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THE DECREASE of pressure in the Beaumont oil-field in Texas and the consequent falling off in the number of gushing wells have caused a great demand for pumping machinery in the district. Few of the companies operating there seem to have been prepared for the necessity of pumping, though it might have been anticipated. In view of the great number of wells drilled in a small area the diminution of the pressure shown by the first wells is a natural result, for which the operating companies might have been better prepared.

THE SHIPMENTS of iron ore from the Lake Superior region this year have been very large. Even making allowance for the late opening of navigation and other causes which impeded shipments last season, the gain this year has been extraordinary. Up to July 1 this year the total shipments from the upper ports amounted to 8,899,833 gross tons, against 4,963,608 tons to the corresponding date in 1900; showing a gain of 3,936,225 tons this year. Shipments continue to be pushed, and there is little doubt that they will exceed 23,000,000 tons for the season. Indeed, if work continues at the present rate and no accident intervenes it is quite possible that a total of nearly 25,000,000 tons may be reached.

THE TOTAL number of blast furnaces in existence in Great Britain in 1901 is reported by the British Iron Trade Association at 557, a decrease of 5 from the number reported in 1900. Of these furnaces an average of 351 were in blast during the year, 206 being idle. The number in blast shows a decrease of 46 from the preceding year. The average output per furnace in blast for the year was 22,113 tons of pig iron. The report of the American Iron and Steel Association for 1901 showed a total of 406 blast furnaces in existence in the United States at the close of 1901, of which 266 were in blast and 140 idle. The average output of the active furnaces for the year was 59,693 tons of pig each. According to these figures the average production per furnace per year in this country was 2.7 times that of the British furnaces.

A PARTICULARLY injudicious strike is now in progress at the mines of the Crow's Nest Pass Coal Company at Fernie and Michel, in British Columbia. The Fernie miners had just resumed work after completing the repairs made necessary by the disastrous accident in May last. The strike was the result of an order issued recently that the eight hours which constitute a day's work at Fernie should be counted from the time the men arrived at the working face to the time they left it, and not "from bank to bank" as heretofore. This practically added about half an hour daily to the working time. The miners at Michel struck only out of sympathy with the Fernie men, and to aid them. In both cases local reports say that the strike was forced by an active minority against the real wishes of the majority. We have called the strike injudicious, partly because the reason does not seem to be an adequate one, but more especially because the miners at Fernie had already been idle for over a month on account of the accident and are in very poor condi-

tion to stand a further period of idleness. Those at Michel are in little better condition, as the town was recently almost destroyed by fire, and many of the resident miners lost nearly all their belongings. The whole affair seems to have been forced on without thought of consequences and without any real effort to secure a friendly settlement.

GOLD PRODUCTION in the Witwatersrand makes moderate but steady progress as the number of mines in operation increases. In June the total output was 142,780 ounces fine gold—4,178 ounces more than in May—making a total for the half-year ending June 30 of 656,864 ounces, or \$13,577,379. This is, however, less than one-fourth of the amount which might have been expected had work continued without interruption. No comparison can be made with last year, as operations did not begin until May, and the total to the end of June was only 27,257 ounces, or \$573,737.

We are pleased to see that the Witwatersrand mines all adhere to the rule of reporting production in fine gold—the standard which has been established by the Chamber of Mines, and the only proper one.

THE STRIKE of the Alabama coal miners has been settled, as we anticipated last week. The miners abandoned their demand for an increase of 5 cents in the maximum rate. That rate is to remain, as heretofore, based upon the price of pig iron, with a maximum of 55 cents per ton. On the other hand, the operators make some concessions, agreeing to provide for the weighing of coal at mines where there are no scales, and where payment has heretofore been made by cars; and to concede a uniform scale of payment for laborers and for dead-work. They also agree that the companies shall provide labor or mechanical means for moving mine cars wherever the grade in the haulage ways is 5 per cent or over. The compromise seems to be a fair one, and both operators and miners have clearly taken the best course. Both sides are to be congratulated.

NO MATERIAL change can be reported this week in the conditions of the strike of the anthracite coal miners. The starting of one or two washeries and some local rioting have been the only incidents. Both parties are apparently waiting for the results of the general convention which met in Indianapolis July 17. Regarding that meeting, it is impossible to predict results; we can only say that the current belief is that no general strike of the bituminous miners will be ordered. It may be well to call attention to the fact that with the end of this week the anthracite miners will have been idle ten weeks, or nearly one-fifth of a year. This means that the miners have already suffered a reduction of 20 per cent in their wages for the present year. Even if the strikers were to gain a 10 per cent increase all around, which they will not do, nor was it demanded, it would take two years for them to catch up with their losses, and by that time conditions will probably have changed considerably.

SILVER SHIPMENTS to the East continue to show a decrease in values, which is in part owing to the lower price of the metal, but chiefly to the heavy falling off in requirements for China. The shipments from London for the first half of the year are reported by Messrs. Pixley & Abell as below; the last line in the table showing the approximate quantity of metal at the average prices for the half-year:

	1901.	1902.	Changes.	
India	£ 4,045,210	£ 3,605,545	D.	£ 439,665
China	339,125	63,440	D.	275,685
The Straits.....	79,970	70,550	D.	9,420
Totals	£ 4,464,311	£ 3,739,535	D.	£ 724,776
Total ounces	38,667,000	36,320,900	D.	2,346,100

This shows a decrease of 16.2 per cent in value, but only 6.1 per cent in quantity, owing to the lower average price of the metal this year.

The exports of silver from San Francisco to the East for the first half of the year are reported as follows:

	1901.	1902.	Changes.	
China	\$2,306,560	\$2,577,906	I.	\$271,346
India	30,000	303,637	I.	273,637
Total value...	\$2,336,560	\$2,881,543	I.	\$544,983
Total ounces..	3,862,100	5,381,500	I.	1,519,400

Here we find an increase of 23.3 per cent in value and of 39.3 per cent in quantity. About half the increase was due to the gain in exports to China; the other half to the shipment made to Bombay, which was an unusual one, very little silver going from San Francisco direct to India as a rule.

It will be seen that the total shipments to the East in quantity of silver have been approximately 41,702,400 ounces this year, against 42,529,100 ounces in the first half of 1901; a decrease of only 826,700 ounces, or 1.9 per cent. While China took considerably less, there was but little difference in the sales to India, when allowance is made for the lower prices.



DRY CRUSHING AND SAMPLING OF ORES.

The extremely valuable paper by Mr. Philip Argall on "Sampling and Dry Crushing in Colorado," an abstract of which we published in our issues of July 5 and 12, received a lengthy discussion at the meeting of the Institution of Mining and Metallurgy in London, before which it was originally presented. The speakers were unanimous in their expression of appreciation of the great value of Mr. Argall's work, but some criticism was ventured upon his condemnation of the method of sampling by quartering and his upholding of roll crushing as the most economical method of comminuting ore from 1.5 inch size down to 30 or 40 mesh. Certain of the critics thought that in the matter of fine crushing the American practice as expounded by Mr. Argall is behind that of Western Australia, where the ball-mill has come into general use. The ball mill is a very efficient machine, no doubt, and has certain advantages over rolls, which Mr. Argall admitted freely in his paper, although he was of the opinion that for large capacities the rolls are superior. We think that it is rather hazardous to draw any conclusions as to the inferiority of American practice in treating ores on a large scale unless the commentator be in possession of very full data, such, for example, as that which Mr. Argall supplied with respect to his own work in Colorado, and the data which his critics presented as to the practice in Western Australia and elsewhere impressed us as being very incomplete; in fact, only fragmentary.

With respect to the question of ore sampling, some of our British friends appear to be very reluctant to admit the inaccuracy of the time-honored method of quartering; or, at least, they are disposed to think it may not be so very bad. Even in the United States it survived for a long time after its liability to error had been pointed out, due no doubt to the lack of a good mechanical sampler which

was not itself subject to error. However, after satisfactory machines, which operated on scientific principles, were designed, their application increased very rapidly. Mr. Argall only stated in his paper very lucidly the objections to the method of quartering which are held by most modern American metallurgists. Of course there can be no question as to the relative economy of the two methods. Mechanical sampling is so cheap that it can and ought to be introduced in all metallurgical works, even those where the purchase of ore does not depend upon it for the proper technical control of the process. The only reliable method of determining losses is to know accurately what value there is in the ore to start with, and if that were done in all cases we are disposed to think that some of the reports as to extraordinary high recoveries would be found fallacious and efforts might be made to stop some leaks which had not previously been suspected. The ignorance as to the precise tenor of the ore treated is manifested most strikingly in those cases where there is a plus outcome; that is, a yield of more value than the assays have shown the ore to contain, which is, of course, a *reductio ad absurdum*. Such a result can be explained only by imperfect sampling or the allowance of the ore buyer to himself of something that is not charged up, as, for example, in the settlement of a lot of copper matte at Liverpool, which Mr. Walter McDermott related, wherein after exhausting all the various and (to Americans) bewildering items for deduction there was a final allowance for a certain proportion eaten by rats! Such a trifling inaccuracy of method fades into insignificance, however, in comparison with the remark of Mr. J. H. Collins, referring to the dishonesty of human samplers, that he knew a man who some years ago complained of his employers because after he had "saved" them £8,000 in the sampling of a certain cargo they did not give him any present.



MARKET CONDITIONS.

Iron and Steel.—Little change is to be noted in the iron and steel markets. While business continues active, the supply of steel is better, and there is less pressure in most lines, structural steel being the chief exception. In steel rails it is now estimated that orders for 1903 delivery amount to fully 850,000 tons. The threatened suspension of a number of Alabama blast furnaces has been averted, the coal miners' strike having been settled. It is to be noted that the Alabama furnaces are now taking contracts for 1903 delivery; hitherto they have been reluctant to take orders running beyond the present year.

Export business continues light, nothing new in that line being reported. A good deal of material from abroad is now being received on contracts made some time ago, but somewhat less new import business is reported.

Copper.—The market continues quiet, and there is little change, though the tendency seems to be towards lower rather than higher quotations. Manufacturers are still taking but little interest, and transactions are somewhat restricted. Abroad conditions improve slowly, though there is some change for the better.

The production of copper in the United States in June, according to the figures furnished by Mr. John Stanton, who acts as statistician for the companies, was 26,740 long tons, the largest quantity ever reported for a single month. Of this, 22,740 tons was from the mines which furnish reports, and 4,000 tons from the outside sources—that is, the smaller mines and the smelters treating ores carrying other metals besides copper. This large production brings up the total in the United States for the six months ending June 30 to 140,448 tons, which is 7,054 tons more than in the first half of 1901. The exports in June were

14,027 tons, being lighter than in any preceding month this year, but greater by 4,185 tons than those for June, 1901. The total exports for the half-year were 97,966 tons, against 48,027 tons in the first half of 1901, showing an increase of 49,939 tons, or 104 per cent. This year the United States exports were 69.8 per cent of the production, against 36.0 per cent last year.

The foreign reporting mines, which include all the important European mines, showed a decrease of 320 tons in June. For the half-year their total output was 52,546 tons, being 5,699 tons more than in the first half of 1901.

According to the best estimates the consumption in the United States for the first half of the current year has been at least 120,000 tons; so that consumption and exports together have exceeded the production by some 78,000 tons.

Other Metals.—Tin continues in good demand for consumption. Manufacturers are not over supplied as a rule, and are, therefore, still on the market.

Lead remains quiet, with no change in prices, and about the usual amount of business doing.

Spelter is still strong and active, with high quotations ruling. The price of zinc ores in the Joplin District continues high, and the miners in that region must have done very well this year. The quotation has been for several weeks \$36 per ton for ore carrying 60 per cent zinc, and as much as \$38 has been paid for 65 per cent ore. A year ago the top price for ore of the standard grade was \$27. The difference this year points to a handsome profit.

Silver has been quiet and fairly steady. The difficulty over the Chinese indemnity payments has not been settled. It is understood that the United States, Great Britain and Japan are willing to concede some relief to China from the additional tax imposed by the low price of silver; but it is not believed that the other treaty powers will consent.

Coal.—The Western coal market remains chiefly dependent upon transportation, and trouble with the railroads is again reported. The movement of coal is not as good as it was recently, and the delays are felt both locally and in the lake trade. Lake vessels are plentiful, but cargoes cannot be provided as fast as they are wanted.

In the seaboard bituminous coal trade conditions are somewhat better, though transportation from mines is rather irregular. The consumption of soft coal in the large Eastern cities is larger each week, and has affected prices to some extent.

The anthracite situation shows no change. There is no trade and nothing new to report as to the strike.



THE ROLLING MILLS MINE EXPLOSION AT JOHNSTOWN.

HAPPILY, AS is often the case in great disasters, the first accounts published of the fire-damp explosion, on July 10, in the Klondike workings of the Rolling Mill Mine of the Cambria Steel Company, near Johnstown, Pa., greatly exaggerated the loss of life and the damage done to the mine. The first reports indicated that 400 men might have perished. To date, however, the total number of deaths is 113, with the probability that very few bodies remain to be found in the mine. The damage done to the mine itself by the destruction of stopings and brattices and the partial closing of air ways by falls of roof, though considerable, is not great. Yet, though the loss of life is far less than anticipated, the explosion ranks among the worst in the history of coal mining in Pennsylvania. While detailed information on the direct cause of this disaster is lacking, yet certain statements about the mine and its condition have not been disputed.

The mine was an old one, first opened nearly 50

years ago, with many miles of underground workings. It has been well managed by a strong and conservative company, and the engineers in charge have been men of high standing. The fact that this disaster is the first serious one in the history of the mine is in itself a witness to the general excellence of the management. The Klondike workings where the explosion occurred are in a "dip" of a synclinal fold in the coal seam, about 1½ miles from the main entrance. These workings were known to be gassy and, apparently owing to "creeps" as the worked area became extensive, the gas was liable to be given off in large quantities. The company had noticed about two months ago that an extra amount of gas was collecting in the workings, and began to take the utmost precautions. About a week before the explosion it was decided that only the more experienced men should be allowed to work in the No. 6 right heading, and only about 12 men were working there when the explosion occurred. Apparently very few men were killed by the direct force of the explosion; the rest fell victims to after-damp and white damp, CO₂ and CO, the products of the explosion which quickly swept throughout the mine workings. In this respect the disaster resembles the terrible explosion at the Pleasant Valley Mine in Utah.

As the mine had been carefully inspected but a few days before the explosion, and as the company's engineers and fire-bosses evidently took all ordinary precautions against gas, it would appear that some miner, careless in the face of imminent danger in spite of his experience, violated some positive order. This view is borne out by a statement credited to Mr. Joseph A. Roderick, chief of the State Bureau of Mines, as competent a person to speak on the disaster as can be found. He is reported to have said: "We know where the explosion in the Rolling Mill Mine occurred. We know what caused it. We know who caused it. If he were alive, criminal action might reach him. He is dead, undoubtedly. There is nothing sensational about the cause. I will only say that the explosion was not caused by a blast."

There is little call for further comment until all the evidence is presented at the coroner's inquest, but one point is worthy of attention. Mr. John Mitchell, of the United Mine Workers, took the sad occurrence as an excuse to assert that the Pennsylvania coal miner, in view of the dangers of his calling, is underpaid, and that the coal mining companies are careless of the lives of their employees. In doing this he added another to the list of things he had better have left unsaid.

Pennsylvania miners in the Central District, embracing the Johnstown mines, are reported to be making at present \$5 and \$6 per day. The State mine inspectors are as fine a body of experienced mining men as can be found in this country, and there is no need to cast slurs on the Cambria Steel Company. As has often been pointed out in Mr. Roderick's reports, most coal mine accidents in Pennsylvania are caused by the carelessness or wilful disobedience of some miner. It is perfectly well-known to every man interested in coal mining in the State that the men have not been more careful or shown better discipline since the United Mine Workers became active. On the contrary, the anthracite companies have accumulated a great mass of evidence, part of which was mentioned in their published correspondence with Mr. Mitchell, showing how the efforts of labor agitators to promote discontent and unrest have interfered with that strict discipline absolutely necessary in a gassy mine. Mr. Mitchell can do the organization he represents no greater injury than by unwise utterances to call attention to these facts. The stand of the anthracite

mine operators in refusing to refer to an interested board of arbitration questions of fundamental importance to the proper working of the mines is really a stand for discipline. Only implicit obedience to proper orders can prevent such disasters as that at Johnstown.

BRITISH PIG-IRON STATISTICS.

In our issue of June 28 we published the advance statement of the British Iron Trade Association of iron and steel production in 1901. We have now the full statement which gives additional details. The output of pig iron, as classified, was as follows, in long tons:

	1900.		1901.		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
Foundry and forge iron...	4,108,350	46.1	3,597,994	46.4	D. 510,356
Hemajite (bessemer) pig...	3,636,839	40.8	3,177,684	40.9	D. 459,155
Basig pig.....	924,987	10.4	794,787	10.2	D. 130,200
Ferromanganese and spiegel-eisen	238,394	2.7	191,365	2.5	D. 47,029
Totals	8,908,570	100.00	7,761,830	100.0	D. 1,146,740

The decrease extended to all classes of iron. The iron ore supply for the year is reported as follows:

	1900.	1901.	Changes.
British mines.....	14,028,208	12,275,198	D. 1,753,010
Imported ore.....	6,297,963	5,545,845	D. 752,118
Purple ore.....	556,073	476,000	D. 80,073
Total	20,882,244	18,297,043	D. 2,585,201
Av. per ton of pig..	2.34	2.36	I. 0.02

The purple ore—or pyrites residue—is almost entirely from imported pyrites, so that foreign ore last year formed 32.9 per cent of the total supply, and British ore 67.1 per cent. Of the imported ore in 1901 Spain furnished 4,749,933 tons, or 85.6 per cent. of the total. Greece came next, but with only 303,825 tons, while 189,014 tons were from Algeria and 80,678 tons from Sweden. No other country furnished a large quantity. It is interesting to note that 35,576 tons were from Newfoundland; while from distant countries we find 5,878 tons from New South Wales, 757 tons from Queensland and 497 tons from Persia.

THE CANADIAN MINING INSTITUTE.

Announcement is made that a meeting of members of the Institute and of others who are interested in promoting the profession and industry of mining in British Columbia will be held in Nelson, B. C., on September 10 and 11 next. While this meeting is to be held principally for British Columbia members and mining men, the council hopes that as many Eastern members as possible will avail themselves of the opportunity to visit the Western mines. Special rates will be given over the Canadian Pacific Railway, and a special excursion party will be made up if a sufficient number of members join.

At this meeting it is expected that a British Columbia branch of the Institute will be organized.

The following is a preliminary list of papers promised for this meeting:

1. Coarse Concentration in the Slocan District; by S. S. Fowler, Nelson.
2. Mine Timbering by the Square-set System at Rossland, B. C.; Bernard MacDonald, Rossland.
3. Comparison of Costs of Compressing Air by Steam and Electric Power at Rossland, B. C.; William Thompson, Rossland.
4. Safety Lamps and Mine Explosions; James Ashworth, Manchester, England.
5. Notes on the Machinery Constituting a Mining Plant; Alfred C. Gardé, London.
6. Mine Signaling by Compressed Air at Rossland, B. C.; Bernard MacDonald and William Thompson, Rossland.
7. Mineral Resources of Vancouver Island; William M. Brewer, Vancouver.

Other papers will be announced in a later circular.

GUARDING TRADE SECRETS IN FRANCE.—London *Engineering* says: Under a French law

still in force, the communication by a factory workmen, clerk, or manager of a trade secret to a foreigner, or a Frenchman resident abroad, is punishable with a term of imprisonment ranging from two to five years, and with a fine ranging from 500 to 20,000 francs. The culprit is, moreover, deprived of his civil rights, and kept under police surveillance for a period of from 5 to 10 years after his release from prison. A similar communication made to a Frenchman resident in France is less heavily punished, the term of imprisonment being in this case 3 months to 2 years, and the fine from 15 to 200 francs. In the case of the State arms or ammunition factory, the maximum penalty must be imposed. It appears, further, that in France the proprietor of a factory has a right, without reserve, to the discoveries and inventions made within his field of work by any of his employees.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for five months ending May 31 included 921,407 metric tons of coal and 65,058 tons of coke. Imports of metals included 1,409 tons pig iron, 2,486 tons wrought iron and 4,980 tons steel. Exports of minerals are given by the *Revista Minera* as below, in metric tons:

	1901.	1902.	Changes.
Iron ore.....	2,770,267	2,997,292	I. 227,025
Copper ore.....	434,641	390,128	D. 44,513
Zinc ore.....	31,732	28,164	D. 3,568
Lead ore.....	1,906	1,387	D. 519
Pyrites	158,418	211,408	I. 52,990
Salt	153,446	120,207	D. 33,239

Exports of metals included 24,033 tons of pig iron, against 4,488 tons for the corresponding period in 1901; 10,268 tons copper, against 9,400 tons; and 67,344 tons lead, against 65,186 tons last year.

OPEN-HEARTH STEEL FURNACES IN GREAT BRITAIN.—The number of open-hearth steel furnaces in Great Britain in 1901 was 482, of which 428 were acid and 54 basic furnaces. The average number in operation was 337.2 acid and 43.5 basic, a total of 380.7; the average number idle being 101.3. Of the open-hearth steel made last year a total of 2,946,614 tons, or 89.3 per cent, was acid, and 351,177 tons, or 10.7 per cent, basic. The average yearly make for furnace was 8,738 for the acid and 8,073 tons for the basic furnaces in operation.

FREIGHTS TO SOUTH AFRICA.—One result of the competition of steamship lines, to which reference was recently made in our columns, is that freights from New York to South African ports have been taken recently at very low rates. The extreme point was reached when 10 shillings per ton from New York to Durban, Natal, was named. This is considerably lower than the rate from London; and the advantage thus gained by American shippers of machinery and other goods has drawn out considerable comment in England.

MICA PLANT IN OTTAWA.—Consul-General C. E. Turner writes from Ottawa that the General Electric Company is establishing a plant for the manufacture of mica in that city. It has leased the large plant formerly occupied by the Ottawa Porcelain Company, and will employ 150 hands immediately and about 400 in the near future. This, adds Mr. Turner, is only one of the many United States concerns which are gradually establishing plants in different sections of Canada.

COKE IN GREAT BRITAIN.—The British Iron Trade Association reports that in the Durham and Northumberland districts in 1901 there were in existence 17,058 coke-ovens, of which 12,962 were in use and 4,096 idle. The total coke made was 4,659,643 tons, against 5,460,965 tons in 1900; showing a decrease of 801,322 tons, or 14.7 per cent, last year. No reports from other districts are made.

NOTES ON THE REPUBLIC DISTRICT, WASHINGTON, WITH SPECIAL REFERENCE TO THE METALLURGY OF ITS ORES.*

By J. C. RALSTON, M. E.

Unlike most mining camps, the Republic District, in Ferry County, Washington, presents more of a pastoral than a mining aspect. Its fairly gentle, grass-covered slopes seem more inviting to the herder than to the miner. This, however, is a superficial conclusion, for the mines have produced, approximately, \$1,400,000 in gold and silver, the silver values being a small percentage of the whole.

Republic is essentially a gold camp, although there are several mines in which the tenor of the ore is strongly but not wholly in silver. In one lot of many thousands of tons of fairly typical ore treated by the Republic mill, the average value was a trifle over 3 ounces of silver to 1 ounce of gold. The general average value of the ore reserves now fairly blocked out in the majority of the mines runs from \$12 to \$16 per ton, with occasional enriched lenses within the shoots running as high as \$50 per ton. Large quantities of ore of less value than \$10 and more than \$6 are known to exist, but have not been opened except so far as they are necessarily encountered by general exploration and by the opening of ore bodies which are merchantable under present and immediately prospective conditions.

To say that merchantable ore must assay something more than \$10 per ton is a statement not so economically inviting now as conditions will no doubt make it later. The total cost of mining during the past has been very close to \$3 per ton. This is not due to inherent adverse conditions underground, but rather to the fact that operations so far have generally been on a small scale, and have been confined very largely to prospecting. Broad and effective measures of economy necessarily have not been possible as yet, and will probably not be for perhaps the first year after the arrival of the railroads which are promised this summer.

Respecting the cost of production, there will be a freight charge of \$1, and a smelter charge of probably \$5 per ton. Allowing, in addition, a possible smelter toll of \$1, there would be, with mining at \$3, a maximum total charge of \$10 per ton on the ore.

That all of these items can and will be decreased by from 20 to 35 per cent is even now reasonably guaranteed. The veins can be easily and cheaply worked; the ground is soft, but not too soft, swells but little, and is easily and cheaply held. There is little water to be handled, and with a few exceptions only, shaft-mining will not become immediately necessary, although future prospecting must proceed by shafts. There is also reason to hope that much, if not all of the ore, will ultimately be treated on the ground by cyanidation instead of going to the British Columbia and Northport smelters. The uniformly excellent results accomplished by Mr. D. C. Jackling in the cyanide treatment of the ores of the camp at the Republic mill—a 200 ton plant—forms a definite and reliable forecast.

It is to be expected that for the first year, already referred to, the mine owners will push forward shipments in order to get back some or all of the money now heavily invested in development before looking to expensive betterments, while at the same time three parallel fissures, extending from north to prosecuting general development.

The prominent veins of the camp lie in a series of south, over a distance, within the actively developed zone, of about five miles, and separated laterally between outside veins by about 3,000 feet. They are enclosed by andesite country—the porphyry being in contact on the west with granite, and on the east with tilted sedimentaries. The enclosing country east of the most easterly vein is a porphyritic conglomerate, which is probably a melted down zone of both argillaceous and arenaceous matter. In this zone the bedding is often fairly preserved, and contains in places carbonaceous matter, fair samples of

*The data for the latter are from notes by D. C. Jackling, metallurgical engineer.

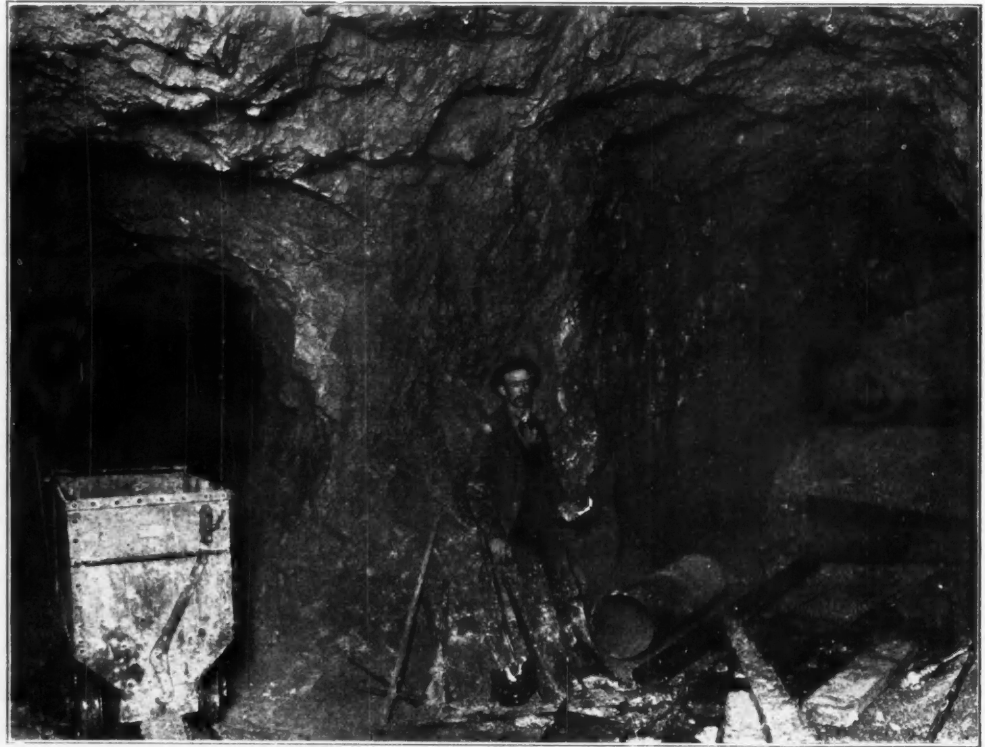
lignite having been discovered in the lowest Republic adit within 1,600 feet of the vein. The line of contact is not at any place, so far as the writer knows, clearly preserved between the volcanic and the stratified rock; nor is there the characteristic contact-shell in the sedimentary so often induced by the influence of the heat of the intruding or overflowing mass.

