed for the manufacture of sulphuric acid, which is probably the first example of that practice in connection with this process. It is indeed remarkable that sulphuric acid can now be made from an ore containing only 12 to 14% sulphur.

Where chain-pipe tongs are not available, a piece of 2 by 4-in. scantling, in conjunction with a few feet of rope, makes an excellent substitute. The rope is looped and the two ends wrapped about the pipe. If the timber is then thrust

through the loop and against the pipe, pressure upon it tightens the rope and gives a grip that will hold to a surprising extent. The rope must be wrapped, of course, in a direction opposite to that in which it is desired to turn the pipe.

The Canadian method of drilling oil wells differs from the American, poles being used instead of manila rope, and different tools of smaller sizes. The poles are of ash, 35 ft. long, one screwed on to the other to reach to the bottom. This is considered to be a good method, and for depths less than 700 ft. probably the cheapest. The poles last well, and strike better and faster than in rope drilling. Beyond 700 ft., however, the pole method becomes slow and expensive, especially if water be encountered, and the rope method is superior. In the Petrolia district, iron rods and tubes are used, with wire rope at the top.

All explosives used in and about mines should be stored in a magazine provided for that purpose, and located far enough from the working shaft, slope or tunnel, boiler-house or engine-room, so that in case the whole quantity should be exploded, there would be no danger. All explosives in excess of what are needed for one shaft should be kept in the magazine. A suitable place for thawing powder should be provided for each mine and quarry and kept in condition for use. The hot water or steam bath is the only safe device. Dry heat is unsafe. A receptacle for carrying explosives should be provided. Exploders and powder should not be kept in the same room. A suitable place separated from mine boilers or engine-room should be provided for preparing charges. One man should have full charge of the magazine.

An ejector for removing the oil of gas tar from an excavation has been made and successfully used as follows: A short piece of $\frac{3}{8}$ -in. pipe is screwed, by means of the standard bushing, into one end of the run of a $1\frac{1}{4}$ -in. tee. A cap, with a small hole drilled through its center, is screwed upon the other end of the $\frac{3}{8}$ -in. pipe, and a piece of $1\frac{1}{4}$ -in. pipe, sufficiently long to extend some inches beyond, is screwed into the other end of the run, so that it will cover and project beyond the $\frac{3}{8}$ -in. pipe. The suction pipe is connected to the branch of the tee, and steam is applied at the end of the $\frac{3}{8}$ -in. pipe. Passing through the small hole, it condenses and tends to form a vacuum, into which the material to be pumped discharges. The steam and liquid are ejected together from the end of the $1\frac{1}{4}$ -in. pipe. It was found in practice that when the device failed to work it was usually due to the warmth of the solution handled; the steam condensing so slowly, under these conditions, as to render it inoperative. When this happens, a bucket of cold water, thrown over the device, is usually sufficient to start it again.

Colliery Notes.

European practice favors high speeds in turbine pumps; in America the contrary is true. American manufacturers claim that in the case of very acid mine water moving at high velocity, the metal of pumps and pipes will be more readily attacked than when the water moves more slowly.

The ordinary mine map is drawn to a scale of 100 ft. to the in. It has been suggested that 20 ft. to the in. be used in the case of more elaborate surveys with detailed side measurements. The map can be constructed on squares convenient for handling, and all the blocks need be assembled only on certain occasions.

The movement of Pittsburgh river coal is uncertain, being largely dependent on the weather. In some years there have been coal shipments every month, but that is quite unusual. In other years shipments cannot be made more than four months out of the twelve. Low water in summer and ice in winter are the difficulties.

Slowing down the fan at the time of firing shots in mines, to prevent explosions of dust, is of questionable benefit. This would certainly be evident in gaseous mines, especially at those workings requiring large volumes of air to dilute the escaping gas to a safe point. At some mines, when the ventilation is not maintained at a certain strength, the miners are not allowed to remain under ground.

When mules are used for haulage in mines, the driver boss and his runners should inspect (every other day) all roads traveled by the animals, and should report promptly to the mine foreman any place that needs repair. Roads must be kept smooth and free from lumps of coal and rock. Also fair drainage must be provided if the mules are to be kept in good condition. Where ditches become blocked they should be promptly opened.

Turbine pumps take up comparatively little room; the parts needing inspection or replacing are accessible, and their operation by electricity does away with the heat of steam. Centrifugal pumps have been used for some time in American and European mines in pumping out local basins; in the last few years they have attracted attention in high lift work. In this latter class is a turbine in Spain, pumping water to a height of 2,000 feet.

In sinking slopes, an important thing to remember when commencing the opening is to place the first set of timber high enough to take care of drainage and waste. Account should be taken of the fact that various kinds of material will accumulate at the slope mouth. In time the surface-grade will be toward the mine opening, instead of away from it (as should be the case) unless this mouth has been made higher than immediately

necessary at the time. Obviously, water falling around openings will drain into the mines, unless it is forced to drain off.

A device which shows the presence of small quantities of gas has the advantage of serving as a warning of impending danger, and usually gives time to take necessary precautions. The common "Davy" in expert hands does not show the presence of less than 2½% of gas in air; and disaster may overtake the miners before they can reach a place of safety. The amount of gas at different points on return airways might advantageously be made a matter of daily record.

The ordinary chain-mining machine, making a 6-ft. undercut, requires a clear space of about 12 to 14 ft. between the timbers (props) and the face. The character of the roof and the seam, and the thickness of the latter largely determine the method of working where machines are to be used. If the top shows a draw-slate (or "clod") so that it will not stand unsupported for 14 ft., it is a source of danger, and the machine must be taken down. In some thick bituminous seams having a distinct top bench (when the main top is poor), this stratum of coal is left up; when the pillars are being robbed, this top coal can be largely recovered.

In bee-hive coke-oven construction, the crown brick are laid in mortar made of a material which will either merely bed the brick, or cement them together. In the former case very little mortar is used between each brick, and the bedding material consists largely of loam. In case the bricks are to be cemented, sand mortar is employed. When the oven is thoroughly heated, the mortar fuses and the crown is formed practically of one brick. This latter is the common method, but it has the disadvantage of making repairs difficult. When a hole appears in the crown, it often takes considerable time to trim away the surrounding broken brick, before new brick can be laid in its place.

In the anthracite field of Pennsylvania, in pitching seams, slopes are started as follows: The outcrop is located with hand churn-drills or by "proving holes." Then a small shaft is sunk over the seam about 20 to 30 ft. from the outcrop. This shaft is sunk through the coal bed to the bottom rock which is carefully laid bare to obtain the pitch accurately. The vertical distance from the surface to the bottom rock in the shaft, together with the pitch of the seam, enables one to calculate the position of the mud-sill of the slope mouth. The inclination of the first set of timbers is also obtained. These points being given, together with the line on which the slope is to be sunk, the work of sinking can start. After obtaining the general strike of the bed, the slope line is determined by a number of crop provings in the vicinity.

Discussion.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of THE ENGINEERING AND MINING JOURNAL.

Minas Geraes, Brazil.

Sir—In THE ENGINEERING AND MINING JOURNAL of October 6, 1904, p. 547, there appeared an article by Martin Schwerin, entitled "Gold in Minas, Brazil." The facts there represented are so erroneous regarding the system of working employed by the natives that I deem it my duty to present evidence to the contrary.

In Minas Geraes the value of a gold mine cannot always be immediately demonstrated; new and strange conditions exist, and the expert is brought face to face with phenomena which, perhaps, he has never even heard of. The gold mines may be divided into three groups or classes, namely: (1) Decomposed-gneiss mines. (2) Quartz veins carrying arsenical pyrite. (3) Jacutinga mines (the word *Jacutinga* is of native origin, and means "gold-bearing iron ores.")

These deposits possess some interesting and possibly unique phenomena. They possess the same peculiarities with the Sao Goncalo group of mines. The country rock is gneiss decomposed *in situ* to an unknown but certainly great depth. By the ancients the lands have been cross-cut for a distance of two miles to an average depth of 100 ft. At this depth the rock mass is as soft as at the surface. This gneiss carries gold in quantities from 1-10 gram to 15 grams per cu. yd. This auriferous "country" is traversed by fissure veins of soft, friable, sandy quartz, generally narrow, but rich. Some of these veins have a length of 2 miles. The richest show a width of from 8 to 10 in. and give from 18 to 20 dwt. per short ton. Parallel to the quartz fissures run rich gold-bearing strata, locally called "lineas." A sample of one yard taken from a width of 5 ft., and washed in a rocker, gave 13 grams. The gold is intensely yellow and is almost pure, being above 23 karat.

Speaking generally, the gold seems to be present as an essential ingredient of the rock mass. No difference of color or of structure distinguishes the richer ground from the poorer. The geological age of the rocks is difficult to determine, as no fossils exist; but (judging from the evidence of the depth of the undisturbed soil, decomposed by atmospheric elements) they can probably be classed as Huronian. In the natural depressions and small valleys, small, thin beds of white sugary quartz exist, intercalated between beds of white clay. These gravel beds are rich and run up to 100 grams per yard. The total thickness of the clay is 16 ft. This clay is capped by a mass of soft decomposed carbonaceous matter, from 1 to 2 yd. thick. The roots and trunks of trees in some parts have re-

tained the original form and fibrous structure. It may be well to mention that the vicinity of Ouro Falla is famous for its mineral springs, comprising carbonic, sulphurous, ferric and magnesian waters.

For more than a century the Ouro Falla has been a steady and constant producer of the precious metal. In A. D. 1814, according to Von Eschwege's estimates, there were employed in the Sao Goncalo mines, including Ouro Falla, 196 slaves and 2 freemen, and the yield in that year was 4,032 *oitavas* of gold. However, the mining industry throughout Minas Geraes was then in decadence, owing to the severe restrictions imposed by the Portuguese Government. The simple, yet effective, system of ground-slucing employed by the old workers is responsible for the enormous excavations, or *cattas*, existing on the property.

An approximate estimate of the gold recovered can be made by calculating the cubical content of the ground excavated. One large old excavation is that called "Carandahy," having a length of 500 yd., width 250 yd. and depth 10 yd. (say, 1,250,000 cu. yd.). Sixty yards of the same stuff washed by me in a ground sluice gave 55 grams of gold, or 0.916 gram per yard. Taking this as approximate, the amount of gold taken from "Carandahy" alone was 1,154 kilos (or, at £130 per kilo, £150,000). Much more must have been obtained from the open works called "Grande Tranche," as this approximates 7,000,000 cu. yd. The quartz veins run along the whole length of this cut for a distance of two miles. A moderate estimate of the total amount of gold won at Ouro Falls would be £500,000 sterling.

The estate covers 1,000 acres, two-thirds of which is gold-bearing. The material may be said to be enormous. Under good management and with modern machinery (which should chiefly consist of pumping engines, capable of delivering water against a head of 400 ft.) a daily output of £1,000 could be assured.

The quantity of gold recovered would be in proportion to the amount and power of the machinery. A delivery of 1,000 gallons per minute would be sufficient to treat a quantity of 1,000 cubic yards per day. No stones exist, the stuff being so soft that it can be sliced off with an ordinary paper-knife. No sluice-boxes would be required, as the bottom of the Grande Tranche, with its natural grade of 3%, would serve admirably as a huge ground sluice of two miles in length. The long ditches made by the ancients still exist. Some of these have a length of 30 miles.

The Jacutinga Mines.—These deposits are interesting. I give an extract from my report made upon the largest, that of Itabira-do-Matto-Dentro: "The mine is composed for the most part of iron-ore (hematite) and quartz in alternate layers, which are often thin, and again attain a thickness of 12 in.; these conform in

large measure to the contour of the mountain, in both direction and dip. The auriferous bed of Jacutinga (which rests conformably) bears nearly east and west; it is composed of sandy iron glance, earthy iron-ore, brownish granular quartz, yellow talc, and earthy oxide of manganese in smaller quantities. Particles of gold are scattered through the formation; those portions in which manganese and talc abound have proved rich. Near the surface gold often occurs in octahedral crystals of deep yellow color, and exceeding purity; at greater depth, however, it assumes the hue of tarnished silver. The masses (on which this mine was worked by the ancients to a depth of 25 fathoms) have an end-long dip or shoot toward the east. The rocks above the Jacutinga pass gradually into a breccia known as *canga*, which has a thickness of from 20 to 30 ft. This is composed chiefly of massive brown iron ore, irregularly mixed with quartzose iron-mica-slate, clay slate and quartz. The blocks (of which the mass is composed) vary from a few inches to several feet. The gold in the Jacutinga, and in the rich stratum below it, exists in clusters resembling pieces of plates or filigree. From the Jacutinga bed upward, the gold is of a bright appearance; below it is of a pale waxy color, due to the amount of palladium it contains. The lowest beds are the richest. The pound (troy) of gold I obtained while making my examination shows the palladium alloy plainly. The top *canga* bed gives \$1 per yd. minimum; the Jacutinga gives \$5 per yd.; the lower strata I could not reach. An interesting fact is, that the richer the ground the more dangerous it is to work. The whole mass (including the rich strata, *jacutinga* and *canga*) possesses a total thickness of 100 ft., and will average \$4 per yd. The mine measures 800 yd. by 900 yd., and has a total cubical content of 23,760,000 cubic yd. The lowest stratum on which the gold-bearing beds rest is composed of solid massive hematite (69.46% fine).

The iron mountains of Itabira are larger than those of Mesabi or Menominee, and could supply Europe with iron for many centuries. The Conceição mine possesses the same conditions as the Itabira mine, except that, territorially speaking, it is larger, the mine property covering an area of 3,000 acres, of which more than half is *canga*. The known gold-bearing land extends for several miles. Both this mine and its neighbor Itabira form ideal hydraulic propositions; a monitor could do in one day what the ancients could not accomplish in a year. Both mines have a slope of from 5 to 15% and ample low lands on which to deposit tailing.

Some mines have produced in recent years; thus "At Gongo Soco, between 1828 and 1856, there was obtained (in clusters, nuggets and other coarse gold, treated by hand at the washing house)

23,381 troy pounds, or 0.677 of entire produce. In smaller grains (and particles extracted from the Jacutinga by stamping), 11,146 troy pounds, or 0.323 of entire produce.

"A more modern mine, the 'Maquine,' in 1868, paid a dividend of 100%, and in that year obtained 2½ tons of gold. At this mine, on the richest vein or 'linha,' as it is called locally, 103 tons Jacutinga gave 127 kilos, or 279 lb. gold.

"The Catta Branca quartz mine afforded much gold, besides the sulphurets of bismuth and antimony in smaller quantities." The produce, as given herewith, was:

	Tons of Ore.	Gold in Lbs. Troy.
1840.....	18,320	974
1841.....	21,704	864
1842.....	21,612	790
1843.....	21,648	385
1844 (6 months).....	7,900	154
Total.....		3,167

After a five years' residence in Brazil, occupied in examining mining properties, I am of the opinion that, if the most promising of the many deposits could be presented to the attention of New York capitalists, it would probably place the industry upon a more flourishing footing. The mine upon which I placed more importance was that of Villa Rica, a huge quartz mine near to Ouro Preto. A sample lot of 33 tons of ore, taken from several veins, was submitted for testing, and to enable me to determine the nature of treatment for arsenical ores. The tests were carried out at Waverly, at Messrs. Ricketts & Banks' sample works. The average was over \$12 per ton, not including values lost in sand and slime.

The pay vein at Villa Rica consists of one great quartz lode, accompanying the length, contour and dip of the mountain. Some vertical stringers have passed through the upper formations of itacolumnite or flexible sandstone, and these stringers from orebodies of many thousands of tons. Resting on clay schist, which forms the capping or hanging wall of the pay vein, are innumerable veins of clear glassy quartz, barren, or nearly so, the best only carrying traces of gold. In almost all cases the ancients have driven adits cross-cutting the mountains, through these hungry veins, in their efforts to reach the pay vein. In some cases these barren veins when in contact with itacolumnite possess drusy cavities or nests filled with oxidized ore, rich in gold, which occurs as beautiful octahedral crystals. The pay vein is from 8 to 20 ft. thick, and in length extends the whole length of the Villa Rica mountain, a distance of 6 miles. The clay schist, forming the capping, carries gold in economic quantities. The same vein at Passagem has been worked at intervals for 125 years, and produces about £90,000 annually. The proportion of pyrite is as 1 to 8.

The result of an examination was that the big Villa Rica mine was turned down.

It was afterward found that the expert had taken the major part of his samples from the barren veins traversing the sandstone.

The Santa Luzia mine (gneiss) was examined in two hours. This mine covers 2 sq. miles of territory, and possesses excavations equal to 2,500,000 cu. yd. This mine is now working under the management of a French civil engineer on a small scale, the gneiss yielding 30c. per cubic yard.

In the mine called Chicaco, the old excavation approximates 1,000,000 cu. yd. From this mine the Baron L'Espe, a French mining expert, had, under my direction, extracted 1,000 cu. yd., washing in a ground sluice, and obtained a little more than 1 kilo of gold, or 64c. per yard. The quantity of material in this mine and the above may be truly said to be inexhaustible. The mine lands embrace an area of about 400 acres.

Another mine was on the River Carmo. This river rises in the Villa Rica mountains, and has a length of about 120 miles. The gravels are known to be very rich, and an option of purchase was given to Mr. Ernest Wiltsee over a stretch of 50,000 meters. The experts who conducted the examination are considered first-class dredging engineers. I had given a verbal guarantee of an average value of 50c. per yard.

Out of seven propositions, two were highly recommended, two approved of subject to future investigations, and three were turned down.

Why Mr. Martin Schwerin should write in such a pessimistic strain regarding Brazilian gold mines, is incomprehensible to me. To the general reader who has no especial knowledge of Brazil, it would appear that his description applies to the mines in general. During the past two months a river dredge owned by a New Zealand dredging company has commenced work on the Rio das Mortes, a large dredging concession 100 miles in length. Up to the present the gold output has been in excess of the estimates made by the engineer who first examined the property.

The gist of the matter is, that Minas Geraes may be favorably compared with any gold-bearing State in the North American Union. The total amount of bullion produced has reached £96,000,000. That the mines are not exhausted, I have endeavored to prove. Minas Geraes is not a prospectors' country. It needs a great deal of money, time and patience to obtain options on any mine. Sometimes a property will be held by more than 100 different persons; and it is necessary to obtain powers of attorney from each of them. The option to be binding must be drawn up by a lawyer, and the State tax paid in proportion to the amount specified in the contract. This tax sometimes is as much as £700. I have found that the cost of getting a proposition into shape and ready

to present as a commercial mine, is £3,000 in money and two years in time. I have great faith in the future of the mining industry of Minas Geraes.

Capitalists who may consider Minas Geraes as a field for investigation and possible for investment should take great care in selecting their experts. Patient painstaking men should be sent, men who do not get homesick, and who have traveled in other foreign countries.

Traveling in Minas Geraes, especially in the mining district, presents no difficulty. The cost of going around, with mule troop, men and outfit, will not exceed £200 per month. The country hotels always have on hand an abundant supply of meat, milk, eggs and vegetables. While comfortable, the hotels are by no means luxurious.

OWEN R. THOMAS.

Rio de Janeiro, July 5, 1905.

Salt Beds in Red Sandstone.

Sir—The existence of salt beds in red sandstones of the Permian and other periods has been noted and commented upon by geologists; it has suggested the following as a probable explanation:

There are many ranges of mountains, among which I may mention the Rockies, the Andes, and the Alps, which have been upheaved since Permian times. This is known from the fact that rocks younger than Permian are found folded into high peaks of these ranges.

These facts (considered in connection with the constant escape of the combined waters from the igneous core of the earth through volcanoes, geysers, hot springs, etc.), constitute proof that the ocean areas of the earth are on the increase and have been so through all geological time. This increase of water upon the surface of the earth, due to its escape from combination with the igneous interior, points to a time when the proportion between land and water areas was far different from what it is now. Instead of three-fourths water and one-fourth land, as at present, it is probable that the proportion formerly was reversed and that the land area exceeded the water area in the same proportion that the water area now exceeds that of the land.

Under such conditions the chances for large desert areas, with their accompanying salt lakes, would exceed those of present conditions. The evaporation of such land-locked salt lakes would leave the salt beds which the climate of the times was admirably suited to produce owing to the large area of land as compared with water.

The reduction of the circumference of the earth (shown by the folding of mountain ranges as mentioned), amounts to enough to correspond to several miles in its diameter, and this may have been principally due to the escape of water, which has increased the depth and area of the oceans. Under the climatic conditions

which existed in Permian times, with its land area vast as compared with the water area, the surface of the earth was, largely, a typical howling wilderness.

HIRAM W. HIXON.

Victoria Mines, Ontario, Aug. 21, 1905.

Correspondence.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Metric System.

Sir—The happy condition of things in Mexico as to the metric system (portrayed by F. Susteric in this JOURNAL of April 27, p. 808) is so far different from that prevailing in the shops under my direction, and from anything that had come under my notice in others, during four years' service in Mexico, that I have been prompted to make inquiries as to the practice of the principal railroads and commercial plants of Mexico.

I wrote to the heads of the mechanical departments of five of the most important railroads of the Republic, all of whom answered to the effect that as far as all shop measurements of gages, drawings of locomotives and cars, and of other apparatus made in shops, is concerned, the metric system is unknown and English measures are used entirely.

The manager of one of the most important commercial shops in the Republic (who has been for 25 years, and is still doing important engineering work) assured me that the same condition exists in his shop. One of the most prominent manufacturing firms, owned and conducted by Mexicans, writes me: "In regard to the metric system, will say, that in our shops we use both the metric and English systems. In fact all of our calculations of strain of materials, and our plans, are based on the metric system, while the sizes and dimensions of material, lathe work, etc., are based on the English method."

All reports and plans for submission to the Government are, of course, made as requested by law in the metric system.

The "illiterate Indians" may have adopted the metric system; but if there is any important machine shop that has done so for its own use in construction work I have yet to learn of it.

I think that the fullest investigation will sustain the opinion I have just expressed and will be glad to submit the original letters, referred to above, to your inspection if of interest.

BEN JOHNSON.

San Louis Div., Mex. Cent. Ry.,

Aug. 28, 1905.

For timbers that are to be constantly submerged, hemlock will last as long as white oak and is preferable to it.

New Books.

Determinacion de los Minerales. By Antonio Gascón y Miramón. 4½ in. by 6 in. Pages, 285. Ricardo Rojas, Madrid, 1905. Price, \$2.40.

Influence De L'Azote sur Le Fer Et L'Acier. By Dr. Hjalmar Braune. Reprinted from "Les Aciers" by Prof. H. Le Chatelier. Pages 6, with illustrations, 8¾ by 10½ in., paper.

Programm der Könighchen Technischen Hochschule zu Aachen mit angelehnter Handelshochschule, for the academic year (Oct. 1, 1905, to July 31, 1906). Pages 146, 6¼ by 9 in., paper. Aachen, Germany, 1905.

The Clays and Clay Industries of Connecticut. By Gerald Francis Loughlin, Bulletin No. 4. Connecticut Geological and Natural History Survey. 5¾ in by 9 in. Pages, 121. The Case, Lockwood & Brainard Co., Hartford, Conn., 1905.

Gems, Jewelers' Materials and Ornamental Stones of California. Bulletin No. 37. California State Mining Bureau. By Lewis E. Aubury, State mineralogist. Pages 171, 6 by 9 in., with maps and illustrations. W. W. Shannon, Sacramento, Cal., 1905. Price, \$0.50, paper.

The Mount Mitchell Folio, No 124, United States Geological Survey. By Arthur Keith. 18 by 22 in., paper. Pages, 9, with 5 plates. The Survey, Washington, D. C. 1905.

A description of resources of soapstone, talc, mica, corundum, chromite, graphite, etc.

Bücher-Verzeichnis des Vereins für bergbaulichen Interessen im Oberbergamtsbezirk Dortmund zu Essen. Germany. Third edition, 1904. 7½ by 10½. Pages, 680, plus 150, cloth. H. S. Hermann, Berlin, 1905.

A convenient and elaborate catalogue of a vast library of matter concerning mining and metallurgy.

The Delevan Lobe of the Lake Michigan Glacier (of the Wisconsin Stage of Glaciation and Associated Phenomena). Professional Paper No. 34, United States Geological Survey. By William C. Alden. Pages, 106; with maps and illustrations. 9 in. by 11½ in.; paper. Government Printing Office, Washington, D. C. 1904.

Wireless Telegraphy. By A. F. Collins. Pages 299, 6 by 9 in. McGraw Publishing Company, New York, 1905. Price, \$3.00, cloth.

Contents—Ether. Wave motion. Electric waves. Disruptive discharge. Electric oscillations. Oscillators. Capacity, inductance and resistance. Mutual induction. Induction coils. Interrupters. Oscillating current generators. Electric wave action. Electric wave detectors. Transmitters. Receptors. Subsidiary ap-

paratus. Aerial wires and earths. Resonance. Syntonization. Wireless telephony.

Cements, Limes, and Plasters. By Edwin C. Eckel. 6x9 in. Pages, 712. Illustrated. New York, 1905; John Wiley & Sons. London: Chapman & Hall, Limited. Price, \$6, cloth.

Contents—Composition, distribution and excavation of gypsum. Chemistry of gypsum burning; manufacture of plasters. Composition, properties and tests of plasters. Flooring-plasters and hard-finish plasters. Statistics of the gypsum and plaster industries. Composition, origin and general characters of limestones. Lime-burning. Composition and properties of lime. Hydrated lime, its preparation and properties. Manufacture and properties of lime-sand bricks. Sources and preparation of magnesia. Magnesia bricks and oxychloride cements. The theory of hydraulic limes. Eminently hydraulic limes; Grapier cements. Feebly hydraulic limes; selenitic limes. Definition and relations of natural cements. Raw material; natural-cement rock. Manufacture of natural cements. Composition and preparation of natural cements. Specifications for natural cements. History, statistics and prospects of the natural-cement industry. Portland cement. Limestones. Argillaceous limestones; cement rock. Fresh water marls. Alkali waste; blast furnace slag. Clays, shales and slates. Excavating the raw materials. Calculation and control of the mix. Preparing the mixture for the kiln. Standard types of crushing and pulverizing machinery. Cement burning; fixed kilns. The rotary kiln. Head consumption and heat utilization. Requisites and treatment of kiln fuels. Clinker cooling, grinding, and storage; use of gypsum. Costs and statistics. Constitution, setting, properties and composition. Physical properties; testing methods. Specifications for portland cement. Puzzolanic materials. Slag cement; requisites and treatment of the slag. Slag cement; lime, mixing, and grinding. Slag cement; composition and properties. Slag bricks and slag blocks.

Transactions of the American Electrochemical Society. Vol VII. Seventh General Meeting (Boston, Mass., and Cambridge, Mass., April 25, 26 and 27, 1905). Pages 345, 6 by 9 in., cloth. Published by the Society. Philadelphia, Pa., 1905.

Contents—Revision of the theory of electrolysis (presidential address), Henry S. Carhart. Reversible and irreversible electrolytic polarization, Franklin and Freudenberg. Notes on economic temperatures of copper-refining solutions, Burgess. Communicated discussion on Burgess' paper, Lawrence Addicks. A diaphragm cell for electrolysis of sodium-chloride solutions, C. P. Townsend. Conduction in fused and solid electrolysis, J. W. Richards. Notes on Nernst fila-

ments, C. I. Zimmerman. On Billitzer's method for determining the absolute potential difference, H. M. Goodwin and R. B. Sosman. On the Edison storage battery, Thompson and Richardson. Chromium and the electrolysis of chromic acid, Carveth and Curry. Electrolytic precipitation of silver, R. C. Snowdon. Some results of experiments with the electro-deposition of metals on aluminum, A. Lodyguine. Some results of experiments with the reduction of titaniferous ores, A. Lodyguine. On the specific inductive capacity of oleic acid and salt, L. Kahlenberg. The rotating diaphragm, W. D. Bancroft. On the heat of solution of aluminum bromide in ethyl bromide, H. E. Patten. The independence of the atomic weights and the electrochemical equivalents, A. Reutherdahl. Notes on the utilization of blast-furnace gases in connection with the electric smelting of iron, A. J. Rossi. The electrostatic treatment of ore, Lucien I. Blake. Experiments with the reduction of different oxides of lead by electric current, A. Lodyguine. Colloids, W. R. Whitney. An electrolytic switch, William Smith Horry. Production of silicon in the electric furnace, F. J. Tone. The microstructure of silicon, and alloys containing silicon, Albro. The mercury arc, E. Weintraub. Ares, W. R. Whitney. The electrolytic precipitation of nickel on nickel, R. C. Snowdon. An optical method of observing the diffusion in electrolytes, Carl Hambuechen. The aluminum electrolytic condenser, C. I. Zimmerman. A low-voltage stand cell, G. A. Hulett.

Questions and Answers.*Recovery of Iron from Cinder.*

Will you inform me of the best method to obtain the particles of iron which have been pounded off with the cinder from a foundry cupola? The ashes from our cupola contain about 50% of pure iron, and we should like to know what would be the best method to secure the iron from a large dump of cinder.—E. M. J.

Answer—This is a question which you should refer to a professional metallurgical engineer, who would examine the conditions and determine by experiment the advisability of attempting the separation desired by you, and its probable commercial results. Jigging and magnetic separation would probably be the methods to be investigated.

The Sluice Head.

A correspondent has written to us for a pump of capacity equivalent to a certain number of "sluice-heads." This is a new unit to us, and we shall be obliged if you will inform us what it means.—K. F. M.

Answer—The sluice-head is a measure of water which is employed in the Yukon territory. It is equivalent to 60 miner's

inches. The miner's inch is equivalent to 1.5 cu. ft. per minute.

We are unable to inform you as to the origin of the term, or as to its usage elsewhere. We shall be pleased to hear from any of our readers who can supply this information.

The Betts Aluminum Process.

Aluminum oxide usually occurs in nature, associated [combined] with other oxides, e.g., those of iron and silicon in clay, and mixed with those of iron, silicon and titanium in bauxite; but since those oxides are more easily reduced than alumina, it has not been possible to prepare aluminum by reducing the ore to an alloy and slagging off the impurities, as with pig iron. For this reason alumina is freed chemically from impurities before it is reduced to metal. Anson G. Betts, of Troy, N. Y. (U. S. patent No. 795,886), proposes a process which is radically different in principle. He reduces the crude ore direct to a metallic state (either with or without diluting the aluminum by the addition of another metal, as copper, zinc or tin). The product of aluminum, mixed with other metals, is placed in a fused state at the bottom of an electrolyzing cell; this cell contains an aluminum-depositing electrolyte which is specifically lighter than the aluminum-containing product, and floats on the electrolyte, which is also specifically heavier than pure fused aluminum. A layer of fused (and substantially pure) aluminum is electrically connected as cathode, while the aluminum-containing product is electrically connected as anode. The property of aluminum, as the most easily oxidized of metals, insures that it alone dissolves from the anode, so that with the passing of the current pure aluminum is deposited at the cathode, where the deficiency of aluminum caused thereby in the electrolyte is made up by solution from the anode.

By this method aluminum can be extracted from such materials as aluminum silicide and carbide and similar non-oxygen containing compounds. It may be applied to the reduction of bauxite (similarly to the Hall process for aluminum) from a bath of fluorides; also to the reduction of bauxite, clay or other aluminous material for the elimination of oxygen, by alloying the product with iron, copper, tin, etc., and extracting the contained aluminum electrolytically, leaving the other elements alloyed with the heavy metal in question.

A thermostatic bar has been employed to operate a low-water alarm, the bar being attached to a chamber whose temperature is normally that of the water in the boiler, but which rises when the water falls and exposes it to the steam. The heat causes the bar to bend and closes the circuit.

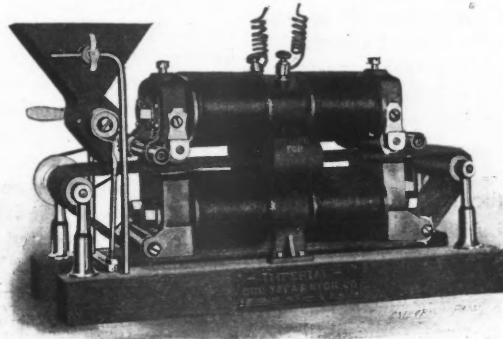
The Imperial Magnetic Ore Separator.

The accompanying illustrations represent a novel type of separator for treating ores which are associated with feebly magnetic iron. In appearance it somewhat resembles a dynamo of the old "Weston" type.

In one pass through the machine the

magnetic circuit is shown by the dotted lines. Special pole-pieces, of different shapes and sizes for use with different kinds of ore, can be attached as desired.

Preferably, each of the upper pole-pieces is provided with a magnetic roller, which removes the attracted particles from the field; this will be seen in position at the



IMPERIAL ORE SEPARATOR, FIG. 1.

ore is separated into three parts, namely, highly magnetic, feebly magnetic, and non-magnetic. The machine is intended for use on ores that contain matter which is but feebly magnetic (or that can be made feebly magnetic by preparatory roasting). The lines of force are highly concentrated within the separating zone, and the intensity is adjusted to the nature of the ore treated. Means for quickly adjusting the fields, as well as for regulating the magnetic flux, are provided.

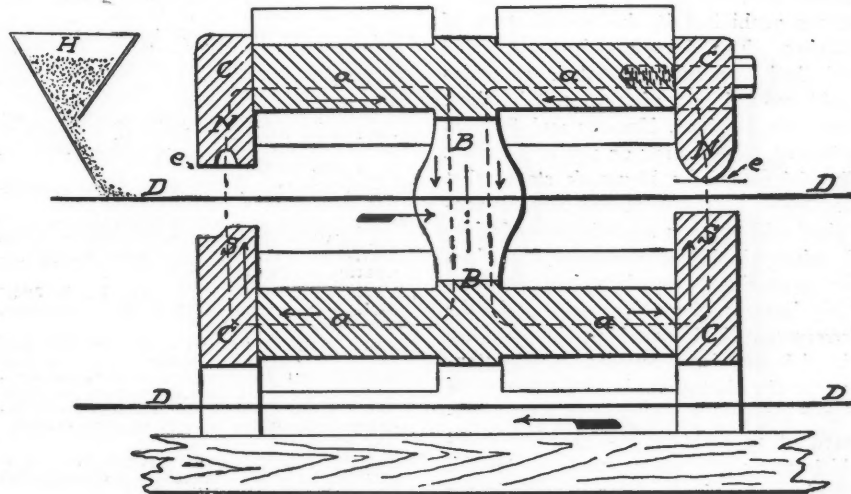
Fig. 2 shows a section of the machine, in which the letters *aa* indicate the magnet cores, *B* is a connecting yoke, located centrally, and having an opening to allow an endless horizontal conveyor belt, *D*,

ends of the machine (Fig. 1). The lower part of the magnet yoke is provided with feet, as shown.

The separator is being brought out by the Imperial Ore Separator Co., 45 York street, Brooklyn, N. Y.

Device to Prevent Overwinding.

A safety device, which tends to prevent a mine cage from ascending more than a certain distance above a landing, was patented recently by J. G. Scott, of Girardville, Pa. This is attracting attention. Damage from overwinding is prevented by an automatic mechanism which detaches the hoisting rope from the cage just before the danger point is reached;



IMPERIAL ORE SEPARATOR, FIG. 2.

to pass through. *CC* are the pole-pieces. All are made from special magnetic steel, the yoke *B*, and the cores *aa*, being cast in one. The pole-pieces, *CC*, are fitted to the ends of cores, *aa*, in such manner that the air gap between the poles, *N* and *S*, can be varied at will. The

the cage is then prevented from falling down the shaft by automatic catches.

These two essential features of the device (the rope-detaching, and the cage-supporting devices) are operated by systems of levers which normally are inactive. The lever connecting the rope with the

cage is ordinarily held from moving out of that position by a copper pin; when the lever strikes a projecting arm in the head-frame (near the sheave-wheel) the pin is broken and the rope disconnected. The hoisting-rope may then pass over the sheave-wheel and wind up on the engine-drum, causing little or no injury to the plant. The projecting arm of the rope-detaching lever is shielded so as to prevent any falling body from striking it.

As the cage travels up the head-frame above the landing, it strikes a lever which throws two catches into position. After the rope is disconnected, these catches keep the cage from falling back into the shaft; shock to the head-frame is prevented by springs connected with these safety catches.

Accidents from overwinding are of periodical occurrence, wrecking machinery and causing the plant to remain idle until repairs are made. The most serious feature of such accidents, however, is the loss of life sometimes resulting when men are being hoisted out of the mine. A number of such disasters occur every year; the tendency of invention to remove the chances of such accidents is a feature that is advantageous alike to operator and employe.

White Phosphorus in Matches.

Consul-General Guenther (*Daily Consular Report*, No. 2347, August 27, 1905) writes that it is reported from Berne that the debate at the International Conference for Legislative Protection to Workmen is now published. Among other provisions, it contains the following:

Germany, Austria-Hungary, Belgium, Spain, France, Italy, Luxemburg, the Netherlands, Portugal and Switzerland agreed to have the use of white phosphorus prohibited in the manufacture of matches. The delegates from Portugal and Spain declared that their countries could only do so after a certain time. Denmark, England, Norway and Sweden abstained from voting on the proposition. The delegate from Denmark stated that the Danish Government had already prohibited (thirty years ago) the use of white phosphorus in the manufacture of matches. The proposition, therefore, had no practical interest for Denmark, and the Government had issued no instructions. The delegate from Sweden called attention to the fact that, in consequence of proper legislation, necrosis is almost unheard of in Sweden, and the few cases which occur are easily cured. It would, therefore, not do to destroy an industry through which the country profits annually to an amount of 4,500,000 francs and which employs 1,500 working people. The delegate from England asserted that necrosis has disappeared from England in consequence of legislation, and therefore England considered it unnecessary to entirely prohibit the use of white phosphorus.

Huntington-Heberlein Process at Marysville, B. C.

According to U. S. Consular report No. 2348, Aug. 30, 1905, the Sullivan smelter, at Marysville, produced in July between 500 and 600 tons of bullion, operating under the Huntington-Heberlein process. The first month's operations were largely experimental, but the results were exceedingly satisfactory, and the new smelting process is a success beyond question. The ore treated was exclusively from the Sullivan mine, running about 30% lead and 12 to 14 oz. in silver. The smelter has a capacity of 100 tons daily, but the roasting apparatus is not sufficient to keep the plant running at its full capacity. It is therefore proposed to increase the roasting facilities. The Huntington-Heberlein process is said to show an advantage, in the operating cost, of about \$2 per ton of ore smelted, as compared with the ordinary process.

Patents Relating to Mining and Metallurgy.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week ending Aug. 29, 1905.

- 798,064. ORE-CONCENTRATOR.—William O. Journeay, San Antonio, Tex.
 798,086. COKING-FURNACE.—Gustav Wolters, Dortmund, Germany.
 798,100. FAN-CASE FOR ACID-FLUES.—Nicholas L. Heinz, Lasalle, Ill.
 798,103. PROCESS OF MAKING ALKALINE-METAL OXIDE.—Rudolf Hutzler, Ludwigshafen-on-the-Rhine, Germany, assignor to the Badische Anilin und Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany, a corporation of Baden.
 798,175. PROCESS FOR THE MANUFACTURE OF CEMENT-CLINKER.—Carleton Ellis, New York, N. Y., assignor to Eldred Process Company, New York, N. Y., a corporation of New York.
 798,176. PROCESS OF GENERATING GAS.—Carleton Ellis, New York, N. Y., assignor to Eldred Process Company, New York, N. Y., a corporation of New York.
 798,181. ALLOY.—Arthur E. Hobson, Meriden, Conn.
 798,200. PROCESS OF REMOVING SOLID OR SEMI-SOLID MATERIAL FROM CONTAINERS OF PRESSURE-FILTERS.—Charles W. Merrill, Lead, S. D.
 798,205. PROCESS OF MAKING NITRIC ACID.—Heinrich H. Niefenführ, Halensee, Germany.
 798,216. PROCESS OF REMOVING ARSENIC FROM GASES.—Maximilian Scharff and Franz Slama, Ludwigshafen-on-the-Rhine, Germany, assignors to Badische Anilin und Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany, a corporation of Baden.
 798,228. FLASK FOR MOLDING CONCRETE BLOCKS.—Peter G. Swanson and Victor R. Carlson, Milbank, S. D.
 798,239. APPARATUS FOR PRODUCING CARBONIC ACID.—Gregor Walzel, Newark, N. J., assignor to Edward Zusl, Newark, N. J.
 798,242. WIRE-ANNEALING FURNACE.—John F. Warwick, Chicago, Ill.
 798,255. GRINDING-MILL.—George A. Bell, Ypsilanti, Mich.
 798,258. METALLURGICAL FURNACE.—George H. Benjamin, New York, N. Y.
 798,278. CENTRIFUGAL WET CRUSHING AND GRINDING MILL FOR QUARTZ.—Louis C. Graupner, San Francisco, Cal.

- 798,302. PROCESS OF REMOVING ARSENIC FROM GASES.—Maximilian Scharff and Franz Slama, Ludwigshafen-on-the-Rhine, Germany, assignors to the Badische Anilin und Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany, a corporation of Baden.
 798,304. FILTER-PRESS.—Harry T. Shriver, New York, N. Y.
 798,306. MACHINE FOR MOLDING CEMENT BLOCKS.—Dexter D. Stringer, Jackson, Mich.
 798,312. SMELTING-FURNACE.—Herbert L. Wrinkle and Noah Wrinkle, Keeler, Cal.
 798,314. ELECTRODE OF ELECTROLYTIC APPARATUS.—George J. Atkins, Tottenham, England.
 798,329. MOLD-FILLING AND TAMPING DEVICE FOR BRICK AND SIMILAR PRESSES.—Harry J. Flood, Chicago, Ill.
 798,347. OIL-FLOWING DEVICE.—John Kamblish, Jr., Piney, W. Va.
 798,382. COAL SCREEN AND SLATER.—Francis Allard, Chatelneau, Belgium.
 798,385. SEPARATING-MACHINE.—Wallace S. Ayres, Hazleton, Pa.
 798,389. REEL FOR MINE LOCOMOTIVES.—Harris Booker, California, Pa.
 798,398. BLASTING COMPOUND.—Gustave Dittmar, Washington, D. C.
 798,415. CRUSHING-ROLLS.—Robert K. Humphrey, Denver, Colo.
 798,416. ROCK-DRILL.—Manetho C. Jackson, Denver, Colo., assignor to the Jackson Electric Drill & Supply Company, Denver, Colo.
 798,449. WELL-DRILLING APPARATUS.—Clark F. Rigby, New Martinsville, W. Va.
 798,494. HOISTING APPARATUS.—Victor R. Browning and Earl H. Browning, Cleveland, O.
 798,500. GAS-PRODUCER.—Carleton Ellis, New York, N. Y., assignor to Eldred Process Company, New York, N. Y., a corporation of New York.
 798,504. APPARATUS FOR CLEANING OIL-WELLS.—William E. Gardner, Pittsburg, Pa., assignor of one-eighth to Frank D. Thomson, Chicago, Ill., and one-half to A. F. Barron, Chicago, Ill.
 798,517. MINE-DOOR.—Lavalette L. Logan, Robertsdale, Pa.
 798,518. MINE-DOOR.—Lavalette L. Logan, Johnstown, Pa.
 798,524. ORE-ROASTING KILN.—James McNab, Catonsville, Md.
 798,568. APPARATUS FOR TREATING CRUSHED ORES, SLIMES AND OTHER MATERIALS.—Alfred Z. Clark, Melbourne, Victoria, Australia.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week ending Aug. 19, 1905.

- 8,677 of 1904. ORE-FEEDER FOR AMALGAMATORS.—W. H. Hyatt, London. In amalgamating machines where finely divided ores are forced by an air-blast into mercury without the use of water, an improved feeding device for feeding small quantities of ore at a time into the air-blast.
 13,578 of 1904. ELECTRICAL ORE SEPARATION.—F. E. Elmore, London. In the process for separating metallic particles from gangue by means of an acid solution that carries the metallic particles upward, the use of an electric current which deflects the metallic particles to the side of the vat out of the way of the descending pulp.
 15,793 of 1904. SLIME TABLE.—J. Buss, London. A slime table, being a modification of the Luhrig vanner, with the frame on which the traveling belt moves mounted on resilient supports.
 18,042 of 1904. ELECTROLYTIC DEPOLARIZERS.—Meister Lucius & Bruning, Hoechst a. M., Germany. The use of vanadium compounds as depolarizers in electrolytic baths, both at the anode and cathode.
 961 of 1905. TREATING ORES.—N. H. M. Dekker, Paris. For desulphurizing ores and for removing also antimony and arsenic, treating them with nascent hydrogen obtained by the electrolysis of water.
 4,291 of 1905. ARTIFICIAL FUEL.—J. Knops, Aachen, Germany. Making an artificial fuel by mixing peat charcoal with ground leather waste.
 11,073 of 1905. RECOVERY OF FOUNDRY REFUSE.—C. Casman, Brussels. In recovering brass, bronze and copper from foundry refuse, removing the mixed sand by means of soda, so making a silicate of soda.