The veins vary in width from 4 to 20 feet. The prevailing width, however, is perhaps 8 feet, with a dip generally of about 70° to the east. The vein-filling is generally quartz, contaminated at times with country rock, and frequently with considerable attrition matter. In the impoverished portions of the vein the quartz is very often a vitreous amorphous mass, exceedingly hard and tough, and in the enriched zones the ore, although often very hard, is essentially a white or grayish-blue quartz, associated with calcite crystals. There are conspicuous instances in some sections of the veins where there is a complete absence of all quartz or other mineral-

milling capacity of 200 tons in 24 hours. The process employed is essentially dry grinding to 60-mesh, roasting to as nearly a dead or sweet condition as practicable, and cyaniding the roasted ore by direct percolation without agitation, the valuable contents of the resultant solutions being then precipitated by means of zinc-dust.

The mill was built primarily to treat the low and medium grade ores of the Republic Mine, but of sufficient capacity to receive also about 100 tons per day of custom ore. It was believed at that time that the Republic Mine could maintain a steady output of 100 tons per day.

The mill ran at part capacity until June, 1901, when it was shut down for want of an adequate ore supply. During the progress of construction, development in the company's mine was allowed to lag, with the unfortunate result that in a short time the stopes had overtaken development, and a temporary shut-down was inevitable. Contracts had not been entered into with other mines for any consider-



A BREAST IN NO. 4 LEVEL, REPUBLIC MINE.

bearing rock, the fissure being totally filled with a talcose material and a country rock. These sections when they occur are generally extensive. There are few evidences of secondary mechanical enrichment. There have been, however, extensive secondary shearing and faulting along and within the vein, always parallel or rudely so, but seldom laterally. Avenues thus created would no doubt have invited the operation of secondary enrichment by circulating waters, but the rule was not invoked. While there has been one striking example of a bonanza in the upper portion of one of the veins, the metallurgical conditions under which such bonanzas are generally formed in gold veins are largely absent in the district.

There is very little cavity quartz. The chalcidonic material built itself up by siliceous deposition and crystallization rather than by accumulations upon and out from the walls of crystallization after any of the favoring wall-rock constituents. The conspicuous absence of sulphides in appreciable quantities, or their decomposition products, in all the veins thus far explored, does not suggest that there will be any enriched portions of water levels. Indeed, in several instances where those levels have been reached no unusual enrichment occurs, but on the contrary the ore preserves a fairly uniform value and tenor downward.

The reduction plant already referred to was completed in October, 1900. It has a rough crushing and sampling capacity of 200 tons in 12 hours, and a

able quantity of ore, nor could ore be had for immediate delivery, due partly to the fact that the mines were nearly all idle, and that large and effective shipments could not be immediately forthcoming. Supplemental to this unhappy condition, there existed a difference of opinion between the mill company and its expected patrons as to what should constitute a proper schedule of treatment charges. In the meantime both the milling and the mining companies had become involved in financial difficulties, whereby the latter was unable to make prompt settlement for ores received. The difficult, expensive, and, in certain seasons, impossible, wagon transportation, added to the embarrassments.

However, in addition to the ore treated from the Republic Mine, the mill received lots of ore, varying in quantity from a few tons to several hundred from most of the other mines in the district. Those shipments were sufficient, both in quantity and variety, to give a thorough knowledge of the characteristics of the ores of the district and their metallurgical requirements.

The results of the entire operation of the mill demonstrated that the methods employed by it were well adapted to the treatment of a large majority of the ores of the district, both from a standpoint of recovery and costs of treatment. The correctness of this statement became apparent with reference to both factors when comparison was made with other localities where somewhat similar conditions obtained.

The clean gold-bearing ores from all parts of the district differ but slightly in appearance and physical properties. The analysis of all would be very nearly identical were it not for the exception of lime contents, which is variable. The ores are almost entirely of a white to bluish-gray quartz, of a very dense character, hard and tough, and frequently exhibiting a banded structure of alternate layers, varying in color from pure white to black. There is usually a rather plentiful coating of a very friable, soft white substance, suggesting amorphous silica, with frequently considerable quantities of pure calcite crystals. Small amounts of iron, alumina and sulphur complete the list of constituents.

The ores as they come from the mine contain only about 90 per cent silica. The calcium carbonate contents vary more than any other constituent, ranging from zero to 5 per cent, but averaging about 0.5 per cent. The sulphur rarely exceeds 1 per cent, and averages 0.5 per cent. Copper is occasionally as high as 0.1 per cent, but the average does not exceed 0.01 per cent. Traces

by means of cyanide solutions, unless the ore is first crushed to pass a hundred-mesh screen, or even finer.

The truth of the preceding statement was strikingly demonstrated by the operations at the Republic Mine for over a year of a Pelatan-Clerici plant, in which several thousands of tons of ore carrying three to four ounces of gold were treated. The ores were ground wet in Ball mills to pass screens which were varied at different periods from 80 to 120 mesh, and yet the actual solution of gold did not exceed 90 per cent of the amount present in this high-grade ore. On account of imperfect precipitation and other losses the net recovery was much less than on 1.5-ounce ore. Crushed to 40-mesh and treated raw with 0.5 per cent solution of potassium cyanide, the best extraction possible is about 50 per cent on ores containing 1.0 ounce per ton or less. Material of 60 to 80 mesh, under the same conditions, will not yield more than 60 to 70 per cent of its gold. When crushed finer than 40-mesh the slimes, produced largely from

scarcity of visible free gold, even when examined under the microscope, is but poorly accounted for by its extreme fineness, and various explanations have been suggested, the most reasonable, and probably true one, having been advanced by Messrs. Chatard and Whitehead in a paper read at the Washington meeting of the American Institute of Mining Engineers, February, 1900. Investigations made by them tend to prove that the gold particles are enveloped in films or coatings of mineral soluble in sulphuric or hydrochloric acids, and that these masking agents are hydrated oxides of iron and aluminum. The existence of such an enveloping film also explains another unusual condition encountered in treating the raw ores with cyanide, which is: If the slimes and sands be separated after treatment it is found that the slimes have not surrendered their values in the ratio that would be expected from the relative fineness of the two samples, which fact indicates that the necessity for such extremely fine grinding is not due entirely to the density of the ore and dissemination of the gold particles. It is probable that all the gold in the ores occurs in the form of an alloy of gold and silver, as all samples of the native metal obtained consists of such an alloy containing about 2 parts of gold and 1 of silver. The remaining silver exists probably, almost, if not entirely, in the form of sulphurets usually mixed with soft sulphurets of copper, and in these mixed sulphurets visible free gold particles are common.

It was first suggested in a report by C. W. Merrill in 1897 that calcination of these ores for subsequent cyaniding would prove beneficial. This has proven true in all respects save one, which is in accord with the well-known fact that silver extractions by cyanide treatment are invariably less on calcined than on raw ores. Calcination makes it possible to keep the degree of fineness of crushing to a point where the ores can be subsequently reached by direct percolation in deep tanks, and also makes a satisfactory gold extraction possible with the usual consumption of chemicals, and as the gold constitutes about 90 per cent of the total value of the ore, a high saving of both gold and silver does not seem possible at reasonable cost. The wisdom of making a maximum gold recovery, and to that end partially disregarding the silver, is apparent.

The sampling mill contains one No. 5 Gates crusher, one "H" style Gates fine crusher and one set 15 by 36 inch Gates rolls, besides the necessary elevators, automatic sampling machines, sample rolls and grinder. The occasion for the large amount of crushing machinery in this department is, that all ores are crushed and sized here to about $\frac{1}{2}$ inch, or as fine as can be conveniently done, before drying, thus avoiding the necessity of any roughing rolls in the crushing department of the main mill, at the same time minimizing dust losses by reducing as much as possible before drying. The sampling mill is automatic excepting in delivering ore from the receiving bin to the crushers, and the sample ore is delivered by skip car to the main storage bin above the fine crushing department, and thence fed automatically to the dryers. Both the sampler and the mill are located on a gently sloping hillside, and their design is, therefore, a compromise between the all-gravity and level site types of automatic plants.

The fine crushing or grinding department contains two 26 feet by 66 inch cylindrical dryers, two sets 15 by 36 inch, and two sets of 15 by 26-inch Gates rolls, six 30-inch Griffin mills, six 8-foot Jeffrey Columbian separators and the necessary elevators, conveyors, etc., to handle the ore and the finished pulp, and deliver the latter to a storage bin to the roasting or adjacent section.

The rolls are set in two series of a 36-inch followed by a 26-inch, each series being served by one dryer, and serving in turn three Griffin mills. Ore passing the large roll falls on a stationary screen, the fines going by elevator and conveyor direct to the pulp bin, and the rejections through the next set of rolls, whence they are elevated



A BONANZA BREAST IN THE REPUBLIC MINE.

of lead, zinc, arsenic and antimony are sometimes present, but tellurium was not detected in any analysis. The proportion of silver to gold contents for all ore received at the mill was 3.2 ounces silver to 1 ounce gold. These figures, however, do not represent the true average proportion of the district. The greater quantity of the ore came from the Republic Mine. It has a lower proportion of silver to gold than some of the others. About 25 per cent of the mines of the district contain considerable quantities of ore in which the silver contents are more valuable than the gold, and the average proportion in all the custom ores received was 6.5 ounces silver to 1 ounce gold. This ratio is in excess of the true average of the district, as it represents an undue proportion of the high-silver varieties. The average for the district, however, is not far from a mean of about 5 ounces of silver to 1 ounce of gold.

The most interesting characteristic of Republic ores, metallurgically and economically, is the necessity of unusually fine crushing in order to so liberate or unmask the gold that it may be attacked by solvents. The chalcidonic nature of the ore, and the fact that the gold contents are finely divided and uniformly disseminated throughout its entire mass, requires a finer crushing than is ordinarily practiced. It is impossible to accomplish a reasonable degree of extraction from the raw ore

the talcose material and pulverulent silicates render it impossible to percolate even a few inches in depth of the ore by the aid of a vacuum, and these slimes will remain in suspension in a solution indefinitely unless precipitated by means of some coagulating agent.

The gold is quite readily and quickly soluble in cyanide solutions when once in contact with them. Solution proceeds rapidly, and 90 per cent of the extraction possible is effected in the first hour or so. If the tailings are reground to a finer mesh an additional extraction can be effected in the same rapid manner. Little free gold is to be detected in the ores, and it is impossible in any case to obtain more than about 20 per cent extraction by amalgamation even from 60-mesh pulps.

The silver extractions follow an almost fixed ratio to those of gold in all cases of treating the raw ores with cyanide solutions, the percentage of silver dissolved being about 0.65 of that of gold; that is, if a solution of 90 per cent of the gold is effected, then about 59 per cent of the silver will be dissolved.

Notwithstanding the apparent freedom which the ores of Republic enjoy from constituents destructive to potassium-cyanide, the raw ores are nevertheless greedy consumers of the chemical, requiring from three to five pounds per ton, unless they be subjected to a preliminary alkaline wash. The

and pass over the screening machinery. The rejections from the screen can be returned to the lower rolls or go direct to the Griffin mills. The latter practice is usually followed.

The Griffin mills are supplied with coarse screens. No attempt is being made to finish all the material going to them at one grinding, the aim being rather to avoid making an excess of fines by discharging rapidly from the mills and circulating again over the screening system. The screens are supplied with 40-mesh, No. 32 brass wire cloth set at an angle of about 40 degrees from the horizontal, and deliver a product 96 per cent of which passes a standard 60-mesh laboratory screen. About 20 per cent of the ore coming from the rolls will pass the finishing screens, the other 80 per cent, which will all pass 8 to 16 mesh, depending on the condition of the rolls, remaining to be finished by the Griffin mills.

The drying, grinding, screening and accessory machinery in this department require about 1.25 horse-power per ton of ore finished. Using rolled steel shells of best quality on the rolls and rings, and dies of the same material on the Griffin mills, the steam consumed or worn away per ton of ore finished is about 1.25 pounds.

In starting the plant an attempt was made to use the old Ball mills which had formerly been in use in the Pelatan-Clerici mill, but they were found to have too small a capacity and require excessive power and at the same time fully five pounds of chilled balls made of the hardest white iron obtainable were worn away for each ton of ore finished.

Dust collection is provided for in large exhausters connecting with the chief sources of dust and discharging into a system of settling chambers. When it is necessary to remove the accumulation of dust it is mixed in small quantities with the regular pulp and fed to the calcining furnaces without damaging results. The dust assays the same as the average assay of the ore from which it was produced.

The mechanical analyses below are averages of analyses of samples taken daily of finished mill pulp, No. 1 when all the regrinding was being done by Ball mills, and No. 2 when Griffin mills were used exclusively, the screens using cloth previously described:

ANALYSIS NO. 1.

Remaining on 40 mesh.....	1.00 per cent.
Through 40 mesh remaining on 50 mesh.....	1.50 per cent.
Through 50 mesh remaining on 60 mesh.....	1.00 per cent.
Through 60 mesh remaining on 80 mesh.....	16.00 per cent.
Through 80 mesh remaining on 100 mesh.....	3.50 per cent.
Through 100 mesh remaining on 120 mesh.....	8.50 per cent.
Through 120 mesh remaining on 150 mesh.....	12.50 per cent.
Through 150 mesh remaining on 200 mesh.....	8.50 per cent.
Through 200 mesh.....	47.50 per cent.
Total	100.00 per cent.

ANALYSIS NO. 2.

Remaining on 40 mesh.....	1.00
Through 40 mesh remaining on 50 mesh.....	1.00
Through 50 mesh remaining on 60 mesh.....	2.50
Through 60 mesh remaining on 80 mesh.....	7.00
Through 80 mesh remaining on 100 mesh.....	3.00
Through 100 mesh remaining on 120 mesh.....	10.00
Through 120 mesh remaining on 150 mesh.....	10.50
Through 150 mesh remaining on 200 mesh.....	8.00
Through 200 mesh.....	57.00
Total	100.00

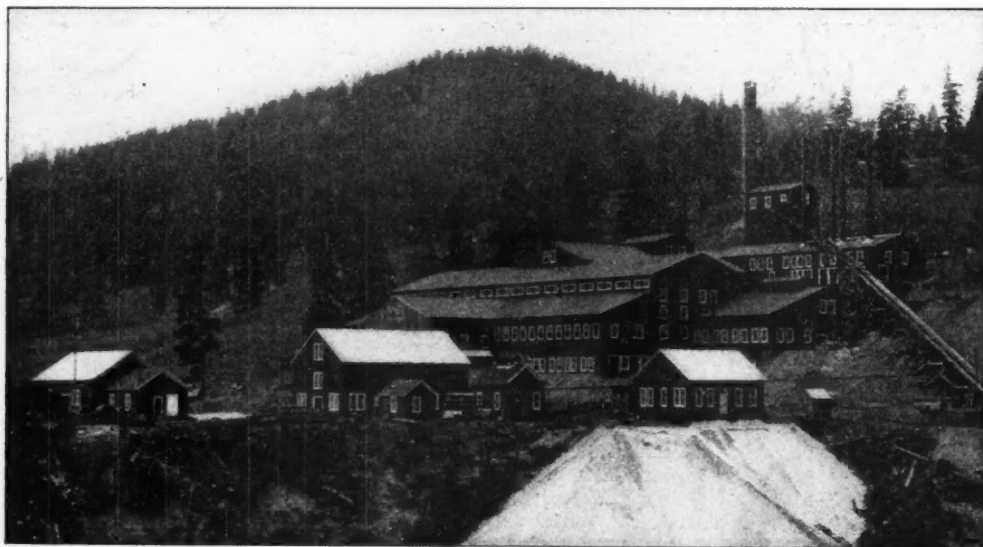
It is believed that such a record of fine dry crushing of gold ores has seldom been necessary or attempted elsewhere.

The roasting or calcining department contains three straight-line furnaces, having hearths 100 feet long by 12 feet wide, and using wood for fuel. The tops of the furnaces are covered with a flooring of heavy corrugated iron supported by the steel furnace frame, thus providing an upper deck onto which the hot ore is elevated from the discharge end of the roasting hearth and returned again to the feed end by the returning rables.

During the return travel the ore becomes thoroughly cooled, being sprayed with water for the last 25 feet of the distance and then discharged to the side of the furnace into an elevator and conveyor delivering it directly into the roasting ore storage bins above the leaching tanks. The

spraying of the ore before discharging from the cooling floor is for the double purpose of avoiding dust in subsequent handling and of obtaining a less compact charge in the leaching tanks. From the fact that the sulphur contents of the ore are so low it would be expected that very light calcining sufficient to thoroughly dehydrate and render porous the talcose materials would answer, but this is not the case. The ore requires a surprisingly high temperature and long exposure, and almost complete expulsion of the sulphur or poor extractions and large chemical consumption will result.

The leaching and precipitating departments adjoin the roasting section. The former contains 16 steel leaching tanks, 22 feet square and 6½ feet deep, holding about 110 tons each of the dampened roasted ore, three steel solution and standardizing tanks, 14 feet in diameter, 10 feet deep, are also located in this section in a platform 12 feet above the tops of the leaching tanks.



REPUBLIC MILL, REPUBLIC, WASH.

The precipitating department contains two precipitating tanks 10 feet in diameter, 8 feet deep; 2 gold solution tanks, 14 feet diameter, 10 feet deep; 1 sump tank, 24 feet diameter, 5 feet deep; all tanks of steel. Solutions are handled by two Root rotary pumps. The slimes resulting from zinc dust precipitation are collected in four 24-inch 36-section Johnson filter presses. Vacuum is supplied for the leaching tanks by an 8 by 10 inch triplex power pump.

The leaching tanks are loaded by means of side dumping basket cars running on parallel tracks over each row of tanks. The first solution containing 0.5 per cent KCy is applied from the bottom of the charge upward, and, after becoming thoroughly saturated on the way, the charge settles to about three-fourths its original depth and is allowed to stand only while any irregularities which have developed in the surface are remedied by leveling off and filling in, and percolation is started at once. Leaching by gravity alone will usually proceed at a satisfactory rate for the first 72 hours, after which vacuum is used. Strong, or 0.5 per cent, solution is allowed to run onto the top of the charge until about twenty tons have been used in addition to the quantity required for the original saturation from the bottom. This will require from 36 to 48 hours, depending on the leaching rate. Weak solution 0.3 per cent KCy is now started through the charge, and continued until samples of solution draining from the tank indicate that the charge is nearly finished. About 40 to 50 tons of this solution will have been used during a period of 72 to 84 hours. Wash water is then applied to the amount of 20 to 25 tons, and requires from 48 to 60 hours before the tank is drained. The average time required for loading, leaching and discharging a tank of ore has been about nine days, and the total solution and wash water actually

passed through the charge, exclusive of what was at first required to saturate it, averages about 85 per cent of the weight of the ore, although good results have been obtained where this total quantity of solution and wash averaged only 60 per cent of the weight of ore for a month run. Tailings are discharged by shoveling into cars through openings in the bottom of the tanks. Filling and unloading tanks cost about 11 cents per ton.

All solutions, whether strong, weak or wash water from the leaching tanks, run into the same gold solution tank together, and after precipitation this mixed solution becomes the "weak" solution for succeeding tanks, strong solution being made up from it by adding the required quantity of cyanide in lumps. When the amount of free lime in the ore is small, it becomes necessary to add an alkaline agent to the solutions, both to save cyanide and to obtain satisfactory precipitation. Caustic soda is used for this purpose, being added before the cyanide in making up strong solution.

The total alkalinity of the mixed solutions as they come from the leaching tanks is maintained at about 0.3 per cent in terms of KOH, or 6 pounds per ton of solution. The caustic soda used in this way, when no lime is present in the ore, amounts to 0.8 pound per ton of ore. The cyanide consumed averages 1.18 pounds per ton of ore. The gold extraction by actual bullion produced for the entire period of operation of the mill on an ore averaging 0.75 ounce gold, was 91.30 per cent. The silver contents during the same period averaged 2.3 ounces per ton, and the recovery varied by months from 11 per cent to 25 per cent, averaging only 15.6 per cent. Calculating the general recovery of all values, it is found to be a little in excess of 85 per cent.

It is a noticeable fact that the quantity of silver saved in ounces is almost exactly one-half the quantity of gold saved in ounces, or about the proportion in which the two occur alloyed in the native state in these ores. Varying the strength of solution and the methods of its application or extension of time of treatment does not materially increase the silver solution after the gold solution is complete, and it would seem that what silver is alloyed with the gold is really all that is dissolved. A considerable quantity of lime in the ore has a beneficial effect on the silver extraction. The Republic Mine, from which most of the ores come, contains very little lime, but on occasions where a few tanks of ore from other portions of the district contain as much as one per cent free lime, the silver extractions have reached over 40 per cent. This may be accounted for in two ways. First, that the silver sulphides may not be completely decomposed in the roasting process in presence of large quantities of lime; and, second, that the silver reduced to a finely divided metallic state in roasting is partially recon-

verted to sulphides when the warm ore is dampened on the cool hearths by reason of the small amounts of calcium sulphides remaining in the ore.

As before stated, precipitation is affected by means of zinc dust. Twenty tons of solution are precipitated at each charge by sifting in the necessary quantity of zinc dust, while the solution is being agitated by means of pipe introducing compressed air to the bottom of the tank. The amount of dust required for a tank of solution averages 22 pounds. Per ton of ore, the zinc amounts to about 0.95 pounds, corresponding to 1.25 pounds per ounce of gold precipitated, or about 0.80 pounds per ounce of combined gold and silver.

Precipitation is usually rapid and complete if the alkalinity of the solution is up to proper standard, but occasionally when the solutions contain appreciable amounts of copper complete precipitation becomes very difficult and tedious, and for such solutions zinc shavings seem to be preferable to dust.

The precipitates and slimes are collected in filter presses and refined in the ordinary way of treating them with sulphuric acid, drying and melting into bars, the resulting bullion being about 900 fine in gold and silver.

The works are operated by steam throughout, each department having its own engine taking steam from one central boiler plant.

COMPOSITE ARC ELECTRODES.—The *Electrical World and Engineer* says that a new type of composite arc electrode is the subject of a patent issued July 1 to C. R. Boehm, Charlottenburg, Germany, which type is claimed to obviate the disadvantages incident heretofore to composite electrodes, such as unsteadiness of the arc, formation of slag and production of smoke and injurious vapors. Finely divided fluorides, such as fluorides of sodium, calcium and magnesium, are intimately mixed. To one part of this mixture one part of pulverized carbon is added, and a paste formed by the addition of tar or other binding substance. In the case of cored carbons, the core is formed of a mixture of fluorides and carbon, to which is added a silicate. The magnesium fluoride is not reduced in the voltaic arc of the carbon, but is dissociated; the metallic magnesium thus produced being of an extraordinary reducing power, liberates the metals from their metallic salts so that the produced spectrum is a pure metal spectrum, whereas other arcs produced by metallic salts without the addition of magnesium fluoride show an impure spectrum of the salts or oxides employed, which are only partially reduced to metals. When the calcium fluoride is present, an intensely yellow light is produced, which, however, becomes of a flesh color when magnesium fluoride is present mixed with the other metallic salts in the proportion of equal or equivalent molecular weights.

AMERICAN TRADE-MARKS AND PATENTS IN CUBA.—The State Department has received from the legation of Cuba, Washington, under date of July 5, 1902, the announcement of the following decision by the Department of Agriculture, Commerce and Industry of Cuba, dated June 25, 1902, in respect to the registration of American trade-marks and patents.

"Patents and trade-marks of all descriptions, printed matter, titles, and labels, duly registered in the Patent Office of the United States, for whose protection in this island application shall hereafter be made, from this date, by filing the same, shall be registered in the Department of which I have charge, if admissible, upon observing the procedure followed for the registration of those of other countries and upon the payment of \$35 currency for patents and of \$12.50 currency for trade-marks, prints, etc.—that is to say, the same fees as are paid by the other foreign and national marks and patents in lieu of the 1 peso currency (about 60 cents), indicated with regard to the American in the circular No. 21, of June 1, 1899, issued by the Division of Customs and Insular Affairs of the War Department, of Washington."

COAL CUTTING BY MACHINERY IN BRITISH COLLIERIES.—III.

By SYDNEY F. WALKER.

DISK MACHINE AND ITS METHOD OF APPLICATION.

As already explained, the disk coal-cutting machine consists of an annular disk, supported by radial arms, from a central boss, which is in its turn supported by a bracket projecting from the main frame of the machine. The main frame of the machine consists, in the main, of a pair of steel girders of sufficient length to carry the parts of the apparatus, joined by strong end pieces. The cylinders of the driving engines, where compressed air is used, or the motors where electricity is used, together with the shafting and wheels for the reducing gear, are mounted on or between the girders. The disk itself lies in a horizontal position, usually with a portion of its periphery under the body of the machine, and is supported by a bracket, consisting of a casting or plate bent at right angles, bolted to the girder next to the coal face on the one side and carrying the axle on which the disk revolves at the other end. The body of the machine runs on small wheels, which rest on rails placed in front of the face, the axles of the wheels being carried by the girders. The disk has radial slots near its periphery, and in those slots a horizontal pinion turns, giving motion to the disk. The pinion itself receives its motion from a train of gearing, including two bevelled wheels, operated by the crank shaft of the engines or the armature shaft of the electric motor. Attached to the body of the machine also and worked from the second motion shaft of the gearing is a small haulage arrangement, consisting of a drum on which a wire rope is wound. The end of the rope is secured to a prop, or anything convenient, at a certain distance in front of the machine, or is taken round a pulley secured to a prop. The drum turns as the machine cuts, winding up the rope on the drum and pulling the machine forward. It is arranged by various devices to alter the speed at which the machine travels. In one form of machine the motion of the drum is controlled by an eccentric, the throw of which can be altered within certain limits. In others, the control is effected by means of a pawl, pushing forward a certain number of the teeth of a pinion wheel at certain intervals. The number of teeth are altered at will. In one form of the machine, made by the Diamond Coal Cutter Company, of Normanton, Yorkshire, the body of the machine runs on plain iron pulleys, as shown in the illustration, and the machine runs on the floor instead of on rails, as is usual, the object being in this case to run the disk at floor level. The disk itself is arranged to run at different levels, according to the height at which the cut is to be made, the bracket carrying the disk being altered to meet the different positions. The disk is also arranged, by similar means, to run partly under the body of the machine, or to stand out. The casting of which the bracket carrying the disk is composed has two members, one vertical and rectangular in shape, the other horizontal and triangular in shape. By lengthening the triangular portion the disk as a whole is pushed out from the body of the machine, and vice versa, and by altering the length, or by reversing the position of the vertical portion to the horizontal portion, the height at which the cut is to be made can be altered. It will be understood that the arrangement for the height of the cut must be made before the machine leaves the works of the makers. Disk machines are now made to work in positions ranging from floor level to 3 feet 6 inches above floor level and to cut up to 7 feet under the coal. In all forms of disk machines, except that made by the Diamond Company, the engines, or the electric motor, are placed at one end of the framework of the machine, the disk at the other. With compressed air the engine cylinders are placed side by side, their piston rods being connected to the same crank shaft in the usual manner, and the reducing gear consists of spur and pinion wheels, with the beveled wheels mentioned above. The crank shaft carries the first pinion wheel, and the last wheel

gearing into the radial slots in the disk. With electric motor driving, the armature shaft carries the first pinion wheel, which gears into the first spur wheel of the train.