Personal.

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. John Seward is at Goldfield, Nevada.

Mr. Arthur Winslow, of Boston, is in Colorado.

Mr. J. W. Finch, of Denver, is at Bullfrog, Nevada.

Mr. A. O. Ihlsing, of New York, was in Denver last week.

Mr. Leo von Rosenberg, of New York, is at Silverton, Colorado.

Mr. Edwin E. Chase, of Denver, is in California on professional business.

Mr. Rensselaer H. Toll, of Mancos, Col., has been in Denver on business.

Mr. J. J. Case, of Cerro de Pasco mines, in Peru, is in Mexico on his way to Montana.

Mr. D. C. Botting, of Black Diamond, has been appointed State mine inspector of Washington.

Mr. R. D. Rhodes is making an extended trip through Mexico in the interest of New York capital.

Mr. P. G. Lidner, who is engaged in professional work on the east coast of Peru, is in New York.

Mr. J. P. Hutchins has returned to New York from Venezuela. He will conduct practice at San Francisco.

Mr. H. W. Hardinge has gone to Brazil on professional business. He expects to be in New York in October.

Dr. Edward Fink, and Mr. R. W. Rodda, of Seattle, are making an examination of a copper property in the Pechastin mining district, Washington.

Mr. Chas. E. Rowe, civil and mining engineer, of Denver, Colo., will be in charge of the School of Mines at the University of Texas, Austin, Texas.

Mr. William Randolph Strickland has resigned from the New York Central Railroad and is now associated with J. G. White & Co. as assistant to the secretary.

Superintendent of Construction F. M. Martin, of the American Smelting & Refining Co., with headquarters at Salt Lake City, has returned to the latter place from Mexico.

Mr. J. E. Spurr has resigned his position as geologist on the United States Geological Survey to accept the position of mining geologist for the Guggenheim Exploration Company.

Mr. H. L. Frank, of Butte, Montana, president of the Canadian-American Coal & Coke Co., operating a coal mine at Frank, Southwest Alberta, Canada, recently visited that property.

Mr. W. F. A. Thomae, of London, passed through New York, Aug. 27, on his way to Canada on professional business. He expects to return to London about the end of September.

Mr. L. S. Austin, professor of metallurgy at the Michigan School of Mines, accompanied by his son, Mr. Arthur Austin, who recently graduated from that institution, have been in New York.

Mr. P. N. Furber, president of the Oil Fields of Mexico, has returned from Europe, and is now on his way to Mexico, where he will inspect the property of the company in the State of Vera Cruz.

Mr. Thomas Riddie, formerly manager for the Tye Copper Co., has accepted an offer to become manager for the Britannia Smelting Co., which recently acquired the smelter at Crofton, Vancouver Island.

Mr. Thomas G. Blackstock, of Toronto, well known in connection with British Columbia gold-mining enterprises in which he was associated with the late George Gooderham, is seriously ill at his residence at Toronto.

Mr. Chauncey G. Newton, of Logan, Ohio, resigned his position as general superintendent of the Columbus & Hocking Coal & Iron Co., Aug. 1, and is forming a company to lease and operate a mine in eastern Ohio on the line of the Pennsylvania road.

Mr. Edwin Higgins Jr., consulting mining engineer, of Columbus, Ohio, has recently been appointed general manager of the Columbus-Butte Mining Co., operating in Butte, Mont. Mr. Higgins will leave Columbus for Butte the first week in September.

Mr. C. F. Owen, for seven years past State mine inspector of Washington, has resigned that position. He has entered into partnership with Mr. C. E. Peterson and will practise as consulting engineer, with office in Tacoma, making a specialty of coal properties.

Mr. J. D. Kendall, of London, England, consulting engineer for the Slough Creek Gravel Gold, Ltd., is inspecting that company's drift mining property on Slough creek, Cariboo. He is accompanied by another mining engineer, Mr. A. Stark, also of London.

Mr. L. D. Anderson, of Houghton, Mich., is on his way to Prescott, Arizona, where he will become mechanical engineer for the Arizona Smelting Co., which is erecting large works at Val Verde. Mr. Anderson has become mechanical engineer for the Allis works, at Milwaukee.

Mr. Herbert Carmichael, provincial assayer and assistant to the provincial mineralogist, of British Columbia, recently made an examination of mining properties in the Big Bend of the Columbia district, north of Revelstoke, for the purpose of making an official report thereon to the Minister of Mines.

Dr. H. S. Poole, of Halifax, Nova Scotia, who had for several months been engaged on Vancouver Island, B. C., collecting information relative to the coal fields of the island, has concluded his field work for the season and is on his way to Ot-

tawa to report to the Geological Survey Department of Canada.

Mr. John G. Sullivan, formerly assistant construction engineer on the Canadian Pacific Railway Co.'s Columbia & Western Railway, and afterward promoted to the position of assistant construction engineer in that company's general construction department, has been appointed assistant engineer for the Panama canal, at a salary of \$20,000 per annum.

Mr. Donald G. Forbes, formerly general manager of the Silver Cup Mines, Ltd., and the Great Western Mines, Ltd., two British companies for several years operating in the Ferguson district of Lardeau, British Columbia, and now merged into one organization known as the Ferguson Mines, Ltd., has again gone north, his recent visit to the Yukon Territory with the A. I. M. E. excursion party having attracted his attention to the promise that country gives of continuing its comparatively large production of gold.

Dr. R. W. Ells, of the Geological Survey Department of Canada, has returned from Graham island, of the Queen Charlotte group, where he went last spring to examine and report on the coal measures of that island. Before going back to Ottawa he will again visit the Quilchena and Nicola districts, where he last year examined the coal measures, and proceed thence to the Tulameen, Similkameen, and Okanagan districts of British Columbia, in each of which coal is already being prospected, or indications of its occurrence have been found.

Obituary.

Charles Taylor, who died at Montreal Aug. 27, aged 90 years, was very prominent in the early days of gold mining, in Nova Scotia, and built the first stamp mill ever erected in Canada. He was supposed to be the oldest mechanical engineer in the Dominion.

John K. Shaw, the well-known financier and coal operator, died on August 27 in Baltimore, Md. Mr. Shaw was the surviving member of the firm of Shaw Bros., who have operated mines in western Maryland and in West Virginia, with offices in Baltimore. After retiring from business in 1903, he took a deep interest in charitable work.

Societies and Technical Schools.

We have received the year-book of the Michigan College of Mines for 1904-5. It shows a total enrollment of 223 students, as against 238 for 1904-5. The book contains much interesting and valuable information in regard to courses and instruction at this excellent institution.

Purdue University.—The following announcement concerning changes in the instructional staff of the engineering de-

partments is approved by the president and trustees. Appointments effective Sept. 1 have been made as follows:

C. P. Matthews, member American Institute of Electrical Engineers, for several years past professor of electrical engineering, Purdue University, has been appointed director of the electrical laboratory and in charge of the School of Electrical Engineering.

W. O. Teague, Massachusetts Institute of Technology, Department of Marine Engineering, two years with the Fore River Ship Yard, and one year with the General Electric Co., has been appointed assistant professor of experimental engineering, in charge of the engineering laboratory.

Albert Smith, Dartmouth, C. E. Thayer School of Engineering, member of the Western Society of Engineers, has been appointed assistant professor of civil engineering.

G. A. Young, assistant professor of mechanical engineering, will hereafter be responsible for the direction of the work in thermodynamics.

F. R. Swift, Massachusetts Institute of Technology, 1901, for two years instructor at the Massachusetts Tech., and more recently with the General Electric Co., has been appointed instructor in mechanical engineering.

O. C. Klipsch, Purdue University, 1901, since graduating with the Lake Shore & Michigan Southern Railway, has been appointed instructor in mechanical engineering.

Trade Catalogues.

Bulletin No. 4 of the Barriett Electric Co., of Cincinnati, Ohio, describes the machinery that its title would indicate.

"Steel Wheel-Barrows" is sent us by the Archer Iron Works, of Chicago, Ill., who are large manufacturers of this class of goods.

"Lunkenheimer Generator Valves" is the title of the flyer of this well-known company (Cincinnati, Ohio), describing the device indicated.

The Crawford & McCrimmon Co., of Brazil, Ind., sends us its catalogue of hoisting engines, ventilating fans and pumps for acid works.

The 1905 catalogue of the Geo. H. Tay Co., San Francisco, Cal., gives illustrations and price lists of valves and pipe fittings. It is substantially bound and has a good index.

The William Powell Co., Cincinnati, Ohio, sends us its flyer, descriptive of the "White Star" valve. The publication has as much to commend it as the device it describes.

The Deming Co., Salem, Ohio, sends us its catalogue No. 22. It is a cloth-bound volume, showing the line of pumps and hydraulic machinery placed upon the market by this company.

The C. O. Bartlett & Snow Co., Cleve-

land, Ohio, sends us its new catalogue No. 15. The new edition contains the usual number of illustrations and tables, and is of standard size.

Catalogue "G" of the Robinson Machine Co., Pittsburg, Pa., is an example of the finest half-tone work that is often seen in a trade publication. It shows the ventilating and hoisting machinery made by the company.

The Raymond system of air separation is described in catalogue No. 7 of the Raymond Brothers Impact Pulverizer Co., Chicago, Ill. The diagrams and dimension drawings render the catalogue of permanent value.

The Carterville crushers, as built by the Carterville Foundry & Machine Works, Carterville, Mo., are described in a catalogue issued jointly by it and the Galena Iron Works, Galena, Kan. The catalogue is 6 by 9 in. in size.

"Power Transmission Engineering" is the new catalogue of the Dodge Manufacturing Co., of Mishawaka, Ind. It is a bound volume, of standard size, and in every way an example of what a technical catalogue should be. The engravings are more than usually well done, the dimension drawings are of value and not as scarce as is unfortunately the case with some publications of this character. The book deserves a place in the library of every engineer.

Industrial.

The slag of the Buffalo Union Co.'s furnace is to be used by the new portland cement plant being erected near it.

The Eastern Steel Co., Pottsville, Pa., just beginning to operate its new plant, is planning for the construction of two additional open-hearth furnaces of 50-ton capacity.

A proposition has been presented to the Pennsylvania Steel Co. by the Steelton and Harrisburg gas companies looking toward the use of the gas from the coke ovens of the company as a source of supply for those towns.

The contract for the complete forge shop equipment of the new manual training school of Washington University, St. Louis, Mo., has been awarded to the Sturtevant Co., of Boston. This consists of 20 down-draft forges with blast and exhaust fans.

Baker & Co., Inc., refiners and manufacturers of platinum, of Newark, N. J., and New York city, are making extensive additions to their Newark works. The refining department will be enlarged over 100%, and the entire plant equipped with the most modern appliances.

The Lake Superior Corporation has decided to proceed at once with the erection of a large coke plant in connection with the steel rail plant at the Sault, and to take up development work on the iron

properties on the Canadian side with a view of getting Canadian ore for the rail plant.

The Dominion Bridge Co. is contemplating the erection of a plant in Winnipeg, Manitoba, to supply material for its Western business. Negotiations are in progress for a suitable site. The new plant will employ about 150 men, and will be equipped with shears, punching and riveting machinery.

The Blaisdell Co., of Los Angeles, Cal., has recently closed contracts to furnish its automatic sand-handling machinery to the Peregrine Mining & Milling Co. at Guanajuato, Mex.; Frank G. Peck & Co., Guanajuato, Mex., and to the New Modderfontein Gold Mining Co. at Johannesburg in the Transvaal.

The Galena Iron Works Co., Galena, Ill., is building for the Skene Lead Co., Elizabeth, Ill., a complete concentrating and electric power plant, the equipment for which includes two 14-in. pumps, one 100-kw. generator, one four-valve Atlas engine, four 100-h.p. boilers, four electric hoists, and three motors.

The American Shipbuilding Co. has been preparing its property at Lorain, Ohio, for the erection of a new dry-dock. No bids of the number already received have been satisfactory, and until a suitable contract can be made little will be announced. The dock is to be over 700 ft. long, and will be one of the largest in the world.

The Springfield Boiler Co., Springfield, Ill., has let a contract for considerable new machinery. The new boiler shop will be 328 ft. long, main span 50 ft. in width, with bays on each side having a depth of 44 ft., making the total breadth of the building 138 ft. The structure will be entirely of steel, including two hydraulic pumps, two traveling cranes, hydraulic flanging press, rolls, punches, etc.

The Bessemer Limestone Co., Youngstown, Ohio, with brick plant at New Castle, Pa., has received a contract for 5,000,000 brick to be used in the new blast-furnace being built by the Republic Iron & Steel Co., at Hazelton, near Youngstown, Ohio. The Bessemer Limestone Co. makes its brick of shale, which is the covering over the limestone. Its plant is equipped with modern machinery and has a capacity of 100,000 brick per day.

At a recent meeting of the directors of the Fort Wayne Iron & Steel Co., Fort Wayne, Ind., the following officers were chosen: E. F. Yarnelle, president; C. H. Rawlins, vice-president and general manager; H. C. Rockhill, secretary; J. W. Sale, treasurer; A. W. Tyler, superintendent; P. H. Joyce, general sales agent. Authority was given the management to increase the capacity to 4,000 tons of finished bar iron per month, making this mill the largest producer of bar iron among the independent Western plants.

Construction News.

Fort Smith, Arkansas.—The Central Coal & Coke Co. has plans for the erection of coal-washers.

Ophir, Utah.—The Ophir Hill mill, near this place, is to be doubled in capacity. E. W. Place, of this place, is manager.

Roseburg, Oregon.—The Continental mines on Myrtle creek expect to install a 50-ton reduction plant in the near future.

Fall River, Colorado.—Machinery is to be installed at the Almaden mine. W. F. Dumbleton, Idaho Springs, Colo., is manager.

South McAlester, Indian Territory.—La Bosque & Wilkerson are preparing to open a coal mine about 6 miles southwest of this place.

Kaslo, British Columbia.—The Providence mines near this place contemplate the addition of a concentrating plant of 100 tons capacity.

Ocampo, Mexico.—The Conchenco mines, R. B. Hutchinson, general manager, will increase the capacity of its 60-ton cyanide plant to 100 tons.

Central City, Colorado.—The Pleasant Valley Mining Co. is figuring on the erection of a concentrating plant. J. Kantnor, Central City, Colo., is manager.

Canyon City, Oregon.—A large electric plant is to be built at some point on the John Day river to furnish power for the Empire Gold Dredging Company.

Tulsa, Indian Territory.—The Tulsa Lime Co. will erect a building 40x100 ft. and have a daily capacity of two cars of lime. About \$50,000 will be invested.

Virginia City, Nevada.—The Longfellow mine, 30 miles from Virginia City, Nev., Edward Carmen, general manager, is to be equipped with a large electric plant.

Mokelumne Hill, California.—The North Star Mining Co., of this place, J. C. Kemp Van Ee, manager, will soon put in electric machinery, haulage motors and ore cars.

Alderson, Indian Territory.—The Rock Island Coal Co. expects to instal boiler, steam engine and electrical machinery at its Mine No. 7; also box-car loaders at Mines No. 5 and 6.

Etna Vale, California.—F. C. Perew, working the property of the Taylor Lake Mining Co., at this place, will add more stamps to the mill battery, and may install an electric-power plant.

Morgantown, West Virginia.—The Morgantown Tin-Plate Works at this place have been taken over by the American Sheet & Tin Plate Co., which will enlarge the present 6-mill plant to a 10-mill one.

Goldfield, Nevada.—It is reported that the Frank Co. will construct a new 15-stamp mill in close proximity to the mines of this place. The company is now enlarging its mill on the flats just north of town.

Bosworth, Kentucky.—The Columbia

Coal Co. has been organized to mine coal on 400 acres of land. Coal tipples and miners' houses will be erected. John Howard, Middlesboro, Ky., is engineer in charge.

Roseburg, Oregon.—The Little Chieftain mine, 12 miles east of Myrtle Creek, has changed hands. John Hamilton, of Yreka, California, has purchased it and intends later to instal machinery for reducing the ores.

Oliver Springs, Tennessee.—David C. Richards is interested in a company which is mining clay and making open ware by hand. It intends to establish a pottery, and will be in the market for machinery in the near future.

Warren, Idaho.—The Idaho Consolidated Little Giant Mining Co., of this place, is preparing for the installation of an electric power plant for the operation of its mines. H. H. Schieler, of Warren, is resident manager.

Seattle, Washington.—The Copper & Lead Smelting Co., recently organized, will probably erect a new plant in this place. H. A. Noble, of Seattle, is one of the incorporators. Most of the stock is owned by Colorado mine operators.

Sonora, Mexico.—The Magdalena Mining & Milling Co. intends to develop mines and mill ores in the State of Sonora. George H. Jacobs, of Newark, N. J.; S. S. Brooks, of Chester, Conn., and T. E. Cottle, of Boston, Mass., are the incorporators.

Palos, Alabama.—The Sloss-Sheffield Steel & Iron Co. will build a washery and later construct coke-ovens in this vicinity. The plans for the washery are now under way. The Frisco System will build an extension spur to the property, about 1½ miles in length.

St. Louis, Missouri.—The Mountain Valley Pottery Co. has purchased deposits near Hot Springs, and will mine and manufacture from the clay high-pressed brick, tile, pottery, etc. Guy R. Alexander is secretary. The address is 854 Century Building, St. Louis, Mo.

Washington, Pennsylvania.—William I. Jones, treasurer of the Pittsburg & Buffalo Co., states that it will begin the opening of a 15,000-acre coal tract in the southeastern portion of Washington county. Eight new mines are to be opened, and a new town built either at Amwell or West Bethlehem township.

Goldfield, Nevada.—The much-talked-of trolley road seems about to become a reality. A company has been organized by James A. Pearce, and New York and Salt Lake City capitalists are interested in the enterprise. The Board of County Commissioners has granted a 20-year franchise to the interested parties.

A. B. Meyers, P. D. Murphy and C. E. Collins intend to drill four artesian wells on their property about 6 miles west of this place.

Pikesville, Pike county, Kentucky.—The Pike Coal & Coke Co. has leased from the Big Sandy Co., of this place, a tract of coal land in the county, and arrangements will be made for developing same. Mining machinery will be installed. The company has a capital stock of \$100,000. The Greenough Coal & Coke Co. has also leased from the same company coal land, and will instal mining machinery.

Lida, Nevada.—It is expected that preliminary work will be begun within a few days for the new smelters at this place. The engineers are already on the ground. The contract for excavation has already been awarded, but contracts for a 100-ton copper furnace and a 80-ton galena furnace are, we understand, still to be let.

Salt Lake City, Utah.—The American Smelting & Refining Co. has let contracts for grading for its proposed 2,000-ton copper smelter in the Salt Lake valley to the Utah Construction Co., of Ogden, Utah, and will proceed as rapidly as possible with the building of the plant. Charles W. Whitley, of Salt Lake, is manager.

Bingham, Utah.—The Utah Copper Co. will commence excavations at once for its proposed concentrating mill, to be erected near the old Garfield beach resort in the Salt Lake valley. The plant is to have capacity for the treatment of 6,000 tons a day. Manager D. C. Jackling, of Salt Lake City, will ask for bids for material and equipment at once.

Eureka, California.—The South and Central Eureka mining companies have united for the construction of a pumping plant and reservoir in the vicinity of their mines. A pump with a capacity of 288,000 gallons per day will be installed at the South Eureka mine. A reservoir with a capacity of 50,000 gallons will be constructed. The pump will be electrically driven.

Brice, New Mexico.—It is reported that the right to the headwaters of the Sacramento river has been purchased by the Southwest Smelting & Refining Co., of this place. The company has concluded arrangements whereby it will deliver water to the town for domestic purposes, as well as installing an electric station in the Sacramento mountains. Oil engines using crude petroleum are to be used. The water will be piped for a distance of 20 miles.

Crofton, British Columbia.—George H. Robinson, managing director of the Britannia Copper Syndicate, states that the company has purchased the Mt. Andrews mineral property on Prince of Wales island, off the southeastern coast of Alaska. The smelter which will treat the ores is situated at this place, and a refinery on the Gulf of Georgia is projected, which will probably be built here. The ore is red hematite, carrying gold and copper as well, and is valuable as a flux.

Special Correspondence.**San Francisco. Aug. 30.**

The old Plumas-Eureka mine at Johnsville, Plumas county, has been sold to capitalists of Newport, R. I. (under the name of the Johnson-Graham Mining Co.). This quartz mine was for many years the most productive mine in the county; it has a record of some millions in total output. During most of its productive period it was owned by the Sierra Buttes Mining Co., Ltd. Of late years, the Plumas-Eureka has been worked on tribute; this is the last of the company's mines. There is an extensive crushing plant on the property, but much of the machinery is out of date. The property consists of 2,800 acres of United States patented land, water rights, mill and buildings. It also holds placers. The new company will immediately instal new machinery; the plant will be increased to 500 tons daily capacity. The ores will be treated by cyanidation, and operations will be conducted on a large scale. The people of Johnsville are rejoicing over the news; this plant formerly gave employment to 350 men. The present owners expect to have all in operation in four months.

R. J. Fitzgerald, of Grass Valley, has purchased the Carson mine near Alleghany, Sierra county, adjoining the now famous Tightner. The mine can be worked through a tunnel.

Some new discoveries of copper ore have been made in the eastern part of Tuolumne county, 60 miles east of Sonora and in the vicinity of Deadman's Crossing on the Sonora and Mono wagon road. The sale of the Quartz Mountain mines in Madera county is thought to mean the erection of a 100-stamp mill to be run by electricity. The purchaser is the Monte Rosa Development Mining and Milling Co. the officers of which are I. Baumberger, pres.; and Philip Garwin, sec. and treasurer.

Samples of cinnabar have been brought in from Coalinga, Fresno county, which is a new region for quicksilver. The Clipper Group of copper claims at Kennett, Shasta county, is under bond to Eastern men, and is about to be opened up under the superintendence of Carl Hartmann. The Clipper group includes the Snyder, Last Chance, Big Bear and Little Bear, Hawkeye, etc., and comprises nine in all. Two were recently bought for cash from Geo. Bassett for \$8,000; the bond stands at \$68,000. The claims are located on the north fork of Squaw creek, 1 mile from the S. P. track and 1¼ miles below Kennett. They are bounded by the Uncle Sam and almost surrounded by Trinity and Balakalala holdings.

The Boston & Kern River Mining Co. has brought suit to have the Superior Court settle its rights in the purchase of mining property in the Cove district, Kern

county. The company was incorporated in Maine by C. S. Long and others. After Long agreed to purchase from Moritz Friedlander, who owned the property, Friedlander agreed to sell for \$100,000; subsequently it was arranged that the company should deduct from the purchase price whatever it might expend in putting the mines in a safe condition. It is alleged that it has expended \$86,000. Friedlander died last February, and the transaction has become tangled. Worthington Ames and David Friedenrich (executors of his will) and Joseph Naphtaly, as trustees for Friedlander, are defendants. They claim that the company has sold the property to John W. Threshie, which sale the Superior court will be asked to confirm. The court is asked to order a general accounting. The properties involved include the Content, Nellie Dent, Sumner, North Extension Summer, Commonwealth, Beauregard, Urban, Frank, Bull Run, Lady Bell and the Jeff. Davis.

In the suit of Peter Curtz against the Alpine Mining Co., located in Alpine county, Judge Beatty (of the United States Circuit Court) has rendered a decision in favor of the plaintiff.

The famous Black Oak mine near Soulsbyville, Tuolumne county, is involved in litigation. Suit has been instituted in the Superior Court by Annie C. W. Scott (as executrix of the estate of her late husband, W. P. Scott) and is against W. G. Scott, C. S. Dowe, Geo. W. Campbell, and the Black Oak Mining Co. Plaintiff asks that a receiver be appointed, and that the property be sold.

Spokane. Aug. 30.

The Turk Mining Co., of Cedar Cañon, Wash., which recently attempted to put in a smelter on the Blanchard system, is trying to recover the ground lost in that disastrous experiment. The smelter will be reconstructed into a straight water-jacket furnace if the Turk people can raise the money.

Directors of the Tamarack & Chesapeake Mining Co., owning property between the Custer and the Hercules mines in the Cœur d'Alenes, decided last week to commence shipments of silver-lead ore to a Salt Lake smelter. The ledge has been drifted upon in ore for 250 ft, at a depth of 500 ft., the vein matter being the characteristic concentrating ore of the district. On the hanging wall is a 12-in. vein of ore running high in silver, and 40 to 75% lead.

Senator George Turner, attorney for the Federal Mining & Smelting Co., who is back from the Sullivan mine at Marysville, B. C., says that the Heberlein process at the smelter has proven all that was expected and the tonnage in sight at the mine is between 150,000 and 200,000 tons, which is the most in its history.

Bisbee. Aug. 31

Copper Queen Consolidated is to enlarge its Sacramento shaft and has driven drifts from it to many of the surrounding mines, notably to its Lowell, which is some 2,800 ft. away. A large new hoist is to be set up at Sacramento at once, and plans have been drawn for ore-bins, the largest yet built at these mines. The shaft is close to the main line of the company's railway, and it seems to be the intention to make it a leading producer. For its entire depth this shaft is sunk in country rock, while most of those north of it are in ore and mineral-bearing formation. There has been no change recently in the tonnage daily extracted, nor in the smelter product, which runs about 7,500,000 lb. a month, but smelter enlargements are rapidly progressing and should before long be ready for a very great increase of mining and copper product. Changes in shafts and surface improvements are continually under way, and the general condition of the properties is steadily improved from month to month, with result that the product is made easier and at less cost than ever before. The receipt of ores from Bisbee at the company's smelter has so increased that all Nacosari concentrates are now going to Globe.

At all the mines of the Calumet & Arizona group great progress is made, and ore is being opened everywhere, in such a way as to indicate the enormous values of the mines and the tremendous possibilities for the future. In Junction's drifts, east and west from the shaft, the breasts are now in carbonate of copper, averaging about 12%. One of these drifts is rapidly approaching Calumet & Pittsburg territory. Oliver ground of the original company is showing ore in great quantities and now has a reserve fully equal to that of the Irish Mag ground, from which all the company's product has so far been made. Duluth mine is getting new orebodies and extending those already found, and is hoisting a considerable daily product from development work alone. On Lake Superior new orebodies have been cut recently, and a raise from the 1,100-ft. level is in high-grade ore. At all these mines, except Calumet & Arizona, the chief work has heretofore been directed to driving long main drifts, for connections and ventilation, and these cut promising orebodies that were attacked only in few cases. But now the companies are going back and opening into the promising points, and for a long time to come there will probably be continual news of rich finds and increasing reserves. This fact should be borne in mind when news of strikes is reported.

These Calumet mines are adding to their equipment rapidly. At every shaft not now completely equipped, aside from the two on Pittsburg ground, steps are under way for the regular and heavy daily handling of ore, and all construction work

along the line of permanent hoists and head-frames is well toward completion. Hoatson shaft, of the Pittsburg mine, has been sunk 70 ft. in the past 19 days, and is now about 300 ft. deep. It will go to 1,000 ft. before resting, unless water causes suspension.

In the Lake Superior & Arizona, which is owned at Calumet, Mich., very rapid progress is making in the Holt tunnel and other development work, and the management expects that a depth of 400 ft. will be reached in the tunnel by Oct. 1, unless water comes in to stop operations. Exposed orebodies are being developed by raises, etc., and are looking well. Fourteen cars of selected ore have been shipped to smelters, and the last brought a net return of \$2,041, the others nearly as much. The mine is a long way from railway transportation, so all ore sent out is the best. Arrangements are being completed for a rail connection with the mine from Florence, on the Salt River Valley line.

The Keystone Copper Co., near Globe, is making copper by precipitation on plates, after solution of the rich ore it is now mining. A small plant is being installed for this work. The Iron Cap mine, in the same district, which was taken some months ago by Salem, Mass., parties, is now to be developed, and active work begins soon. This work will be under the general direction of A. C. Sheldon, of Minneapolis, Minn.

The Arizona Smelting Co., which now owns the Bradshaw mountain mine, at Val Verde, north of here, is putting in a large smelter and expects to have it in operation the coming season. A sampling works has been hurried forward, and should be running to its full capacity before October 1.

The Dawson Coal & Coke Co. is erecting 350 additional bee-hive ovens, at Dawson, N. M., on account of the demand expected from the Copper Queen smelter and other properties in this district. Now that the Dawson properties, including coal mines, ovens, roads and everything else, have been bought by Phelps, Dodge & Co., there will be far greater activity there than before.

Denver. Sept. 1.

The output of the Cripple Creek district, for August, from about 60,000 tons of ore, amounted to \$1,928,400, a small amount over the value for the preceding month. Thus far this year, the total amount of dividends paid aggregates \$2,320,000, which does not include those of close corporations. It seems probable that the directors of the Mary McKinney Co. will resume the payment of dividends before long, as the mine shows up well, a number of valuable ore-shoots having been opened up lately. A number of new leases on the Stratton's Independence ground have been granted, these being divided into three classes, A, B and C, while the royalty to

be paid ranges from 10 to 65% of the ore values.

The plant of the Colorado Fuel & Iron Co. is very busy and improvements are under way which promise to increase its capacity for production before long. This company, while showing a large deficit last year, will probably show a surplus this year. When the Gould interests obtain control, as will probably be the case next month, the rails and materials for the construction of the Western Pacific railroad will probably be manufactured there at a much lower price than what this material would cost East at the present prices; in fact, the difference is stated as high as 50 per cent.

A large number of men have been added to the forces at the Globe smelter, and for the first time in a number of years the plant is running full blast.

The supply of gold bullion at our branch mint, where preparations are being made to commence coining within the next few weeks, amounts at present to over \$26,000,000, a supply for about six months at least.

In the United States Court, before Judge Moses Hallett, the preliminary injunction hearing in the Gore Cañon case, between the Federal government and the Denver, Northwestern & Pacific Railroad Co. has commenced. C. E. Grunsky, of Washington, a special representative of the Department of the Interior, is here in connection with that case and expects to make a thorough examination into its merits.

On Sept. 15, it is expected that the Moffat line will be opened as far as Hot Sulphur Springs, in Middle Park, and a large excursion to that point is planned by the Chamber of Commerce for that date.

During the present summer the old Montezuma district, about 20 miles southwest of Georgetown, which until now has been far from railroad communication, has shown considerable life. It had been virtually abandoned during the past ten years. A number of properties in the district have changed hands, and with the completion of the railroad from Silver Plume to the top of the range, there will only remain a gap of about 12 miles.

Butte. Aug. 29.

Pumps driven by electricity are to be installed in all of the mines of the United Copper Co., at Butte. The company placed one of these pumps in its Rarus mine a few months ago, and it has given satisfaction from a working and economic standpoint. There are only two other mines to be equipped, the Minnie Healey and Cora. The steam pumps will be retained for emergency use. The Pittsburg & Montana Copper Co. was the first to adopt the use of the electric pumps in this district. It installed two last spring. United Copper is building an ore house at its Belmont mine, but the property is yielding only a small quantity of second-class rock, which it is handling twice. The bin is one used at one of the other mines,

and will hold 400 or 500 tons, and when complete will save the expense of second handling.

Carle Galigher reports the sale of the Protection and Carlile claims, in the northern part of the district, to Pittsburg and Minnesota men supposed to be connected with the North Butte Copper Co. He had a bond on the two, having secured it last April. He says the purchase price was \$150,000. The daily output of North Butte has been reduced recently from nearly 800 tons to 600 tons on account of the fact that the ore has to be hoisted through the shaft of the High Ore, which necessitates a haul of several hundred feet from the place of mining. The work of retimbering the shaft is progressing as rapidly as possible, but some time will elapse before the company will be able to use that outlet.

Raven has struck a shoot of copper ore in its east 1,200-ft. level and is drifting on it. The class is much better than that of the ore previously found in the property. Shipments are to be resumed shortly.

The Reins Copper Co. has begun sinking its shaft to the 1,200 and is making good headway, 30 ft. having been made during the last week. While this work is in progress, another compartment is being made from the 800 to the surface. No ore will be mined until the shaft is finished.

The Montana Zinc Co. has suspended operations temporarily on account of a shortage of water with which to treat its pulp. It is arranging for a supply from the Lexington. Manager C. B. Wisner says the company has shipped 10 carloads of concentrate, each car containing from 25 to 40 tons. It will be three weeks or more before the plant can be started.

Amalgamated has finished its principal shaft-sinking for the present, and is cross-cutting from lower stations in several of its large producers. The daily average output is being maintained from the opened levels, in which there are immense bodies of ore, some of which is high grade and some low.

Paradise, Ariz. Aug. 24.

Paradise and the Chiricahua district continue on an even advance, much work is being done and more contemplated.

At the Chiricahua Development Co. progress continues, the new 150-h.p. boiler has been installed and will be in commission in a few days. The company at its main working shaft continues to push the crosscut and is also running a drift on the contact, but is running this drift in the lime. It is making record work, having made 103 ft. in the drift during the last 7 days. The drift is now in about 200 ft. and the crosscut 800 ft. The contact which carries the ore on this property has a strike nearly east to west. On the same level as the collar of the shaft the original prospect tunnel was driven at right angles with the contact and cut two ledges, the first about 100 ft.

from entry, being about 40 ft. thick and of very low grade; but the second, 700 ft. from entry, was 43 ft. thick and of pyritic iron, largely hematite and carrying about 4½% copper. A winze was sunk 100 ft. deep on this ledge, all in ore, with increasing values toward the bottom. This tunnel is about 200 ft. below the apex of the immense iron capping on surface. The company, after this work was completed, erected the following plant: Two boilers, 150 h. p. each; 20-drill Sullivan cross-compound Corliss air compressor; double 6-ft. drum hoist, with a sinking capacity of 2,000 ft.; sinking pumps of the Prescott make and a large stationary pump, which has not as yet been needed. Substantial buildings were erected, and with this large permanent working plant a three-compartment, finely-timbered shaft has been sunk to a depth of 425 ft. From the 385-ft. level in this shaft, making a 585-ft. depth from the apex of the contact, a crosscut tunnel is being driven to cut the ledge. From some cause, instead of driving this tunnel north, it was driven northeast, and the present superintendent, Mr. Hoar, has changed its course to the north and will soon have the formation cut and reach the ledge. By this error in driving the tunnel in a wrong course it will make about 200 ft. longer than originally planned. The company is also pushing a drift on the hanging wall of the contact to get under the winze that was sunk in the upper tunnel. This drift will be about 800 ft. long, but will facilitate the extraction of the ore when they are ready for that part of their work. There are rumors that they have good ore in the crosscut, but this is not confirmed at headquarters.

Platteville, Wis. Sept. 1.

The Baxter mine, owned by five of the leading business men of Janesville, Wis., operating under the name of the Baxter Mining Co., Geo. S. Parker, of the Parker Pen Co., president, and W. F. Palmer, secretary, have just closed a contract for the erection of a 50-ton modern concentrating plant and an 8-in. Galena pattern Cornish lift pump, to be placed at shaft No. 1, located on the Baxter farm, in the Meekers Grove camp, about 3 miles from Cuba City. The ore on this property differs materially from the general run, as found in the southwest Wisconsin district, being of a finely disseminated nature. The body has been proven for 500 ft. in length, the side walls having not as yet been found. The quality of the ore is high grade, average 57 to 60%. A peculiar feature encountered in the Baxter is that there are two distinct runs converging, one being entirely jack and the other lead, both being found on the same level. The usual occurrence is that they are mixed when the lead does not overlie the jack. The Baxter ore is an extremely free milling one, with little or no sulphur or iron.

A company with \$15,000 capital, shares to be \$100 each, is being organized in the Galena camp. It is composed of 150 of the leading citizens, for the purpose of prospecting and opening up the rich deposits in the neighborhood. This means enough money is being raised to carry on the work for at least two years. It is hard to estimate what the results will be, but it is safe to say that it will be the means of increasing the output of the Platteville zinc and lead district quite materially. It is quite a boon to the district to be free from the "get-rich-quick speculator."

The Wicklow Mining Co. contracted during the week for a large roasting and magnetic separating plant. Contractors guarantee to have same in operation by Dec. 1. This company is one of the many that have spent much time and some money in fully prospecting their property before putting thereon expensive improvements. It has opened up what seems to be one of the richest ore deposits in the Platteville district, being very rich in both zinc and lead. Owing to the fact that the ore carries from 8 to 10% iron pyrites, it was concluded to erect the above-mentioned roaster and separator, which will make the ore of such a grade as to enable the company to sell it at top prices.

One of the many reasons that zinc mining of the Platteville Zinc & Lead district is a paying proposition is, that they have a custom roasting and magnetic separating plant located therein. The company is known as the Joplin Separating Co., and its presence in the district has enabled the small producer, without any means at hand for separating the ore, to sell his product from the mine at a figure that brings him a profit. At the same time the separating company, after treating the ore, can sell the finished concentrates at such an advanced figure, due to the high-grade ore produced, that the profit is quite large. This custom plant has been operated for over a year, and in that time has paid the owners handsomely. There is considerable talk at the present time of erecting another plant near Platteville. Representatives of the General Electric syndicate are investigating the conditions under which lead and zinc mining operations are conducted throughout the district, with the view of installing a large central power plant with a capacity of at least 2,000 kw. A power plant in connection with the contemplated electric road, with which it is planned to connect Platteville, Hazel Green, Cuba City, Lancaster, Bloomington, Shullsburg and Apple River, Ill., at which point it will connect with the Illinois Central railroad, thus giving this territory a direct opening to the coal of north Illinois, will overcome many of the present drawbacks. Parties who have the matter in hand have been making personal visits to the different operators of the district and we are informed that they have the necessary

subscribers to the amount of power necessary to make the enterprise a go. A great number of the mines in this district are already equipped with electric appliances, both for power and lighting.

The Lucky Hit mine, owned and controlled by capitalists at Pittsburg, Pa., who are operating in this district under the name of the Union Zinc & Lead Co., is adding its quota to the general output of the district. They recently started a magnetic separating plant, at which the system of magnetic separation received a severe test owing to the fact that their ore runs from 55 to 75% iron.

Duluth. Sept. 1.

Alfred Merritt, of this city, who is interested in an iron-ore property in San Bernardino county, Cal., has sent a crew of miners from here to make examination and sink pits for thorough development. The ore from this mine is to be shipped to the Pacific at San Pedro, and thence to Tacoma, where a company has been organized to erect a blast-furnace. This furnace is to be of 100 tons daily capacity, but the intention of the company is to enlarge later to about 350 tons per day.

Shipments from the Hibbing district of the Mesabi range are about 60,000 tons per day; this is from mines within five miles of Hibbing on the east and four miles on the west. There are many new mines in that part of the Mesabi, and some of the largest operations anywhere in the world are there under way. At the new Monroe-Tener mine there a pumping plant is handling about 5,500 gallons of water per minute, and a large and efficient plant is to be installed. At the Burt mine six steam shovels are employed, four mining and two stripping overburden, and at Mahoning there are three shovels in ore. At Leonard and Monroe the stripped overburden varies from 70 to 90 ft. At Leonard and Albany steam shovels are employed in the pit making ore and loading cars, which are then trammed to the shaft and dumped into pockets prior to hoisting. Monroe is to have a complete electric underground haulage plant. This mine is credited with a tonnage of about 20,000,000 tons of ore, and is quite liable to contain much more than that. One of the shovels in the Burt pit is to be fitted with a small generating engine for running an electric-light plant for lighting the shovel operations, and if as successful as it should be, the plan will be adopted generally by the Oliver Co. any other year in the many shovels it will be operating.

On the Crystal Falls range the old Armenia mine of Corrigan, McKinney & Co. is about to resume, but it is not probable that pumping will start much, if any, before the close of the shipping season, and the mine cannot be mining much ore before the new year. It is a good property, but its ore is very moist. At the same

company's Dunn mine, arrangements for extensive operations are under way, and the mine should make a record for itself the coming year. The Dunn is no worked-out property, as many suppose, from its history, but has been rejuvenated, and is on the eve of a good career. It will be some time before the water is all out. A new shafthouse and large Gates crusher are being put in, and all ore requiring reduction will be crushed at the hoist. All summer waste has been dumped into the Great Western open pit by the thousands of yards, in a successful effort to save the company's shaft. The ore left in the old workings is being rapidly taken out, and the mine will be caved down to the eleventh level. New drifts will be driven at lower levels and a large amount of ore taken therefrom the coming winter. A large stockpile ground will be laid out at No. 3 shaft for the winter's work. Tobin mine, belonging to the same concern, has been changed this year by the centralization of all machinery and the cleaning out of all buildings about the works. The owners are figuring for an electric tramming plant underground, but has let no contracts yet. Other mines of this district are active, the Mansfield has resumed hoisting, and Crystal Falls bids fair to see the best year in its history.

Some exploration is under way on the extension of the Mesabi formation west of the Mississippi river, and several crews are at work on the shores of Pokegama lake, Itasca county. This work is under control of the Oliver Iron Mining Co. and Messrs. Adams, Roucheleau and Whitesides, of Duluth. So far there have been no definite results.

Salt Lake City. Sept. 1.

Clarence E. Allen, superintendent of the United States Mining Co.'s mines, has been engaged in making an examination of the Daly-Judge mine at Park City during the past week. Mr. Allen was engaged, it is said, by an Eastern syndicate which has in view the erection of a zinc smelter in this State. Several Utah properties which contain zinc ores have been subjected to examinations during the past few months for the same people, the object of which is to obtain some idea as to the tonnage that could be depended on should a plant be erected here. The Daly Judge, Daly West, Comstock and California of Park City contain large quantities of zinc ore. The Pittsburg and other properties in American Fork cañon, as well as several mines at Alta, can supply zinc ore; so can the Honerine of Stockton, the Bullion-Beck and other Tintic mines. In the Horn Silver at Frisco there are said to be at least a half-million tons practically blocked out. A prominent ore buyer for one of the Salt Lake smelters is quoted as saying that within the next year the zinc producers will have an opportunity to market their ores at home.

The San Pedro, Los Angeles & Salt Lake railroad has announced a new tariff on ores from California and Nevada points, which gives the producer quite an advantage in shipping to the smelters at Salt Lake City.

Former United States Senator Thomas Kearns and associates are still prospecting with diamond drills at Iron Springs, Iron county, where they have acquired a promising copper property.

About two weeks ago a new copper ore-body was encountered in the Commercial mine in Bingham, the same having been intercepted in a cross-cut run west from the main tunnel and at a depth of about 500 ft. on the dip. The management is much interested in the development of the vein, which is 24 ft. in width and carries copper values of from 1 to 5%. The mine is one of the group belonging to the Bingham Consolidated.

A deal has been consummated for the sale of the Deems group of claims in Bingham to a Missouri syndicate for a consideration of \$20,000. The property consists of about 50 acres and is to undergo development. Dr. W. A. Breckline, C. A. Keith, C. W. Hutchinson and others of Higginsville, Mo., are the buyers.

The Ivanhoe Mining Co. is plaintiff in a suit filed in the Federal court here against the United States Mining Co., operating in Bingham, alleging an unlawful extraction of ore to the value of \$20,000 from the Ashland mining claim. A temporary restraining order was issued upon the plaintiff filing a \$5,000 bond. Judgment is asked for the restitution of the property and for other relief.

The work of drifting around what is believed to be the last cave in the Ontario drain tunnel at Park City is in progress, and it will be continued for a distance of about 300 ft. more. The drift was started near the 13,000-ft. point in the tunnel.

A statement issued by President W. S. Cleaves of the Sheba Mining & Milling Co., with property in Humboldt county, Nevada, shows an indebtedness of \$15,063, with no cash in the treasury to meet it; but an assessment of 3c. a share, or \$15,000, has been called for. The company has expended to date \$106,933, out of which there was paid \$32,497 for purchase of property; for development purposes, \$74,436. There is owing on notes outstanding \$7,919. The management proposes to make some alterations in the mill, to treat 50 tons of ore daily.

A consolidation of the Holland and Deer Park mining properties in Piute county and in the Gold Mountain mining district has been affected, making a combined property of about 200 acres. In the former about 3,000 ft. of workings have been run and about one-third as much in the latter. Connections underground are to be made. The Deer Park Co. will pass out of existence after the formal transfer to the Holland Co. are made.

Scranton. Sept. 5.

The North West Coal Co., of Carbondale, has been organized to develop a tract of land in the neighborhood of Carbondale. Scranton and Carbondale capitalists are at the head of the new venture.