In the Diamond machine, the engines are divided, one cylinder being placed at each end of the framework, and the same arrangement is made when electric motors are employed. Instead of one comparatively large motor being placed at one end of the frame, a motor of half the power is placed at each end. With compressed air driving, the two piston rods work on to a disk in the center of the machine, forming the common crank. With electric motors, the two armature shafts are connected in a similar manner to the gearing. The advantage claimed for this arrangement is that the machine is more nearly balanced, and it will cut in either direction without any inconvenience and more easily work round curves. The Diamond Company has also adapted its machines for use with the polyphase induction motors, and the result is remarkably good. The writer saw a machine mining in the clay at one of Messrs. Pope & Pearson's collieries, at Normanton. It was fitted with two polyphase motors, each taking 16 h. p. and there was no sign of heating or sparking anywhere. The one objection to the use of polyphase motors is the difficulty of starting against the load, if you dispense with the slip rings, and adjustable resistance, but it is usually not difficult to start the disk out of contact with the coal or clay, and to direct it inwards when it has attained its speed.

Disk machines are also divided into two classes, according to the speed at which the disk runs. Singularly enough, the division also marks the difference between Scotch and Yorkshire thought in this matter. Two disk machines were invented at about the same time, one in Yorkshire and one in Scotland. That in Yorkshire was known as the Gillott & Copley, which is still made by Messrs. John Gillott & Son, of Barnsley. That in Scotland was the invention of Messrs. Rigg and Micklejohn, and it is made by Messrs. Grant and Ritchie, of Kilmarnock, by Mr. James Stewart, of Leith, Edinburgh, and by the mechanics of the Lothian collieries. The Rigg and Micklejohn disk runs at from 60 to 70 revolutions per minute, the Yorkshire machine at from 6 revolutions up to 20 revolutions per minute. The Gillott machine has formed the basis upon which other Yorkshire firms have worked, and modifications of it are made by the Yorkshire Engine Company, of Sheffield; Messrs. Clarke & Steavenson, of Barnsley, and the Diamond Company already referred to. The engine cylinders employed are from 8 to 9 inches, with stroke of the same length, and they run at 200 revolutions per minute, with practically no cut-off in the cylinder, the air being admitted for practically the whole of the stroke. The Scotch disk has few cutting tools round its periphery, while the Yorkshire disk has more. It will be seen that the distinction between the two apparatus is important in the matter of the reducing gear. Allowing the disk to run faster admits of lower proportions in the reduction. But the faster running disk has the disadvantage that the portion of the gear most exposed to the dirt produced by the machine is more liable to increased friction than the slower running disk. In addition, the tools in the slower running disk have longer to cool than in the higher running one, and therefore requires changing less frequently. It is found in practice that the Rigg and Micklejohn machine will not usually cut in the underclay, though it does very well indeed in the coal itself. One reason of this will probably be the fact, pointed out to the writer by a mining engineer who has had considerable experience with coal-cutting machines, that coal dust does not create as much friction as clay when it gets in between the wheels of the gearing.

The Clarke-Steavenson machine is principally known as the machine that first successfully adapted electric motors to coal-cutting machines in England. It is also known as a thoroughly strong and substantial machine, that will stand knocking about,

and it may be taken that this and the Diamond machine represent very fairly the British line of thought, as distinguished from American. Machines on this side are made strong and heavy. The electric motors fixed on coal-cutting machines are from 25 to 30 horse-power nominal, but work up to at least double that for a short time. In one case, the writer was given figures where the Clarke-Stevenson machine delivered 100 horsepower for some minutes. This is again one of the advantages claimed for the electric method of driving. It is comparatively easy to deliver whatever power is required, especially where it is a case of exerting a powerful effort for a short time. This is a case that very frequently arises owing to the presence of nodules of iron pyrites in the under clay and sometimes in the coal itself. These nodules are very hard indeed, and either the machine must pull them out, cut through them, or stop while the miners clear them out by hand. With electrically driven machines it is usually possible to deal with them without stopping the machine, though for the time the nodule is being dealt with the power expended is considerable.

It is interesting to note here that the success obtained in coal cutting by machinery in British collieries has been almost entirely by mining men, who have taken the subject up. Mr. Gillott who worked out the first Gillott & Copley machine was engineer at the Thorncliffe Ironworks, who own a large number of collieries. Mr. Garforth is the managing director of Messrs. Pope & Pearson's collieries, and took the subject up originally for his own collieries. He is assisted by an able staff of mining engineers and an able electrician. Messrs. Clarke and Stevenson are the owners of the Tankersley collieries, near Barnsley, and the colliery is worked entirely by coal-cutting machines.

Mr. George Blake Walker, the managing director and part owner of the Wharnciffe Silkstone colliery, where more has been done in the matter since about 1870 than in any colliery in the United Kingdom. Perhaps a more striking instance is worth noting; at the Lothian collieries in Scotland, where the Rigg and Micklejohn machine was used at an early date, the engineers at the colliery took the matter in hand, on the failure of the manufacturers, and have since made and repaired all their own machines, the failure occurring very early in the history of coal cutting.

It may be mentioned en passant, that one of the reasons for the non-adoption of coal-cutting machines, in the early seventies, and in some cases at later dates, was the absence of power for the purpose. Compressed air plants existed at many collieries, but it was insufficient to stand the additional call made upon it, even by one percussion machine, and so the machine was not successful.

The cutting tools used with disk machines in their simplest forms may be described as pieces of square steel, with one end bevelled off to a chisel edge. But a point arises here, as in all cases where an apparatus of this kind is at work. It is necessary, in order that the disk may work freely, to have the groove cut larger than the thickness of the disk, and this has to be provided for in some way. In the Gillott machines and those which have followed them the object is attained by making two kinds of tools, one straight, and one forked, the prongs of the fork giving the necessary width of cut. This has the disadvantage that if one prong of a forked tool is broken off, he tool is lost. It has therefore been arranged, in other cases, to have three separate tools, one in the center and one on each side, the three together giving the necessary width. In some cases this is effected by beveling the wheel periphery so as to splay the tools. The best arrangement, however, is probably that of the Diamond Company, in which the three tools are held in one tool box, which bolts on the periphery of the disk, and can be removed, and the tools changed in a few minutes. The tools are made from the hardest and toughest steel obtainable, toughness being the great desideratum. Messrs. Blyth, Ledingham & Company, of Sheffield, who have devoted a special study to this

problem, supply a large portion of the steel that is used. As the cutting tools lose their edge, the power taken goes up, and this may be read off on the current measuring instrument where electric driving is employed, another advantage of that system. Tools have usually to be changed at least once in a shift of eight or ten hours, oftener when much pyrites is met with.

Another point that should be mentioned in connection with the difference between the Scotch and Yorkshire machines is the direction in which the disk runs. The Scotch machine runs inwards, the cutting tool meeting the coal face first and passing towards the back. The Yorkshire tool cuts forward from the back, entering the cut already made behind the machine. It is claimed by Yorkshiremen that they get rid of the cuttings more easily than the Scotch machine. Their machine they claim brings it out in front, while the Scotch machine carries it into the cut, from where it has to be drawn out by hand labor.

The Gillott machine is now distinguished mainly by the fact that it is lighter than any of the other machines, it weighing only 15 cwt. as against 24 cwt. for the Yorkshire Engine Company's machine and 35 cwt. to 2 tons for some of the other disk machines. This has a very important bearing upon the problem of coal-cutting by machinery, as it is often a very difficult matter to move heavy masses of machinery in the space available. The writer has not dealt with the Jeffrey machine, which has had a good sale in the United Kingdom, as it is well known in America. It is constructed on distinctly different lines to any British machine. One important feature in which it differs from British machines is in the use of only one rail for the machine to run on, in place of two as other machines require, with the result that the machine is able to be worked more easily on roads that are not uniform.

In working either the disk or the bar machine it is usual to have three pairs of rails for use with the machine, except in the case of the Jeffrey. One pair is under the machine, one pair in front, ready to receive the machine as it passes on, and the third pair behind the machine. As the last pair are released by the passage of the machine, they are taken out and passed over the top of the machine and relaid in front. Some makers, however, notably the makers of the Hurd machine, insist on having rails laid in front of the machine for the full length of the day's cut. It will be understood also, with the Yorkshire disk machine, that as the disk turns towards the coal face it draws the machine bodily towards the face. This is provided for, in the Gillott and similar single ended machines, by a bridle, as it is called, shown in the drawings, which clasps the rail in front of the machine, and so keeps it off the face. With the Scotch machine cutting outwards, this trouble, at least in this form, does not arise.

The length of cutting done with the disk machine varies from 40 to 120 yards in a shift of 8 hours.

MANUFACTURE OF ELECTRO-STEEL IN SWEDEN

CONSULAR REPORT.

At the meeting of the Iron Manufacturers' Association in Sweden recently, Engineer F. A. Kjellin and Mr. Benedicks gave some interesting information about the production of electro-steel at Gysinge.

In the latter part of February, 1900, the first furnace was finished and ready for trial, and after a few experiments the first ingot was produced. The steel was found to be of excellent quality. The problem was solved technically, but not economically; for, with the dynamo of 78 kilowatts used, not more than 270 kilograms (575 pounds) of steel were obtained in twenty-four hours, and in the furnace there was not room for more than 80 kilograms (176 pounds). A larger furnace was seen to be necessary, and this was completed in November, 1900, and proved to be a great improvement. In the second furnace, which held 180 kilograms (397 pounds), from 600 to 700 kilograms (1,323 to 1,543 pounds) of

steel were produced in 24 hours. The Gysinge sulphite factory burned down on August 11, 1901, and it was decided to build steel works in its place and to use the water power available there. For the steel furnace there was utilized a turbine of 300 horsepower, the direct-coupled generator. The new furnace is to hold 1,800 kilograms (3,970 pounds), and the production is estimated to be at least 1,500 tons a year if charged with cold raw material.

Engineer Kjellin said that the steel produced is of superior quality and characterized by strength, density, uniformity, toughness, and the ease with which it can be worked in cold, unhardened condition, even when containing a very high percentage of carbon. Compared with other steel, it also has less tendency to crack or warp when hardened.

The reason why this steel in certain qualities differs from other steel, especially in its softness when unhardened, is considered to be its freedom from gases. The manufacture of special steel, with nickel, chrome, manganese, or tungsten, will, of course, not meet with any difficulties. The chrome steel and tungsten steel produced at Gysinge has proved to be excellent for lathe tools. When used for permanent magnets, the Gysinge tungsten steel has been found to give stronger magnets than other tungsten steel and has not warped in the hardening.

LAKE SUPERIOR TRAFFIC.

The official report shows that the number of vessels passing through the Sault Ste. Marie canals this season up to July 1 was 7,753, the registered tonnage being 10,533,384; an average of 1,359 tons. The total freight passing the canal was as follows, in net tons:

	1901.	1902.	Changes.
Eastbound	5,392,954	9,529,439	I. 4,136,485
Westbound	1,374,166	1,957,062	I. 582,896
Totals	6,767,120	11,486,501	I. 4,719,381

This year's tonnage is by far the largest ever reported. The items of mineral freight included in the totals were as follows, in net tons, excepting salt:

	1901.	1902.	Changes.
Anthracite	196,823	103,167	D. 93,656
Bituminous	982,411	1,594,859	I. 612,448
Total coal.....	1,179,234	1,698,026	I. 518,792
Iron ore.....	4,334,514	7,806,573	I. 3,472,059
Pig and man. iron....	39,912	49,850	I. 9,938
Copper	24,647	35,614	I. 10,967
Building stone.....	10,494	17,231	I. 6,737
Salt (barrels).....	172,751	174,274	I. 1,523

The opening of navigation was unusually late in 1901, which accounts in part for the great increase shown. There has been, however, an actual gain in movement, and the total freight shows a gain over 1900, when navigation opened early, of 2,813,020 tons. It is now believed that the total Lake Superior freight movement this season will run up to nearly 30,000,000 tons.

SHIP-BUILDING IN THE UNITED STATES.

—The *Cleveland Marine Journal* says: "Only a brief summary of the report of the Commissioner of Navigation on ship-building for the last fiscal year is yet available. The commissioner reports that during the year ended June 30, 1902, 1,657 vessels of 473,081 gross tons were built in the United States and officially numbered, compared with 1,709 vessels of 489,616 tons for the previous fiscal year. The decrease compared with last year is in sailing vessels and canal boats, barges, etc. New steel steamers aggregate 275,479 tons, compared with 235,265 tons last year. Included in the total new tonnage are 94 vessels of over 1,000 tons, aggregating 315,062 tons, or two-thirds of the output. Of this large construction 41 steel steamers of 158,631 tons were built on the great lakes. The output of completed steel steamers on the seaboard has been much below the indications of last July. The launching of nearly every large steamer has been delayed from three to eight months, and some are still on the ways which by this time were to have been in operation. The delays have been partly due to the steel strike last summer, to the great demand for structural steel in all directions, to low freights and the lack of new ship building orders.

RESUMING OPERATIONS IN SOUTH AFRICA.

By T. LANE CARTER.

The work being done on the mines about Johannesburg speaks volumes for the skill of the management in surmounting so many difficulties. No mine is yet able to run all its stamps. In some ways the necessity of starting off with one-third to one-fourth stamping capacity has proved a blessing in disguise, for it has enabled the mines to prospect, and "root" around. On one of the leading mines of the Rand a most valuable strike has been made in consequence of this careful investigation. To show how this strike was considered in the market, I may state that since the discovery of this gold vein, the market value of the company on which it was found, together with the company to the South and one to the East, has quickly gone up £2,000,000—too great a rise, no doubt, but proving how much importance the public attach to this find.

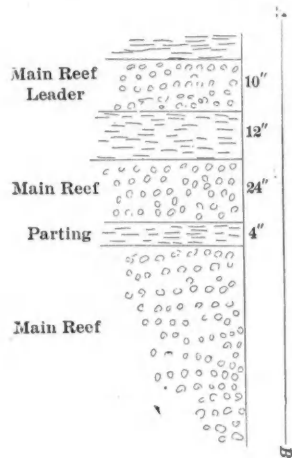


FIG. 1.—SECTION OF MAIN REEF, JOHANNESBURG.

To illustrate where this small reef is situated, in regard to the formation. Mining for gold is carried on here principally in two gold bearing series, known as the Main Reef and South Reef, the latter being from 10 to 150 feet from the former, due south. In the eastern part of the Rand the two reefs are nearer together, while in the western section they get farther apart. A typical section of the Main Reef, in the immediate neighborhood of Johannesburg, is given in Fig. 1. In looking at this figure, it should be remembered that in some places it is nearly 20 feet from the hanging wall A to B, the end of the Main Reef; but 54 inches is all that is stoped at present.

Fig. 2 is a sketch section of the South Reef. In this the stringer marked A was worked before the war as the South Reef leader. The stringer marked B is the one just found, which is so valuable. The stope will now be 84 inches wide, against 48 inches formerly; and a larger sorting plant will be needed.

The South Reef is frequently made up of small bonds or stringers, of gold-bearing reef, separated by varying thickness of sandstone. What is known as the South Reef Leader is the lowest portion of rock taken out, the bottom of it being considered the footwall. There is no way of recognizing it, except by its high gold value and the greasy, smooth appearance of the wall underneath. In the mine I speak of, investigation of some old stopes showed that 3 to 4 feet below the rich stratum which was considered the footwall in the past, there was a tiny reef, about 1 inch thick, assaying extremely high. This leader has been proved in many places, and is certainly a valuable asset. Strange to say, there is a large amount of visible gold in the leader, a condition seldom if ever met in mines over 1,000 feet deep.

This find has shown the necessity of using a diamond prospecting drill, with which prospecting holes can be put into either the hanging or footwalls, and the cores examined for gold-bearing material.

It may be of interest to mention a new scheme in management that is to be tried by one of the group of mines here. Almost all the mines are under the control of some powerful group, such as the Rand Mines, Eckstein Group, East Rand Proprietary, Alber Group, Goertz Group, and Consolidated Gold-Fields of South Africa.

The scheme on the group I mention, is to centralize the six or seven mines under one head. There is a general manager of all. Now instead of having separate managers for each mine, the idea is to have a general man for each department. For instance, there will be one mechanical engineer, with assistants, who will be responsible to the general manager for everything in the mechanical line on all the mines. In like manner there will be one underground manager, one chief surveyor, one central assay office, one large workshop, each mine having only a small blacksmith shop, etc. No individual mine will have a head, for the general manager will be over all.

This is carrying the idea of centralization further than it has ever been carried before in this district. On the other groups there is a general manager, but every mine has its own manager. The idea might work for a number of small mines, but I do not see how one man can possibly attend to the details of five or six big companies.

The Witwatersrand Chamber of Mines is the same splendid body it was before the war. There seems reason to believe that it will yet become the Transvaal Chamber of Mines.

The engineering societies of the Rand are getting into form again, especially the Chemical and Metallurgical Society, known so favorably to hundreds in the United States interested in the cyanide process.

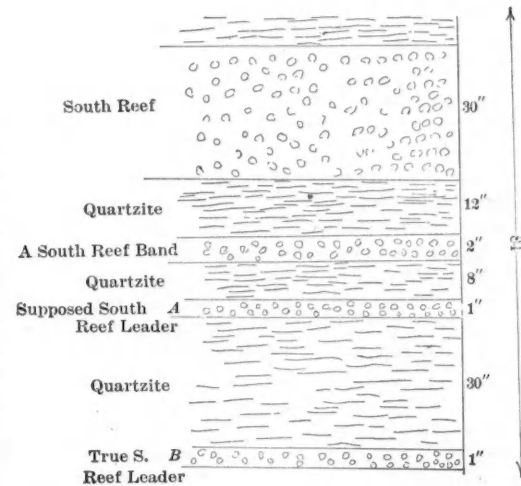


FIG. 2.—SECTION OF SOUTH REEF, JOHANNESBURG.

It is very likely that the municipal limits of Johannesburg will be extended many miles to the East and West, so as to bring into the city limits a great many more mines.

In consequence of peace, the market is high, too high, I think. The future will see many booms and collapses, except in those stocks which are as safe as the Bank of England.

There is considerable activity in the building trade, and architects and builders are kept busy. The big mining men are all building their homes in the northern part of Johannesburg, far away from the mines, in order to escape, if possible, from the unpleasant dust of the tailings heaps.

One of the problems of the future is the disposition of tailings. Already they rise like white mountains far into the air.

In the city itself a number of business buildings are to be erected, one of the most important being that for the Eckstein Group. There are many town and Government buildings to go up also, such as a town hall, etc. The town council will expropriate a great deal of property, on part of which a town hall will be built. On the mines also, a good deal of building is going on, to accommodate the

married people working on the properties. These houses are rented to the employees, and bring in a good interest on the money.

A novel scheme is to be tried on some of the mines. It is found that at times there is considerable scurvy amongst the Kaffirs. The mine doctors say that fresh vegetables will prevent this disease, so it is possible that some of the mines will go in for agriculture. Unused ground has been plowed up at some of the mines, and when spring comes, a good deal of seed will no doubt be sown. It is not yet decided how the scheme is to be run, but there is no doubt that more attention will be given to the food of the natives in the future.

Apart from the mines, this is not the place to speak of agriculture in general, but from the common talk one would think that the agricultural future of this country is an easy certainty. The people seem to forget the plagues from which South Africa suffers and the enormous amount of money that must be spent in irrigation schemes. The future of the land as a pastoral country is no doubt much more promising.

Allow me to close, not with a word of warning, but of friendly advice, as I did in a former letter to the JOURNAL. It is to say to the thousands who contemplate coming to South Africa to make their fortunes, to look well before they leap.

SHIPBUILDING IN THE UNITED STATES.

The *Cleveland Marine Review* says that that report of Mr. E. T. Chamberlain, United States commissioner of navigation, regarding ship building in the United States during the year ended June 30 shows that during the year 1,657 vessels of 473,981 gross tons were built and officially numbered, compared with 1,709 vessels of 489,616 tons for the previous fiscal year.

The decrease compared with last year is in sail vessels and canal boats, barges, etc. This year's new sail tonnage is 101,072 tons; last year's 128,099 tons. This year's new canal boats, barges, etc., aggregate 57,502 tons; last year's 88,331 tons. New steel steamers aggregate 275,479 tons, compared with 235,265 tons last year.

Included in the total new tonnage are 94 vessels, each of over 1,000 tons, aggregating 315,062 tons, or two-thirds of the output. Of this large construction 41 steel steamers of 158,631 tons were built on the great lakes. The lakes have built for ocean trade two West India fruit steamers of 1,820 tons each; one cargo steamer, of 2,182 tons, and two large cargo steamers of 5,270 tons each, cut in two to pass the Canadian canals.

The output of completed steel steamers on the seaboard has been much below the indications of last July. The launching of nearly every large steamer has been delayed from three to eight months, and some are still on the ways which by this time were to have been in operation. The delays have been partly due to the steel strike last summer, to the great demand for structural steel in all directions, to low ocean freights and the lack of new ship building orders, which has left builders and owners without motive for haste. Last July 255,000 tons of ocean steel steamers were under construction or under contract, while at present only about 160,000 tons are under construction and no new large seaboard contracts are reported.

The year's new steamers on the seaboard, however, include the transatlantic liner *Kronland*, 12,760 tons, the largest vessel ever built in this country; the Pacific Mail liner *Korea*, 11,276 tons, of 19 knots, the largest and fastest merchant steamer on the Pacific; *Shawmut* and *Tremont*, of 9,606 tons each, built for the opening trade with the Philippines, and *Alaskan*, 8,671 tons, for the New York-Hawaiian trade, the largest vessel ever launched into Pacific waters. Two steamers of 4,408 tons each have been added to and two more of 8,000 tons each are building for the steam fleet to Hawaii around Cape Horn. The remaining nine new ocean steamers of 1,000 tons or more are for local coasting trades.

RECENT DEVELOPMENT OF SOUTHERN COPPER DEPOSITS.

By WALTER HARVEY WEED, U. S. Geological Survey.

It is only in the past two years that investments of capital in southern copper lands, particularly in Virginia, North Carolina and Tennessee, have developed properties to the point where there is now an assurance that they will become important and constant producers. Practically no new deposits have been discovered in any of the Southern fields, but old and well known properties have been re-developed.

The Ducktown District.—The most productive copper deposits of the South have been those of the Appalachian Mountain belt, extending as the "Great Gossan Lead" through Virginia, showing in the famous Ducktown mines in Southeastern Tennessee and appearing in Georgia and Alabama. Though this lead was discovered in the early forties and was the scene of great mining activity while the rich black sulphide-oxide ores lasted, the Ducktown properties are the only ones worked in recent years. The "English" company of that place has for years maintained a steady output, and managed to make a profit even at the lowest prices paid for copper. About four years or so ago the titles to the other properties of the district were pooled and extensive diamond drill prospecting carried on by Dr. P. deP. Ricketts for the purpose of ascertaining the size of the ore bodies and the tenor of the ore. The results obtained being satisfactory, the Tennessee Copper Company was formed and mine development was systematically undertaken. Reduction works with a capacity of 2,000 tons of ore a day were erected and the long deserted district given a new lease of life.

The district is accessible by the Atlanta, Knoxville & Northern Railroad from Knoxville and Chattanooga, with spur lines to the mines. The copper deposits are capped by gossan, forming great beds of quite pure iron ore, large quantities of which are shipped to iron furnaces. The ores average about 3 per cent copper, occurring as copper pyrite in a matrix of pyrrhotite (monosulphide of iron), together with pyrite epidote, diopside quartz and other metamorphic minerals. Unlike the ore of the Virgilina and Gold Hill districts, these ores carry no gold and no silver.

The ore bodies are large and of uniform character, occurring as great lenses in soft metamorphic schists. The ore is generally sharply defined from the adjacent rocks, but low grade ores showing transitions also occur. Owing to the occurrence of the copper in pyrrhotite no wet concentration of the ore is practicable. It has been the custom to heap-roast the ore and smelt the product in a shaft furnace to a matte. Owing to the ferruginous nature of the roasted ore, silica from small quartz veins in the schists is added as a flux. Many of the pyritic ore-bodies consist of normal pyrite, but these have almost uniformly been too low in copper to warrant working. Although the Ducktown deposits are the only ones of the type at present worked there seems to be no reason why other localities where similar ores occur in large quantity and of equally good copper contents.

According to reliable reports the Tennessee Company has spent nearly \$3,000,000 on its plant and properties and the Ducktown Sulphur Copper and Iron Company, \$1,000,000. These two companies employ nearly 3,000 men. The last named treats from 280 to 300 tons of roasted ore daily, producing about 3,000,000 pounds of copper per year. The dividend was \$140,000 for 1900 and 1901. The cost of production has been estimated at 10 cents per pound of copper. The Tennessee Company, owning 13,157 acres, began work in July 1899, and 18 months later had 800,000 tons* of ore blocked out. The plant is very complete; the shaft houses contain crushers, rotary screens, and Robins picking belts, and have 500-ton bins, besides power and air compressor plants. Seven and one-half miles of standard gauge railway have been laid connecting the shafts, roast yards and smelter with the Atlanta, Knoxville &

Northern Railroad. The ore is roasted under sheds with a capacity of 83,000 tons. The smelter contains two water jacket blast furnaces 56 by 180 inches at tuyeres, and 18 feet from tuyeres to charging floor; two converter stands with six shells 7 feet in diameter and 10½ feet long, which are handled by a 40-ton electric crane with a 50-foot span. There are the usual accessories of electric slag cars, clay mills, etc. The power house has four 250-horsepower boilers, supplying two Nordberg engines. The estimated cost of production is 9 cents.

The Virgilina Copper Belt.—This district is situated on the State line between Virginia and North Carolina on one of the lines of the Southern Railway 160 miles west of Norfolk. Although known for 40 years or more, the lack of railroad facilities and the general disinclination of capitalists to invest in Southern mining properties retarded development and the region remained an area of forest land with scattered corn-fields until a very few years since. The investment of over a million dollars in the field in the past two years, together with the active opening up of its veins, erection of mining and milling plants, and the employment of several hundred people, has brought the region into prominence. The district is in a gently undulating country, the copper belt being 2 to 3 miles wide, and traceable from the banks of the Hyco River, 8 miles north of the State line, for some 20 miles or more southward. Active development has been confined to a radius of 8 miles from Virgilina, in which area there are now fourteen mines being operated, four of which may be classed as steady producers, while the others have as yet only shipped occasional lots of high grade ore. A rough estimate of the total shipments of ore in 1901 is 17,000 tons, but, as will be explained later, this is not a fair measure of the productiveness of the field, as the bulk of the ore, probably 95 per cent of it, must be concentrated and the only mill so far erected was not started until the past autumn.

The ores consist of copper glance and occasional bornite in a white quartz vein matter with admixed talcose altered country rock. The ores so far mined average about 3 per cent copper, but shoots of high grade ores (5 to 25 per cent) occur in all the veins so far opened. The ore is extremely siliceous and the lower grades are unfit for smelting without concentration, a fact which is now well recognized. The high grade ores are shipped directly to the New York works or to the Norfolk smelter. The gold and silver values vary but slightly in the different veins, the gold averaging less than \$1 per ton and the silver 6 to 10 ounces per ton in the ores shipped. The High Hill concentrator, working on an ore carrying 5.9 per cent copper, 2 ounces silver per ton and 0.04 ounces gold per ton, effects a concentration of 11 tons into one, the concentrates carrying 40 to 50 per cent copper, 0.24 ounces gold, and 20.3 ounces silver per ton. The shipping ore carries 4 to 5 per cent iron and 68 to 75 per cent silica.

The ores occur in a number of true fissure veins of remarkable regularity and persistence in length. The vein consists mainly of white quartz sometimes weathering out as low reefs standing above the level or gently sloping ground. The rocks are schists formed from volcanic rocks (andesites) by regional metamorphism. Occasional dikes of diabase also occur.

The veins show no gossan or iron hat and but small amounts of green carbonate and oxide ores. At the Blue Wing Mine the ore is mainly bornite—the copper-iron-sulphide, in a calcite gangue. The veins run north and south and dip east at 70 degrees.

Development work consists of shafts and drifts. The deepest working is that of the Holloway Mine, 510 feet deep, which goes down on a shoot of high grade glance ore. The Person Company has two shafts 150 feet and 225 feet deep respectively, and the High Hill (or Virginia Company) one of 231 feet and one of 339 feet depth. Numerous shafts 50 to 150 feet deep have been sunk on the other properties.