The alleged grievances of the employees of the Gaylord colliery, at Plymouth, still remain unsettled. A committee of the men has been selected to call upon an official of the company. The workers feel that, if the matter is placed in a proper light, their grievances will be adjusted. If not, the matter will be taken before the conciliation board.

Circular letters are being sent out by all the mine inspectors in the anthracite region, insisting upon a daily inspection of all ropes and cages by qualified mine officials. This is a constituent part of the mining laws of the State, but Chief Roderick, of the Bureau of Mines, thinks that it has hitherto been somewhat neglected.

It is stated that the Philadelphia & Reading Coal & Iron Co. is about to erect a new breaker at the Bear Valley colliery, at Shamokin. There are two shafts at the colliery, but the breaker now in use is too small to handle the output. A large plot of ground has been leveled off on the mountain side, near the old breaker; it is supposed that this is to be used for the new breaker.

The strikers at Morris Run colliery have opened a large commissary store. They have contracted to be supplied with a thousand dollars' worth of goods every week during the winter. This indicates that those miners are preparing to hold out for another season. The strike at these mines has, in one way or another, lasted nearly two years; and today there is as little indication as when they started, of coming to a settlement.

The strike of the patchers, door-tenders and mule-drivers, at the Cranberry colliery of A. Pardee & Co., came to an end a couple of days ago, when the boys were summoned to the main office of the company at Hazleton and informed that their demands had been granted. They asked for a 10% increase.

W. J. Cuyle (who has contracted to do considerable stripping work for the Lehigh Valley Co. at Lost Creek) is setting up a new steam shovel at the scene of operations. The shovel is said to be an especially powerful piece of machinery.

A singular condition of affairs exists in Luzerne county at the present moment. There are six mine inspectors to be elected in November, but none of them has been adopted by either the Republican or Democratic party. There are six inspectors to be elected, and there are only six candidates. It is necessary that candidates be named on the ticket by one party or the other, or by both. It is a peculiar situation, and shows the folly of practically having scientific men nominated to

technical positions by professional politicians.

An official of the Lehigh Valley Coal Co. says: The demand of the miners' union may not seem to the public too onerous for the companies to accept, in view of the fact that miners on contract seldom work more than eight hours. As a matter of fact, it would be the addition of three-quarters of a day's pay every week to all the employees at the mines, except the contract miners. It would involve between \$5,000,000 and \$6,000,000 in additional wages every year, and would make absolutely necessary an increase in the price of coal, if coal is to be mined at a profit.

Leadville. Aug. 31.

The Yak tunnel is on the road to become one of the largest properties in the State, and at present the mine can ship more ore than the smelters can handle, so the output is restricted to 8,000 tons per month; this does not include the concentrate turned out by the mill, which is in the neighborhood of 200 tons a day. The Silver Cord winze, one mile from the portal of the tunnel, is down 400 ft., and it will be sunk another lift of 200 ft. to get under the entire ore channel. When the sinking is completed the orebody will be opened up by drifts and laterals. The work of wiring the tunnel to the breast, beneath No. 4 shaft of the Jonny, has started, and this is the first step toward driving to Big Evans basin. By September ground will be broken and the long run started.

Those interested in the Ballard visited the camp recently, and the first payment, \$18,000, was made on the deal. The mine was thoroughly examined and the owners expressed themselves as well satisfied with the condition of the property. At the lower level, 420 ft., a very fair body of ore has been opened, and from this several hundred tons per month are being shipped; of the low-grade stuff 50 tons daily is being sent out, netting a fair profit. In the body of higher-grade ore are several streaks of bismuth, and this is saved separately and sacked, waiting until satisfactory arrangements can be made with the Colorado Tungsten Co. Taken altogether, the mine is in good condition, and it will not be long until it is back to its old form.

The work on the different new shafts on lower Rock hill is making fair progress, and the Parson, Mike and Frank should all be in the lake bedding within another month. At the Parson shaft some trouble is being experienced with sand and water, and after passing through 200 ft. of the former, the shaft is now getting into more solid ground, with the water readily handled. Toward the center of the hill the Nil Desperandum is driving the two drifts north and south through black lime, with two small

drifts. The President has installed its new machinery and is again sinking. Regular shipments are being sent out from the Reindeer, Dome and Murphy shafts, while at the Bessie Wilgus, prospecting in a body of low-grade ore is being carried on. Good progress is being made in driving from the Ben Burb to the Great O'Sullivan, and in another month the orebody should be encountered.

A great deal of activity is noticeable in the down-town section, and several shafts are being sunk deeper. At the Coronado in the neighborhood of 350 tons are being shipped daily, and from the Northern 75 tons of a good grade of iron are being sent to the smelter. Sinking has started on the Bohn shaft, and it will be sent down another lift of 300 ft., making the total depth 900 ft. Sinking is also going on at the Jason, Sam S. and Home Extension.

Good progress is being made on the Sunday shaft, which is now down about 200 ft.; the property is shipping about 40 tons daily of ore that nets \$40 per ton. Works is being pushed on the Mountain Lion, and Mabel near the Sunday. The Butcher Boy, belonging to the estate of the late Peter Kimberley, will be in commission shortly, and the first work to be done will be the sinking of the shaft deeper.

The Resurrection is shipping oxidized iron from the upper workings. The Winnie, New Monarch and Cleveland, combined, are shipping 350 tons daily. The new shaft on the Mammoth is down 300 ft., and will have to go another 350 ft. before the mineral is struck.

The Gold Basin, Jonny hill, is shipping 60 tons daily of silicious ore. Prospecting is being carried on at the 750-ft. level of the Triumph, and some low-grade sulphides have been found to the east, which will probably lead to the ore-short that was in the upper workings. The Vinnie, on the same hill, is shipping 50 tons daily of a good grade of silicious ore from the lower levels.

Toronto. Sept. 1.

The Ontario Bureau of Mines has issued a statement showing the output of the metalliferous mines and works of Ontario for the first six months of 1905 as given herewith.

	Quantity.	Value.
Gold, oz.....	2,930	\$25,093
Silver, oz.....	1,128,212	595,974
Nickel, tons.....	4,671	1,638,040
Copper, ".....	2,256	335,637
Cobalt, ".....	65	80,560
Iron ore, ".....	113,583	274,224
Pig iron, ".....	116,794	1,510,197
Steel, ".....	64,527	2,070,003
Total.....		\$6,529,728

Practically all the silver included in the table as well as all of the cobalt was produced from the mines of Coleman township, in the Timiskaming district. The Helen mine, in the Michipicoten district was the source of nearly all the iron ore, and the greater proportion of

the steel was the output of the Algoma Steel Works at Sault Ste. Marie. There were five blast-furnaces in operation, two at Sault Ste. Marie and the others at Hamilton, Midland and Deseronto.

The figures given herewith show the output of the silver-cobalt mines of Coleman township separately.

	Quantity.	Value.
Silver, oz.....	1,121,762	\$592,749
Cobalt, tons.....	65	80,560
Nickel, ".....	32	8,987
Arsenic, ".....	281	2,583
Total.....		\$684,879

The quantity of ore shipped from these mines during the six months was 891 tons, making an average value of \$768.68 per ton. The average contents of the shipments were: Arsenic, 31%; nickel, 3.6%; cobalt, 7.3, and silver, 1,257 oz. per ton.

The price offered by buyer for cobalt has fallen from 65c. to 35c. per lb., and while formerly 12c. per lb. was paid for the nickel and 1/2c. per lb. for the arsenic contents of the ore, nothing is now allowed for these constituents. The price paid for the silver is 90% of the current rate for fine silver.

The returns show substantial progress in nearly every branch of metalliferous mining and an advance upon any previous six months period.

On Aug. 28 the Ontario Government, by order-in-council, withdrew all lands in the townships of Coleman, Bucke, Lorrain and Hudson, comprising the silver-cobalt area, from sale or lease under the Mines Act. This step is taken to enable the Government to adopt new regulations before any further mining rights are granted, with the object of making the mines yield a larger revenue to the province. It is the intention to impose a royalty or percentage upon the profits from mining enterprises and to reduce the area of claims. The order-in-council provides that existing rights of applicants are not to be interfered with. The whole question will be carefully considered by the Government and a policy upon these lines adopted before the territory is re-opened.

Victoria, B. C. Aug. 28.

Coast.—W. F. Borland, of Montreal, who lately returned from examining coal lands on Graham island, one of the Queen Charlotte group, in northern British Columbia, has been negotiating with the owners—a Victoria syndicate—of 30,000 acres of those lands for their purchase, on behalf of himself and Eastern men associated with him. It is stated that terms have been agreed upon, and Mr. Borland has gone east to confer with his associates.

The first move in the direction of a friendly settlement of the differences between the Western Fuel Co. and its miners was made August 25, when a committee representing some of the miners had an interview with Superintendent

Stockett. While nothing definite resulted, the interview was a friendly one and preliminary to a conference that is being arranged between the miners' unions and the company with a view to coming to an agreement under which the men will resume work in the company's mines.

Slocan.—Ore shipments from the Sandon district during the expired eight months of the current year have reached a total of about 13,000 tons, of which quantity nearly 9,000 tons were zinc ore and concentrate and the remainder silver-lead. The largest shippers of zinc were the Slocan Star and Lucky Jim, each of which shipped nearly 4,000 tons. In silver-lead production the Slocan Star is first with an output of about 1,600 tons for the year, the Reco coming next with above 500 tons, the Ivanhoe with about 400, the Payne 300, the Last Chance 250, the American Boy 150, and nearly a score of smaller shippers making up the balance.

Finally revised figures of lead production for the fiscal year ended June 30 last, have been published. These vary but little from the figures published in the *ENGINEERING AND MINING JOURNAL* on July 22, when the total was stated as 55,752,019 lb. The following are the final figures:

	Lb. Lead.	Bounty.
Nelson smelter	16,421,071	\$116,709.10
Trail smelter.....	13,446,086	96,684.36
Unclaimed.....	7,599	51.84

Including claims paid at another smelter, the totals for lead produced and treated in Canada are 33,730,546 lb. of lead and \$240,288.90 bounty.

The amount of lead exported was 21,972,988 lb., on which the bounty paid was \$96,697.37.

The grand total for the year, therefore, is 55,703,534 lb. of lead produced and \$336,886.37 paid in bounty.

The leading producers and earners of the lead bounty were, in order of production, as follows: St. Eugene, North Star (both in East Kootenay), Slocan Star, Ivanhoe, Payne (all in the Slocan), Paradise (Northeast Kootenay), Silver Cup (Lardeau), Enterprise, Lucky Jim, Silver Hustler (Slocan), Ymir (Ymir), and Trime (Lardeau).

Rossland.—It is announced here that the directorate of Le Roi Mining Co. has decided to retire A. J. McMillan from the general management of its affairs as from September 1. No official reason has yet been made public for this step, but it is stated by a Nelson newspaper that it is the result of the efforts of W. H. Aldridge, manager of the Canadian Pacific Railway Co.'s mining and metallurgical department to have him removed owing to his opposition to the amalgamation scheme under which the Canadian Pacific railway purposes securing for its smelting works at Trail the ore of the Le Roi mine instead of letting it continue to be sent to the Le Roi smelter at Northport, Washington. It is expected that Mr. Mc-

Millan's removal from the general management will occasion trouble at the next meeting of stockholders, for he has placed the affairs of the company on a better financial footing than they had been for a long time.

London. Aug. 26.

The Camp Bird (Ouray, Colo.) has now paid to its English shareholders dividends amounting to 13s. 6d. per £1 share. The practice is to pay four interim dividends, and one final, every year. The totals paid during the three years of the English company's ownership have been 4s., 4s., and 5s. 6d. The total distribution in the way of dividends has therefore been £553,500 on a nominal paid-up capital of £820,000. As will be remembered, the property was acquired from Mr. Walsh by the Venture Corporation in consideration of a large cash payment and a proportion of the yearly profit. The shares of Camp Bird, Limited, were retailed in the London market by three or four firms of brokers who had underwritten the flotation. The average price obtained for the £1 shares will probably work out at about 27s.; the quotation today is about 35s. At the time of flotation the Venture Corporation was financially weak; its experience with Stratton's Independence was fresh in the minds of the London public. This is not to be regretted, for it has given the average outsider a very fair run for his money. At the present time the list of shareholders is extensive, and there is no large preponderating holding. The largest individual shareholders appear to be the engineers and lawyers who were concerned in the purchase of the property from Mr. Walsh. There are a large number of shareholders on the list who are well-known believers in mines as investment as distinct from market speculation. The future of the mine certainly promises well. During the past twelve months, 74,674 ton of dry ore was treated, which yielded \$31.38 per ton; the ore reserves amounted to 116,500 tons broken in the stopes and an approximately similar amount blocked out; thus there is practically a three years' supply of ore on hand. The development and exploration work shows that plenty of ore may still be expected.

A companion company is the Esperanza, Ltd.; this owns the mine of that name near the El Oro, in Mexico, through shares in the American company nominally holding the mine. The shares in Esperanza are being boomed more than those of Camp Bird, and are a feature of the market. The capital of the company is £455,000; the £1 shares are now quoted at over £3. When the company was floated, the mine was yielding over ten-dollar ore, most of the gold being caught in the mills, and a small part on the concentrate. About six months ago a find was made of excellent sulphide ore suit-

able for smelting; the consequence is that the monthly profit has steadily risen from \$24,000 in January, to \$143,000 in June. If the London mining market were not so dull, this development would have held more attention; thus if the mine had been situated in West Australia and the year of discovery were six or seven years ago, the shares might have risen to £30. On the other hand, there are a number of wiseacres who are saying that the rich ore is being worked out without regard to the general good of the mine, as was the case with Lake View and other West Australians. But on the favorable side, and in the first place, the engineers give proper figures of rich sulphide ore blocked out, and admit that it is only a shoot; secondly, there is no need to treat the ore in the West Australian method, for there are smelters at hand. In fact, is not the Esperanza under the ægis of the Guggenheims? As regards the quotation of the shares, capitalization at the price given represents more than twice the estimated profits on the ore already known; moreover, the nature of the sulphide deposits indicates that further development may reveal other orebodies; from this point of view the shares make a fair speculation.

Sydney, N. S. W. July 25.

The close of the half year disclosed the fact that the gold mining industry in the Eastern States of Australia is in a less flourishing condition than in the previous period, and it is quite clear that the satisfactory record of the year 1904 will not be approached. The returns from the Charters Towers field, Queensland, exhibit a marked decline, and there are no developments of importance which will warrant the assumption that any immediate improvement may be expected. These remarks also apply to the Gympie field. On the other hand, the yield from the Mount Morgan mine is very gratifying. In the report just issued it is stated that the gold won during the year was 120,047 oz., and the amount paid in dividends £150,000. It is added that the erection of smelting and bessemerizing works to treat the auriferous copper ores will probably be completed by the end of 1905.

An important discovery has recently been made as the result of boring operations undertaken by the Mines Department (Victoria) to prove the continuance northward of the Main Berry deep auriferous lead in the direction of the Moolort Gold-Field's workings. A bore bottomed at a depth of 448 ft., and proved the depth of auriferous wash to be 12 ft., the prospects of gold being the best for some time. The importance of locating the trend of this lead will be best understood when it is stated that gold to the value of several millions sterling has been won from some eight miles of this lead.

General Mining News.

The fourth conference of the commissioners and secretaries of the American bituminous coal operators' associations was held at Columbus, Ohio, August 23 and 24. Important matters were brought up and discussed. The conference decided that a meeting of the bituminous coal operators of the country should be called, to be held in Chicago, on Nov. 22. The object of this proposed meeting is the present necessity for the bituminous coal-mine owners entering into closer relations for the protection of their interests and the betterment of the coal industry. The basis of representation at the Chicago meeting will be four delegates from each district, and one additional delegate for each million tons of coal produced in excess of 4,000,000 tons per annum. Attention was called to the advisability of the respective groups of associations meeting in advance of annual conventions with miners and reaching a thorough understanding as to the course to be pursued. It was the opinion of the meeting that a court of last resort should be established which should be capable of passing upon any questions in dispute that might arise between the operators and miners impossible of settlement otherwise.

ALABAMA.

JEFFERSON COUNTY.

Alabama Consolidated Coal & Iron Co.—This company is boring at the Mary Lee mines, looking for the Black Creek vein of coal. It is believed that this vein is under the New Castle vein now being worked, and that a shaft 200 ft. under the present mine will get at it. It is intended to get the coal into the slope of the present mine and use the same haulage in handling the new coal. The New Castle vein is a coking coal, while the Black Creek vein is a fine domestic coal.

ST. CLAIR COUNTY.

Alabama Fuel & Steel Co.—This company, of which J. M. Overton, of Nashville, Tenn., is president and H. F. de Bardeleben, one of the pioneers of the Birmingham, is a director, will lease and work the Tunnel Coal Co., which was organized by the Central Railroad of Georgia.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Co., Ltd.—The production of this company for July was 1,261 tons of copper.

Much comment has been caused by the action of the Territorial Board of Equalization at a recent meeting. The assessments of mine property made by the county boards were revised and the values raised, in some cases to four or five times the original assessment. It is claimed that the action taken is arbitrary; and also that it is not based on any uniform

rule. Increases were made on prospects and prospects and undeveloped claims, as well as on operating mines.

PINAL COUNTY.

El Dorado.—Shipments of ore from this mine will begin as soon as the Phoenix & Eastern road is completed up the Gila river. A good deal of prospecting is going on in the neighborhood.

CALIFORNIA.

CALAVERAS COUNTY.

San Andreas Gold Quartz Mining Co.—At this mine, San Andreas, John L. Henry, manager, a gallows-frame and whim have been erected.

Round Butte.—At this mine, James Stewart, manager, operations will shortly be commenced and five shafts sunk.

ELDORADO COUNTY.

Alcimente Mining Co.—This company, operating the old Granite mine near Smiths Flat, has run 500 ft. of drifts since beginning operations. In the Unity or Gregory claim adjoining, the same company has discovered a bench of paying gravel.

Pyramid.—Superintendent Prewett is to increase the 15-stamp mill on this property to one of 25 stamps, and the foundations are being laid for the addition. An oil-burning plant is to be installed.

Union.—It is reported that a body of rich ore has been struck in this mine at El Dorado.

INYO COUNTY.

Happy Canon.—In this rough cañon Williams, Reed & Babcock, while prospecting, discovered a vein carrying copper and are now opening it.

MONO COUNTY.

Syndicate Mining Co.—This company, at Bodie, expects to start 15 stamps early in September. A rock-breaker and grizzly are being put in.

Standard Consolidated Mining Co.—This company, at Bodie, intends building a dam to retain the water at East Lake, in the Forest reserve, as soon as the authorities grant permission.

NEVADA COUNTY.

Murchie Mining Co.—The new mill of this company at Nevada City is running steadily. The sulphuret and slime saved in 17 days' run yielded \$16,500. There were 32½ tons of sulphuret, and nearly four tons of slime. The yield of the slime was \$634 per ton and of the sulphuret \$343 per ton.

Banner.—In reopening this mine near Nevada City, the shaft has been cleared to the drain tunnel and partly retimbered. The hoists have been set and the new pump is being put in. The shaft is to be continued down to 1,200 feet.

PLACER COUNTY.

Lewis Hill Gravel Mining Co.—This property, near Newcastle, is being rapidly developed under superintendent R. M.

Mooer, of Auburn. There are two tunnels, one of them being run in 380 feet.

Rawhide.—It is expected that this mine, near Towle, will shortly be in operation again. It has been closed down a few months. There is a new 10-stamp mill on the property, and also a compressor and drills.

SHASTA COUNTY.

Clipper.—At this mine, near Kennett, C. C. Hartman, superintendent, the money has been raised for active development as soon as the shaft is pumped out. The mine has been in litigation for some time.

Bonny View.—The prospecting drills of the Oroville Exploration Co. failed to find any dredging gravel of value on the Bonny View tract and prospecting work has been stopped. Gold was found, but not enough to warrant the construction of dredgers, the averages being between 5 and 10c. per cubic yard.

SAN BERNARDINO COUNTY.

Copper.—Albert Chase, John Verding and H. H. Ahrens, three railroad engineers of Needles, have sold a group of copper claims 40 miles south of that place to Minnesota men for \$75,000, the first \$10,000 of which has been paid. Development work will commence next month.

SAN DIEGO COUNTY.

Chula Vista Oil-well.—This oil-well is now down 1,800 ft. and has entered dark shale, which is regarded as very favorable. For the first 270 ft. this well is 16 in. in diameter, then 14 in. for several hundred feet more, and then 11 in. to 1,350 ft. In the lower portions the casing is 8 inches.

SANTA BARBARA COUNTY.

Union Oil Co.—This company is about to start six new oil-wells, three on the Santa Maria side and three on the Lompoc side. Those on the Santa Maria side will be near the gushers which have been struck on that part of the field.

SISKIYOU COUNTY.

Nordheimer.—At this hydraulic mine they cleaned up \$6,000 from a six weeks' run.

Mill.—F. H. Elder will shortly have a three-stamp mill at work at Prospect Hill, Orleans. He has bonds on several quartz claims.

Great Western Gold Co.—The first shipment of copper matte from the new smelter of this company, at Ingot, has been made to the Delamar refinery in the East. W. Gillette Scott has resigned as general manager and M. E. Dittmar has taken his place.

TUOLUMNE COUNTY.

Horse Shoe Bend.—At this mine grading for the new mill is proceeding. Edward Skewes, the new superintendent, has arrived from Liverpool, England. Mr. Skewes has had much experience in Colorado.

Clio Mining Co.—A large body of good ore has been exposed, enough to supply 10 stamps for many months.

COLORADO.

CLEAR CREEK COUNTY.

Seven Thirty.—Franchini & Co., lessees on the west end of this property, have opened up a streak of ore from 6 to 10 in. in width, from which shipments of very rich ore have been made.

Kirtley.—J. Reynolds, of Las Vegas, N. M., has purchased a one-fifth interest in this property, at Georgetown, for a cash consideration of \$5,000. The property is to be worked through the Equator tunnel, Mr. Reynolds obtaining a lease and bond on the interests of the other owners.

American Sisters.—In the Headlight shaft of this group an ore streak, carrying high values of silver and 40% lead, has been opened. The property is operated by a group of Georgetown business men, with J. J. White, Georgetown, as manager.

McClellan.—C. K. Wolf, administrator of the Martine estate, has sold to H. Scifreid, of Georgetown, a one-half interest in this mine for \$2,500, and the property is to be actively operated by the new owners.

Brighton Mill.—New machinery is commencing to arrive for this new mill, at the mouth of Fall River, in which Pennsylvanians are interested. It is to be 50 tons daily capacity, and is being designed for the purpose of handling the ores from the Dover and Brighton mines, of which D. Ellis, Idaho Springs, is manager.

Argentine Central Railway.—Grading work has been commenced on this new railroad which is to be built from Silver Plume to East Argentine, the enterprise being a personal one of E. J. Wilcox, manager of the Waldorf Mining & Milling Co. The road is to be 9 miles in length, the grade being from 3 to 6%; 40-lb. rails are to be laid, and the motive power will be Shay geared locomotives. This road will connect with the Colorado & Southern at Silver Plume, and will furnish an outlet for the ores of the Waldorf and other mines in the East Argentine district.

Blue Bird.—Idaho Springs parties have secured a lease and bond from the Georgetown owners, and will put on a force of men to work this property on Republican mountain, installing machinery at a later date.

Rockford.—A Rand "Imperial" compressor, 100-h.p. boiler and "Little Giant" drills have been purchased by H. A. Riedel, Idaho Springs, manager of the Banner Consolidated Mines Company.

GILPIN COUNTY.

Colorado Chemical & Amalgamating Co.—Denver parties are interested and they have secured a lease on the Brooklyn mill on North Clear creek, and are refitting it for the purpose of handling custom ores. C. S. Arnold, Central City, is in charge of the mill.

Ralls County.—Columbus, Ohio, parties are interested with St. Louis, Mo., parties in starting up of this property, and C. S. Gage, Central City, will have charge of operations. New machinery is to be installed and shaft buildings erected.

Russell Mining Co.—Missouri and Pennsylvania capital is interested and will instal machinery on the No. 2 shaft of the Russell mine, and erect a large shaft building, intending to carry on heavier developments. Frank L. Paxton, Russell Gulch, Colo., is superintendent.

Hillhouse.—Eastern parties are becoming interested in this property in Russell district, owned by T. H. Potter & Co., of Central City, and machinery is to be installed during the coming month, with a view of carrying on heavy operations.

Pleasant Valley Mining Co.—Detroit, Mich., parties have become interested in the Banta Hill property south of Central City, and several of the properties are to be worked under lease to local parties, on royalty basis. The company will erect two or three new shaft buildings and instal machinery for the lessees, and is figuring on the erection of a concentrating plant for the treatment of its own ores during this fall. J. Kantnor, Central City, Colo., is in charge of operations.

TELLER COUNTY—CRIPPLE CREEK.

Elkton Consolidated Co.—This property is to commence work again in a few days. Only a small force of men has been employed lately in timbering the shaft and making other improvements. From all reports the mine is in very good condition, and is now in shape to make a good production. The Hayden lease on the Gregory property of this company is shipping some very good ore, and the leasers stand a good chance of making money.

Forest Queen.—It is thought that this property will soon commence work again. It was shut down a few days ago for a short time, and it is expected that it will soon be ready to begin again. The property is situated on Ironclad hill, adjoining the famous W. P. H. Some ore has been shipped from the property.

Mary Nevin.—A new compressor is being put in by Manager Jackson, of this property. It is understood that some very good ore has been opened up on the property. The mine is situated on Rosebud hill, adjoining Beacon hill, and appears to have the western extension of the ore shoots that have made the latter hill famous.

Womack Hill.—Some work is being done on this hill at present. On the Mollie Kathleen H. D. Gortner, the owner, is saving some ore and expects to make a shipment soon. On the Vaughan lease on the Reno a steam hoist is being put in. The Gold King is working steadily, and a number of other small leases are doing some work.

National.—This property, on the edge of the town of Cripple Creek, has recently put on a night shift, and is at present shipping a little ore. The property is under lease to Taber and associates.

Gold Cycle Mining Co.—This company has about completed the installation of the new compressor, and will soon be ready for work again.

FLORIDA.

POLK COUNTY.

American Phosphate Co.—This company, organized in Boston, has bought the Pharr property, 1½ miles from Bartow. This tract has been well tested; it is 792 acres in extent and is close to the Atlantic Coast Line railroad.

INDIAN TERRITORY.

CHOCTAW NATION.

Hailey-Ola Coal Co.—This company closed down its Haileyville coal mine recently, on account of slack business. It is to be closed for three months.

La Brosque & Wilkerson.—This firm, of South McAlester, is prospecting for coal about 6 miles southeast of that place with the expectation of opening a mine in the near future. The place is accessible by building two or three miles of track to either the Chicago, Rock Island & Pacific or the Missouri, Kansas & Texas. Mr. La Bosque was until recently manager of the La Bosque Coal Co., operating a mine at Hughes.

Osage Coal Co.—This company, at South McAlester, is drilling for coal nearer the middle of the McAlester basin from its present mines, and expects soon to sink a 1,000-ft. shaft, as the coal nearer the outcrop on its leases is rapidly becoming exhausted.

Rock Island Coal Co.—This company is making a number of improvements at some of its Indian Territory mines. At Mine No. 5, Anderson, there was recently installed an electric haulage plant composed as follows: Erie engine, Crocker-Wheeler 100-kw. generator, Morgan-Gardner 7-ton electric locomotive and General Electric 55-h.p. slope-hoist. The company expects also to add shortly an electric chain-mining machine for experimental purposes. At Mine No. 7, Hartshorne, it expects soon to add to the equipment a 150-h.p. return tubular boiler, 200-h.p. engine, 150-kw. generator and two or three chain-mining machines, the electric plant to be used a little later also for haulage. At Mine No. 8, Hartshorne, the company is sinking a new air and escapement shaft 235 ft. deep, to which the fan will be moved; it is also installing additional power, as follows: Two 150-h.p. return tubular boilers, 140-h.p. engine, 100-kw. generator, 8-ton electric locomotive and 85-h.p. slope hoist. It is also to put in box-car loaders at mines No. 5, and 8.

LOUISIANA.

CADDO PARISH.

Shreveport.—Development here is extremely quiet; wells are as follows: Caddo Lake Oil & P. L. Co., 1 gas well, 1,550 ft.; Citizen's Oil & P. L. Co., 1 gas well, 1,000 ft., 1 drilling, 200 ft.; Producers' Oil Co., 1 gas well, 900 ft., 1 burning gasser, 1 drilling; Shreveport Oil Co., 1 well drilling down, 1,500 ft.; Louisiana & Texas Oil Co., 1 drilling down, 1,800 feet.

CALCASIEU PARISH.

Jennings.—Bass & Co.'s No. 6 has been brought in, and is doing 2,000 bbl. under air pressure. Wells drilling: J. B. Tierce, No. 6; Morse Oil Co., No. 2; Wilkins, No. 4; Jennings Heywood Co., Nos. 4 and 5. Under the judgment given in Martel versus Jennings Heywood Oil Co., the sheriff is sequestering one-fifth of all oil produced by the Heywood Oil Co., H. L. Shultz, J. B. Tierce, Lovegrove & McIntosh and Jennings Heywood Oil Co. The quarantine authorities of several Louisiana parishes prevented the movement of all freight, thus tying up all rail shipments of crude. The senseless proceeding caused much inconvenience and loss before the trouble was adjusted.

HARDIN COUNTY.

Batson.—Houston Ice & Brewing Co.'s well had a blow-out, but the well was not seriously damaged. The Security Oil Co.'s pipe line from Batson to Dayton has been completed; 27 miles of pipe were laid in 23 days. It will be extended from Dayton to Humble, giving the last-named field four pipe lines to tidewater.

Saratoga.—Producers' Oil Co., No. 2, and Cole Oil Co., No. 1, have been deepened and are now flowing 400 bbl. daily. Rio Bravo Oil Co. has two wells nearing completion.

HARRIS COUNTY.

Humble.—The Guffy Petroleum Co. had two steel tanks, holding 50,000 bbl. of oil, destroyed by fire. Other operators lost settling tanks, three derricks, five drilling rigs and three compressed-air plants; total loss, \$50,000. Production here has fallen to 55,000 bbl. daily, and crude has jumped to 20c., the highest point it has ever reached. The rapid falling off in production and the probability of a further decline accounts for the stiff advance in local prices. Development has slackened and gushers do not last long, while producers say that the field is not a good pumping proposition. The July output was 2,650,000 bbl.; June, 3,400,000; May, 2,800,000. Up to August 1, 385 wells had been drilled, and on that date 100 were producing and 27 drilling.

MICHIGAN.

HOUGHTON COUNTY.

The *Marquette Mining Journal* says that R. S. Fitch, of the Michigan College of Mines, is inspecting the Michigan gold mine property, located northwest of Ishpeming, in a search for molybdenite ore, which is used in the manufacture of steel

and armor plate. He is there at the instance of Prof. Seamen, of the mining school faculty, who knew of the existence of the mineral in the vicinity of the mine.

MINNESOTA.

IRON—CUYUNA RANGE.

In a general way, as indicated by careful magnetic surveys with the dip needle the new Cuyuna range in Minnesota starts in the region around Kimberly, in Aitkin county. Running southwesterly, it passes below Rossberg and Aitkin and then swings up around the westerly end of Cedar lake into Deerwood township. Within a mile of the Northern Pacific station of Deerwood, the line of magnetic attraction takes the conventional southwesterly direction around the lower end of Reno lake through Deerwood, Nokay and Oak Lawn townships right into the suburbs of Brainerd, in Crow Wing county. The strongest, most definite and unbroken line of magnetic attraction extends for a distance of about 20 miles along the south side of the Northern Pacific railroad, from a point near Cedar lake, through to Brainerd. This is called the south range. What is known as the north range lies between the railroad and the Mississippi river, around Rabbit and Little Rabbit lakes, within 5 or 6 miles of Deerwood.

There is almost an utter absence of any surface indications. The south range is comparatively level. There are no outcrops, either of rocks or iron ore. Much of the range passes through farms, more or less improved and tilled. The entire course of the belt that is assumed to bear iron ore is covered with an alluvial deposit, from 40 to 180 ft. deep. This deposit embraces loamy soil, gravel, sand, clay, hardpan, and here and there beds of quicksand. Drill holes have told some things in corroboration of the magnetic needle. In a general way, the formation is thought to resemble the Gogebic and Penokee ranges. The orebodies are veinlike and more or less vertical, instead of being in bunches or beds. Drills are boring, shaft sinking has commenced, the woods are swarming with prospectors and scientific men are becoming interested.

OREGON.

BAKER COUNTY.

I. X. L.—Manager F. T. Kelly, of this mine, has just returned from a trip to New York and Chicago, where he went to purchase additional machinery for the mine, which is situated in the Greenhorn district, Greenhorn post office. Mr. Kelly expects that he will soon begin operations on a large scale.

Virtue.—This old mine, which years ago made eastern Oregon famous, has been leased by K. J. Romig and the board of directors in Montreal to W. L. Vinson, of Baker City, who is the managing

owner of the Emma mine and several properties in Greenhorn. The Virtue and Emma are practically adjoining properties and are situated about 6 miles east of Baker City. Vinson has already put a force of men at work on the Virtue and expects good results from the labors before snow flies.

Mountain View.—President H. M. Cake, of this mine in the Cable Cove district, 30 miles west of Baker City, has just returned from a visit to the property and reports that Superintendent Techow, who, for eight months past, has been taking out shipping ore, is continuing the work, and that the values from this property are holding up. The company owns a half dozen claims and has a mill and concentrating plant in operation.

Belcher.—A mining man just returned from the Greenhorn district reports that while several of the properties there have been closed down on account of litigation and change in management, men are at work in most of the claims. The men at work on the Belcher and Golden Gate properties of the Daines Mining & Milling Co. are still blocking out high-grade ore and making every preparation for the installation and operation of the new mill which is on the ground.

Gilkey & Kershaw.—These placer groups, or rather quartz claims, which are being operated on placer principles, because of the soft condition of the disintegrated quartz, are still taking out high values. Mr. Gilkey believes that his property will retain these values as depth is attained, although others believe that he is simply working out some pockets.

Mayflower.—The final contracts have been let at the Mayflower for the erection of the new mill and cyaniding plant, and a large part of the machinery has already been shipped to the camp, which is in the Cornucopia district, 60 miles east of Baker City. Geo. W. Boggs, the manager, who has his headquarters in Baker City, states that he hopes to have the plant in full operation early in September.

PENNSYLVANIA.

ANTHRACITE COAL.

Lehigh Valley Coal Co.—This company operates the coal lands controlled by the Lehigh Valley Railroad Co. The report for the year ending June 30, 1905, gives the following statements of its operations. The capital obligations include \$1,965,000 stock, \$12,968,000 bonds and \$10,537,000 certificates of indebtedness. The yearly interest charge on the bonds is \$634,400. The stock and certificates of indebtedness are owned by the railroad company.

The total production of coal by the company, and the minor concerns which it controls, was as follows, in long tons:

	1904.	1905.	Changes.
Lehigh Vy. Co.....	4,275,131	5,605,988	I. 1,330,857
Tenants of L. V. Co.	1,667,957	1,709,882	I. 41,925
Minor companies..	1,568,870	659,341	D. 909,529
Total.....	7,511,958	7,975,211	I. 463,253

The changes shown were in part due to the transfer of several minor companies during the year. This was an increase of 6.2% in the total production.

The gross earnings of the Lehigh Valley Coal Co. are not given; the net earnings were \$635,548, or 7.97c. per ton of coal reported. Charges were \$500,000 for improvements and \$108,676 for bonds redeemed and other adjustments, leaving a surplus of \$26,872. Adding \$1,624,429 brought forward from previous year, made a total surplus of \$1,651,501.

The earnings of the Lehigh Valley Railroad from coal traffic for the year were \$13,530,337, or 43.3% of its total revenue. The total coal tonnage was 11,255,918 tons, and the coal traffic amounted to 1,880,899,182 ton-miles. The average haul on coal was 167.1 miles; the average gross earnings per ton of coal, \$1.20; and per coal ton-mile, 0.719c. These figures include only revenue coal, and not coal for the company's use.

The report says: "The collieries operated by the Lehigh Valley Coal Co. and heretofore affiliated coal companies produced during the year 53.3% of the coal transported by the Lehigh Valley railroad, being an increase of 1.56%, compared with the previous year. From the operations of the Snow Shoe property there were mined 291,396 tons, as against 169,577 tons the previous twelve months. Additions and improvements were made to the various collieries during the year amounting to \$876,377. In pursuance of the company's policy of handling its own coal at points where the tonnage warrants, additional coal yards at Syracuse, Chicago, Milwaukee, and St. Paul have been secured. The advance royalty account shows a decrease of \$164,706.26, due to the improvement and development of the coal property."

"The \$5,000,000 Lehigh Valley Coal Co. second mortgage bonds and the \$1,844,000 Hazleton Coal Co. bonds owned by the Lehigh Valley Railroad Co. and formerly held as collateral, as well as the \$2,000,000 Lehigh Valley Coal Co. five-ten year coal pledge bonds, were cancelled. The properties of the Connell, Seneca, Righter, Warrior Run and Wyoming Coal & Land companies were acquired for the Lehigh Valley Coal Co. and in the place thereof the Lehigh Valley Coal Co. issued to the Lehigh Valley Railroad Co. certificates of indebtedness and capital stock amounting to \$11,202,000, which have been pledged under the general consolidated mortgage as additional collateral security."

BITUMINOUS COAL.

Bessemer Coal & Coke Co.—At a special meeting of stockholders of this company the directors were authorized to dispose of the company's property.

The concern is backed mainly by Cleveland capital, Joseph Brockenstein of that city having the largest interest. Its property is on the Bessemer & Lake Erie railroad.

SOUTH DAKOTA.

The State Board of Equalization has rescinded its action raising assessed valuation of Lawrence county mineral lands. No information is given as to the disposal of the increase in Pennington county mineral lands.

This concession by the State board was secured by the committee sent to Pierre by the Black Hills Mining Men's Association, the committee consisting of Harris Franklin, R. E. Grimshaw, J. N. Hawgood and Fred. Pennington, assisted and working in harmony with Chambers Kellar, general counsel for the Homestake Co., who appeared in behalf of that concern.

UTAH.

BEAVER COUNTY.

Frisco Contact.—A depth of 300 ft. has been attained in the shaft.

Skylark Copper.—At a depth of 115 ft. in the new shaft a low-grade copper ore-body, said to be 20 ft. in width, has been encountered. A. J. McMullen, of Salt Lake, is manager.

Majestic Copper.—The most important development yet made in the Harrington & Hickory mine, owned by this company, has taken place at a depth of 435 ft. in the Gomer shaft, where a 6-ft. vein of high-grade lead ore has been encountered.

JUAB COUNTY.

Star Consolidated.—This property, in Tintic, is being developed and since a month ago the shaft has been put down more than 100 ft. It is now down 600 ft. and will be continued to the 900-ft. level.

SALT LAKE COUNTY.

Albion.—A 2-ft. streak of high-grade copper ore was encountered during the week in the east drift of the main tunnel and at a depth under the surface of the mountain of 1,100 ft. The great mass of the vein is of a milling grade. A scarcity of water at the power plant has retarded development work some.

Columbus Consolidated.—This company is keeping up its ore shipments regularly and will continue to do so. It is believed the directors will order the posting of a dividend soon.

SUMMIT COUNTY.

Little Bell.—Development work has been inaugurated in this property again. The orebodies opened by the crosscut run through the company's territory by the West Quincy Co. are to be fully explored. Newton Dunyon, of Salt Lake, has been made superintendent.

Daly West.—Repairs to the damaged hoisting engine have been finished, and the plant is in commission again.

New York Bonanza.—Development work is being prosecuted on the 640, the 700 and the 800 levels. Some water has been encountered on the lower level, but not enough to interfere with progress.

WASHINGTON.

FERRY COUNTY.

Pearl Consolidated Mining Co.—The Supreme Court of the State has affirmed the judgment of the Superior Court of Spokane, Wash., in the case of F. B. Pitcher against this company, wherein the former sought to have set aside the sale of the Lone Pine, Pearl and Surprise claims by the Lone Pine-Surprise Consolidated Mining Co. to the Pearl Consolidated Mining Co. The decision was in favor of the companies. Charles P. Robbins, Leo H. Long and Thomas Ryan, three of seven trustees of the Lone Pine-Surprise Co., held a mortgage against the claims of the company, herein named, for \$28,070, and the sale, which was ratified by three-fourths of the shareholders, was made for the purpose of re-organizing on an assessable basis, to pay off the indebtedness and continue the exploitation of the company's property.

In an action brought by Robert Breeze against the same companies, in which the plaintiff asked to have a receiver appointed, a decision was rendered in favor of the companies, and that also was affirmed by the Supreme Court. The prime object in both cases was to prevent the Pearl Co. from collecting assessments. It is probable that the company will continue levying assessments and resume work on its property.

Ben Hur.—The ore production is now reduced from 15 to 17 carloads a month, and from 15 to 20 tons a day is being raised to surface from the two levels of the mine. Ore had been shipped to the British Columbia Copper Co., at Greenwood, B. C., in excess of the contract to supply 400 tons a month, and that smelter was overstocked. Arrangements have been made to ship to the Hall Mines Smelter at Nelson, B. C., and also to Northport, Wash. The Washington & Great Northern Railway Co. is building a loading station and chutes on its track, below the mine, to facilitate the haulage to Northport. Three power drills are in operation at the mine. The north drift on the 115-ft. level is in over 200 ft. and has about 200 ft. further to run to connect with the old tunnel workings, making 4 ft. a shift. A drift is being pushed northwest on the 230-ft. level, to prospect for another ore-shoot.

Foreign Mining News.

EUROPE.

FRANCE.

According to the *Echo des Mines*, the new coal basin that is being mapped out in French Lorraine extends to 25 km. in length from the frontier, while in width it has already been traced from Lesmenils to Abancourt, a distance of 12 km. This covers a space of 30,000 hectares, whereas the basin of La Loire is only 25,000 hectares. The *Echo* is of opinion that the Lorraine basin is but just touched.

Coal Trade Review.

NEW YORK, Sept. 6.

ANTHRACITE.

The hard-coal trade shows no particular vigor, although the active fall demand is expected at about the middle of the month. This apathy on the part of consumers, except in case of those whose storage room is already well filled, is surprising in the face of the repeated warnings from the headquarters of the labor unions that an extended strike in the anthracite fields may be looked for next spring. Mining superintendents all through the field, who are in intimate contact with their underground workmen, say that the prevailing temper of the men is opposed to any violent rupture of present relations; this, however, may be readily explained by timidity on the part of the workmen to express in advance their determination to create a disturbance.

The mines are working full time, with the exception of a holiday on last Monday, and coal is in good supply, particularly of the small sizes. Prices, however, have not been affected, but remain as follows: \$4.75 for broken and \$5 for domestic sizes. Steam sizes: \$3 for pea; \$2.25@\$2.50 for buckwheat; \$1.45@\$1.50 for rice and \$1.30@\$1.35 for barley.

BITUMINOUS.

The Atlantic seaboard soft-coal trade shows continuing strength, and it is the general opinion that the fall activity has begun. All classes of coal feel the effect of this, and some of the better grades even have difficulty in keeping up with their orders, while better tonnages are seen coming from all the mines. There is no surplus at tidewater and prices remain firmly at around \$2.30@2.35 for the fair grades of coal. Car supply and transportation are feeling the pressure and both appear to have fallen slightly below normal. Some vessels in the coastwise market are inquiring for Southern business, the hurricane season having passed. Export trade has been limited for some time by the high freights prompted by fear of storms.

Trade in the far East is active; shippers have plenty of orders from this territory, but after the activity shown in this region during the summer, it is better supplied than many other districts, in spite of which a continued pressure is expected. Trade along the Sound is improving rapidly; indeed, some points are calling for more coal than can be shipped promptly. New York Harbor trade is strong, there are no accumulations, and orders are more plentiful than coal. All-rail trade continues vigorous and consumers are being rather slighted in favor of tidewater business. Car supply is short with some railroads in certain quarters. Transportation is slow and has caused some little trouble with consumers who are not well stocked.

Vessels in the coastwise market are in urgent demand and freights are strong.

Philadelphia quotes as follows: to Boston, Salem and Portland, 65@70c.; to Lynn, Newburyport and Gardner, 90c.; to the Sound, 55@60c.; to Portsmouth, 75c.; to Gloucester, 90c.; to Bath, 75c.; to Bangor, 80@85c.; to Saco, \$1 and towages. New York harbor charges 55c. to around the Capes.