The mines are mostly equipped with steam hoists, and four of the companies have installed power plants and use air drills. The mining development follows well approved Western mining practice, with double compartment shafts. The veins being from 4 to 10 feet wide, the ore is extracted by ordinary overhand stoping using stulls.

The 2,000 or more feet of drifting in the High Hill property and the deep levels of the Holloway and Person mines show that the values persist in depth and are not merely superficial enrichments of the veins. The veins are continuous for long distances, and there are a considerable number of veins as yet undeveloped that lie parallel to those so far opened. The favorable labor conditions, cheap fuel, proximity to tide water and smelting plant, and railroad communication all indicate that the ore can be mined and milled at low cost.

The Gold Hill District.—At Gold Hill, North Carolina, important results have been achieved in the past two years. The properties of this district have yielded gold to the estimated value of \$3,500,000 from 1842 to 1893, and were shut down because the presence of copper made gold milling unprofitable. Early in 1899 the chief properties of the district were acquired by Mr. W. G. Newman, by whom they were transferred to the corporation which now owns them.

Gold Hill is situated on the Norwood branch of the Southern Railroad, 14 miles southeast of Salisbury, N. C., on the main line of the road. The mineral district is about 20 miles long and 1 mile or less wide, forming a low, nearly level topped ridge, that is a part of the Piedmont Plateau area. The productive veins do not form prominent outcrops, though sometimes barren portions containing much white quartz rise slightly above the general level. The ores consist of chalcopyrite (copper pyrite) in a gangue of quartz and decomposed schist. This mineral occurs in shoots of high grade ore and also disseminated through the vein stuff. The first class ore can be sorted up to 20 per cent or more. The low grade ore carries 1 to 5 per cent copper and is concentrated 10 into 1. The ore carries from 2 to 4 ounces of silver per ton and from 50 cents to \$2 in gold. Well defined fissure veins traverse the mineralized belt, their course being northeast and southwest and dip west. The upper portions of the veins contained much native copper, together with copper oxide and carbonate, passing into glance in depth and this to normal copper pyrite.

The mine development has proven that these veins have a great horizontal extent and that the ore goes down to the greatest depth yet reached, over 800 feet, the ore shoots so far developed extending from the surface to the bottom levels. Compared with the Virgilina deposits or those of the Rocky Mountain region the ores are less siliceous and as the ore mineral is chalcopyrite they are of course higher in iron. The quartz is very fine grained, gray in color and has a superficial resemblance to the gray schists which form the vein walls.

The district has been actively developed and the principal producer, the Union Copper Company, is equipped with a large plant. The concentrator can handle 250 tons per day and the smelter is equipped with the latest type of roasters and furnaces. It was blown in September 20, 1901, but the company closed its smelters in June and is now shipping concentrates instead of smelting on the ground.

Up to present date it is said that \$1,600,000 has been spent on the property. No. 3 shaft is 500 feet deep, and the ore on the dump is the result of development work.

In roasting, the former superintendent, Mr. Carl Henrich, sintered the ore, obtaining about one-third of the material as matte, the balance being in good shape for furnaces. The smelter contains two 40-ton furnaces. There are 12 shafts on the property, 3 of which are on the Big Copper Vein, which has been traced for a distance of 3,000 feet.

The Gold Hill Company has not yet begun mining in the old Randolph, but a 20-stamp mill has been

erected and all preparations made to treat the large body of ore blocked out in the mine in the days when it was worked as a gold mine.

The Whitney Reduction Company properties adjoin those of the Union Copper Company on the north. For two years past development work has been carried on and experimental runs made in the 10-stamp mill on the property. The mines are down to 500 feet and show that the vein carries free gold. The company will expend a large sum in the purchase of lands and in the erection of a power dam on the Yadkin River 14 miles from Gold Hill, where it will erect a 100-stamp mill.

MINING IN FRANCE.

CONSULAR REPORT.

A recent report of the Minister of Public Works to the President of the French Republic contains interesting information regarding the coal, iron, and other mining industries of France, a résumé of which is as follows:

Under the mining law of April 21, 1810, the prospecting for and the exploitation of mineral riches were left entirely to private parties, to whom concessions were granted by the Government. A concession being granted, the role of the Government was confined merely to the imposition of measures necessary for the preservation of the mine, the protection of the surface of the ground, and for securing the safety of the miners.

The execution of the law, modified by that of July 27, 1880, was left to the prefects of the Departments, assisted by the local mine inspectors, the central government merely having general supervision. Grave objections having been raised to the gratuitous granting of concessions, it is the present practice to ask bids for the concessions and to let them to the highest bidder, preference being given to the discoverer of the mine.

By the decree of 1848, the legal length of a day's work in the manufacturing and other industries was fixed at 12 hours. It was thought, however, notwithstanding the limitation of working hours prescribed in certain cases by the law of 1900, that the length of a day's work for those engaged in the extractive industries should be the subject of an investigation. For this purpose, a commission was appointed in June, 1901, by the Minister of Public Works, consisting of members of his Department and representatives from the mine proprietors and miners. The committee, assisted by the engineers of the corps of mines, made an extensive inquiry as to the number of working hours per day performed by the miners in the different mines throughout France and the conditions under which the work was done. The principal subjects investigated had reference to (1) The application of the double shift to miners of coal, and the possibility of its extension in order to increase the coal production; (2) The development of the preparatory work and first establishment of coal mines to increase the production; (3) The use and development of mechanical drills to increase the individual output and, thereby, the total production.

The results of the inquiry were discussed by the Chamber of Deputies and a bill was passed by that body, which was referred to the Senate, which is now investigating the subject.

According to the new law, the number of hours constituting a day's work in coal mines will, at the end of a certain number of years, be reduced to 8, with two transitory periods of two years each, during which the maximum length of a day's work would be 9 hours and 8½ hours, respectively; the length of the day's work to be counted from the last descent into the mines to the first ascent. The bill, as passed by the Chamber of Deputies, provides, under certain conditions, for the increase of the number of hours of a day's work, either for all the mines, or for a certain category only.

At the end of the year 1901, the number of mining concessions existing in France was 1,463, of which 643 were granted for the extraction of fuels, as will be seen in the following table, giving de-

tailed information concerning concessions for the past three years:

Mines.	1899.	1900.	1901.
Mineral fuels.....	637	640	643
Iron ore.....	335	342	343
Other metallic ores.....	320	323	329
Various substances.....	89	88	88
Rock salt.....	59	59	60
Total	1,440	1,452	1,463

The variation in the number of concessions from year to year is due not only to new concessions being granted, but also in a small proportion to the abandonment of former concessions, or to the consolidation of several concessions. In the above table it will be seen that the mining of mineral combustibles embraces a large proportion of the concessions granted.

Of the 178,894 workmen employed in all mines in 1900, 169,079, or 86 per cent, were engaged in mining coal and lignite.

The principal French coal basin, which is located in the Departments of Nord and Pas-de-Calais, produces 20,000,000 tons of the 33,000,000 tons mined in France annually, or about two-thirds of the total output. The extraction of coal in the Department of Nord remains practically stationary, while the production of the mines of the Pas-de-Calais is increasing at the rate of 650,000 tons annually.

The coal basin of St. Etienne, which comes third, is much less important than the above. Its output of 4,000,000 tons—about 12 per cent of the total production—does not show any marked increase. Then follow the basins of the Centre and of the Midi, which have a comparatively small output.

The production of iron ore in France is centered principally in three districts; that of the northeast, or the Meurthe-et-Moselle, is the most important, producing 4,500,000 tons of the 5,500,000 tons of iron ore mined in France, annually; that of the Pyrenées producing 250,000 tons; and that of Normandy, 150,000 tons. The latter may be said to be in its infancy. From its geographical position, its ores are generally sent to foreign countries, while the ores produced in the other districts are consumed by the metallurgical industries of France.

Of the other mines producing metallic ores may be mentioned those of Sain-Bel (Rhône), with an output of 300,000 tons of iron pyrites, and three lead and zinc mines of Malines (Gard), Sormettes (Var), and Pontpéaus (Ille-et-Vilaine), producing 28,000, 20,000, and 14,000 tons, respectively, of merchantable products (blende and galena).

The "various substances" mentioned in the table comprise bituminous schist, calcareous asphalt, sulphur, or marl impregnated with sulphur.

The extraction of rock salt for household purposes shows no increase, remaining stationary at 300,000 tons; for making soda, it ranges from 550,000 to 600,000 tons yearly.

In the following table are shown the coal consumption and production for the past five years, not including the exports of native coal, which amount to about 1,000,000 tons annually.

Year.	Total. Tons.	Increase or decrease over previous year.		Total. Tons.	Consumption.		Ratio between production and consumption.
		Tons.	Per cent.		Total. Tons.	Increase or decrease over previous year.		Per cent.
1897.....	41,850,000	+1,850,000	+4.4	30,800,000	+1,600,000	+5.5	73.6
1898.....	43,300,000	+1,450,000	+3.4	32,350,000	+1,550,000	+5.3	74.7
1899.....	45,200,000	+1,900,000	+4.3	32,150,000	- 500,000	-1.6	72.6
1900.....	48,800,000	+3,600,000	+7.9	33,400,000	+ 550,000	+1.6	68
1901.....	46,450,000	-2,350,000	-4.8	32,800,000	- 600,000	-1.8	70

From this table it will be seen that since 1898, with the exception of 1900—which was an abnormal year—the production of coal in France has not shown the normal annual increase.

The falling off in 1901 was due to the decreased demands caused by the unsatisfactory condition of the metallurgical industries of France and other European countries.

The period from 1899 to 1901 was one of the most favorable that the coal industry of France ever enjoyed. The prices went up slowly at first, but at the end of 1899 they rose rapidly until the autumn of 1900, when they commenced to fall again. The aver-

age rise was from 10 to 12 francs (\$1.93 to \$2.32) per metric ton, an increase of from 30 per cent to 120 per cent, according to the kind and quality of the coal. Run-of-mine Pas-de-Calais coal rose from 11 to 12 francs (\$2.12 to \$2.32) per metric ton to 23.50 francs (\$4.54), and afterwards fell to 15 francs (\$2.90), which is from 3 to 5 francs (58 to 96.5 cents) above the average normal price. The above-mentioned prices are those for which coal for immediate delivery was sold at the mine, or for which new contracts would be made; but, owing to old contracts for long periods entered into between the proprietors of mines and large consumers, the former did not receive all the benefits of the rise in price. It is estimated that the average price of coal in France during 1900 was 14.95 francs (\$2.885) per metric ton, or about 5 francs (96.5 cents) above the lowest market prices of 1896 and 1897. The average price in 1901 was not materially different from that of 1900.

The rise in the price of coal was attended by a corresponding increase in the wages of the miners. In the Departments of Nord and Pas de Calais this increase was 25 per cent, and in the center and south of France from 5 to 9 per cent.

The number of accidents in the coal mines of France was slightly increased during the past few years, but it is less than those in the mines of neighboring nations.

Of the 1,440 concessions existing in 1899, 808 were unexploited. The latter were divided as follows: Coal mines, 301; iron mines, 248; other metallic ores, 186; salt mines, 15; and various mines, 58.

CONSUMPTION OF PETROLEUM IN TURKEY.

According to a report from Consul T. H. Norton, at Harput, the use of petroleum is extending rapidly throughout Asia Minor, and is fast displacing all other methods of lighting. Russian petroleum is imported exclusively. The quality is so inferior to that of American petroleum that it would seem worth while for American exporters to make a determined effort to recapture the market, which formerly was largely in their control, despite the short distance to the oil-fields of Baku. The price of petroleum is now exceedingly low at the seaports of Turkey. It is rarely imported in barrels, the bulk of the trade being in tin cases containing 18 liters (4¾ gallons). The wholesale price of these cases on the coast is 8 piasters (32½ cents), or 6.8 cents per gallon. It retails at 10 piasters per case, or 8½ cents per gallon. The price of petroleum at such interior points as Harput is more than doubled by the cost of transportation. It retails at about 21 cents per gallon.

SCHOLARSHIPS IN MINING.—At a meeting of the Council of the Institution of Mining and Metallurgy in London, June 17, it was decided to offer scholarships in mining and metallurgy to the

following colleges: The Royal School of Mines, two scholarships of £50 each; King's College (London), £50; Camborne School of Mines (Cornwall), £50, and the Durham College of Science (Newcastle-on-Tyne), £50. These scholarships will be offered annually for three years. In addition to other work for the advancement of technical education in mining and metallurgy, the Institution has submitted to the Board of Education a comprehensive scheme for affording practical experience in workshops throughout the kingdom to mining and metallurgical students, and it is expected shortly to be put in force.

HENRY WILLIAMS.

From private correspondence, as well as from the Montana press, we receive tidings of the death at Butte, July 8, of Mr. Henry Williams, one of the most effective and important agents in the progress of American metallurgy and in the development of American mineral resources and industries—though, in proportion to his merit and work, one of the least advertized and the least notorious.

Mr. Williams was born August 30, 1840, in Truro, Cornwall. In youth he was practically employed as a miner; and, after a course at the Truro Miners' School, he studied at the famous academy of Clausthal in Germany. Returning to England, he spent several years in the employ of the ancient and celebrated house of Vivian & Sons, at Swansea, and was sent, as an ore-buyer for that house, to Mazatlan, on the western coast of Mexico. Returning to England, he formed a company to carry on the smelting of ores in Clear Creek County, Colorado, the chosen field of the Boston & Colorado Smelting Company, established by Prof. N. P. Hill, of Rhode Island, (afterwards senator from Colorado) whose

mined. So, in 1878, Mr. Williams was sent to Butte by the management of the Boston & Colorado Company, to report upon the prospective production of the district. Butte was not then accessible by railroad. He had to finish his journey thither and begin his return by stage. But the lack of the facilities for transportation, which he knew American enterprise would speedily provide if the permanent productivity of the district were made reasonably clear, did not affect his judgment. After spending several weeks at Butte, he returned to Colorado, and in the winter of 1878-79, as a result of his favorable report, the Colorado & Montana Smelting Company was organized. In this enterprise, Mr. Richard Pearce, the famous manager of the works at Black Hawk, and later at Argo, Colo., was an active partner. In the spring of the following year, the site of a previously unsuccessful smelter at Butte was purchased and the erection of new works was conducted by Mr. Williams with such vigor that in August, 1879, regular operations were begun, establishing for the first time a local market for the copper-silver ores of Butte.

the discharge of duty above all considerations of reward or temptations of personal advantage. The hardest thing I know of is to find a manager who is both competent and loyal. Many there are who know enough, but cannot be trusted. Many there are who mean well, but are no match for the conditions and the people they encounter. This man, who was to be relied upon, both intellectually and morally, has given an example already recognized, and worthy to be followed, by all who knew him.

R. W. RAYMOND.

EARNINGS OF BUTTE COPPER COMPANIES.

We give below the statements of earnings of the several copper companies in the Butte District controlled by the Amalgamated Copper Company. These returns are filed, in accordance with law, with the assessors of Silver Bow County, and are given for what they are worth. As the companies make no reports public it is impossible to judge the correctness of the figures. The statement is understood to give net earnings for the year ending June 1, and the table gives also the figures for the preceding year:

	1901.	1902.	Changes.
Anaconda	\$5,069,071	\$1,289,610	D. \$3,779,461
Boston & Montana	7,043,302	1,639,695	D. 5,403,607
Butte & Boston..	585,052	166,136	D. 419,916
Colorado Smelting	303,619	152,495	D. 151,124
Parrot	510,196	577,617	I. 67,421
Totals	\$13,512,240	\$3,825,553	D. \$9,686,687

If these figures are correct, or approximately so, they show a decrease of 71.7 per cent in the net earnings of these Butte properties. Our readers can form their own judgment.

PIG IRON PRODUCTION IN GERMANY.—

The output of the German blast furnaces in May is reported by the German Iron and Steel Union at 710,420 metric tons; which is 37,508 tons more than in April, and 33,646 tons more than in May, 1901. For the five months ending May 31 the total production was as follows:

	1901.	1902.	Changes.
Foundry iron.....	642,115	664,023	I. 21,908
Forge iron.....	617,566	497,762	D. 119,804
Bessemer pig.....	202,647	156,999	D. 46,548
Thomas (basic) pig.....	1,858,405	2,000,819	I. 142,414
Totals	3,320,733	3,318,703	D. 2,030

The total was very nearly equal to that for the corresponding period in 1901; but was still 49,637 tons below that for 1900.

BRITISH EXPORTS OF RAILS.—Exports of rails from the United Kingdom in May showed a substantial increase, having amounted to 59,961 tons, as compared with 40,695 tons in May, 1901, and 34,586 tons in May, 1900. This is probably due to the fact that American rolling mills are for the present so pressed with orders that they cannot undertake any fresh business. The aggregate shipments in the five months ending May 31 of this year were 215,590 tons, as compared with 178,667 tons in the corresponding period of 1901. The deliveries of British rails to British South Africa have been rather disappointing this year. The Indian demand has been good, and the same may be said of the Argentine; there has also been an inquiry for British rails in Mexico. The value of the rails exported from the United Kingdom to May 31 of this year was £1,209,421, as compared with £1,135,525 in the first five months of 1901, and £954,901 in the first five months of 1900.

SLAG CEMENT IN EUROPE.—A recent paper by Karl Stockl, quoted in *Le Genie Civil*, says that the manufacture of cement from blast furnace slag has made great progress. In France there are now ten factories making this cement; one of the important plants is that of the Societe des Ciments de Laitier de Donjeux, which produces 80 tons a day. There are 5 factories in Belgium, 2 in Luxembourg and 1 in Switzerland. In Germany there are 12 plants turning out about 150,000 tons yearly; in



HENRY WILLIAMS.

technical knowledge was backed by Eastern capital. As a consequence of competition with this strong concern, the enterprise inaugurated by Mr. Williams was abandoned in 1875, and he utilized his consequent vacation by returning to England and marrying the woman who remained his faithful and congenial companion through life.

But Mr. Hill was a keen observer of personal character, and notably ready to engage the services of those who had shown professional ability; and it was not long before he engaged Mr. Williams, his late competitor, to conduct at Alma, Colo., a branch of the Boston & Colorado works. In 1878, however, this branch was reduced to simple sampling works, the building of the South Park Railway having made it practicable, and more profitable, to ship ores from Alma and vicinity to the main works of the company, then at Black Hawk, Colo.

About this time the Black Hawk works began to receive from the Original and Gagnon mines, at Butte, Montana, considerable shipments of rich copper-silver ores. This was a phenomenon which so acute an observer as Prof. Hill could not expect to be permanent. Sooner or later, such ores would be reduced at or near the place where they were

The importance of this event, as a factor in the development and prosperity of the Butte District, can scarcely be over-estimated. It enabled the prospectors and operators of the region, by receiving timely returns from the ores extracted in the course of their development work, to carry on that work, even without additional capital, and thus to demonstrate the vast mineral wealth of the camp. Of course, this demonstration led to the establishment of other smelting-works, but those established by Mr. Williams kept pace, technically and economically, with these rivals.

Some two years ago, after several periods of invalidism due to his arduous and incessant labors, Mr. Williams finally resigned his position to Mr. R. F. Pearce, the son of his old friend and associate, Richard Pearce. He continued, however, to reside in the home which he had established when he first became a citizen of Butte—a modest house in full view of the furnaces he had created and loved, and furnished within to suit his simple, genial, hospitable tastes.

He died, as he had lived, a strong, honest, generous man, neither inviting nor shunning fair battle, taking just pride in thorough work, and placing

Austria 2 plants making 100,000 tons yearly. The paper recommends the granulation of slag by running it into cold water as it is drawn from the furnace. It studies the composition of basic slags, and describes the methods of cement making adopted in different countries.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

LIABILITIES WHEN THERE HAS BEEN WILFUL VIOLATION OF MINER'S ACT.—Where there has been a wilful violation of a statute the contributory negligence of the deceased will not bar recovery. The financial condition of one bringing an action under such a statute for damages for death by wrongful act is immaterial, and evidence regarding same should not be admitted. Where there is a wilful violation of a law, the true rule is that if the wilful violation "occasioned" the injury, then it is wholly immaterial whether the consequences of such violation, as it did in fact occur, could have been foreseen or not, nor whether the injury was directly or indirectly caused by such violation. It is sufficient if the violation of the statute is wilful, and that it did in fact occasion the injury.—*Willis Coal and Mining Company v. Grizzell* (100 *Appellate Court Reports*, 480); Appellate Court of Illinois.

WHEN LETTER CONSTITUTES CONTRACT FOR PRODUCT OF MINE.—Where the last of several letters which passed between operator and dealer as to the sale of coal containing a statement of the buyer's understanding of the seller's proposition as to quality and price, and an acceptance thereof, that letter, in the absence of any reply to same, bound the seller, if it furnished the coal, to do so on the terms stated in that letter.—*Excelsior Coal Mining Company v. Virginia Coal and Iron Company* (66 *Southwestern Reporter*, 373); Supreme Court of Kentucky.

WHAT INDICATES REPUDIATION OF CONTRACT.—Where a contract for delivery of a specific quantity of iron requires payment in installments on the delivery of each 100 tons, and the buyer, on demand being made for payment after delivery of the first installment, by letter replies "In regard to remitting, we will not remit for this lot until we get enough of the balance of the contract in our hands to know that we will receive the amount we have purchased. We will therefore thank you to rush forward the whole contract with the class of iron that is now here, and which will be satisfactory," such letter evidences an intention to repudiate the contract, justifying a rescission by the sellers.—*Johnson Forge Company v. Leonard* (51 *Atlantic Reporter*, 305); Supreme Court of Delaware.

DUTY ON CHARCOAL BAR-IRON.—There is no distinction between "bar-iron" provided for in paragraph 123, act of July 24, 1897, and "iron bars" provided for in paragraph 124, and such merchandise is not distinguished by any trade term or recognition. Held, therefore, that iron bars made by the charcoal process are included in the last proviso to paragraph 124, and are dutiable thereunder at the rate of \$12 per ton, and are not taken out of its operation by virtue of the provision for "bar-iron" in paragraph 123.—Appeal of *Wheelock & Co.* from Collector of Customs at New York; Board of General Appraisers.

MINERS WORKING UNDER RECEIVER ENTITLED TO A LIEN IN ILLINOIS.—A receiver of a coal mine, appointed at foreclosure sale, during the period of the equity of redemption, may operate the mine and employ miners, agreeing to pay them out of the earnings, and if they are insufficient such miners are entitled to a lien for their services, under the laws of Illinois (Illinois Session Laws, 1895, p. 242) pro-

tecting laborers and miners by giving them a lien for labor performed in working coal mines.—*Traylor v. Barry* (96 *Illinois Appellate Court Reporter*, 644); Appellate Court of Illinois.

EVIDENCE OF DEFECT NOT SUFFICIENT TO DEFEAT PLAINTIFF.—In an action by an employee for injuries due to the breaking of a pulley, the jury found, in answer to interrogatories, that the defect in the pulley could have been discovered by its general appearance; that the size, kind, and make of the pulley were obvious to any one looking down at it from the top of the shaft; that its general appearance would have indicated its insufficiency. The court of appeal held that this finding was not sufficient to show that the defect was so obvious that it could have been discovered by ordinary care on the part of the employee, so as to require that court to overrule a verdict in his favor.—*Indiana Bituminous Coal Company v. Buffey* (62 *Northeastern Reporter*, 279); Indiana Court of Appeals.

WHEN MINER WILL NOT ASSUME RISK OF CONTINUING AT WORK.—Where a miner directed his employer's attention to the fact that the place where he was at work was not in proper condition, and telling him he would quit unless it was made safe, and was told to get along the best he could and repairs would be made as soon as possible, such employee did not lose his right to recover for an injury resulting from such conditions by remaining at work after such promise to make repairs.—*Westville Coal Company v. Wood* (96 *Illinois Appellate Court Reporter*, 616); Appellate Court of Illinois.

WHEN ROYALTY WILL BE PAYABLE ONLY ON ORE MINED.—In an action on a mining lease, requiring the lessee to mine such quantities of a certain class of ore as should, at the royalty payable thereon, yield a stipulated sum, and in case it should not remove such quantities, to nevertheless pay such sum, and the mining company shows that it has continued its explorations with diligence and failed to discover sufficient deposits of that kind of ore in paying quantities, the lessor will not be entitled to anything beyond royalties on the ore actually mined.—*Hewitt Iron Mining Company v. Dessau Company* (89 *Northwestern Reporter*, 365); Supreme Court of Michigan.

ACTION FOR PURCHASE MONEY ON SALE OF MINING CLAIM.—A party contracted to sell to the assignor of another a mining claim, which he had located and to which he had made application for a patent, described in accordance with the survey of same made by the government surveyor. He deposited a deed in escrow, and agreed to prosecute his application and obtain a final receipt before the purchase money became payable. A portion of the claim as so surveyed overlapped a placer claim owned by the purchaser, and to which it afterwards received a patent. Thereafter it filed a protest against the issuance of the patent for such portion of said first entry, on the ground that there was no known lode or vein thereon at the time it was patented under the placer location. This issue was tried and decided by the Land Department in favor of the protestant, and the entry of the first party was held for cancellation as to such portion of his claim, which included about one-half its surface area. The court held that such determination was conclusive, and, since his contract was entire, and he could not give title to the land sold and described in the deed, he could not maintain an action for the purchase money. The fact that the other had contracted to purchase a mining claim from one, conditioned upon the obtaining of a patent for same, did not deprive him of his right to contest the allowance of such patent as to a portion of the claim which overlapped a prior claim owned by himself.—*Griffin v. American Gold Mining Company* (114 *Federal Reporter*, 887); United States Circuit Court of Appeals, Ninth Circuit.

BOILER-HOUSES, BLACKSMITH SHOPS, ETC., REAL ESTATE.—Boiler-houses, blacksmith shops, side tracks, stationary engines, and other appliances used in operating a mine are, when attached to, unquestionably a part of the realty, and as such a purchaser of the land upon which they are situated at a sheriff's sale under an execution against the mining company as owner, acquires an interest in them which may ripen into title if no redemption is made from the sale. The validity of the equity of redemption cannot be assailed collaterally in a proceeding in which the defendant in the execution or owner of the land sold is not a party.—*Off v. Finkenstein* (100 *Appellate Court Report*, 14); Appellate Court of Illinois.

RIGHT OF STOCKHOLDER TO OBTAIN CONTROL.—It is competent for a stockholder in a mining corporation to obtain control of a majority of the stock by purchase, and the validity of the transfer to such stockholder will not depend upon his motive or purpose in so acquiring it. But where the board of directors of a mining company, with the full concurrence of the majority stockholders, agree that one stockholder shall expend certain money in the development of its mine, and in return for same shall receive certain shares out of the treasury stock, and such contract is declared to be void, and the transfers of the shares is set aside, equity will require that the stockholder be reimbursed for all monies expended by him in good faith and pursuant to the contract for development. His lien for the same should be limited to the stock delivered to him pursuant to the contract.—*Jones v. Green* (88 *Northwestern Reporter*, 197); Supreme Court of Michigan.

DUTY ON LEAD IN BASE BULLION.—I. Base bullion in bars, containing gold, silver, lead, and small quantities of other metals, is not dutiable under paragraph 166, tariff act of 1894, covering "lead in pigs and bars, molten and old refuse lead run into blocks and bars, and old scrap lead fit only to be remanufactured," which includes only commercially pure lead; nor is it dutiable directly under paragraph 165 of said act, covering "lead ore and lead dross. . . . silver ores and all other ores containing lead," since it is not dross or an ore; but by virtue of the provisions of section 4 of said act it should be classified under said paragraph 165, at the rate of three-fourths of 1 cent per pound on the lead contained therein, being similar in material to the ores containing lead provided for in that paragraph.

2. In order to obtain the benefit of the similitude clause (section 4, tariff act of 1894), it is not necessary that the importer should expressly refer to it in his protest. It is sufficient if he claims the merchandise to be dutiable under the proper paragraph of the tariff act, without expressly invoking the aid of this particular provision.

3. Decision of Circuit Court of Appeals in *re Guggenheim Smelting Company* (112 *Federal Reports*, 517) followed in this case.—Appeal of *Balbach Smelting and Refining Company* from Collector of Customs at Newark, N. J.; Board of General Appraisers.

ABSTRACTS OF OFFICIAL REPORTS.

United States Cast Iron Pipe and Foundry Company.

The report of this company covers the year ending May 31, 1902. The capital account shows \$15,000,000 common stock; \$15,000,000 preferred stock; and \$1,587,500 bonds. The company holds \$5,347,555 stock unissued, among its assets.

The income account for the year is as follows:

Profits for the year.....	\$901,949
Improvements written off.....	\$117,287
Interest on bonds.....	77,415
Reserve fund, working capital.....	289,827
Dividends paid.....	246,063
Total charges.....	\$730,592
Balance.....	\$171,357
Surplus from preceding year.....	500,361
Surplus, June 1, 1902.....	\$671,718

The net earnings showed an increase of \$500,650 over those for the preceding year. The report gives no details of the company's operations.

Ymir Gold Mines, Limited, British Columbia.

This London company owns the Ymir Mine in British Columbia. The capital stock is £200,000 in £1 shares; this has been increased to £220,000 since the close of the year. The report covers the year ending December 31, 1901.

The total ore broken during the year was 70,640 tons, of which about 1,100 tons remained in the bins at the close of the year. The ore sent to mill was 69,540 tons, of which 69,505 tons were stamped and 35 tons sorted out and shipped as crude ore. The mill of 80 stamps ran 339 days 15 hours, crushing 69,505 tons; the average duty being 2.56 tons per

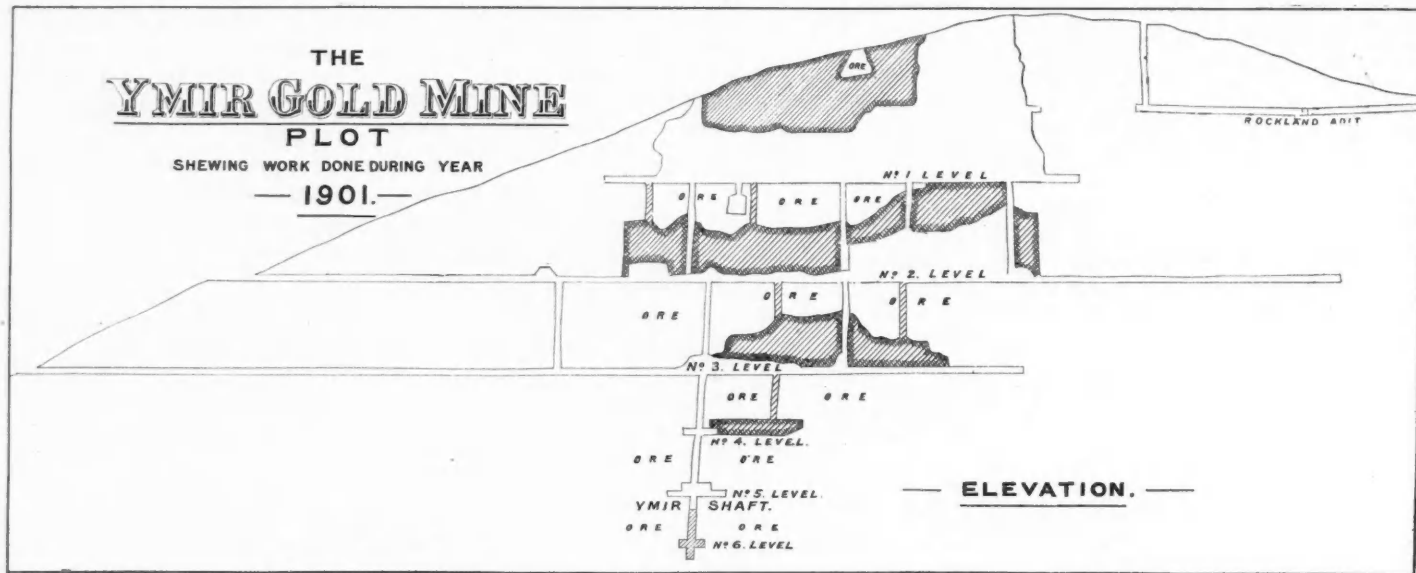
the contractor for all the iron work, consequent on strikes, and these delays have not only prevented an earlier completion of the plant, but considerably increased its cost. The next annual report, I trust, will show that the entire expenditure incident to the construction will have been defrayed, and that a profit will have been made on the operation."

The superintendent's report is accompanied by a map showing the work done in the mine, which is reproduced herewith.

The report as issued from the London office shows gross proceeds of ore, bullion, etc., £114,887; transfer fees, £87; total income, £114,974. The total costs in British Columbia were £64,424; depreciation, £3,579; London office, £1,729; total, £69,732, leaving a net balance of £45,742.

The directors' report says: "It will be seen from

738 feet, and the continuance of the vein has, by means of a tunnel about 2,150 feet long, been proved to the 1,000-foot level. At the point where the vein was cut, its width is 13 feet 6 inches. That the vein should show such strength at this level is extremely satisfactory, and as Mr. Fowler points out in his recent cable, he considers the pay shoot lies to the east of the present workings, higher values should be obtained by driving in that direction. Sufficient time has not elapsed for carrying out this work, therefore the average value of the ore at this level has not yet been ascertained. The policy of your board has always been directed to the introduction of every possible means for reducing the working expenses of the mine, and Mr. Fowler, in his report, recommends the carrying out of further works, which should have a very bene-



stamp per day of 24 hours. The total returns from this ore were as follows:

	Gold, oz.	Silver, oz.	Lead, lbs.	Value.
Bullion	18,658	12,620	.....	\$393,116
Concentrates	4,567	61,464	2,156,317	152,886
Crude ore sold	55	661	19,622	1,650
Cyanide	258	1,001	.....	5,888
Totals	23,538	75,746	2,175,939	\$553,540
Per ton	0.34	1.09	1.56%	\$7.96

The average net price received for lead was only \$1.65 per 100 pounds, against \$2.99 in 1900. The average received for silver was 58.6 cents per ounce, against 61.8 cents in 1900. The costs of operation for the year were as follows:

	Total.	Per ton.
Mining	\$126,159	\$1.8142
Milling	56,592	0.8138
Tramway	6,816	0.0979
Transport	14,959	0.2151
Office and management	10,395	0.1495
General and contingent	19,425	0.2793
Freight and smelting	73,893	1.0626
Totals	\$308,239	\$4.4324

The net balance was \$245,301, or \$3.53 per ton. The expenses per ton in 1900 were \$4.8402, showing a decrease last year of 40.78 cents, or 8.5 per cent.

Superintendent Samuel S. Fowler's report says: "A year ago we were constructing an experimental cyaniding plant under the direction of Mr. E. C. Holden, and the operation of this small installation of 10 tons daily capacity was in that gentleman's charge until its taking down a short time ago. During the period of operation 3,100 tons of tailings from the vanners were treated, and the actual recovery of metal sold averaged 0.083 ounce gold and 0.323 ounce silver per ton; a saving of about 84 per cent of the gold, and 30 per cent of the silver from material treated. The actual extraction was considerably higher, but the losses are accounted for principally by absorption in the material of wooden vats used, and the necessary crudity of an experimental plant. The general result of the work was such as to justify the board in authorizing us to proceed with the construction of a plant designed to treat all of the tailings from the stamp mill, and ground was broken for this about August 1 last. The plant is now practically complete and in operation. We have had to put up with several annoying delays on the part of

the accounts that after charging against revenue £2,346 for development, and writing off £3,579 for depreciation on machinery, etc., a net profit of £45,242 has been realized during 1901, which, added to the balance brought forward from the previous year's accounts, makes a total of £86,201 standing to the credit of profit and loss account. Of this amount £40,000 has been distributed to the shareholders in dividends during the year, £2,542 is absorbed in income tax and directors' commission, and the balance, amounting to £43,659, has been expended upon developments, machinery, and other capital expenditures.

"Reference to Mr. Fowler's report will show that during the year 69,505 tons of ore were treated, which, added to 35 tons of crude ore shipped direct to the smelters, produced a net average value of \$7.96 per ton, as against \$8.88 in 1900, thus showing a decrease of 92 cents per ton, of which 41 cents was due to the fall in the prices of silver and lead and 51 cents to the grade of the ore. It will be satisfactory to observe that this slight reduction in the grade of the ore treated has been practically offset by a saving in the working expenses in spite of the fact that the freight and smelting charges have been somewhat higher.

"As the small rich bodies of carbonate ore found in No. 1 level have now become exhausted, it follows that the average grade of the ore becomes somewhat reduced; our engineer, however, reports that it is probable that other rich bodies will be met with as the 4th and lower levels are opened up. Adopting a very conservative basis of calculation Mr. Fowler estimates the ore reserves actually opened up at the end of the year at 134,000 tons. Owing to the satisfactory results obtained from working the small cyanide plant the installation of a large plant sufficient for treating the whole of the tailings from the mill was proceeded with, and this plant commenced operations on March 6 last. At the end of the year the shaft had been sunk to a depth of 655 feet, and so far as the vein was then opened up, both value and width were quite satisfactory. Since then the shaft has reached a depth of

financial effect on the company's revenue. The directors consider that they are fully justified in carrying out these important recommendations now that the vein has been proved at a depth of 1,000 feet, and for this purpose they propose to increase the capital of the company by 20,000 shares. This additional capital will enable these and other economies to be effected without depriving the shareholders of the direct benefit of the profits as they are earned."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Western Australia, Statistical Register, Part IX. Compiled in the Registrar-General's Office, Perth, W. A.; Government Printer. Pages 40.

Maryland Geological Survey, Volume IV. William Bullock Clark, State Geologist. Baltimore; the Johns Hopkins Press. Pages, 524; illustrated.

China, Imperial Maritime Customs, Returns of Trade and Trade Reports for the Year 1900. Shanghai, China; published by order of the Inspector-General of Customs. Pages, 780.

The Saline Deposits of California. By Dr. Gilbert E. Bailey. Being Bulletin No. 24, California State Mining Bureau. San Francisco; issued by the State Mining Bureau. Pages, 216; with maps and illustrations. Price, 50 cents.

Record of the Mines of South Australia, Tarcoola and the Northwestern District. By H. Y. L. Brown, Government Geologist. Adelaide, South Australia; Government Printer. Pages, 32; with maps.

Transvaal Mines Department, Report of the Government Mining Engineer for the Six Months Ending December, 31, 1901. H. Weldon, Acting Government Mining Engineer. Pretoria, Transvaal; Government Printing Works. Pages, 56; with tables.

United States Geological Survey. Geologic Atlas of the United States. Austin Folio, Texas. Washington; Published by the Survey, 7 plates, with 9 pages text.

Information as to Mining in Rhodesia. 1902. London, England; compiled and published for the British South Africa Company. Pages, 466; with maps.

United States Geological Survey: Mineral Resources of the United States, 1901. Extracts. Aluminum and Bauxite. By Dr. Joseph Struthers. Pages, 10. *Arsenic.* By Dr. Joseph Struthers. Pages, 4. *Antimony.* By Dr. Joseph Struthers. Pages, 10. *Graphite.* By Dr. Joseph Struthers. Pages, 8. *Iron Ores.* By John Birkinbine. Pages, 34. *Titanium.* By W. O. Snelling. Pages, 14. Washington; Government Printing Office.

BOOKS REVIEWED.

Annual Report of the Director of the Mint of the United States for the Fiscal Year Ended June 30, 1901. George E. Roberts, Director. Washington; Government Printing Office. Pages, 436.

This report contains, as usual, a great deal of information valuable to financiers and economists. Besides the statistics of the United States Mint, there are reports from all the civilized and semi-civilized nations of the world, showing the movement of the precious metals, coinage of all kinds and other statistics on matters relating to monetary circulation and legislation. The reports of the United States Mint, in fact, are now accepted as authority in all financial centers, and are of undoubted value. Two articles of special interest in the present report are on "Money and Exchange in British India," and on "Banking and Finance in Japan;" the latter being an account of the development of the present coinage system, by Governor Yamamoto, of the Imperial Bank.

Electrical and Magnetic Calculations. By Prof. A. A. Atkinson, New York; the Van Nostrand Company. Pages, 320; illustrated. Price, \$1.50.

This book was prepared in the first place as an introduction to a course in electrical engineering, and the author undertook the work because he found nothing published covering the topics found desirable. Its object is well expressed in the preface as follows: "A multiplicity of wordy rules and unexplained constants arbitrarily set down burden the memory unnecessarily, are often unintelligible to the reader, and are at best clumsy tools with which to work. In the present volume, on the other hand, several processes are brought together, wherever possible, under a single broad principle, which is then expressed by means of a formula. The treatment in this respect aims to be educational. Through a step-by-step process principles and formulas are evolved from facts and principles already understood. After the law has been clearly developed, and has been given the most concise, easily remembered and convenient working form, the method of induction gives way to that of deduction. A series of examples are worked out, illustrating the application of the principle, and giving familiarity with its processes. At the end of the chapter are also lists of original problems for drill in the mastery of the principles and their application."

The lines thus laid down have been carried out very well throughout the book, which will be found very useful for electrical and other engineers, as well as for students.

Recovery Work After Pit Fires. By Robert Lamprecht. Translated from the German by Charles Salter. London; Scott, Greenwood & Company. New York; the D. Van Nostrand Company. Pages, 176; illustrated. Price, \$4.

The author of this book has for years made a special study of coal mine explosions and their

causes, and of the methods in use for the rescue and recovery work so often necessary after such accidents. His study and experience extended to other countries as well as Germany and Austria. He found that existing literature on the subject contained very little of practical service on rescue work, and for that reason has embodied in this volume the results of his studies and experience.

The book includes chapters on the Causes of Mine Fires; Preventive Regulations; Indications of Existing or Incipient Fires; Appliances for Working in Irrespirable Gases; Extinguishing Mine Fires; and Rescue Stations. There is also a supplementary chapter on the Spontaneous Ignition of Coal in Bulk. The chapters on the apparatus for use where a mine is full of deadly gases, and on the various methods which are used for extinguishing fires, are especially full of details and of directions for practical work. The author urges strongly the necessity that action in the case of mine fires—both for rescuing men and for limiting and extinguishing the fires—should be not only prompt, but also systematic. Work carried out on a suitable plan is of far greater value than any scattered and haphazard efforts can possibly be. The directions and suggestions given are illustrated by a number of examples cited from actual practice.

The book is well illustrated; but we regret to see that the publishers of the English edition have adopted the bad German practice of putting all the cuts on plates, which are bound in at the end of the volume; a method which is extremely annoying to the reader, and is a defect in a book otherwise well executed mechanically.

The book is one which deserves careful reading and has many excellent points. It ought to be very useful to managers and engineers of coal mines everywhere.

Gas and Coal-dust Firing. By Albert Pütsch. Translated from the German by Charles Salter. London; Scott, Greenwood & Company, New York; the D. Van Nostrand Company. Pages, 124; illustrated. Price, \$3.

This book is a critical review of the various appliances for gas and coal-dust firing and heat recuperation patented in Germany since 1885, being a supplement to the previous works on this subject by the same author which were published in 1880 and 1887. Herr Pütsch, who was a well known authority on this subject, died soon after the completion of this book, the publication of which was supervised by his assistant.

In the preparation of the present work the author adopted the method of summarizing the principal features of the new patent specifications, which he conceived, very properly we think, should show the progress in the art. We must confess, however, a feeling of disappointment in our perusal of the book because of the lack of any reference to some of the more important inventions and applications in gas firing during the last 10 years, which was not removed by the author's explanation, toward the end of the book, that "it is admittedly impossible to mention and describe all the patents taken out in connection with gas firing during recent years," and a selection having to be made the plan was adopted of referring "to only such forms of apparatus as exhibit a decided positive or negative importance." This system of exclusion does not, however, explain to us the omission of any reference to the well known Mond producer and its applications; or to the Siemens system of chemical regeneration, if we may so designate the method of blowing the producer with waste products of combustion, both of which have been patented and applied during the last 10 years.

The book cannot, in fact, be considered in any way a treatise on gas firing up to date, but it is a very pleasant essay upon what appears to us to be a more or less random selection of new patents, which may be read with interest, and perhaps with profit, by those who are already more or less familiar with the subject. The author writes in a critical

spirit and is very positive in his expressions of opinion, which for the most part appears to be sound, but not always. Thus, his remark at the conclusion of his description of the well known Taylor producer, drawn from the German patent specification, that "there is certainly no future in store for this apparatus" is rather amusing in view of the extent to which it is actually in use in the United States.

Mr. Salter's translation appears to have been very well done and the make-up of the book shows good taste on the part of the publishers, but the lettering on the engravings, which are evidently electrotypes from the German original, is very unsatisfactory and sometimes quite obscure. In this respect the publishers of the book might well have done better by its prospective readers.

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 MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

A New Metal From Idaho.

Sir:—I notice in the *Detroit News-Tribune* of July 6 an account of the finding of a new metal in the Waldo District of Idaho. I quote the following from the report:

"B. E. Meredith, manager and owner of the Meredith Hydraulic mines, on the Illinois River, in the Waldo district, Idaho, brought in a quantity of strange nuggets from his property. Mr. Meredith says they could save tons of it from their placers each season if the new metal was of value. The unknown metal has been given the name 'Josephineite,' from the fact that it is found only in Josephine County. In lustre and weight it resembles nickel. It also has the appearance of platinum, and may be one of the five groups of the latter metal.

"Eastern mineralogists have become interested in the unknown metal and are trying to identify it. If it prove of value, the Illinois River placers will become of much greater note, as the metal is found in them in great quantity on the serpentine bedrock."

This appears to be the metal I have been working on since last September and which I call "amarillium," from the deep orange solution it gives in dissolving the gold button that contains it. It is mistaken for platinum and is so reported by Eastern platinum men, but it attracted my attention first from the color of its solution and its solubility in nitric acid.

Also on throwing out the silver and then the amarillium with H₂S, the sulphide is easily reduced and melts to a button with soda on charcoal. This button is very hard, as it cuts steel, but it seems malleable or brittle, depending upon how it is made; perhaps it takes up carbon. It gives a deep blue, like cobalt in borax, when reduced, but is opaque in the reduction flame. As I had only 40 milligrams in all with which to make the tests, I did not care to publish the results until I could get more ore from the mines this summer.

I found it in a friable carbonate of copper ore from the Fraser Mines, Similkameen, B. C., September 27, 1901. I submitted the results to Dr. Drown, of Bethlehem, and Prof. Pettee, of Ann Arbor, and thought we would wait for some results before making it public.

W. M. COURTIS.

Detroit, Mich, July 6, 1902.

The Dry Crushing of Ore.

Sir: In your abstract, published July 5, of Mr. Philip Argall's paper on "Sampling and Dry Crushing" (which paper I have not read), I notice a statement which, I think, must be quoted erroneously or with the omission of some very important qualifying clauses, as this statement is in conflict with results of careful and long continued work. In discussing methods of ore sampling, you say that Mr. Argall "condemns unreservedly the antiquated method of quartering, and ably points out its likelihood of introducing errors. If the work must be done by hand, the method of fractional selection—that is, the reservation of shovelfuls at regular intervals when the pile of ore is being handled for other purposes—is not only more convenient, but also is far more accurate."

The method of sampling by quartering as practiced 30 odd years ago at the Auburn Mill, Reno, Nevada, and described in former numbers of your JOURNAL, was noted for its accuracy. This was a custom mill, and it was necessary to obtain correct results. I was there as assayer for nearly a year, and can vouch for the facts. For its own purposes the mill always used the quartering process. Oftentimes, when desired by customers, it also took (dry) battery samples. There never was any difference between the results. Ever since my stay at the mill I have sampled by the method there practiced, and I never have had reason to doubt its accuracy.

Mr. Argall gives correctly the rules which must be followed in order to obtain accurate results: (1) Take out at each cut a sufficient quantity; (2) always crush and thoroughly mix the ore between each cut. As, in quartering, about 25 per cent is taken at each cut, which is more than is usually taken by other methods; to this extent quartering is superior to other methods. The one objection to it is that it is cumbersome.

Sampling by the reservation of shovelfuls at regular intervals, as usually done within my knowledge, violates both of the above rules. It was long practiced on the Comstock, because it was thought necessary to go through a form of sampling, but the results were worthless.

I imagine, therefore, that your abstract does not quite correctly represent Mr. Argall's views on this subject.

A. D. HODGES, JR.

July 10, 1902.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.)

Natural Gas and Coal.—What are the relative heating values of natural gas and coal? They naturally vary with the quality of both the coal and gas, but I want to get the generally accepted heat values for production of steam, etc.—P. L. G.

Answer.—Some experiments made several years ago, and recorded in a report made to the Engineers' Club of Philadelphia, gave the following results: 1 pound anthracite coal evaporated 9.70 pounds water from and at 212 degrees F.; 1 pound good bituminous coal evaporated 10.14 pounds; 1 pound fuel oil, 16.48 pounds water; 1 cubic foot gas, 1.28 pounds water. The gas used was obtained in the distillation of petroleum, having about the same fuel value as natural gas.

Kent—Steam Boiler Economy, page 143—says: "Approximately, 30,000 cubic feet of natural gas has the heating power of one ton of coal." This means one ton of fair quality bituminous coal.

According to W. J. Taylor, the heat units in 1,000 cubic feet of natural gas are 1,100,000. The same authority puts 1,000 cubic feet of gas at 45.6 pounds.

By-Product Coke Ovens.—Can you state in your columns: (1) If the additional Otto coke ovens for the Lackawanna Iron and Steel Company, at Buffalo (from 564 to 1,000 ovens), are under erection? (2) If the 212 Schniewind coke ovens, at Sharon, Pa., are under erection? (3) If the Tidewater Steel Company, at Chester, Pa., has 60 Otto coke ovens in course of construction?—H. A. W.

Answer.—1. The Lackawanna Iron and Steel Company has now in course of construction the additional Otto coke ovens needed to bring its total number up to 1,000.

2. The Schniewind coke ovens at Sharon, Pa., are now in course of erection.

3. The Tidewater Steel Company, at Chester, Pa., is not at present building any Otto coke ovens.

Electrolytic Lead.—Can you tell me anything about the electrolytic process of treating lead which is in use at Niagara Falls? I believe the company is called the Electrical Lead Reduction Company.—C. T.

Answer.—Prof Hofman says, *Mineral Industry, Volume IX.*: "Theoretically the process consists of the electrolytic reduction from galena of spongy lead, which may be compressed into the form of storage battery plates or converted into litharge, red lead, lead peroxide or white lead; 100 pounds of spongy lead yielding respectively 108 pounds litharge, 110 pounds red lead, 116 pounds lead peroxide, or 125 pounds white lead. Sulphuric acid is a by-product, 800 pounds being produced per ton of lead. High-grade galena concentrates from Joplin, Mo., are treated, requiring five days for reduction to spongy lead. This, when washed and oxidized to litharge, yields a product of 99.36 per cent purity."

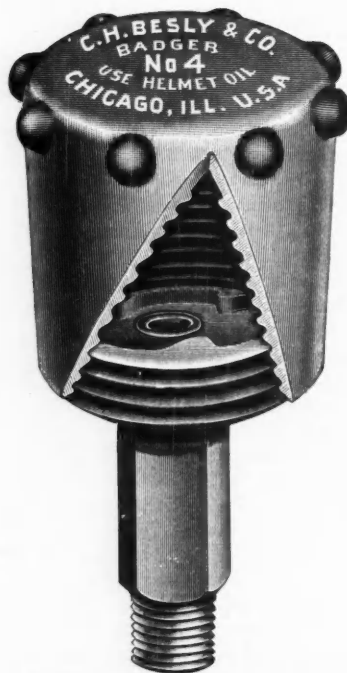
Manganese Ore Buyers.—Are there any companies outside of the Carnegie and the Illinois Steel companies which use manganese ore?—W. C. S.

Answer.—All the steel making companies use ferro-manganese and spiegeleisen, but not all of them use manganese ores, as they buy their ferro-manganese. The Cambria Steel Company, at Johnstown, Pa., and the Pennsylvania Steel Company, at Steelton, Pa., are possible buyers outside the companies you name. Both the Carnegie and the Illinois companies, we may add, are now included in the United States Steel Corporation.

A NEW GREASE CUP

A new double depth Badger grease cup made by Charles H. Besley & Co., 12 North Canal street, Chicago, is illustrated herewith. This cup is similar to the regular Badger cup, except that cap has double capacity and stem is made proportionately longer.

The Badger cup, which is made of cast iron, can be operated by hand or wrench. The manufacturers



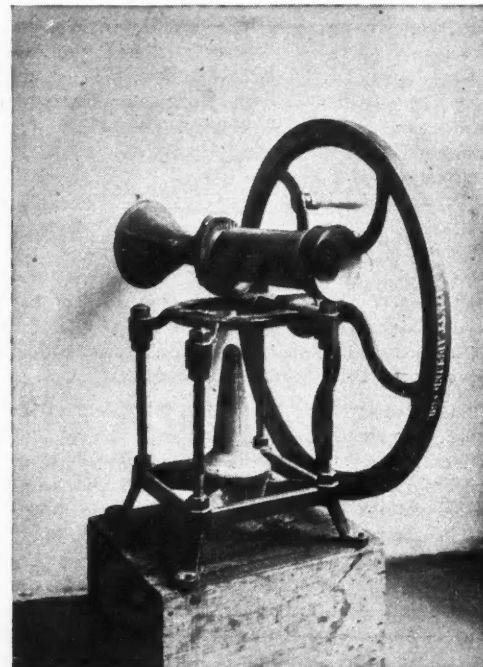
BESLEY'S NEW GREASE CUP.

state that the base has round thread and will not strip, clog, or cross, while the stem being made of bar steel, drilled and threaded, will not break off in oil hole. Further particulars regarding prices, etc., will be furnished by the manufacturers.

THE FORWARD QUARTZ MILL.

The accompanying illustration shows the general appearance of a hand-operated quartz mill designed especially for the use of the assayer and prospector. It is placed upon the market by Mr. W. L. Forward, of San Francisco, Cal., and Mr. J. F. Forward, of San

Diego, Cal. The mill is constructed in three sizes. No. 1, designed for assayers' use, weighs 95 pounds. Its cylinder is 2½ inches in diameter, inside measure. No. 2 has a cylinder 4 inches inside measure, and weighs 195 pounds. It is built especially for the prospector, and can be readily taken apart for convenience of transportation over rough country, the heaviest piece weighing 75 pounds. No. 3 is a combination mill, constructed for assayer, prospector and



FORWARD QUARTZ MILL.

mill man. It weighs 200 pounds. All of the mills can be easily opened and cleaned without disturbing the adjustment. The principal merits claimed for the Forward mills are their simplicity, efficiency and durability. Light weight and the fact that no more energy is needed than that required for an ordinary grindstone are also put forward as strong points in its favor.

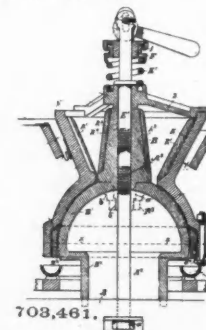
PATENTS RELATING TO MINING AND METALLURGY

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 receipt of 25 cents.

Week ending July 1, 1902.

703,424. ROTARY MIXER FOR CONCRETE, ETC.—William J. Judd, New York, N. Y., assignor to Frederick C. Austin, Chicago, Ill. A mixer for concrete and the like, comprising a rotary, tilting mixing-drum, having charging and discharge openings respectively at opposite ends and tapered toward its discharge-opening; and a series of straight, longitudinally-disposed flat blades projecting radially inward from the inner wall of the drum and arranged parallel or substantially parallel with the axis of said drum and extending substantially from end to end thereof, whereby the mixing of the material is effected when the drum is rotated, and the material permitted to slide freely toward the contracted discharge-opening when the drum is both rotated and tilted.



703,461.