The Chesapeake & Ohio Railroad Co. reports the coal tonnage of its lines in the month of June as follows, in short tons:

	1904.	1905.	Changes.
New River.....	384,191	422,449	I. 38,258
Kanawha.....	154,265	186,554	I. 32,289
Kentucky.....	4,409	5,704	I. 1,295
Total C. & O.....	542,915	614,707	I. 71,792
Connecting lines.....	10,555	22,839	I. 12,284
Total.....	553,470	637,546	I. 84,076

Deliveries of coal originating on Chesapeake & Ohio lines are reported as follows:

	1904.	1905.	Changes.
Tidewater.....	277,345	253,799	D. 23,546
Eastern points.....	75,843	101,997	I. 26,154
Western point.....	189,727	258,911	I. 69,184
Total.....	542,915	614,707	I. 71,792

There was a small decrease in tidewater deliveries, but a large increase in all-rail trade, especially to western points. Of the total tonnage this year, 41.3% was carried to tidewater; 16.6% to rail points east of the mines, and 42.1% to points west.

Coke traffic for June was: New River, 19,592; Kanawha, 6,304; connecting lines, 21; total, 25,917 tons, an increase of 8,234 tons over June, 1904. Of the Chesapeake & Ohio coke, 10,217 tons, or 39.4%, were carried eastward; and 15,679 tons, or 60.6%, westward.

The total tonnage reported for the fiscal year ending June 30 was as follows:

	1904.	1905.	Changes.
Coal.....	5,937,325	7,582,344	I. 1,645,019
Coke.....	325,303	312,700	D. 12,603
Total C. & O.....	6,262,628	7,895,044	I. 1,632,416
Connecting lines.....	171,682	214,801	I. 43,119
Total.....	6,434,310	8,109,845	I. 1,675,535

The total increase was 26.2%. The tidewater coal deliveries last year were 3,220,385 tons, or 42.5% of the total tonnage.

Birmingham. Sept. 4.

The coal production in Alabama is steady and the demand is sufficient to warrant shipment of every ton being produced about as rapidly as it can be loaded. The railroads are furnishing all the cars that are necessary in a prompt handling of the business. The demand will show some improvement in the next few days, it is believed, inasmuch as inquiries are quite strong and indications pointing to the starting in of the winter demand. The railroad officials look for the heaviest business this winter in the coal trade Alabama ever enjoyed. The mines are working fairly steady. A casual investigation shows decided improvement at some of the mines, while at others there is still some straggling. The union miners are

keeping up their strike, though the bulk of the strikers have sought work at the commercial coal mines or out of the State. A large sum of money is still being spent by the union miners in shipping men back to their respective homes who were brought to the district to take the places of the strikers.

The Alabama Cannel Coal Co. was incorporated last week (capital stock, \$10,000) by E. F. Enslin, W. C. Sterrett and Forney W. Brandon. The company will open mines in the Birmingham district.

The wages of the union coal miners will remain the same during the month of September as for the past month—55 cents per ton. The maximum wage is 57½ cents per ton, and the average selling price of iron is the basis.

Coke is in strong demand, and good prices obtain. The production in Alabama is considerably under the actual needs. One of the coke manufacturing companies in this district, which has been selling coke right along ever since the strike of the union miners began, has been making a strong profit on its surplus coke; in fact the statement is made that the profits made on this commodity have paid handsomely.

The Alabama Fuel & Steel Co., announcement of which was made heretofore, expects to be able to ship some coal just as soon as the railroad extension has been completed to its properties in St. Clair county. The roadbed is almost completed, and rail-laying will begin in the next few weeks. Within two years it is expected that 2,000 tons of coal a day will be the output.

A number of deals in mineral lands in Alabama are reported to have been made in the past week, which means that there is to be considerable done in the way of coal development. The Pratt Consolidated Coal Co. has engineers in its recently purchased properties in Walker county, and expects to begin opening mines in the near future. This company will be the largest independent coal company in the State by the end of another twelve months.

Chicago. Sept. 4.

The coal trade is becoming better in nearly every line. With the passing of the September line, there has come cool weather, such as makes fires in households desirable and causes orders for winter coal to the retailer, who, in turn, is beginning to lay in his stocks. This applies particularly to anthracite sales, but bituminous—particularly the grades used for domestic purpose—is active also. With good trade prospects throughout Chicago territory, due to the prospect of good crops, there doubtless will be a heavy demand for anthracite from this time forward. Prospects now, indeed, are exceedingly encouraging to the wholesaler.

There is still much cutting of prices on anthracite, due to the large amount of free coal that accumulates on tracks and must be sold. September prices now in force prescribe \$6.50 for egg, stove and chestnut anthracite, and \$6.25 for grate. The present demand is largely for the smaller sizes.

In Illinois and Indiana coals the condition of oversupply continues. The market is very weak on nearly all grades, and especially on fine coals. Of Eastern coals, smokeless and Hocking are strong; for others, there is yet a comparatively light demand. It is to be said, however, that all grades are strengthening somewhat, and that the prospect is more encouraging than it has been for a long time. The September revival of trade is apparently about to begin.

The trade derives much optimism from the general prosperity of the Middle West in agriculture, and all lines associated with agriculture. The demand for threshing coal has been extraordinarily good, and it is a rule of the trade that good crops mean heavy coal sales. If only some means could be found for checking the excessive shipments of Illinois and Indiana coal to the local market, the trade would feel greatly encouraged.

Pittsburg. Sept. 5.

Coal.—There has been a decided improvement in the market and indications point to higher prices before the end of the month. All shading has stopped and the maximum price quoted a week ago is now the minimum price. Run-of-mine coal is quoted at \$1.05; ¾-in., \$1.15, and 7¼ in., \$1.25 a ton at the mine. Railroad cars are becoming scarce and this will have a tendency to still further stiffen rates. Heavy shipments continue to the lake ports and there is every indication that the lake trade will exceed that of last year.

Connellsville Coke.—Coke prices are higher this week, sales having been made at \$2@2.10 for furnace coke for delivery during the rest of the year. Standard Connellsville coke commands a higher price. Foundry coke is quoted at \$2.50@ \$2.60 a ton. The production for the week was 255,469 tons, an increase of nearly 4,000 tons. The shipments aggregated 11,281 cars, distributed as follows: To Pittsburg and river points, 4,257 cars; to points west of Pittsburg, 5,757 cars; to points east of Everson, 1,267 cars.

San Francisco. Aug. 31.

No change is noted in the coal market; the strong competition of fuel oil keeps prices down, in spite of light receipts of Australian and Eastern coal. British Columbia coal is in good supply.

For Coast coals, in large lots to dealers, prices are as follows: Wellington, New Wellington and Richmond, \$8; Roslyn, \$7; Seattle and Bryant, \$6.50; Beaver

Hill and Coos Bay, \$5.50; White Ash, \$5.25. For Rocky Mountain coals, in car lots, quotations are: Colorado anthracite, \$14; Castle Gate, Clear Creek, Rock Springs and Sunnyside, \$8.50. Eastern coals are nominal at \$14 for Pennsylvania anthracite, and \$13 for Cumberland. For foreign coal quotations are, ex-ship: Welsh anthracite, \$13; cannel, \$8.50; Wallsend and Brymbo, \$7.50 per ton.

Foreign Coal Trade.

Sept. 6.

Exports of coal and coke from the United States for the seven months ending July 31 are reported by the Bureau of Statistics of the Department of Commerce and Labor as follows:

	1904.	1905.	Changes.
Anthracite.....	1,402,057	1,417,789	I. 15,732
Bituminous.....	3,386,041	3,824,452	I. 438,411
Total coal.....	4,788,098	5,242,241	I. 454,143
Coke.....	311,102	342,126	I. 31,024
Totals.....	5,099,200	5,584,367	I. 485,167

The coke went chiefly to Mexico, with some shipped to Canada also; the latter being taken by blast-furnaces in Ontario. The coal exports were distributed as follows:

	1904.	1905.	Changes.
Canada.....	3,566,938	3,930,143	I. 363,205
Mexico.....	544,550	540,823	D. 3,727
Cuba.....	257,174	283,598	I. 26,424
Other West Indies.	159,994	181,357	I. 21,363
France.....	9,704	651	D. 9,053
Italy.....	53,580	51,771	D. 1,809
Other Europe.....	39,452	15,860	D. 23,592
Other countries..	156,706	238,038	I. 81,332
Total.....	4,788,098	5,242,241	I. 454,143

The greater part of the exports are to adjacent countries—Canada, Mexico, Cuba and the other West Indies. The coal to other countries goes principally to South America. Exports to Canada in detail were as follows:

	1904.	1905.	Changes.
Anthracite.....	1,383,558	1,398,252	I. 14,694
Bituminous.....	2,183,380	2,531,891	I. 348,511
Total.....	3,566,938	3,930,143	I. 363,205

Shipments to Canada were 98.6% of all the anthracite exports, and 66.2% of the bituminous, this year.

Imports of coal into the United States for the seven months ending July 31 are reported by the Bureau as follows:

	1904.	1905.	Changes.
Canada.....	715,724	753,643	I. 37,919
Great Britain.....	53,601	27,526	D. 26,075
Other Europe.....	50	114	I. 64
Japan.....	33,722	39,058	I. 5,336
Australia.....	122,855	85,898	D. 36,957
Other Countries..	977	38	D. 939
Total.....	926,929	906,277	D. 20,652

In addition to the coal there was imported 16,197 tons of coke. No coke was reported in 1904.

Of the coal imported this year 6,810 tons were classed as anthracite; the balance was bituminous. With the exception of some Nova Scotia coal which comes to Boston, the imports from Canada were British Columbia coal, received at California ports. There was a large decrease this year in Australian coal, which comes to California. Nearly all the Japanese coal is received in Manila.

Iron Trade Review.

NEW YORK, Sept. 5.

Exports and Imports.—Exports of iron and steel, including machinery, from the United States, for July and the seven months ending July 31, are valued by the Bureau of Statistics of the Department of Commerce and Labor as follows:

	1904.	1905.	Changes.
July.....	\$9,990,247	\$11,036,843	I. \$1,046,596
Seven months.	70,984,791	78,206,137	I. 7,221,346

The increase in June was 10.5%; for the seven months the gain was 10.2%. The chief items of the iron and steel exports for the seven months were as follows, in long tons:

	1904.	1905.	Changes.
Pig iron.....	\$26,324	\$31,541	I. \$5,217
Billets, blooms, etc....	208,072	106,563	D. 101,509
Bars.....	32,384	32,609	I. 225
Rails.....	174,690	155,194	D. 19,496
Sheets and plates.....	19,382	39,796	I. 20,410
Structural Steel.....	26,118	45,540	I. 19,422
Wire.....	67,062	78,970	I. 11,908
Nails and spikes.....	24,561	29,366	I. 4,805

Exports of iron ore were 47,933 tons in 1904, and 94,036 tons in 1905; an increase of 46,103 tons, chiefly in Lake ore shipped to Canadian furnaces.

Imports of iron and steel, including machinery, into the United States were valued as follows for July and the seven months ending July 31:

	1904.	1905.	Changes.
July.....	\$1,899,966	\$2,112,557	I. \$212,591
Seven months....	12,992,163	15,092,948	I. 2,100,785

The increase for June was 11.2%; for the seven months it was 16.2%. The chief items of the imports for the seven months were as follows, in long tons:

	1904.	1905.	Changes.
Pig iron.....	48,254	109,816	I. 61,562
Billets, blooms, etc....	7,492	7,970	I. 478
Scrap iron and steel..	8,894	7,916	D. 978
Bars.....	13,111	19,143	I. 6,032
Rails.....	34,028	9,898	D. 24,130
Wire-rods.....	9,516	9,153	D. 363
Tin-plates.....	42,115	40,732	D. 1,382

Imports of iron ore for the seven months were 198,667 tons in 1904, and 506,418 tons in 1905; an increase of 307,751 tons. A large part of this ore was from Cuba, but there were some imports from Spain also. Imports of manganese ore were 32,292 tons in 1904, and 164,358 tons 1905; an increase of 132,066 tons this year—a large gain.

Birmingham. Sept. 4.

After a quiet spell the demand for pig iron in the Southern territory is picking up some, and during the past week a few good orders were booked by the manufacturers. The trade is on a firmer basis now than it has been for more than a fortnight, and the prices have recovered again. Toward the latter part of August some iron was sold at \$11.50 and \$11.75 per ton, No. 2 foundry; but this week \$12 flat is the rate mentioned for that grade, and the furnace companies again have assumed a firm stand in this regard. Some healthy inquiries are being received, and it is believed that in the next few days the active buying for delivery during the last quarter of the year will be on

in earnest. The production in the Southern territory is improving, one furnace having been blown in during the past week by the Tennessee Coal, Iron & Railroad Co. at Oxmoor. This makes two furnaces this company has put in operation in the past two weeks. The last of the foundry iron furnaces at Bessemer belonging to the Tennessee Co. will be blown in during the next week or ten days. The Tennessee Co. now has four furnaces at Ensley making basic iron, four at Bessemer on foundry and one at Oxmoor on foundry iron. The Sloss-Sheffield Steel & Iron Co., with six furnaces manufacturing foundry iron, is meeting orders right along. The Alabama Consolidated Coal & Iron Co. has three furnaces manufacturing iron, while the Republic Iron & Steel Co. has a like number. The Woodward Iron Co. has two, while the one-furnace companies in the district all report steady production. The accumulated iron in this section is being moved off rapidly, as the railroads are lending their assistance in the prompt movement of the traffic.

It is learned that consumers are asking for immediate delivery on their old orders, which means that their supplies are beginning to get near the bottom again. Labor is still scarce about the furnaces and mills in this district, but the furnace companies state that they are gathering more hands and expect shortly to be in a position to obviate all trouble in that direction.

The following iron quotations are given in this section: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50; No. 1 soft, \$12.50; No. 2 soft, \$12.

The steel production is holding its own, and there is a steady shipment of the various products. Because of the urgent need for all the product that can be turned out, there was no cessation whatsoever at any of the steel industries in Ensley today on account of Labor Day. The men only enjoyed the day as their "turns" at the plants allowed them off. There is still an inquiry for steel rail, but the Tennessee Coal, Iron & Railroad Co. have sold so far ahead that there is no anxiety whatever in looking after business. One of the basic iron furnaces at Ensley will be rebuilt, so that the production will be larger and all demands in that direction will be met.

Steady production of steel rod, wire and nails, plows and plow points and other products is announced. The Alabama Steel & Wire Co. announce a sudden change for the better in the demand for their various products. The rod mill will be improved in order to increase the output. The warehouses of the Alabama Steel & Wire Co. were far from being filled before a change in demand set in, and the outward movement is greater than was expected.

The cast-iron pipe trade is steady also. The statement that a location had been

selected for the new cast-iron pipe plant of the American Cast Iron Pipe & Foundry Co. was premature.

Chicago. Sept. 4.

The last week has shown a fairly good good week—perhaps more than fairly good—in sales of pig iron. There is yet no tendency toward a rush of buyers toward covering the needs of next spring, but there is much business in lots for speedy delivery and activity concerning the supplies of melters for the first quarter and first half of next year. Malleable iron is selling freely now, and there is notable activity in Lake Superior charcoal iron, at \$17.

Southern iron is in demand, particularly the higher grades, and the difficulty continues of supplying this iron on spot orders. Agents of Southern profess to care little about the demand for Southern, except on orders that will be filed late in the year or in the first half of next year. Sales now are chiefly of Northern iron, and agents of Northern are very optimistic about the outlook. If they are right, the local market will improve steadily, now that the September line has been passed, and three or four weeks will see the market booming.

Northern continues to bring \$16.50, and Southern is quoted at \$12 Birmingham or \$15.65 Chicago, though, as noted in the foregoing, there is little buying of Southern. A large part of the local business, as heretofore, is in small lots for quick delivery.

Inquiries continue to be large, and indicate an increasing amount of business as soon as the trades all have recovered from summer vacations and summer in-ertness. The tendency of the week, indeed, has been toward a steady materialization of these inquiries into orders, and all signs are encouraging for the increase of business.

Finished materials have an especially strong market now, with sales of rails particularly heavy. Every kind of finished materials, indeed, is in active demand, with every indication that the prosperity will continue.

Coke is in more active but still not extraordinary demand; the market quotation is about \$4.90 for 72-hour Connellsville, with the probabilities that this will go higher rather than lower.

Cleveland. Sept. 5.

Iron Ore.—All indications point to a much slower movement of ore during the fall. The upper lake ports cannot handle the boats as fast as formerly; lower lake docks and furnaces stock piles are well filled, permitting of only a moderate movement, and the car supply is growing short, in addition to which the lake tonnage is going more and more into the coal trade. The rates of carriage have remained firm, however, at 75c. from Du-

luth to Ohio ports; 70c. from Marquette, and 50c. from Escanaba.

Pig Iron.—Low-priced foundry pig iron is getting scarce, and most of the sales now made are on the basis of \$14.50 for No. 2 in the Valley, although a little iron has gone at \$14.25. The buying movement is not extensive. The furnaces producing bessemer are coming to find that the market does not depend so completely upon the Steel Corporation as has been supposed. The general buying, therefore, offsets the hesitating tendency of the Steel Corporation, with the result that prices are stronger. Most of the furnaces are holding for \$14.50 in the Valleys. The basic and malleable trades are firm on the same basis.

Finished Material.—The strike of the structural iron workers in this territory has not lessened the demand for that steel. The supply had been short, at any rate, and, besides, most of the builders are looking forward to an immediate termination of the difficulties, and are getting their steel shipped in anticipation of such a state of affairs. Premiums of \$5 to \$7 a ton are still being paid to the smaller mills. Bar iron is strong, with prices up to 1.70c. at the mill, and bar-steel business is unusually good. There is a shortage of billets and a big demand. The price holds at the premium figure of \$26 to \$27, Pittsburg, for the bessemer quality at the Pittsburg mill.

Philadelphia. Sept. 6.

The pig-iron market has been more or less disturbed during the past few days by various influences. The large purchases of bessemer and basic in the West have indirectly affected prices here, but what more seriously affected the situation is the increasing probabilities of a heavier consumption of pig iron during the remainder of this year and next than had been figured upon. Most of our furnace people are thinking it possible to obtain higher prices for future deliveries. The advances of 50c. at some Western furnaces confirms the view of some of our Eastern furnace people that a higher range of prices is possible, but their confidence is not sufficiently strong as to foundry and forge to bring about any immediate action. The tone of the market is decidedly strong, and orders are coming in steadily, with an occasional inquiry for an exceptionally large lot, though no orders of any magnitude have been received recently. Several engineering plants are making inquiries for special grades and brands, and those who are figuring on this business feel quite confident that they will sell a good deal of iron this month. The usual quotations are for No. 1 X foundry, \$17.50; for No. 2 X, \$16.50; No. 2 plain, \$16; standard forge, \$15; basic, \$15.50; low phosphorus, \$21; Southern No. 2 by rail, \$15.50 to \$16.

The usual quotations for steel are \$27.

Muckbars are quoted at \$27, but little business has been done.

Merchant Bar.—Some of our bar-iron people are figuring on getting a little more money from those who want iron for early delivery. Those who have been obtaining slight concessions during the past two months have found it impossible to obtain favors recently because of the oversold condition of mills for early delivery. Steel bars are quoted at 1.63½; and under increasing inquiry for both steel and refined iron, it can be safely said that present prices will be firmly adhered to.

Sheets.—With the incoming of September there has been quite an influx of orders for sheet iron, most of them for small lots. The mill people have not yet shown any desire to shade prices for large orders, which no doubt could be secured if they would yield a little on quotations.

Merchant Steel.—The prices at which merchant steel sold during the past few days show that prices are exceptionally firm.

Boiler Tubes.—The pressure for delivery shows that an immense consumption is going on and the placing of additional orders by large buyers indicates that there is a heavy volume of work in hand.

Plate Iron.—The demand for plate is very heavy, owing to the enormous amount of business being taken by the car builders whose facilities are far too small to take care of all the business in sight. The railroad companies are showing a decided preference for steel cars. The enormous orders recently placed, and to which the papers are calling attention, will result in placing an immense amount of business with the plate mills for delivery of material up to the first half of next year.

Steel plate is particularly active.

Structural Material.—Capacity for structural steel will soon be increased by the completion of a large works; most of the orders recently placed are for comparatively small lots for general construction purposes.

Pittsburg. Sept. 5.

The price of bessemer pig iron has been firmly established at \$15, Valley furnace for prompt shipment, and for delivery through the fourth quarter a higher price is demanded. Inability to obtain the terms offered for iron is assigned as the cause of the delay of the United States Steel Corporation in placing contracts for a large tonnage for delivery during this and next month. While no official announcement was made, it is known that the Corporation bought 25,000 tons of bessemer iron for delivery before Sept. 15, the contract being equally divided between the Bessemer Pig Iron Association and W. P. Snyder & Co. The price paid for some

was \$14.50, Valley furnaces, and \$15 was paid for part of the tonnage. The Corporation has ordered in every available blast-furnace, but despite the increase in production there seems to be no doubt but that it will be forced to enter the market for pig iron and its requirements for outside iron for the rest of the year will not be less than 50,000 tons a month. The market is very strong, and indications point to much higher prices. According to the latest reports, ample provision is being made for an unprecedented demand for pig iron, as the ore shipments from upper lake ports this season promise to break all records. It is believed the total movement from the Lake Superior region will reach the high estimate of 35,000,000 tons. The record for ore shipments was 27,500,000 tons, made in 1902.