703,461. ORE CRUSHER AND PULVERIZER.—Adolph J. Petter, San Francisco, Cal. The combination with a cone-shaped crushing-head, of means for securing the same to the base or platform of the machine, a spheroidal shell

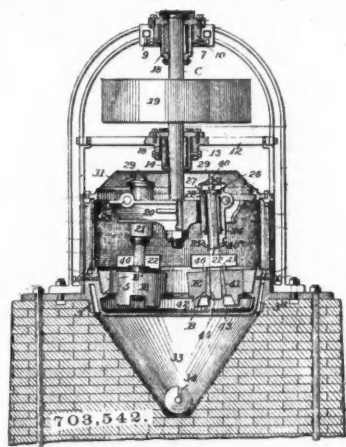
secured to and depending from the crushing-head, an inclined hopper surrounding the crushing-head, means by which a gyratory motion is imparted to said hopper, a spheroidal shell depending from the hopper, which shell surrounds and works upon the shell of the crushing-head, a die-ring having a smooth periphery secured to the inner face of the outer shell at its lower edge, and of devices for adjusting the die-ring.

703,512. COMPOSITION FOR RUBY GLASS.—Richard Zsigmondy Jena, Germany. A composition for ruby glass consisting of a barytiferous glass composition which contains as substantial metallic oxides soda and baryta and to which from 0.25 to 1.7 parts of gold are added for every ten thousand parts of quartz sand.

703,516. MINERAL COMPOUND.—McKenzie Arnn, Bristol, Va. A method of treating slag from furnaces, consisting of the addition to molten slag, of salt, lime, sulphuric acid, hydrochloric acid, coal-tar, pulverized mica, talc, kaolin, clay and water, the separating out of the lighter portion of the mass and the subsequent pulverizing of the compound thus formed after the same has become cold and the mixing with each 100 pounds of the pulverized mass thus produced of 5 pounds of coal-tar, 1 pound of sulphuric acid and 5 ounces of hydrochloric acid and the mixing of the same with ordinary cement in the proportion of 20 per cent of ordinary cement.

703,522. APPARATUS FOR IMPREGNATING WOOD.—John Borner, Rahway, N. J. 1. In an apparatus for the impregnation of wood, for the purposes of rendering it tenacious and resistible to pressure, or for fire-proofing or waterproofing the same, the combination, with means for supporting a log or beam which is to be impregnated, of means for forcing the impregnating mixture longitudinally through the said log or beam, consisting, essentially, of a funnel-shaped mixture-receiving device, having an outwardly-flaring and expandible delivery-throat into which a portion of the logs of different thicknesses may be placed, so that said throat encompasses said portion of the log and helps support the same.

703,542. PULVERIZER. John G. Clark, Atlanta, Ga. The combination with a radially-swinging shaft having a threaded end and a transverse slot and means for moving the shaft in a circular path, of a grinding-roll provided with a cen-



tral conical opening and a slot transverse the upper end of the opening, a sectional conical sleeve within the opening of the grinding-roll provided with a central threaded bore for the reception of the threaded end of the shaft, a key extending through the slots in the shaft and roll, and an annular grinding-ring with which the roll cooperates.

703,543. MANUFACTURE OF CRUCIBLE-STEEL.—Eben B. Clarke, Pittsburg, Pa., assignor to Firth Sterling Steel Company, a corporation of Pennsylvania. An improved process of making crucible-steel, which consists in first introducing the materials for making crucible-steel in the required predetermined proportions into a receptacle and melting them in contradistinction to treating the materials with oxidizing or metallurgical agents, whereby change in the proportions may be avoided, and then introducing the melted mass into a previously-heated crucible with carbon or other modifying substance and covering the crucible, and subjecting it to further heating for a limited time.

703,562. APPARATUS FOR BRICKING PULVERIZED MATERIAL. Thomas A. Edison, Llewellyn Park, N. J. An improved apparatus for bricking pulverized material, comprising a heater for heating the pulverized material, a mixer in which the heated pulverized material is admixed with a binding agent, a cooling device for reducing the temperature of such mixture, a bricking-machine for bricking the mixture, an oven for baking the finished briquets, and means connecting such devices for automatically progressing the material continuously through the apparatus.

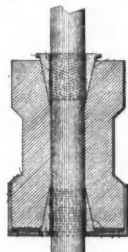
703,619. APPARATUS FOR GENERATING WATER-GAS.—Hugo Strache, Vienna, Austria-Hungary. In a gas-generating apparatus, the combination, with a horizontally-attenuated inclosure having a fuel-supply inlet and an outlet for the generated gas, of an inclined fuel-support and an evaporator, means for introducing into the inclosure the fluid to be evaporated, and a reticulated heat-storing

medium comprising a series of horizontally-extending tubes disposed longitudinally of said inclosure.

703,620. APPARATUS FOR ROLLING SHEET METAL.—Fritz O. Stromborg, Braddock, Pa. In a device for feeding sheets or packs to sheet-rolls, the combination of the rolls, and a conveyor extending from the rear of the rolls around to the front thereof and out of contact therewith, said conveyor having its ends in line with the same pass of the rolls and in position to receive the sheet or pack from, and feed the same to, said pass.

703,640. PROCESS OF MAKING ARTIFICIAL STONE AND FORMING ARTICLES THEREFROM.—George P. Chappell, New York. A process of producing cement, which consists in forming a mixture of oxide and chloride of magnesium, water and a filling material, and mixing such ingredients thoroughly and continuing the working of the pasty mass thereby formed until it acquires a putty-like consistency.

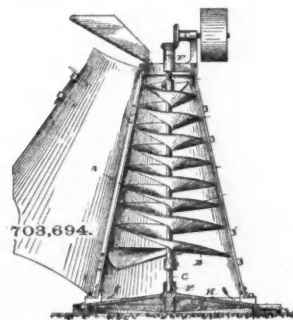
703,680. TAPPET FOR STAMP-MILLS.—James C. H. Vaught, Phillipsburg, Mont. The combination with a stamp-stem, and a tappet having a flaring opening, of a



703,680.

compressible conical or wedge-shaped sleeve provided with oppositely-disposed longitudinally-inclined ribs arranged to embed themselves in the stamp-stem and adapted when the sleeve is compressed, to feed the same inward to tighten the parts.

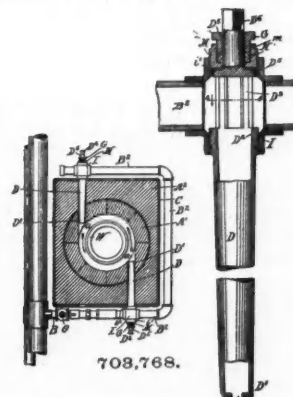
703,692. MANUFACTURE OF CARBONS FOR ARC-LAMPS.—Conrad R. Boehm, Charlottenburg, near Berlin, Germany. A process for manufacturing carbons for arc-lamps which consists in incorporating into the carbon besides other metallic salts an addition of magnetism fluoride not less in proportion to said salts than is defined by equal or equivalent molecular weights.



703,694.

703,694. AMALGAMATOR.—James V. Coleman, San Francisco, Cal. A conical casing, a conical spiral journaled vertically therein, the inner surface of the casing and the upper surface of the spiral being formed with amalgamating-surfaces, each portion of the periphery of the spiral being located interiorly of a vertical plane through the corresponding portion of the spiral below it and exteriorly of a vertical plane through the portion of the casing above it, said spiral having an unobstructed outer edge, and means for rotating the spiral upward toward the smaller end of the casing.

703,696. PROCESS OF UTILIZING CARBONIFEROUS COLLIERY WASTE.—Clemens Dorr, Cologne, Germany. A method of utilizing carboniferous colliery waste consisting in finely granulating such material, and adding thereto coal-slime, coal-dust, small coke and the like.



703,768.

703,768. FURNACE.—Philip Corrigan, Wakefield, N. Y. In a metallurgical apparatus, a furnace having a tangential passage *a* leading from the outside of the furnace-

wall to the interior space of the furnace and a supply-pipe arranged to bring gases under pressure, a burner adapted for being inserted and removed longitudinally of such passage, a screw-threaded portion on such burner, a stuffing-box on the exterior of the chamber, a further extension of the burner outward beyond the stuffing-box equipped to receive a wrench, and a chamber in such supply-pipe having a screw-threaded portion, a portion of the burner being open-work so as to constitute a strong extension of the burner across the chamber, but so liberally apertured as to freely admit the gas and air, such apparatus being adapted to allow the burner to be adjusted outward and inward and to be removed and replaced when required without disturbing the other parts.

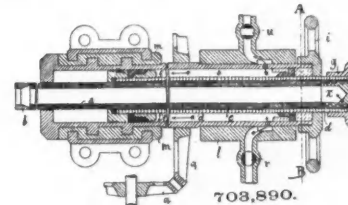
703,817. DREDGER.—Raymond A. Perry, San Francisco, Cal., assignor of one-half to Atlantic, Gulf & Pacific Company, New York, N. Y., and San Francisco, Cal., a corporation of West Virginia. In a dredger, an excavator, suction and conducting pipes and a supporting-float, a fixed point behind the float around which the dredger swings, slidable joints in the conducting-pipes, and means for advancing the excavator and float in any direction with relation to said point while cutting.

703,831. MINE-VENTILATOR.—Peter T. Reynolds, Butte, Mont. In a fluid-cooling device, the combination with a fluid-supply pipe and a cooling-mixture tank, of a rotatable tube passing through the interior of and passing through and journaled in the walls of said cooling-mixture tank, said tube within the interior of said tank provided with a series of sinuous bends in the same plane, one end of said tube communicating with said supply-pipe and the other end of said tube communicating with the atmosphere.

703,857. ELECTROMETALLURGICAL TREATMENT OF ZINC ORES AND ESPECIALLY BLENDE.—Constantin J. Tossizza, Paris, France. For the electrolysis of the sulphate and other salts of zinc, a process whereby a practical reduction of the voltage below 2.3 volts is obtained by the aid of sulphurous acid as a depolarizer, the said process being divided into two parts to avoid the decomposition of said sulphurous acid and consisting as to one part in the electrolysis of the zinc salt with corresponding solution of copper anodes and formation of copper salt, and as to the second part in the electrolytic reconstitution of the said copper anodes by decomposition of the so-formed copper salt in a solution preliminarily charged with sulphurous acid.

703,861. ELECTROLYTIC CELL AND ELECTRODE THEREFOR.—August A. Vogelsang, Dresden, Germany, assignor, by mesne assignments, to William Lewin, Nottingham, England. In an electrode, the combination of a series of supporting-bars, electrode-strips, covering the sides thereof, and conducting-strips integral with such electrode-strips and passing through said electrode between said bars.

703,890. ROCK-BORING MACHINE.—Josef Brejcha, Strasburg, and Eduard Schulte, Dusseldorf, Germany. In combination in a boring-machine, a boring-rod, a cylinder, a piston-head within the said cylinder, a piston-rod con-



703,890.

nected to the piston and within which the boring-rod is located and a connection between the hollow piston-rod and the boring-rod, said connection being detachable and outside the rear end of the cylinder.

703,901. APPARATUS FOR MAKING OIL-GAS.—Robert Dempster, Marietta, Ohio, assignor to Mary Dempster, Henry H. Burns, and Norman Morrow, Marietta, Ohio. A retort, means for heating the same, a perforated pipe centrally disposed within said retort, and forming a primary vaporizing-chamber, an oil-feeding device situated at one end of said pipe, and a second perforated pipe surrounding said primary vaporizing-chamber.

703,940. PROCESS OF THE FUSION OF METALS.—Hermann A. E. Menne, Creuzthal, Germany, assignor to Coln-Musener Bergwerks Actien Verein, Creuzthal, Westphalia, Germany. A process of effecting the fusion of hardened masses, particularly the residues or slag in furnaces, which consists in supplying a jet of gas under pressure to said masses, said jet containing sufficient oxygen to burn the components of said mass and being of such a high pressure as to remove the molten masses out of the pit formed by said masses when melted.

703,943. GAS-PRODUCING APPARATUS.—John H. Miller, Jr. In a gas-producer, the combination with the main structure including the vertical walls thereof, a vertically-disposed generating-chamber, a valved stack therefor, and means for feeding vaporized oil into the said vertical chamber; of the horizontal chamber, consisting of a metal shell erdwise slidable and detachably supported in the vertical walls of the main structure, said shell having an intake in communication with the generating-chamber, a closure-cap for one end of said shell, and an extension for the other end, provided with a valved draft flue or stack and gaseous outlet.

AMERICAN COAL AND FRENCH MARKET.

CONSULAR REPORT.

The fact that much of the fuel used in France has to be imported, at an exceedingly high price, has led the French to make minute calculations of the relative value of the various combustibles they employ. In some localities, there is a strong conservatism which opposes the use of any product unknown in a practical way. The result is that American coal has been looked upon with more or less suspicion and many unfavorable prejudices have been created (1) by first appearances, due to the ignorance of our exporters as to the needs of the French market; (2) by analyses which, theoretically, showed a too small percentage of carbon and too much volatile matter, judging from experience with European coals.

It has been found in practice, however, that to some degree appearances were deceptive and the theory incorrect, as shown by the opinions of seven persons as to the quality of American coal. These persons are either highly connected with railway lines or with large manufacturing concerns which have burned American coal. The first claimed that it was inferior in calorific force, as compared with newly mined South Wales coal; the second, that he found the combustion in the grates of his factory too rapid; the third, that the lumps fell to pieces when touched by the stoker (he admitted that his men may not have made the most of it, as they were not accustomed to such coal); the fourth declared that the coal was too friable; the fifth stated that for locomotives, other conditions being equal, there was no noticeable difference between the samples of American coal tried by him and the best Cardiff; the sixth was persuaded that this coal could easily replace the best Welsh; while the seventh person had learned that American fine coal was worth 10 per cent more than Cardiff "menu," because it did not run to fine dust when broken, but consisted largely of particles the size of pease.

The French classification of coal used here is as follows:

(1) "Tout venant" ("run-of-mine" or "through and through"). To the French purchaser, the signification is not the same as to the American seller; it means here coal that contains not more than 30 per cent of fine.

(2) "Menu" (fine coal), which contains 30 per cent of lumps. The rest consists of dust and particles small enough to pass through a mesh of 25 millimeters (0.98 inch).

American coal, on its arrival in France, has usually been so badly broken as to contain as high as 85 per cent of fine. This places our coal on a par with Cardiff menu, so far as the proportion of lumps is concerned.

The prices are determined by classification and quality. As the general opinion of the railroads is that the quality is of the best, there remains only the question of classification. One railroad officer writes me that "the price should not exceed at any time that of Cardiff coal quality being equal."

If American mine owners are content to sell their coals as menu in France, they can easily secure the market, but the buying price is low. One railroad official tells me that his company recently purchased 115,000 tons of menu at 15.50 francs (\$2.99) the ton, delivered in cars alongside and duty—1.30 francs (25 cents)—paid by the sellers. These people could have paid 17 francs (\$3.28) for American menu under the same conditions.

Should our exporters wish to sell coal with 70 per cent large, they may be governed in price by the current value of best Cardiff.

The following conditions will usually fulfill the requirement of any French railway contract:

Water	per cent.	1
Volatile matter:		
Minimum	do.	18
Maximum	do.	24
Ash	do.	9
Caloric force (minimum)	calories.	8,000

As to consistency, the coal should contain on delivery at destination not more than 30 per cent menu, it being understood that all that passes

through a sieve with holes 25 millimeters (0.98 inch) in diameter in menu.

Cardiff coal fulfilling the above conditions has recently been sold here, duty paid by the sellers, delivered on cars alongside, for 21.40 francs (\$4.13) the ton of 2,205 pounds.

The uses of bituminous coal in France should also serve as a guide to the American exporter. For domestic purposes, the coal should not be too friable, as the necessary handling produces much dust and consequent loss; neither should it be too bituminous, on account of the smell and smoke.

For the manufacture of gas, the requirements are practically the same as in the United States, except, perhaps, that more stress is laid on the necessity for a large amount of coke. Large quantities of coal are consumed in factories in this part of France. Two important consumers say that under existing conditions American coal is worth about 10 per cent less than the best Cardiff. How far this deficiency in value may be due to grates adapted to burning a coal with a greater per cent of carbon and of a slower combustion than the American coal tried here, is a question which it may pay our exporters to investigate.

PERSONAL.

Mr. R. H. Foster, of Salt Lake, Utah, has gone to British Columbia to inspect his mining interests.

Mr. Eugene Ruig is now superintending the operations for the Nugget Gulch Mining Company at Nugget Gulch, Mont.

Prof. J. F. Kemp, of Columbia University, New York City, was in Bingham, Park City and other Utah camps last week.

Mr. C. L. Dignowity, who was prominent in Utah mining operations a few years ago, has been spending a few days in Salt Lake, Utah.

Dr. John H. Tucker, who served the Germania Smelter near Salt Lake, Utah, for 8 years as its superintendent, is seriously ill.

Mr. Fritz Grimm, one of the engineers of the Schalker Huettten und Gruben Verein of Gelsenkirchen, Westphalia, is now in this country.

Mr. Titus Ulke has resigned his position as consulting chemical engineer for the Consolidated Lake Superior Company, of Sault Sainte Marie, Ont.

Mr. E. McCormick, of Lordsburg, N. M., recently returned from a trip to Nevada, where he went to examine property for Eastern capital.

Mr. G. P. Goodier, of the Oro Verde Mining Company, operating at Yankee in Clear Creek County, Colo., is making a business visit to the East.

Mr. Peter Morgensen, engineer of the Monterey, Mexico, plant of the American Smelting and Refining Company, is on a 5 months' trip to Europe.

Mr. C. B. Hill, president of the Pacific Consolidated Mining Company, of Pyramid Lake, Nev., recently went to New York City to return in September.

Mr. W. A. Polkinghorn, president of the new Leadville Home Mining Company, at Leadville, Colo., has returned from a 3 months' trip to California.

Mr. W. A. Dinker, of Pittsburg, Pa., has resigned as general purchasing agent of the Pittsburg Coal Company. His successor has not been appointed.

Mr. E. W. Williams, of Denver, Colo., who is interested in mines in Gilpin and Clear Creek counties, Colo., is on a two months' trip to Wales and England.

Mr. W. J. Blade is now superintendent of the Cripple Creek & Idaho Springs Mining Company's property, the French Flag Mine, Idaho Springs, Colo.

Mr. D. G. MacNeill, formerly of Salt Lake, Utah, has returned from a 9 months' absence in Guanajuato, Mex., where he is carrying on extensive operations.

Mr. William Roberts, consulting engineer of the Colorado-Carr Company, Limited, arrived from London, Eng., last week at the properties in Gilpin County, Colo.

Mr. Miles Finlen, of Butte, Mont., with Messrs. H. M. Ryan and J. M. Nusbaum, of Chicago, Ill., has been investigating some mining property in Gallatin County, Mont.

Mr. George R. Nicky, manager of the Britania Mine in Butte, Mont., has returned from Wisconsin, where he went about a month ago to confer with some of the owners.

Mr. R. L. Edwards, general manager of the Kittie Burton Gold Mines Company, of Lemhi County, Idaho, has gone to the Lake Superior region of Michigan on a brief visit.

Mr. J. Stanley James, the English engineer for the Caucasus Copper Company, spent several days last

week inspecting smelters near Salt Lake, Utah, going thence to Butte, Mont.

Prof. S. F. Emmons and his assistant, Mr. Irving, is at Leadville, Colo., where he will complete the geological investigations he began last year. He will remain several months.

Mr. C. P. Collins, of Bradford, Pa., has been in Encampment, Wyo., where he is interested in the North American Copper Company, which purchased the smelter at Encampment.

Mr. L. A. Powelson, of New York City, assistant general sales agent of the Lehigh & Wilkesbarre Coal Company, who has been laid up with typhoid fever for over a month, is much better.

Messrs. Kyle, Lyons, Samuels, Summers and Skanson, of Chicago, Ill., and Boston, Mass., have been in Gilpin County, Colo., for the past week looking at mining property in which they are interested.

Mr. H. M. Whitney, of Boston, Mass., for many years associated with the Dominion Coal Company, and the Dominion Iron and Steel Company, of Sydney, N. S., has returned from a 6 months' trip to Europe.

Mr. Robert J. Coleman, of Salt Lake, Utah, of the Newhouse engineering forces, has obtained a leave of absence to go to Mexico and attend to mining interests in the State of Oaxaca for the next three months.

Mr. John Hays Hammond has accepted an appointment as a professor at the Sheffield Scientific School, Yale University. It is stated that he will have charge of the practical part of the course in mining engineering.

Mr. Don H. Bacon, president of the Tennessee Coal, Iron and Railroad Company, has returned to New York City after a visit of a few weeks to Birmingham, Ala., where he inspected the properties of the company.

Mr. Robert J. Coleman, who has been long manager of the interests of Mr. Samuel Newhouse, in Utah, Colorado and Montana, is going to Mexico on a protracted stay. His address will be Hotel Jardin, Mexico City.

Mr. F. von Petersdorf, mining engineer, who has been spending about 3 months in England, Germany and France, has returned to the United States. He will be in New York City for several weeks before going to California.

Mr. P. C. Rieckey, auditor for the Republic Iron and Steel Company in the Southern District, has resigned. His successor has not been named as yet. Mr. Rieckey has left Birmingham, Ala., and will locate either in Chicago or New York City.

Mr. H. M. Dieffenbach, who for 10 years past has been general manager of No. 3 smelter at Monterey, Mex., has accepted the position of general representative of the American Smelting and Refining Company, in the City of Mexico, and has left for his new post.

Col. Nicholas Treweek, of Salt Lake, Utah, has opened offices in Boston, Mass., as headquarters for various companies, of which he is president, among which are the Lucky Boy Gold Mining Company, of Custer, Idaho; the Big Cottonwood Copper and Gold Mining Company, near Park City, Utah, and the Wabash Mining Company, of Park City.

Mr. R. H. Corbett is to take active charge of the interests of the Nordberg Manufacturing Company, of Milwaukee, Wis., in the Lake Superior copper regions. The Nordberg Company now has under way a vast amount of work for copper country mines. Mr. Corbett has been with the American Smelting and Refining Company at El Paso, Texas, for some time.

Mr. D. M. Forker, secretary and treasurer of the Republic Iron and Steel Company for the Southern District, has tendered his resignation effective August 1, and will remove from Birmingham, Ala., to New York City. Mr. Forker was interested with Mr. W. H. Hassinger and others in the organization of the company which in 1887 erected the Alabama rolling mills in Gate City, near Birmingham, which were absorbed by the Republic Company. His successor has not been named.

Mr. T. R. Jones, who has served the American Smelting and Refining Company at Salt Lake, Utah, as local manager, will retire on August 1 to seek relaxation from a most active career. For 20 years he has been identified with the smelting of ores in the Salt Lake Valley, and his retirement is regretted. He had charge of the Germania Smelter, built by Carl Eilers, when it reposed back in 1882. Mr. Charles W. Whitley will succeed Mr. Jones. He comes from the company's plant at East Helena, Mont., and is an experienced smelter man.

Mr. John J. Broughall, for many years the Western manager for the Mine and Smelter Supply Company, of Denver, Colo., has resigned his position with that company to accept one with the Daly-Judge Mining Company, of Park City, Utah, as consulting engineer. Mr. Broughall has had wide and varied experience, and the Daly-Judge Company is to be con-

gratulated in obtaining his personal services in its management. Mr. Broughall is one of the largest stockholders in this company and in the Pride of the West Copper Company, of Washington.

Mr. James B. Gallagher has been appointed superintendent of the Colorado Company's smelter in Butte, Mont., to fill the position made vacant by the promotion of Mr. Richard F. Pearce, who was sent to New York City to take charge of the company's interests. Mr. Gallagher has been identified with the mining and smelting industry in Montana for many years. When the new Washoe Smelter in Anaconda went into commission a few months ago he was placed in charge of one of the departments of the huge works. Prior to assuming the responsibilities of that place, he had charge of Marcus Daly's mines in Copperopolis, Mont.

Governor Miguel R. Otero, of New Mexico, has appointed these delegates to the International Mining Congress: A. R. Gibson, Santa Fe; C. T. Brown, Socorro; C. R. Lutson, Silver City; Jefferson Reynolds, Las Vegas; J. C. Rutherford, Stein Pass; A. B. Fitch, Magdalena; J. L. Terry, Chloride; Mrs. L. F. Pearson, Hillsboro; J. W. Fleming, Silver City; Joseph E. Sheridan, Silver City; W. H. H. Llewellyn, Las Cruces; A. B. Fall, Las Cruces; H. B. Ferguson, Albuquerque; Thomas H. Jenks, Bland; A. H. Hilton, San Antonio; J. C. Carrera, Las Cruces; Jay Turley, Santa Fe; A. W. Gifford, Lordsburg; R. G. Head, East Las Vegas; C. M. Myer, Socorro.

The following delegates to the International Mining Congress at Butte, Mont., have been appointed from West Virginia: Prof. I. C. White, Morgantown; Maj. W. N. Paige, Ansted; T. E. Houston, Elkhorn; Dr. G. A. Newlon, Buckhannon; L. E. Tierney, Elkhorn; T. L. Henritze, Welche; Thomas H. Coopers, Cooper; Enoch Carver, J. E. Dana, James W. Paul, Fred Paul Grosscup, all of Charleston; A. J. Ruckman, Monongah; F. S. Landstreet, Davis; Samuel Dixon, Macon; J. B. Jenkins, Parsons; W. N. H. Toler, East Bank; B. D. Spilman and F. E. Mallory, Parkersburg; Clyde D. Hutchinson, C. M. Watson and A. J. Stone, Fairmount; A. D. Hemmings, Raymond City; W. W. Shock, Rowlesburg; J. W. Dawson, Mammoth; O. Tibbetts, Piedmont; Col. T. B. Davis, Keyser; A. J. Bonnafield, Tunnelton; R. L. Sommerville, Farmington; Philip Goodwill, Goodwill.

Governor Hunt, of Idaho, has named the following delegates to the International Mining Congress at Butte: M. H. Jacobs and M. Alexander, Boise; Charles P. Diehl, Idaho Falls; M. F. Whitman, Montpelier; Dr. O. B. Steele and J. H. Bradley,ocatello; Capt. Rupert Winters, Idaho City; William H. Watt, Hailey; Robert Bell, Challis; J. J. Story, Albion; Thomas Taylor, Elba; William H. Dewey, Nampa; Arthur Davis, Atlanta; Thomas E. Bassett, Rexburg; A. F. Parker, Grangeville; Warren Helm, Warrens; Mrs. N. K. McClure, Rathdrum; Clem King, Coeur d'Alene; Prof. A. S. Miller, Moscow; Phil Shenon and R. W. McBride, Salmon City; George W. Fritz, Shoshone; W. P. Hurlburt and Judge R. S. Anderson, Lewistown; L. L. Evans, Malad; Peter Larsen, Mullan; J. R. Sovereign, Wallace; Thomas H. Davery, De Lamar; Ellis H. Beebe, Silver City, and Lewis Hall, Weiser.

OBITUARY.

Dr. Daniel J. Runkle, formerly president of the Massachusetts Institute of Technology, died of heart disease at Mount Desert, Me., on July 9, aged 79 years.

SOCIETIES AND TECHNICAL SCHOOLS.

COLUMBIA UNIVERSITY.—A party of students from the School of Mines has been inspecting mines and metallurgical plants in Utah under the direction of Prof. J. F. Kemp.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—At the recent meeting at Pittsburg, Pa., George Westinghouse was elected an honorary fellow. Prof. Ira Remsen, president of Johns Hopkins University, Baltimore, Md., was elected president of the association for the ensuing year, and H. B. Ward, of the University of Nebraska, general secretary.

INDUSTRIAL NOTES.

The Lunkenheimer Company has recently purchased a large number of Westinghouse induction motors for the equipment of its new works at Cincinnati, O.

The Buffalo Forge Company, of Buffalo, N. Y., is to furnish the American Trading Company, of New York City, an induced draft plant, to be shipped to British Guiana.

The Laramie, Wyo., cement plaster works have been sold to S. A. Walker, of the Acme Cement Company, of St. Louis, Mo., for \$14,000. Mr. Walker says the company will spend at least \$50,000 in improvements.

At the annual meeting of Virginia-Carolina Chemical Company the retiring board of directors was re-elected. At the meeting 86,945 shares of preferred and 229,964 shares of common stock, making a total of 316,909 shares, were represented.

The St. Louis Pneumatic Tube Works, of Jefferson City, Mo., has been incorporated with \$50,000 capital for the purpose of operating a plant for the manufacture of pneumatic tubes. W. E. Clarke, R. W. Morrell, R. A. Jones, D. W. Voyles and M. W. Oliver are the incorporators.

The South African commission house of Leaycraft & Company, with offices in New York City, has placed a contract with Westinghouse, Church, Kerr & Company, for 2 compound engines of 330-h. p. each. These engines are to be used for driving a general power plant in the mines of the Indwe Coal and Land Company, Cape Colony.

Cass Harkins, of Columbus, O., manufacturers' agent and consulting engineer, who has been in business in Columbus, for a number of years has been appointed sole agent for Central Ohio for the We-Fu-Go and Scaife water softening and purifying systems, manufactured by Wm. B. Scaife & Sons Company, of Pittsburg, Pa.

The Ironsides Company, Columbus, O., reports a substantial increase of business during its fiscal year recently ended, with encouraging prospects for continued growth in this year. Its manufactures comprise special lubricants for ropes, gears and machinery, not only to protect against wear, but also to resist the corrosive action common in mining operations.

The Illinois Glass Company has recently purchased an extensive electrical equipment from the Westinghouse Electric and Manufacturing Company to be used for operating the machine, blacksmith and mould shops, blowers, etc. It includes a 250 kw., 2-phase, 440 volt, 60 cycle belted generator, 20 Type C induction motors, 38 Type O. D. transformers and arc and incandescent lamps.

The new plant of the Holthoff Machinery Company, at Cudahy, Wis., started active operation July 1, and is expected to have all machines ready and in operation in a few days. Special attention has been given to the boiler shop, as the company intends to build an internal fired boiler with Morison corrugated furnace, as well as heavy tank work of all kinds. The company says that it has a large number of orders on hand.

At a recent meeting of the stockholders of the Bessemer Limestone Company, in Pittsburg, Pa., the following officers were elected: President, J. G. Butler, Jr.; general manager, Charles M. Crook; secretary and treasurer, C. S. Crook. Charles Crook, formerly secretary and treasurer, is now general manager. The old board of directors were re-elected, as follows: J. G. Butler, Jr., C. R. Hubbard, W. B. Schiller, H. H. Stambaugh and J. D. Du Bois.

The International Foundry Company has been chartered at Trenton, N. J., with an authorized capital of \$5,000,000. The specific object of the company is to acquire and develop certain patents and secret processes invented by Charles Szekely, of New York, for casting iron in permanent molds. The incorporators are Claude S. Stillman, of Newark; Nathan Videver, Nathan Boehm and Charles Szekely, of New York City, and Frederick Parsons, of Tarrytown, N. Y. The registered office is in Jersey City.

The Big Savage Fire Brick Company has leased from the Borden Mining Company 200 acres of clay land at Allegheny Mine, one mile below Frostburg, Md., and will erect at once a plant with a daily capacity of 25,000 bricks. The company will also mine coal for its own use. It will employ about 100 hands. The officers are: President, Davison Armstrong; vice-president, Harry E. Weber; general manager, John N. Benson; secretary and treasurer, Davison A. Benson; executive committee, John N. Benson, Davison Armstrong, Harry E. Weber, Howard H. Dickey and E. P. McKenna.

The Pelton Water Wheel Company, of San Francisco, Cal., has just received an order for a 200-h. p. water wheel to operate under 106 ft. head, from the Pacific Portland Cement Company, of Spokane, Wash. The Pelton Company also recently closed a large contract with the Spanish Cement Mills of Barcelona, Spain, for a large pipe line and a number of water wheels to furnish all the power required to run the cement plant. To install this pipe line and power station will be quite a feat of engineering on account of the inaccessibility of the location and the rough mountainous country.

The American Concentrator Company, of Joplin, Mo., reports among recent orders taken and now being shipped: 14 New Century drop motion jigs, for washing bituminous coal, to the Link-Belt Machinery Company, of Chicago, Ill.; one 3-compartment New Century jig to Larson & Greenough for the Morning Mill, at Mullan, Idaho; a 2-compartment jig for the Bismarck-Nugget Gulch Mining Company, Sheridan, Mont.; 4 3-compartment New Century jigs to the Gouveneur Lead and Garnet Com-

pany, Gouveneur, N. Y.; a New Century ore feeder to the Rambler-Cariboo Mines, Kaslo, B. C.

Owing to the greatly increased demand for its output, the Sturtevant Mill Company, of Boston, Mass., manufacturing rock crushing, grinding and screening machinery, has greatly enlarged its plant. These thoroughly modern works include a large Green engine, the latest high speed lathes, boring mills, planers, shapers, etc. The equipped wood working shop is exclusively adapted to the manufacture of toggle screens, the demand for which has increased so rapidly that the new works are just beginning to fill orders secured in the early spring. By the middle of summer, the Sturtevant Mill Company will be able to make quick deliveries on nearly all its products. One of the novel features of this plant is its sampling department. The company has found that working tests on varying material often save a great expense to prospective purchasers, as the exact results thus attained assure the buyer just what each machine will do when working for him. This plant is seldom out of use and the company's patrons are cordially invited to make use of it.

The Denver Engineering Works, of Denver, Colo., has under construction a 10-stamp mill for R. B. Pratt, to be erected at Thomasville, Colo.; also a 40-stamp mill for the Penobscot Mining Company, of Deadwood, S. Dak. Electric hoists under construction are as follows: Three 2-h. p. hoists, 2 5-h. p. hoists, 2 hoists of 10,000 lbs. capacity, and 2 150-h. p. hoists for the Penoles Mine, in Old Mexico; a 135-h. p. hoist for the Utah Fuel Company; a 50-h. p. hoist for the Kendall Gold Mining Company, Kendall, Mont.; a special 50 h. p. hoist for the Montana Coal and Coke Company, Harr, Mont.; a 50-h. p. hoist for the Northern Pacific Railroad Company; a 5-h. p. hoist for Hendrie & Bolthoff; a 5-h. p. hoist for the Mine and Smelter Supply Company; a 100-h. p. endless cable, electrically driven, winding engine, for the Anaconda Copper Mining Company. The Denver Engineering Works also has an order for 300 tons of special castings for the Colorado Fuel and Iron Company, and an order for 30,000 lbs. of castings for a new rolling mill. The company has also recently shipped a set of 16 by 36 spring rolls and 2 sets of new type 14 by 27 rigid rolls to the Columbus Skein and Iron Works, Columbus, O.; a complete mine timber framing plant, comprising timber framer, slab saw, wedge saw, swing cut-off saw, and automatic saw sharpening machines, to the Allis-Chalmers Company, Chicago; a 25-h. p. electric hoist to the Candelaria Mining Company, Mexico; a 15-h. p. electric hoist to Harron, Rickard & McCone, San Francisco; 2 sets of riveted steel jackets to the Bingham Copper and Gold Mining Company, Utah; 30 special butterfly valves to the United States Mining Company, Utah; a 4 by 6 and a 9 by 10 steam hoist to Van Voorhiss y Sanford, Mexico; a 5 and a 7.5-h. p. hoist to Parral, Mex.; a 3-h. p. induction motor to the Gold King Consolidated Mines Company, Silverton, Colo.; 3 8-ft. flat rope sheaves for 4 in. and 5 in. ropes to the American Bridge Company; a 135-h. p. electric hoist to the Commodore Mining Company, Creede, Colo.

TRADE CATALOGUES.

The Denver Engineering Works, of Denver, Colo., announces that in about 2 weeks it will have ready for distribution its new electric hoist bulletin of 30 pages, fully illustrated, containing construction drawings of all the company's standard hoists. The company's new electric rock drill bulletin will be ready for distribution about August 1.

The Joseph Dixon Crucible Company, of Jersey City, N. J., is sending to its friends souvenir cards containing some fine half-tone cuts of railway bridges, viaducts, manufacturing plants and office buildings. In these structures the cards state Dixon's silicate graphite paint has been used as protective coating for the iron and steel work. The company says that a good painter and a good paint are needed to save steel work from corrosion. The durability records show that silica-graphite paint protects steel bridges and viaducts from corrosion for 5 to 15 years; iron and tin roofs from 5 to 10 years, and steel smokestacks from 1 to 5 years. The souvenir mailing cards referred to will be sent upon request to the Joseph Dixon Company.

GENERAL MINING NEWS.

Mineral Oil Exports.—In June the United States exported 15,054,676 gals. crude oil, 2,136,601 gals. naphtha, 69,734,232 gals. illuminating, 5,112,893 gals. lubricating and paraffin, and 3,972,610 gals. residuum; total, 96,011,012 gals., against 84,372,345 gals. in the same month last year, showing an increase of 11,638,667 gals. In the 6 months ending June 30 the total exports were 519,666,312 gals., as against 493,626,837 gals. in the corresponding period last year, showing an increase of 25,939,475 gals., or about 5 per cent, principally in illuminating oil.

Chesapeake & Ohio Railway Company.—Shipments in the 11 months ending May 31 are reported as follows, in short tons:

	Coal.	Coke.
New River.....	3,891,658	355,806
Kanawha.....	1,243,779	94,944
Kentucky.....	125,139	.....
Total.....	5,260,576	450,810
Total, 1901.....	4,587,471	340,677
Increase, 1902.....	663,105	101,133
From connections, 1902.....	29,616	3,207
From connections, 1901.....	63,616	13,754
Decrease, 1902.....	34,000	10,547

The increase in this year's shipments is credited chiefly to heavier Eastern buying.

Consolidated Oil and Mining Company.—A deal involving oil and mining property in Kentucky and Indiana is reported closed at Shelbyville, Ind., by F. B. Sandusky, of Mt. Sterling, Ky. The deal is the first move in a consolidation of the Sandusky and Moore holdings in Kentucky and the property of the Lowe Oil and Mining Company, in Grant County, Indiana. Under the articles of agreement, the new enterprise will be known as the Consolidated Oil and Mining Company of Kentucky and Indiana, and will be capitalized at \$1,000,000. The business offices of the company will be moved to Mt. Sterling and placed in charge of F. B. Sandusky, who is vice-president and general manager of the company. The officers of the company are: James E. Cantrill, Georgetown, Ky., president; F. B. Sandusky, Mt. Sterling, Ky., vice-president and general manager; Peter G. Kamp, Shelbyville, Ind., secretary and treasurer. The directors are: James E. Cantrill, Georgetown, Ky.; E. M. Dickson, Paris, Ky.; F. B. Sandusky, Mt. Sterling, Ky.; Kelly Moore, North Middleton, Ky.; Peter G. Kamp, A. J. Thurston, W. A. Yearling and Charles W. Chaney, Shelbyville, Ind. The company's holdings in Kentucky are said to include 11,000 acres of timber, mineral and oil lands in Bath, Menifee, Powell, Montgomery, Nicholas, Bourbon and Morgan counties. In Indiana the company has several tracts in Grant County in proven territory.

Field Work of the United States Geological Survey for the Season 1902.

Assignments of Geologic and Paleontologic Parties.

The following assignments of geologic and paleontologic parties of the United States Geological Survey have been made for the present field season:

Pacific Coast.—Dr. J. C. Branner will continue areal surveys on the Santa Cruz quadrangle, California.

Mr. J. S. Diller will complete the areal and economic survey of the Redding quadrangle, California, and make a reconnaissance of the Klamath Mountains. He will be assisted by Dr. Geo. B. Richardson.

Dr. Geo. F. Becker will continue the supervision of the Division of Physical and Chemical Research, and the preparation of a report embodying his investigations on the conditions of gold deposition in the Mother Lode of California.

Dr. T. W. Stanton will continue a general supervision of the paleontologic work of the Survey, and will carry on field work in co-operation with Mr. J. S. Diller in the Klamath Mountains of California.

Mr. Geo. H. Eldridge, who has recently completed a study of the oil fields of California, will devote the coming year to the preparation of a report on this subject and on the phosphate deposits of Florida.

Dr. Geo. Otis Smith will continue areal surveys necessary for the preparation of the Snoqualmie folio, Washington. On the completion of his field season in the Cascade Mountains he will survey the Bluehill quadrangle, Maine. He will be assisted by Mr. Frank C. Calkins.

Rocky Mountain Region.—Mr. J. M. Boutwell and Dr. J. D. Irving will study the mining geology of the Park City district, Utah.

Prof. T. C. Chamberlin will continue the supervision of investigations in Pleistocene geology of the United States. He will be assisted by Prof. R. D. Salisbury and Mr. W. W. Atwood in the Rocky Mountain region, by Mr. Frank Leverett and Mr. F. W. Taylor in Michigan and by Mr. W. C. Alden in Wisconsin.

Mr. S. F. Emmons will continue the supervision of investigations in the Division of Metalliferous Minerals, visiting various mining regions in the west for the purpose of examining work in progress and preparing plans for future work. He will be assisted by Dr. J. D. Irving in the completion of work on the Leadville mining district.

Dr. N. M. Fenneman will continue the investigation of the Boulder oil field, Colorado.

Mr. Arnold Hague will continue the preparation of his monograph on the Yellowstone National Park and will visit the Park for the purpose of obtaining necessary additional information.

Dr. T. A. Jaggar will complete the areal work nec-

essary for the preparation of the Boston folio, and will prepare a report on the Bradshaw district, Arizona. He will be assisted by Dr. Chas. Palache and Mr. Laurence La Forge.

Prof. Wilbur C. Knight will continue the areal and economic surveys necessary for the completion of the Laramie folio, Wyoming.

Dr. F. H. Knowlton will devote the year to the completion of reports on the fossil floras of the Puget and Laramie formations.

Mr. Waldemar Lindgren has recently returned from a winter field season in Arizona, and will spend the greater part of the coming year in the preparation of reports.

Prof. H. F. Osborn will continue his investigations on vertebrate paleontology, and under his supervision special examinations will be made of the stratigraphy of the Colorado Jurassic by Mr. F. B. Loomis, and of the Bridger, Washakie and Uinta basins, Wyoming, by Mr. W. B. Matthew and Mr. Walter Granger, for the purpose of determining the exact stratigraphic position of beds from which fossil collections have heretofore been made.

Dr. F. L. Ransome is at present engaged in the preparation of his report on the Globe, Arizona, mining district. Later in the season he will carry on areal and economic surveys for the preparation of the Bisbee folio, Arizona, and for a report on the Bisbee mining district. Dr. J. Morgan Clements will be associated with him in this work.

Dr. A. C. Spencer will study the areal and economic geology of the Grand Encampment mining district, Wyoming. He will be assisted by Prof. J. Volney Lewis.

Mr. W. H. Weed will revisit Montana for the purpose of securing additional information required for the completion of his report on the Butte mining district.

Mr. Bailey Willis will continue the supervision of the investigation in areal and stratigraphic geology. He will visit field parties in various parts of the United States and will investigate the stratigraphy along the eastern base of the Rocky Mountains in Montana and Wyoming.

The Southwest.—Dr. George I. Adams will make an areal and economic survey of the Yellville quadrangle in Arkansas, with special reference to the preparation of a report on the Arkansas lead and zinc district. He will be assisted by Prof. A. H. Purdue and Mr. Ernest F. Burchard.

Dr. Geo. H. Girty will investigate the paleontology and stratigraphy in connection with the work of various geologists in Arkansas, Indian Territory, Texas, and elsewhere.

Mr. R. T. Hill will continue his investigation of the economic geology, stratigraphy, physiography and vulcanism in the Trans-Pecos region of Texas, New Mexico and Arizona. Dr. Girty will be associated with him in this work.

Mr. J. A. Taff will continue his areal and economic surveys in Indian Territory. He will be assisted by Prof. S. W. Beyer and Mr. J. W. Beede.

The Northwest.—Mr. N. H. Darton will continue areal surveys in the Black Hills and the Big Horn Mountains, and will complete a reconnaissance of the Great Plains for the preparation of a map showing the geology and water resources of that region. He will be assisted by Mr. C. A. Fisher.

Northern and Eastern States.—Mr. M. R. Campbell will continue the supervision of areal and economic work in New York, Pennsylvania, Ohio, Indiana, Kentucky and West Virginia. He will be assisted by Messrs. Charles Butts, Lester H. Woolsey, Ralph W. Stone and Marcus Goldman, in Pennsylvania; by Mr. Myron L. Fuller, in New York and Indiana, and by Profs. Geo. H. Ashley and L. C. Glenn, in Kentucky.

Prof. T. Nelson Dale will continue his surveys in Western Vermont, and will survey the Slatington quadrangle in Eastern Pennsylvania. He will be assisted by Prof. Frederick B. Peck and Mr. Fred H. Moffit.

Prof. B. K. Emerson will continue his investigations on areal and structural geology in Central Massachusetts.

Prof. J. F. Kemp will complete the field work necessary for the preparation of the Mettawee folio in New York and Vermont.

Prof. Chas. S. Prosser will continue areal work necessary for the preparation of the Columbus folio, Ohio. He will be assisted by Mr. E. R. Cumings.

Mr. Geo. W. Stose will continue in charge of the editing of geologic maps and will spend a short field season in the continuation of work on the Chambersburg quadrangle, Pennsylvania.

Prof. C. R. VanHise will continue the supervision of investigations on the pre-Cambrian and metamorphic rocks of the United States. He will visit various parties in the field for the purpose of verifying and co-ordinating work in his division. He will be assisted by Mr. C. K. Leith in the preparational of a final monograph on the Lake Superior region, by Dr. W. S. Bayley in the completion of field work in the Menominee district, by Dr. W. H. Hobbs in the continuation of surveys in Connecticut and

Rhode Island, by Dr. Florence Bascom in the continuation of areal and structural studies in the Philadelphia district.

Mr. David White will continue his investigations on the paleo-botany of the Carboniferous, working in co-operation with various geologists in West Virginia, Ohio, Pennsylvania and Indian Territory.

Prof. Henry S. Williams will continue his studies on the co-relation problems of the Devonian in Pennsylvania, New York and Maine. He will be assisted by Mr. E. M. Kindle.

Prof. J. E. Wolff will continue the investigation of the areal and structural geology in the crystalline areas of New Jersey and Southern Vermont.

Southern States.—Prof. W. B. Clark, with assistants, will continue the investigations of the geology of the Coastal Plain region in Maryland and Delaware, and of the Piedmont plateau of Maryland in co-operation with the Geological Survey of Maryland.

Dr. William H. Dall will continue his studies for the completion of the revision of the Tertiary faunas of Florida.

Dr. C. W. Hayes will continue the supervision of investigations on non-metalliferous economic deposits, and will continue areal work in the southern Appalachians. He will be assisted by Mr. W. T. Griswold in the Eastern Ohio oil field, and by Mr. Edwin C. Eckel in Alabama and Georgia.

Mr. Arthur Keith will continue areal, structural and economic surveys in the Southern Appalachians. He will be assisted by Mr. H. S. Gale.

Dr. W. S. Tangier Smith will be associated with Mr. E. O. Ulrich during the early part of the season in the study of the lead, zinc and fluorspar deposits of Western Kentucky, and later will continue his investigation of the lead and zinc deposits of the Joplin district. He will be assisted by Dr. C. E. Siebenhal.

Mr. E. O. Ulrich will study the geology of the Western Kentucky mining district in connection with Dr. Tangier Smith's investigation of the mineral deposits. Later in the season Mr. Ulrich will be associated with Dr. Adams in Arkansas and Mr. Taff in Indian Territory.

Mr. T. Wayland Vaughn has recently returned from field work in Southern Louisiana, Alabama, Georgia and Florida. He will be engaged throughout the greater part of the coming year in the preparation of a monograph on the fossil corals of the United States.

Alaska.—Four parties, under the supervision of Mr. Alfred H. Brooks, are now carrying on geologic work in Alaska. The first, in charge of Mr. Alfred H. Brooks, geologist, with Mr. D. L. Raeburn as topographer, and five camp hands, is exploring the northern slopes of the Alaskan Range, having for its more especial aim a geologic and topographic reconnaissance of the region. This party expects to obtain important information concerning Mount McKinley, said to be the highest mountain on the continent, which lies in the heart of the Alaskan Range and whose base has not yet been reached. The party hopes to cross the Tanana River at the mouth of the Cantwell and to investigate the Tanana and Birch Creek gold districts, reaching the Yukon at Circle City, thus obtaining a chance to examine the important and little known gold fields on the lower Tanana.

Mr. Arthur J. Collier, geologist, accompanied by two men, will start at the international boundary and carefully study the coal deposits of the Yukon section as far as the delta, visiting also some of the placer camps accessible from the river, which have not yet been investigated.

The copper deposits of the Chitina River, a tributary of the Copper, have excited a great deal of interest among miners and capitalists. There have been many parties outfitted to prospect this region, and some preliminary development has been made. Prospecting has also been done in a second copper belt in the northern part of the Copper River and in the upper Tanana and White River basins. These two belts are to be the subject of special investigation during the coming season. The Chistochina gold fields, also included in the Copper River basin, have become important producers of placer gold. A survey of their entire area is contemplated. The surveys of the Copper River basin will also throw a good deal of light on the proposed railway route from Valdes to the Yukon River, and they will cover large areas which are believed to have value for stock raising and for cultivation.

The work in this region has been divided. One party, in charge of Mr. F. C. Schrader, geologist, with Mr. D. C. Witherspoon, topographer, will map the upper Copper River basin and adjacent portions of the Tanana basin, giving special attention to the upper northern belt; the other party, in charge of Mr. T. C. Gerdine, topographer, with Mr. Walter C. Mendenhall, geologist, will map the Chistochina gold fields and will give attention to the southern copper belt.

In addition, Mr. W. J. Peters, topographer, will make a map of the Juneau mining district as a base

for future detailed geologic studies. The Juneau district is the most important in all Alaska, containing, as it does, the famous Treadwell mine.

Hawaiian Islands.—Dr. Whitman Cross will suspend his regular field work in Colorado for the present season and will spend a portion of the year in the Hawaiian Islands for the purpose of investigating volcanic phenomena.

Mr. G. K. Gilbert does not expect to carry on any field work, but will be engaged throughout the year in the preparation of reports.

Prof. Lester F. Ward will continue the preparation of reports on the Mesozoic floras of the United States.

FOREST RESERVES.

Mr. Henry Gannett, in charge of the examination of forest reserves, will examine forest reserves in Utah and will visit the different parties working in the field under his direction.

Mr. Arthur Dodwell will complete the examination of the San Francisco Mountain Reserve of Arizona and will continue work to the southward and eastward in the Black Mesa Forest Reserve, Arizona, as far as the season will permit.

Mr. Theodore F. Rixon will commence the examination of the Black Mesa Forest Reserve, Arizona, completing with Mr. Arthur Dodwell the entire area of the reserve.

Mr. Fred G. Plummer will examine the Uinta Reserve, in the northern part of Utah, a rather narrow, irregular strip of country lying mainly along the top and north slopes of the Uinta Range.

ALABAMA.

Coal Miners' Wage Scale.—The new agreement between the operators and miners to remain in force until June 30, 1903, re-affirms the old scale prices, rules and regulations with the following additions:

1. With a view of remedying conditions that have developed in carrying out the joint resolutions adopted last year providing for arbitration of differences, it is hereby agreed that the United Mine Workers will not ask the companies to take up any grievance for adjustment during any suspension of work, unless authorized by district officers.

2. Funeral clause left for local adjustment.

3. Absentee clause left for local department.

4. That the day wage scale heretofore in effect is hereby canceled and the following uniform day wage scale adopted, based on 55c. per ton for mining coal, to go up and down with the scale as before: Drivers, \$1.78; drivers, minimum, \$1.47½; spike team drivers, 25 per cent extra, and for each mule over 2 10c. extra; trackmen, \$2.69; trackmen helpers, \$1.70; trappers, 93½c.; brattice men, \$2.69; inside engineers, \$1.95; outside engineers, \$2.56; tail rope chainers, \$1.78; slope chainers, \$1.78; steam pumpers, \$1.78; furnace firemen, \$1.50; boiler firemen, \$1.85; slope repairmen, \$2.40; dumpers, \$1.52; scalars, \$1.52; tippie middlemen, \$1.48; coupler, \$1.09; greaser, \$1.04; pin puller, \$1.64; railroad car loader, \$1.62½; ash roller, \$1.35; car repairer, \$2.47½; machinist, \$2.49; blacksmith, \$2.96; blacksmith helper, \$1.67; drummers, \$2.02; miners on company work, \$2.93; stablemen, \$1.37½; all men working on rock shall not receive less than miner on company work, and all other common day laborers for inside work not mentioned on the scale to be paid \$1.78 per day.

5. That 2 or more cars daily shall be set aside to determine average weight of cars at mine that are now paying by the tram or car. Time of weighing to be at the option of operator.

6. That 5 per cent shall be the maximum grade over which a miner shall be required to push cars.

7. To avoid probability of misunderstanding, it is hereby recorded that the contracts specify all coal in Pratt seam under 3 ft. 2 in. shall pay 2½c. per ton above scale shown; when size of coal in Pratt seam goes below 3 ft. then the price is 5c. per ton above scale shown.

ALASKA.

JUNEAU DISTRICT.

Berner's Bay Mining Company.—Julien A. Becker, consulting engineer, and Harry H. Williams, superintendent, are now at this company's 2 claims. Superintendent Williams is to start work on a tunnel, of which 75 ft. have been driven. With the exception of Col. John W. Linck, of Tacoma, and Harry H. Williams, the members of the new company are all Seattle, Wash., men. J. A. Baillargeon is president; Col. John W. Linck, vice-president; E. Lobe, manager; James D. Hoge, Jr., treasurer; Will A. Steel, secretary. The other stockholders are K. Gottstein, R. V. Ankeny, R. Sartori, E. Rosenberg and Harry H. Williams.

Johnson.—Messrs. H. L. Smyth and C. P. Perrin have finished their report on this property at Berners' Bay, owned by the Nowells, of Boston, Mass. The Mines Securities Corporation, of New York City, has an option on the property.

ARIZONA.

GILA COUNTY.

Old Dominion Copper Mining and Smelting Company.—The new briquetting plant is nearly ready for work. A White briquetting press and complete outfit manufactured by the Henry S. Mould Company, of Pittsburg, Pa., has been received, and the machinery is being installed.

GRAHAM COUNTY.

Arizona Copper Company, Limited.—The company reports that the production of copper from its mines at Clifton for the month of June was equivalent to 1,258 tons of 2,000 lbs. each.

MOHAVE COUNTY.

(From Our Special Correspondent.)

The group of gold claims recently bought from the Richardson Brothers, at Union Pass, is shipping ore to the Halsey Sampling Works, at Kingman.

Homestake.—This mine, 4 miles south of Kingman, is having a mill erected. It is worked by a San Francisco company.

Occidental.—This mine, at White Hills, is reported showing a fine body of rich silver ore. It is in the hands of leasers.

Tennessee.—This mine, at Chloride, is shipping 2 car-loads of concentrates weekly.

PINAL COUNTY.

Troy and Manhattan.—At special meetings this week the stockholders voted unanimously for a consolidation of the two companies, and hereafter the name will be the Troy-Manhattan Copper Company. On July 15 it was voted to order a 300-ton smelting furnace, and instructions have already been sent to Manager Cutting to that effect. At present the company's smelter is producing 6 tons of copper, says President Sisson. A 3-years' contract has been made with the National Metal Company, of New York, to take all the copper produced during this period. The mines at Troy are working full time. The officers of the Troy-Manhattan Copper Company are as follows: John W. Sisson, president; Augustus K. Sloan, vice-president; George E. W. Stivers, treasurer; Vincent P. Tommins, secretary. The directors are: Myles Tierney, Walter J. Leavenworth, Charles C. Hoyt, Chas. H. Barney, Robert C. Rathbone, Augustus K. Sloan, John F. Galvin, Edward Potts Williams, John W. Sisson, Joseph B. Martin, George E. W. Stivers, Vincent P. Tommins, and Edwin D. Washburne. Charles H. Utting is mine manager, at Troy; Joseph B. Henry, Jr., consulting engineer; James P. Prince, corporation counsel, and Hudson Trust Company, registrar.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Argonaut.—This mine at Jackson has laid off a number of men lately and work has practically ceased for a time.