Some surprise was caused during the week by the announcement of an advance of \$2 a ton in structural material, effective at once. The new prices are as follows: Beams and channels, 15 in. and under, angles 2x3 to 6x6, inclusive, and zees, 1.70c.; tees, 1.75c.; beams and channels over 15 in., 1.80c. These prices are the highest since 1899 and the first quarter of 1900. On Sept. 6 last year, the price was reduced from 1.60c. to 1.40c., and on Dec. 20 an advance to 1.50c. was ordered and on Feb. 16 the price was increased to 1.60c. Premiums have been paid for some time past on small lots for prompt delivery, but no business for next year has been contracted for. The mills in this district cannot take on any new business for this year, and all are being operated to capacity. The outlook for 1906 is for record-breaking production. This, however, is the indication in every finished-steel line. Plates are stronger, and it is not unlikely that an advance may be ordered before the end of the year. Orders are still being booked for plates for shipment in 1906 at the pool price of 1.60c., which is practically an increase, as this rate has been shaded on a great deal of business taken for delivery this fall. The Pennsylvania Railroad Co., it is reported on excellent authority, will contract for 15,000 steel freight cars in addition to the 12,500 ordered for this year, making a total of 27,500 steel freight cars for 1905-6. The company has just decided to apportion an order for 5,000 cars for delivery beginning Jan. 1 to the Pressed Steel Car Co., the Standard Steel Car Co., the Cambria Steel Co., and the American Car & Foundry Co. This is expected to be followed by an order for 10,000 cars. The plate mills in this district are behind in deliveries, and a number of them cannot take on any business for shipment this year. The steel-bar mills will be busy the rest of the year, but some are catching up in deliveries. It is believed an advance will be ordered in a short time, as iron bars are now quoted at about \$4 a ton above steel-bar prices. Steel rails will

remain at \$28 for another year, and large contracts for 1906 delivery are being closed. The production for 1905 will exceed the tonnage estimated early in the year and will be more than 2,000,000 tons. So far orders for 1906 amount to fully 400,000 tons. Conditions in merchant pipe, wire, sheets and tin plate continue to improve. These have been the weak lines for several months. The Pope Tin Plate Co., the largest independent producer, will start its plant at Steubenville on Monday, when all the independent plants in the country will be running. Some, however, are not in full operation. The American Sheet & Tin Plate Co. is preparing to put all of its idle plants in operation before the end of this month, which will necessitate an increased production of sheet and tin-plate bars.

Pig Iron.—The purchase of 25,000 tons of bessemer iron by the United States Steel Corporation at \$14.50@15, Valley furnaces, has firmly established a minimum price of \$15 for prompt shipment. No price has been named for fourth quarter, but it is believed sales will be made at a higher figure. One sale of 2,000 tons for September was made during the week at \$15. Foundry iron prices remain at \$15.10@15.35, Pittsburg, for No. 2 grade. Gray forge is firmer this week. Sales of 9,000 tons have been made, chiefly at \$14.50 to \$14.65, Pittsburg.

Steel.—There is a decided scarcity of bessemer billets, and premiums of from \$4 to \$5 above the pool price of \$21 can easily be obtained. Almost any price can be had for open-hearth billets. Plates are firm at 1.60c., and merchant-steel bars at 1.50c.

Sheets.—The market continues to improve, but prices are still low, and 2.30c. for black and 3.35c. for galvanized sheets, No. 28 gauge, can be done.

Ferro-manganese.—There is no change in the market, domestic 80% still being quoted at \$49.50@50 a ton.

Heavy Chemicals and Minerals.

NEW YORK, Sept. 6.

(For other prices of chemicals and minerals, see large table on page 480.)

The market for heavy chemicals holds even and firm, with no special changes except for American sulphur, which shows another slight but distinct advance. The Louisiana product has been advanced \$0.50, and is quoted at \$22.50 in New York, Boston and Portland, and at \$23 in Philadelphia and Baltimore. Sicilian sulphur is still quoted at \$22.25 for Atlantic ports.

Pyrite continues unchanged at 10@11c. per unit of sulphur for lump ore, with 25c. additional for breaking to furnace size; 9.5@10c. for fines f. o. b. Atlantic ports. Domestic pyrite sells at 11c. per

The conditions which have made themselves felt here have not been without effect upon the standard market, which has gradually declined, owing to large speculative realizations, to £69 5s. for spot and £69 for three months.

Statistics for the second half of August show a decrease in the visible supplies of 400 tons.

Refined and manufactured sorts we quote: English tough, £71 10s. @ £72; best selected, £73 @ £73 10s.; strong sheets, £82; India sheets, £77; yellow metal, 6 3/4d.

Copper Imports and Exports.—Exports of copper from the United States, for the seven months ending July 31, are reported as below by the Bureau of Statistics of the Department of Commerce and Labor; the figures given are in long tons, of 2,240 lb. each:

	1904.	1905.	Changes.
Copper.....	133,322	147,590	I. 14,268
Copper ore, etc.....	10,549	19,071	I. 8,522

The contents of copper ore are not given. Estimating them, chiefly on the basis of values, we find that the total exports this year were equivalent to 150,037 tons of fine copper.

	1904.	1905.	Changes.
All other countries.....	133,218	119,134	D. 14,084
China.....	104	28,456	I. 28,352
Total.....	133,322	147,590	I. 14,268

Imports of copper and copper material into the United States for the seven months ending July 31, with re-exports of foreign material, were as follows, the figures giving the equivalent, of all material, in long tons of fine copper:

	Metal.	In ore, etc.	Total.
Mexico.....	27,017	6,978	33,995
Canada.....	5,948	3,602	9,550
Great Britain.....	4,928	21	4,949
Other countries.....	1,084	1,298	2,382
Total.....	38,977	11,899	50,876
Re-exports.....	482	.....	482
Net imports.....	38,495	11,899	50,394

The net imports given above were less than the exports by 99,643 tons. The ores and matte received from Mexico this year reached a total of 51,085 tons, carrying 6,978 tons of copper; from Canada and Newfoundland, 101,154, carrying 3,602 tons of copper.

Tin.—In sympathy with other metals, the price declined sharply during the week, at one time going below £147. Since then there has been a reaction, the close being firm at £148 15s. for spot, £148 for three months.

The local market has followed closely the fluctuations abroad, and closes at 32 3/4 @ 32 3/4c.

Imports of tin into the United States for the seven months ending July 31 are reported as follows, the figures being in long tons:

	1904.	1905.	Changes.
Straits.....	10,818	12,731	I. 1,913
Australia.....	201	307	I. 206
Great Britain.....	11,058	11,086	I. 28
Holland.....	397	264	D. 133
Other Europe.....	240	469	I. 229
Other countries.....	20	23	I. 3
Total.....	22,734	24,880	I. 2,146

The increase of 9.4% this year was almost entirely in direct imports from the Straits Settlements. Most of the metal received through Great Britain is Straits tin.

• **Lead.**—A fair business is doing at last prices, which are 4.85c. New York, 4.77 1/2c. St. Louis.

Imports of lead in all forms into the United States, with re-exports of imported material, for the seven months ending July 31, are reported by the Bureau of Statistics as follows; the figures being in short tons:

	1904.	1905.	Changes
Lead, metallic.....	6,051	3,020	D. 3,031
Lead in ores and base bullion.....	58,453	56,738	D. 1,715
Total imports.....	64,504	59,758	D. 4,746
Re-exports.....	51,256	37,486	D. 13,770
Net imports.....	13,248	22,272	I. 9,024

Of the total imports this year, 53,985 tons were from Mexico and 5,069 tons from Canada; the balance from other countries. Exports of domestic lead were 162 tons in 1904 and 212 tons in 1905; an increase of 50 tons this year.

St. Louis Lead Market.—The John Wahl Commission Co. telegraphs us as follows: Lead is quiet at 4.77 1/2 for both Missouri and desilverized brands.

Spelter.—There has been a very good inquiry from all sources, and it appears that the consumption is at present in excess of the current production, so that stocks on hand are being drawn upon. Prices have responded to these conditions and close firm at 5.75 @ 5.85c. New York, 5.60 @ 5.70c. St. Louis.

Zinc Sheets.—Sheet zinc is quoted at \$7.50 per 100 lb. (less discount of 8%), f. o. b. cars LaSalle and Peru, in 600-lb. casks, for gauges No. 9 to 22, both inclusive, widths from 32 to 60 in., both inclusive, and lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since January 1, 1905, have been as follows: December 30, 1904, \$7.25; January 7, 1905, \$7.50; May 12, \$7.25; June 1, \$7; July 29, \$7.25; August 10, \$7.50.

Exports of spelter from the United States for the seven months ending July 31 were 1,970 short tons in 1904, and 1,793 tons in 1905; a decrease of 177 tons. Exports of zinc ore were 15,720 tons in 1904, and 16,133 tons in 1905; an increase of 413 tons this year.

St. Louis Spelter Market.—The John Wahl Commission Co. telegraphs us as follows: Spelter is more or less unsettled. The latest sales are on a basis of 5.67 1/2. Forward deliveries are held higher, and smelters are still firm.

Antimony.—The market is somewhat weaker, and quotations have declined to 12 3/4 @ 13 3/4c., depending upon brands and deliveries.

Imports of antimony into the United

States for the seven months ending July 31 are reported as follows, in pounds:

	1904.	1905.	Changes.
Metal and Regulus..	2,260,779	2,795,819	I. 535,040
Antimony.....	1,501,043	1,102,807	D. 398,236

The increase of 23.7% in metal was accompanied by a decrease of 26.7% in imports or ore.

Nickel.—Quotations for large lots, New York or other parallel delivery, are 40 @ 47c. per lb., according to size and condition of order. For small quantities, prices range from 48 up to 60c., also according to size of order and deliveries.

Exports of nickel, nickel oxide and nickel matte from the United States for the seven months ending July 31 were 2,880,655 lb. in 1904, and 6,214,949 lb. in 1905; an increase of 3,334,294 lb. this year. Imports of nickel ore and matte were 5,311 tons in 1904, and 7,965 tons in 1905; an increase of 2,654 tons.

Platinum.—Quotations are firm at \$20.50 per oz. Gas-engine sparking points vary from 87c. for "A," to \$1.80 for "B."

Platinum in manufactured forms is strong. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 80c.; crucibles and dishes, 85c.; perforated wire, 90c.; and cones \$1 per gram.

Imports of platinum into the United States for the seven months ending July 31 were 4,360 lb. in 1904, and 4,371 lb. in 1905; an increase of 11 lb. this year.

Quicksilver.—The market is steady. The New York quotation is \$40 per flask of 75 lb. for large orders, and \$40.50 @ \$41 for small lots. San Francisco prices hold steady at \$39 for domestic orders, and \$37.50 @ \$38 for export business. The London market is unchanged, £7 2s. 6d. being quoted both by first hands and jobbers.

Exports of quicksilver from the United States for the seven months ending July 31 were 1,053,859 lb. in 1904, and 651,629 lb. in 1905; a decrease of 402,230 lb. this year.

Minor Metals.—For minor metals and their alloys, wholesale prices are f. o. b. works:

	Per lb.
Aluminum.	
No. 1, 90% ingots.....	33 @ 37c.
No. 2, 99% ingots.....	31 @ 34c.
Roll'd Sheets.....	4c. up
Aluminum-Bronze.....	20 @ 23c.
Nickel-alum.....	33 @ 39c.
Bismuth.....	\$2.10
Cadmium, f. o. b. Hamburg.....	77c.
Chromium, pure (N. Y.).....	80c.
Copper, red oxide.....	50c.
Ferro-Molybdenum (50%).....	95c.
Ferro-Titanium (20 @ 25% N. Y.).....	75c.
Ferro-Chrom. (74%).....	12 1/2c.
Ferro-Tungsten (37%).....	28c.
Magnesium, pure (N. Y.).....	\$1.60
Manganese (98 @ 99% N. Y.).....	75c.
Manganese Cu. (30 @ 70% N. Y.).....	40c.
Molybdenum (98 @ 99% N. Y.).....	\$1.75
Tantalum acid (N. Y.).....	50c.
Thallium, f. o. b. Breslau, Germany.....	65 @ 70c.
Phosphorus, foreign.....	45c.
Phosphorus, American.....	70c.
Tungsten (best), pound lots.....	90c.

Variations in prices depend chiefly upon the size and condition of orders.

Manganese Alloys.—Prices for manganese alloys in Germany are given by Paul Speier as below. The prices are for or-

ders of not less than 500 kg., delivered in Bremen, and are as follows, per 100 kilograms:

	Marks
Manganese Copper, No. 1, 30% Mn.....	265
No. 2, 28% Mn.....	175
No. 3, 20 to 25%.....	165
Manganese Tin, No. 1, 55% Mn., no iron.....	365
No. 2, 55% Mn., some iron.....	225
Manganese Nickel, No. 1, free of iron.....	450
No. 2, traces of iron.....	270

Manganese metal is quoted at 3.60 marks per kg.—38.8c. per lb. delivered in Bremen.

Missouri Ore Market.

Sept. 2.

The highest price paid for zinc ore was \$49 per ton for two bins of the choicest Joplin ore. The assay basis price is \$43 to \$45 per ton of 60% zinc, and the average price paid for all grades of ore was \$42.42 per ton. The highest price a year ago was \$40 per ton, and the average price \$34.18. The highest price last week was \$52, and the average price \$46.96 per ton. Zinc ore has declined in price \$10 per ton since the week ending July 12, having at that time advanced \$10.50 per ton in three weeks. The output is resuming a normal condition of approximately 5,000 tons per week, but has not reached as high a point by 500 tons per week as was being outputted before the July floods. The average output for the year has been under 4,800 tons per week, and it is extremely doubtful if this year's average can possibly run so high as that of last year. The Badger mines are now about drained and will be outputting inside two weeks a normal production, with a possibility of an increase. The mines are being crowded to the utmost capacity and will continue to so output if the price is maintained at a basis of \$40 per ton of 60% zinc, but should the smelters conclude to lower the price below that point it will drop away several hundred tons per week, as there are mines in operation that cannot make a profit marketing ore under that figure.

Competition for lead ore is very active between the Picher Lead Co., of Joplin, and the lead smelter at Galena, Kan., while the Granby Co. is taking a very little and the St. Louis Smelting & Refining Co. has temporarily withdrawn from the market. The highest price was \$63.50 per ton, with 80% grades selling at \$63, and the average for all grades was \$62.48. A year ago the highest price was \$52, and the average price was \$49.08 per ton.

The shipment for the week was 250 tons more zinc and 106 tons more lead than the previous week, but a decrease of 226 tons of zinc and 96 tons of lead compared with the same week a year ago. With higher prices, however, the week's value is \$34,265 larger than a year ago.

Following are the shipments of zinc and lead from the various camps for the week ending today:

	Zinc, lb.	Lead, lb.	Value.
Joplin.....	2,963,840	231,770	\$71,390
Cartersville-Webb City.....	1,809,840	578,420	58,040
Galena-Empire.....	931,990	66,130	22,580
Duenweg.....	739,050	193,850	22,360
Oronogo.....	255,480	500	5,725
Aurora.....	933,430	.....	11,880
Carthage.....	192,790	.....	4,600
Neck City.....	160,950	6,850	4,770
Granby.....	510,000	30,000	7,900
Alba.....	557,090	22,570	14,110
Prosperity.....	131,110	10,790	3,220
Baxter Springs.....	165,490	68,260	5,400
Sherwood.....	10,820	2,690	3,630
Wentworth.....	40,390	.....	890
Stott City.....	80,390	.....	1,390
Beef Branch.....	63,390	9,490	1,000
Zinc, Arkansas.....	56,360	.....	1,120
Spurgeon.....	78,880	2,420	1,650
Totals.....	9,701,020	1,221,740	\$243,955

35 weeks..... 334,535,370 41,061,460 \$8,682,735
 Zinc value, the week, \$205,780 : 35 weeks, \$7,478,430.
 Lead value, the week, \$38,175 : 35 weeks, 1,221,740.

ZINC ORE AT JOPLIN.

LEAD ORE AT JOPLIN.

Month.	1904.		1905.	
	1904.	1905.	1904.	1905.
Jan.....	33.33	52.00	55.55	61.50
Feb.....	33.63	52.77	56.37	57.62
March.....	35.40	47.40	57.20	57.20
April.....	35.75	42.88	58.60	58.00
May.....	34.87	43.31	57.77	58.27
June.....	32.93	40.75	56.60	57.80
July.....	33.37	43.00	53.00	58.00
August.....	37.55	48.83	53.00	58.00

Wisconsin Ore Market.

Sept. 1.

The price of zinc for the week remained about the same as last week, several large lots being sold that had been held for higher prices. The Mineral Point Zinc Co. has put a new buyer in the field, in the person of W. A. Jones, much to the satisfaction of the producers, who now believe that they will receive fairer treatment and better prices for their lower grades of ore. This belief is based on something more substantial than mere conjecture, as the Hazel Green Mining Co. sold several hundred tons to the Mineral Point Zinc Co. that there had been holding to treat on their new magnetic separator, which is nearing completion; the price being so much above that before offered that it paid them to sell. Choice lots of Jack 60% and upward are bringing from \$45 to \$47 per ton.

Lead is in good demand, last week's prices prevailing.

The output for the current week will be somewhat cut down owing to the fact that many of the large producers shut down Wednesday for the balance of the week on account of the county fair.

Mining Stocks.

New York. Sept. 6.

The prices for mining stocks, especially the copper stocks, suffered a rather sharp decline toward the end of last week, in sympathy with the weaker tons of the market for the metal. Advantage was taken of the latter by a bear party, which singled out Amalgamated and American Smelting & Refining as special targets. Other copper stocks suffered also, but to a less extent. In the early part of this week there was a recovery in prices, but the latter have not yet returned to their recent high level.

On the Consolidated Exchange there were the usual small dealings in the Comstocks and in the Cripple Creek stocks.

In the outside market there were large transactions, especially in the copper stocks.

Boston. Sept. 5.

There was a day last week when prices for mining shares actually melted away in this market, but it was of short duration, as supporting orders soon came to hand and the market steadied. The weakness was more in sympathy with the decline in the New York list rather than anything else. However, in a way, it shows that the market is more or less of a traders' affair and is swayed according to their movements. There is nothing that can be gathered at this center showing any weakness in the metal situation; on the other hand, all evidence points to the reverse. In the general weakness Allouez broke \$4 to \$29, but rallied to \$33.62½ today on the announcement that the rock stamped last month yielded about 41½ lb. of mineral to the ton. Centennial broke \$3 to \$23.50, with recovery to \$25.50. August returns of this mine showed about 34½ lb. of mineral to the ton of rock stamped. Atlantic, which has been a leader of late, fell over \$3 to \$20.37½, but recovered to \$22.

Copper Range fell \$2.75 to \$68.50, but touched \$71.50 today. The August output was a record breaker, being 2,130 tons of mineral, including the Champion's one-half. This was equivalent to almost 3,000,000 lb. of fine copper, allowing 70% fine. A quarterly dividend of \$1 per share was declared the past week, payable Sept. 30. This is the third dividend at this rate. Isle Royale broke \$2.75 to \$19.25 on small transactions, recovering to \$20. Mohawk fell \$3.75 to \$56, recovering to \$58, and Osceola broke \$5.50 to \$97, quickly recuperating to \$101.50. Tecumseh fell \$1.37½ to \$8.50, recovering to \$9.62½, and Franklin dropped \$2 to \$12.50, recovering to \$13.75. Michigan fell \$1.75 to \$12.75, recovering \$1, and Mass fell \$1.12½ to \$8, recovering fractionally.

There was a sudden spurt in North Butte today, which rose to \$38, against a close at \$35.12½ a week back. United States fell \$1.75 to \$33, but recovered to \$34, and Utah broke \$2.50 to \$44.25, rallying to \$46 again. Greene Consolidated slid off \$1.87½ to \$24.25, but touched \$25.50 today. There is some talk of an alliance with the Phelps-Dodge people and the Shannon mining people. It is known that the Phelps-Dodge crowd came to Col. Greene's rescue last December, which might give something tangible to this report. Boston Consolidated has been weak, declining to \$7.62½. July net earnings are reported as \$33,892. The company sent over 8,000,000 lb. of ore to the Bingham smelter for treatment that month, which yielded a net profit of \$8.46 per ton.

Colorado Springs, Sept. 1.

The market in Cripple Creek shares during the past week has been quite active, although prices have not varied much during that time.

August also led the other months of the year in output, exceeding July by over \$100,000. The total output of the Cripple Creek district for August was \$1,928,075.

Portland sold during the week for 2.35. El Paso, which has been selling around 1.20, dropped off to 1.16 1/2 on today's market.

Salt Lake City, Sept. 1.

A deal was consummated during the week for the consolidation of the International and Dirigo La Sal mines, in the La Sal mining district.

STOCK QUOTATIONS.

Table with columns: NEW YORK, Name of Company, High, Low, Clg., Sales. Includes companies like Amalgamated, Anaconda, Arizona Consolidated, etc.

NEW YORK INDUSTRIALS.

Table with columns: Name of Company, High, Low, Clg., Sales. Includes Am. Smelting & Ref., Am. Sm. Securities, etc.

BOSTON.

Table with columns: Name of Company, High, Low, Clg., Sales. Includes Allouez, Amalgamated, Atlantic, Bingham, etc.

PHILADELPHIA.

Table with columns: Name of Company, High, Low, Clg., Sales. Includes Cambria Steel, Philadelphia Co., etc.

PITTSBURG.

Table with columns: Name of Company, High, Low, Clg., Sales. Includes Crucible Steel, O. Tonopah, etc.

COLORADO SPRINGS.

Table with columns: Name of Company, First, High, Low, Clg., Sales. Includes Elkton, El Paso, Isabella, etc.

SAN FRANCISCO.

Table with columns: Name of Company, High, Low, Clg., Sales. Includes Best & Belcher, Bullion, Caledonia, etc.

Monthly Average Prices of Metals.

Table with columns: Metal (SILVER), Month, New York, London. Shows monthly average prices for silver.

The New York prices are in cents per fine ounce; the London quotation is in pence per standard ounce, .925 fine.

COPPER.

Table with columns: Month, New York (Electrolytic, Lake), London. Shows monthly average prices for copper.

New York prices are in cents per pound. Electrolytic quotations are for cakes, ingots or wire bars. The London prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Table with columns: Month, 1904, 1905. Shows monthly average prices for tin.

Prices are in cents per pound.

LEAD IN NEW YORK.

Table with columns: Month, 1904, 1905. Shows monthly average prices for lead.

Prices are in cents per pound.

SPELTER.

Table with columns: Month, New York, St. Louis, L'nd'n. Shows monthly average prices for spelter.

New York and St. Louis prices are in cents per pound. The London prices are in pounds sterling per long ton (2,240 lb.) good ordinary brands.

Dividends.

Table with columns: Company, Payable, Rate, Amount. Lists dividends for companies like Calumet & Arizona, Federal Mfg. & Sm. pfd., etc.

*Monthly. †Bi-monthly. ‡Quarterly. §Semi-Annually.

Assessments.

Table with columns: Company, Delinq., Sale, Amt. Lists assessments for companies like American, Alpha Con, etc.

St. Louis, Sept. 3.

Table with columns: Name, High, Low. Lists prices for commodities like Adams, American Nettie, etc.

LONDON. (By Cable,*) Sept. 5.

Table with columns: Name, £ s. d. Lists prices for commodities like Camp Bird, Consolidated Gold Fields, etc.

*Furnished by Wm. P. Boubright & Co., New York.

*Ex-dividend. †Instalment Paid. ‡Assessment Paid. §2d Instalment Paid.