Kennedy Mining and Milling Company.—In this mine at Jackson, J. F. Parks, superintendent, the developments on the 2,200 and 2,300 levels show an ore body about 100 ft. wide of \$5 to \$6 rock.

Mitchell.—On this mine at Pine Grove the mill will start on Aug. 1.

Wildman.—On this mine at Sutter Creek, John Ross, Jr., manager, sinking continues. The Mahoney mine is closed for the present.

BUTTE COUNTY.

(From Our Special Correspondent.)

Garden Ranch.—This ranch, 3 miles from Oroville, has been leased to R. S. Grant for mining purposes. The McPherson land near by has been leased to I. N. Large.

Golden Trout.—Twenty-five stamps are being added to the mill, making 35.

Oroville Dredgers.—It is expected that within two years 25 dredgers will be working on mining ground near Oroville.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Beatrice.—At this mine near Murphys, R. Ober, superintendent, day and night shifts are driving the tunnel to cut the main ledge.

Calaveras.—This old mine on Indian Creek, near Murphys, is being unwatered previous to an examination with a view to purchase.

Cataract and Wide West.—At these hydraulic mines, Wm. B. Lake, owner, the main ditch is being extended about a mile.

Central Hill.—On this mine at Mokelumne Hill, owned by D. and W. Nuner, work has started on a double compartment shaft.

Last Chance.—This mine near Angels, owned by the Tryon estate, has been sold to Salt Lake, Utah, men.

Rose Rock.—Men are to start work under Super-

intendent J. Heinsdorff and a 10-stamp mill is to be erected.

Utica.—The iron pipes to connect the Utica Mill and the canvas plant for the slimes, have been laid.

Yellow Aster.—Ore is being hauled from this mine, at Mokelumne Hill, to the Nixon Mill.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Eureka Slate Quarry.—An air compressor has been hauled in to this quarry at Kelsey.

Golden Gate.—On the Golconda Mine, at Rescue, belonging to this company, the tunnel is now in 400 ft. and work is carried on day and night.

Montecuma.—In this mine at Nashville a ledge has been struck on the 300-ft. level.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Orcutt.—On this property, 12 miles from Orleans Bar, men have been at work the last six months running tunnels, crosscuts and sinking shafts under J. B. Randall. Geo. W. Leavitt, R. W. Stiller, Mrs. J. B. Gilzean and Mr. Randall have a bond on the mine. Some high grade free gold ore is taken out.

KERN COUNTY.

(From Our Special Correspondent.)

Asphalt Works.—The Jewett & Blodgett oil refinery at Sunset is running full time and finds a market for all the asphalt which can be made.

Big Blue.—This company is cleaning out the Lady Belle claim and a hoist and a pump are to be installed.

Gold Peak.—Twelve men are at work in this mine at Amalie. A 200-ft. tunnel is to cut the ledge.

Keyes.—This mine, at Keyes, J. Spellacy, manager, is working 23 men, and Hooper's Mill at Isabella is busy on ore from the mine.

Mammoth.—This mine, at Kernville, after an idleness of a few months, is to start up again.

Mondoro.—This mine, between Kernville and Havilah, has shut down, too little ore being found.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Ellingham.—This mine at Whitlock has been leased by E. B. Walters, who is taking out ore.

Orleans.—This mine near Mount Bullion is being worked by W. H. Johnson.

NEVADA COUNTY.

(From Our Special Correspondent.)

Oil Fuel.—Experiments are being made with oil burners at Grass Valley mines. Oil is already largely in use along the Mother Lode in Amador County.

Standard.—This mine on Deer Creek, Grass Valley District, is being reopened under Superintendent Hugh J. Thomas.

PLACER COUNTY.

(From Our Special Correspondent.)

Bob Lewis.—At this mine, at Damascus, H. M. Jarvis, superintendent, the tunnel is in 1,700 ft. and about 50 tons of gravel are taken out daily. Miners are still drifting across the channel.

Great Channel.—This drift mine near Michigan Bluff has its tunnel in 1,670 ft. and expects soon to reach the gravel encountered in an upper tunnel. H. T. Power is general manager.

Hidden Treasure Mining Company.—This mine at Michigan Bluff, Harold T. Power, president and manager, employs 180 men. The face of the tunnel at Centerville is 10,100 ft. in, and breasting operations (with 6 breasts) are at 8,000 ft. An average of 440 tons of gravel daily are mined. The property includes 5 claims. There are tunnels at Centerville and Sunny South.

Lease.—A tunnel is being run in ground leased from the Hidden Treasure Company at Michigan Bluff by H. J. Bilkey, C. Williams and E. Turnbull, who are opening the ground.

Red Point.—The property at Damascus belongs to the Societe des Mines de Golden River, of Paris, France. J. A. Ferguson is superintendent. The main tunnel is now in 18,000 ft. and the face is 1,000 ft. under the top of the main divide. A round trip on the compressed air trains takes an hour. The power plant will furnish power for 5 miles up the channel.

SACRAMENTO COUNTY.

(From Our Special Correspondent.)

Prosperity.—The machinery at this new drift mine near Folsom has started. A gas engine is used for power. A centrifugal mine pump is a feature of the equipment.

SHASTA COUNTY.

(From Our Special Correspondent.)

Midas Gold Mining Company.—This property, at Knob, is the most productive gold quartz enterprise in the county. A. J. Oswald is mine superintendent and

Mr. L. A. McIntosh is vice-president and general manager. Capt. Roberts, of Sacramento, is the largest owner. There is a 20-stamp mill and a complete cyanide plant. Steam and water power are used.

Texas Gold Mining and Power Company.—While shipments to the smelter are suspended from the mine in Old Diggings District, near Redding, arrangements are being made to improve the mill. Col. H. C. Woodrow is manager. A cyanide plant will be built.

SIERRA COUNTY.

(From Our Special Correspondent.)

Balsam.—At this mine, near Alleghany, the tunnel is in 400 ft.

Gold King.—This mine near Alleghany, which has been idle 18 years, is to be started up by J. B. Rinehart, of Medford, Ore., and others.

Pilgrim.—This mine at American Hill, owned by the English-German Gold Mining Company, Thos. A. Patterson, Jr., manager, has recently struck a body of high grade ore in No. 4 tunnel. It is apparently an entirely new ore channel.

Weldon.—W. H. Weldon, of Grass Valley, is opening a mine near the Gold King at Alleghany and taking out some good ore.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

The group of mines owned by J. F. Welch, O. H. Wood and L. A. Sheldon, about 4 miles from Sisson, near the Trinity County line, has been bonded by English parties.

Bloomer.—This claim at Forks of Salmon, W. P. Bennett, owner, is running full blast. Considerable top stuff is being washed at present.

Blue Gravel.—It is stated that a new company will take hold of this claim near Yreka and re-open it.

Cherry Hill Mining Company.—The tunnel at this mine near Yreka, E. D. Baker, superintendent, has cut the ledge at 1,500 ft. The ore is free milling and of good grade.

Hawkinsville District.—The gravel miners around this place have about finished the season's work. Much of the old ground did not carry as much gold as expected.

Hawkinsville Dredger.—The dredger below Hawkinsville is to work most of the ground on Yreka Creek above and below Yreka, and the owners are satisfied with the prospects.

Indian Girl.—This quartz mine near Hornbrook, owned by A. M. Williams, has a new 2-stamp prospecting mill.

Ironsides.—This mine, near Yreka, operated by Geo. W. Whipp, has been shipping some ore to the smelter. Mr. Whipp intends to develop the mine thoroughly.

Nordhimer Mining Company.—This company at Forks of Salmon, Fred. Gent, superintendent, owns the McNeil Flat, Maggie May and Billy Mac mines, and is running night and day with a good force.

SONOMA COUNTY.

(From Our Special Correspondent.)

Culver-Baer Mining Company.—D. C. Page is arranging in San Francisco for a larger furnace for this quicksilver mine.

TRINITY COUNTY.

(From Our Special Correspondent.)

Bullychoop Mining Company.—The 10-stamp mill is being moved a mile down the hill from the claim and an aerial tramway will take the place of teams for hauling. A Huntington mill is to be added by W. P. Gester, manager. Twenty-five men are employed. The base of supplies is Redding, 40 miles east of the mine.

Fairview.—The machinery for the 10-stamp mill for this mine at Minersville, Joseph Porter, superintendent, is being hauled in. Fifty-five men are employed.

Mason & Thayer.—This mine near Dedrick is now under bond to P. Joyce, who is doing development work. Tunnels are being run to open the ore body.

Trinity County Gold Mining Company.—This company now owns the Chloride-Bailey Mine at Dedrick, F. R. Culbertson, manager, and J. T. Stephens, superintendent. A cyanide plant is to be erected below the new mill.

Vermont.—This group of mines near Dedrick, owned by Geo. Bailey, will probably have a mill shortly.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Confidence Mining Company.—On this mine at Confidence, Neil Carmichael, superintendent, 100 men are employed. The new cyanide works are being rapidly completed and air compressors installed.

Consolidated Eureka.—Striking the ore shoot in this mine at Carters at over 1,700 ft. depth has caused increased activity at Carters.

Cosmopolite.—In this mine at Groveland, Harry Ar-gall, superintendent, 3 shifts are working.

Del Monte.—Machinery has been hauled from the

Accident Mine, near Groveland, and put on the Del Monte.

Eagle-Shawmut.—On this mine at Chinese Camp, C. E. Uren, superintendent, 40 stamps are being added to the 60 stamps lately put in. The mill will now have 140 stamps. Originally it had 40 stamps. There are 250 men on the payroll.

Key West.—It is reported that this mine near Big Oak Flat will soon start again.

McAlpine.—In this mine at Big Oak Flat Mr. Riggs is sinking with two shifts.

Mohican.—At this mine, near Groveland, Felix Chappelet, Jr., superintendent, 30 men are at work and the mill is steadily busy.

Mount Jefferson.—This mine at Groveland has resumed work with 10 men, and as soon as J. M. Meigham arrives from the East a larger force will be put on. Extensive development has been planned.

Richards.—This gravel mine, near Springfield, is under bond to a new company and work will be resumed on the old incline. Engines, hoist, boiler, etc., have been shipped in.

COLORADO.

BOULDER COUNTY.

Black Cloud.—v. A. Langridge, representing, it is said, Boston, Mass., men, has purchased this group of 14 claims in Gold Hill District. The group has been idle since 1880. The ore bodies, though reported large, were not rich enough to pay under the old treatment charges. There are 4,000 ft. of shafts, tunnels and levels in the group, which are on either side of the gulch leading to Gold Hill. The company will drive a tunnel 700 ft. to cut the Gold Hill lode. The purchasers have organized under the laws of the State of Maine the Corona Mining Company, capitalized at \$1,000,000, which has taken over the properties.

Logan.—This old mine, operated now by the Clinton Company, is again giving up some more good ore in a 6-in. streak, in the lower tunnel, 900 ft. beneath the surface.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—California Mining and Milling Company to E. S. Moulton, et al, Rocky Mountain mill site, Enterprise District; Rocky Mountain Milling Company to J. A. Emery et al, the Rocky Mountain Mill, Enterprise District; H. Hawn to M. E. Duffield, the Nora Lode, Pine District; Thomas Cody to the Palace Mining Company, the Pied Piper, Palace, Highlander, Two Fifty and Poor Man lodes, Silver Lake District; L. B. Hail to A. J. Simonson, 51-100 interest in British lode Illinois-Central District; W. H. Kelly to Van B. Straight, the Claudia J. and a 2-3 interest in the Millie B. lode, in the Hawkeye District; Extra Rue to J. W. R. Ansted, the Plymouth lode, and easterly 833 ft. of Carr lode, Gregory District; J. M. Ross to the Delmonico Mining Company, the Delmonico and Annex lodes, Illinois-Central District; the East Boston & Gilpin Mining and Milling Company to the East Boston Mining Company, the East Boston lode, Central City District; M. E. Duffield to H. Burroughs, 1-3 interest Nors lode, Pine District; M. E. Duffield to K. C. Young, 1-3 interest Franklin lode, Pine District.

Actna.—Local men have taken a lease on this property in Nevada District, owned by Denver men, and have been taking out a carload of ore to send to the Carpenter Smelter at Golden on trial. If the run is satisfactory the leasers expect to get out a heavy tonnage.

Kansas-Burroughs Consolidated Mining Company.—The production for June was 250 cars, or 2,200 tons, most of it coming from the Phoenix-Burroughs. The English-Kansas is being worked under a lease by local parties, who are getting out some ore, and are having the Gilpin Tramway run in a switch to the mine for future shipments. P. McCann, Central City, is manager.

Nebraska Mining Company.—An order has been placed for a 7 by 10 gear and friction hoist and a 60-h. p. boiler, to be installed at the main shaft in Black Hawk District. A new shaft building 20 by 40 ft. is being erected, and the company intends to start active work at an early date. Nebraska men are interested with G. D. Johnstone, Black Hawk, as manager.

Next President.—In sinking a winze below the 360 east level some high grade ore has been opened, assay values showing gold and silver values of \$6,290 per ton. The property is worked by George H. Ellis Smith & Company, and it is owned by London parties. Regular shipments of fair grade milling ores are made.

Ontario-Colorado Mining Company.—Some high grade ores have been opened in the bottom workings at 606 ft. and the ores are expected to run about \$600 to \$700 per ton. In the upper levels the ores opened will give values between \$100 and \$200 per ton. The

company has resumed sinking, and the shaft, now 675 ft. deep, will go to 1,000 ft. No efforts are made to take out milling ores during sinking. H. C. Eastman, Central City, is manager for Canadian parties, and about 30 men are employed.

War Eagle.—Local parties have put machinery on this group in the Independent District and are preparing for work. The property is credited with producing fair grade milling ores in the past, and is owned by the owners of the Perigo.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

A. M. W. Mill.—There is said to be practically no loss excepting in the tailings, and these are handled by a sludge mill, and the company gets a royalty. The company has connected its tracks with the railroad, and has erected 9 ore bins with a capacity of 70 tons each. Two sluice boxes carry streams of zinc or lead concentrates. By a system of gates the water can be turned into any of these bins, and at the rate the mill operates 1 zinc bin is filled every 24 hours and 1 lead bin a week. The water passes out of the bins through fine screens, and is caught in settling tanks. The material is loaded on the cars at the bins, and the zinc is shipped to Galveston and thence to Europe.

A Y & Minnie.—Shipments are steady, and the new mill will be in operation August 1. The ore can be transported from mine to mill by gravity. The old tramway is torn out and a tunnel cut 40 ft. from the collar of the shaft saves that much hoisting and 150 ft. tramming. The ore bin holds 400 tons. The ore is fed to a grizzly, and thence to the crusher, where it falls into the feed bin, 20 ft. high, 14 ft. wide and 30 ft. long. The fine material passes next to Huntington mills and then to the Wilfley tables. In the past only a lead product was made, and the zinc went into the tailings.

B. B.—This claim is a fine piece of virgin ground in Union Gulch.

Ball Mountain Development Company.—Manager M. P. Murray is developing his combination at the head of South Evans Gulch through a tunnel and opening large bodies of low grade ore. Plans are being formed for a mill near the mine. It is the intention to sink the shaft 100 ft. in the near future.

Bertha.—William Colley and associates have this Breece Hill property under lease. The shaft is 300 ft. deep and prospecting is under way.

Colorado-Manhattan Mining Company.—This is new work on an Iron Hill combination, in which New York capital is interested. It is cross-cutting on a prospect drift started at 100 ft. in the Montgomery shaft.

Gold Basin Mining Company.—As drifting progresses from the new shaft on the old Big Four ground the extension of the old vein is being opened. One hundred tons recently shipped assayed 1 to 9 oz. gold, 18 to 170 oz. silver, 2 to 17 per cent copper.

Graham Park.—Present explorations promise to open still more sulphide shoots. The Greenback has opened stronger and richer shoots at 1,350 ft. The Evelyn has sunk to 1,000 ft., and is drifting for the sulphide shoot dipping from above, while the Mahala's new shaft will open large sulphide shoots in virgin ground.

Homer Placer.—This new down town shaft on 150 acres of virgin territory to the west of the city limits, will likely resume operations in August.

Louisville.—E. A. Hannifen and W. O. Reynolds, who recently sold the Sierra Nevada lease on the Yak ground, and leased the Coronado Mine, have just purchased the old Louisville Mine from David H. Moffat. It has been shut down over a year.

Mike & Starr.—John McAllister is at the head of this lease, operated through the Yak, and one of the most important on the hill. Large bodies of low grade copper sulphides are being opened, and 40 tons daily are shipped to the Buena Vista Smelter.

New Leadville Home Mining Company.—Very encouraging conditions are reported at the Penrose, where development shows large bodies of iron ore. Shipments in June were 5,600 tons of oxidized iron ore.

Occidental Mining Company.—This property is taking out ore, some of which assays 4 oz. gold.

Phoenix Mining Company.—One hundred tons daily of oxidized iron are shipped, most of it to the Germania Smelter, in Utah. The property could ship 200 tons more from its manganese deposits, but the Colorado Fuel and Iron Company, at Pueblo, is not ready for ore. A new iron body recently opened in the Sixth Street shaft is 90 ft. high. The company has control of the Coronado workings.

Resurrection Gold Mining Company.—The company has broken ground for a 150-ton concentrating plant to handle its zinc sulphides. The company is now shipping 100 tons a day, but in both No. 1 and No. 2 shafts there are large deposits of low grade zinc sulphides that have not been handled. Manager Carna-

han will push the work to completion. The new mill will use some form of magnetic separation, enabling a concentrate of about 55 per cent.

Sunrise.—The Sunrise Mining and Milling Company has recently taken hold of this proposition south of Leadville. There is much low grade gold ore in sight, and the company will build a new mill.

Two Bit Gulch Mining Company.—The new shaft is down 330 ft. At 306 ft. a new drift is being run.

MINERAL COUNTY.

Amethyst.—Improvements in this mine at Creede are progressing satisfactorily, and preparations to transport ore from the mine to the railroad cars through the Nelson tunnel are fast nearing completion. The raise connecting the shaft with the tunnel is finished.

Humphreys.—The mill at Creede is running with full forces day and night. The work in the main shaft of the mine is completed and connections with the levels where the milling ore is and the tunnel that leads to the mill is made. The milling ore comes principally from above the 12th level, while the ore below that carries high values in gold, besides the lead, and is shipped crude to smelters.

OURAY COUNTY.

Ouray Chief Mining Company.—This company is capitalized with 750,000 shares of \$1 each. Ohio men are interested and will develop what is known as the Portland group of 20 claims east of Ouray. A concentrating plant will be built. The section where the mine is located is not very well known.

San Juan Mining Company.—This company, at Ironton, is about to start work on an extensive scale. The company is incorporated under the laws of Delaware by C. G. Noel, of Springfield, Mass.; L. A. France, Holyoke, Mass., and S. M. Noel, Ouray, the latter being local manager. The company owns 2 patented claims and a millsite on Brown Mountain. The former owners drove a tunnel, which developed a good vein of low-grade ore. Another tunnel will be driven to facilitate shipments to the proposed Saratoga Smelter.

PARK COUNTY.

Macleane Gold Mining Company.—This company, with \$200,000 capital in \$1 shares, has been organized in Salt Lake, Utah, to develop the Golden Era and Maclean claims, situated in Buckskin District. Charles I. Rader, manager of the Annie Laurie gold mine at Kimberley, Utah, is president; Dr. A. M. Maclean, of Leadville, vice-president; Percy S. Sowers, of Salt Lake, Utah, secretary, and Wilson I. Snyder, of Salt Lake, is the treasurer and the remaining director. Fifty thousand shares have been deposited in the treasury for working capital.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Burrows Park.—This section, between Lake City and Telluride, is attracting considerable attention. The Tobasco Company is developing a 12-ft. vein, showing a reported average value of better than 1 oz. in gold per ton. The company is erecting a concentrating mill and power plant to cost \$100,000. This is an old property, but has shipped little, owing to its distance from the railroad. Among other promising properties are the Isolda, Inez and Hollister. Since last fall the last has shipped 50 tons of ore, which netted over \$1,000 per ton, and these rich shipments caused the recent inrush of prospectors. The Du Pre Company, on Cinnamon Mountain, has opened up 2 large gold veins and employs 15 men. Beam Brothers have a vein of rich ore on the Horseshoe side of Burrows Park, and are preparing for immediate shipment. Puckett & Olson, adjoining the Beam Brothers, have a vein carrying gold, silver and lead. Judge Kinkaid, of Ouray, is sacking 8-oz. gold ore from his claim on Cooper Creek. The Mankato has broken into good ore, and is preparing to begin shipments.

Congress.—Shipments have again been started from this mine on Red Mountain, near Silverton, and will continue all the season.

Gold King Consolidated Mining and Milling Company.—The 80-stamp mill is running full capacity. A new power house is under construction.

Grand Mogul.—The force at this Silverton mine has been increased to 50 men, and the lower tunnel has reached the 1,500-ft. point. Two other levels are also being driven.

Grand View.—This property is in Ice Lake Basin, and was operated during the winter by leasers. A shipment of 24 tons just made to Durango smelters gave an average of 5 oz. gold per ton.

Highland Mary.—The new mill near Silverton is rapidly nearing completion. Two new boilers are being put in.

Irene.—Shipments have begun from this property from the work done during the winter, and will average a carload per week during the summer.

Isabelle Group.—This group, owned by Robert Davis, of Colorado Springs, resumed operations July

1 with a full force. Work will be continued in the 800-ft. tunnel.

Kendick-Gelder Smelter.—The new White briquetting machine recently installed at this smelter near Silverton is giving satisfaction, and is now being tried on concentrates, having been used exclusively on flue dust.

Lady Ellen.—Joseph Bordeleau has let a contract for sinking a shaft on this vein, on South Mineral Creek, to Dave Heindel. The property was formerly developed by several tunnels.

Little Dora.—After many months of idleness, this property, just south of Silverton, has started. It will be worked with one shift for the present.

Minnie Gulch Mining Company.—The stockholders will meet in Silverton shortly, and endeavor to arrange for an early resumption of operations. The property is in the hands of a receiver.

North Star.—This company, operating just west of Silverton, is renovating its old mill, and will install new machinery. A new flume is being constructed. Two 125-h. p. Corliss engines, 2 100-h. p. electric generators and 10 new Woodbury concentrators have been ordered.

Notaway.—A 2-ft. vein of very rich silver ore has been cut in a vein near the main vein. The find is important.

Porphyry Gulch Mining Company.—Two shifts are working at this property near Chattanooga.

Silver Queen Mining Company.—Manager B. D. Smith, of Silverton, has a large force at work on this property in Picayune Gulch. The mine is an oldtime producer of high grade ore.

Slide.—This property on Galena Mountain near Silverton will start shortly with a full force of men under the management of J. B. Petrie.

Sunnyside.—Judge Terry is pushing the erection of his new mill.

Sunnyside Extension.—Work is resumed on this property above Eureka by Frank Popple with 2 shifts.

Sylvanite.—Price & Nance have taken up the option on this and adjoining properties in the same group and put on a full force. A mill is to be erected to use the Price & Nance process of treating ores electrically.

Western States Gold Mining Company.—This company, recently formed, is to drive an 1,800-ft. tunnel under Deer Park. A crosscut is being run to cut the Montana and other veins at depth. An air compressor is to be installed.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Japan Tunnel.—Work is pushed more rapidly than on any work under like circumstances in San Miguel County. The total distance driven in June was 208 ft., an average of about 8½ ft. per day. No work was done for 6 days, while the compressor was being repaired.

Peck Cyanide Company.—This company has sold its ground and plant, a mile east of Telluride, to the Smuggler-Union, Tomboy, Liberty Bell, Japan and Revenue Tunnel Mining companies. The purchase price was \$42,829, and the Peck Company will work the tailings for 2 years, paying a royalty of 1c. per ton to be applied to taxes, insurance and other expenses. The sale is the result of a law suit between the Peck Company and the Smuggler and Liberty Bell companies. Four years ago the Gold Run Extraction Company was incorporated to build a plant and treat the tailings that have been accumulating below the mills. After operating about 2 years it sold out to the Stephen Peck Cyanide Company, of St. Louis, Mo., which increased the capacity of the plant near Pandora, and built a smaller one just outside the city limits. Since then large profits have been realized. When the cyanide plants of the Smuggler and Liberty Bell companies were completed, legal proceedings were brought to prevent the dumping of worthless tailings on the ground owned by the Peck Company.

Savage Basin Road.—This road is under construction. A large force is employed. Carlisle and Ryan Brothers, of Pueblo, have the contract. The road is from Telluride to the Smuggler-Union and Tomboy mines in Savage and Marshall basins.

State Road.—This road, from Pandora to Bridal Veil Basin, is going ahead rapidly. The crew is now working in the loose slide rock below Ingram Falls at about ¾ the total distance. It is expected that the road will be completed by September 15.

Telluride Coal Mining Company.—This company has opened a small seam which unites with the one being developed, and the two combined make 5 ft. of good coal. Rooms will not be opened for at least 2 weeks.

SUMMIT COUNTY.

At Breckenridge 2 more mills are about to start—the Juanita, on Nigger Hill, and the Washington, in Illinois Gulch.

Gold Cup.—This group, at Swandyke, is reported to have passed into the hands of a California syndicate stocked for a large sum. The company has agreed to expend \$6,000 on development work between now and the first of next year.

Pennsylvania.—This mine, at Argentine, is a steady producer of good grade ore. A concentrator, run by water power, is going night and day, treating about 60 tons of ore every 24 hours.

Robinson Smelter.—The new smelter is reported running smoothly. The company is employing about 125 men in the smelter and mine.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Arequa Gulch Cyanide Plant.—This plant is so successful that others of the same pattern may be started in various parts of the district before long. The plant has been treating ores much lower in grade than those accepted by any outside mills. Prominent mining men are much interested in these attempts at low grade ore treatment.

Bonanza King.—Ore has been shipped from a sub-lease on this property on Gold Hill. A fair shoot has been developed at slight depth. The property is one of the most active on this part of Gold Hill, and is steadily shipping a considerable tonnage.

C. K. & N. Company.—The stock is listed as a mine on the Colorado Springs Stock Exchange. The Raaler Mine has made a most wonderful showing. Since January 1 the property has produced \$63,068, and since the annual meeting last month Lessee Granfield has shipped \$20,535, gross value.

Golden Cycle Company.—The directors have declared that \$11,250 be paid to stockholders every month until further notice. This is at the rate of ¾c. per month on the 1,500,000 shares outstanding. This plan of declaring several monthly dividends in advance, obviating the necessity of the directors meeting, is unusual with Cripple Creek companies.

Gold Dollar Consolidated Company.—This company now has 75 sets of lessees at work on Beacon Hill ground with excellent results. The lessees on the Mabel M. ground are taking out much ore, and on the Gold Dollar the lessees are also active. The company itself is opening ore in the bottom of the Mabel M. and producing right along.

IDAHO.

BLAINE COUNTY.

Gray Bull.—A vein carrying 7 ft. of copper ore is reported in this mine, on Fish Creek, 16 miles northeast of Carey.

Lucky Boy.—At this mine, near Hailey, Ravanel Macbeth, superintendent, 80 tons of ore go daily through the crushers.

BOISE COUNTY.

Lincoln.—John T. Hodson has made the final payment on the Rhoades' contract on this mine, at Pearl. The new owners have installed a large pump, and are sinking a 250-ft. shaft, which will have 2 compartments, and will be the main working shaft of the mine.

CUSTER COUNTY.

White Knob Copper Company.—According to a New York financial paper, the reports circulated recently that this company, at Mackay, is to abandon its works are entirely erroneous. The company has not abandoned its mines, nor does it intend to do so. The property consists of 32 mining claims, 3 mill sites, valuable water power, timber rights, 11 miles of electric railway and a 600-ton smelting plant. The works and railroad are completed, and the company will blow its smelters as soon as slight labor troubles are adjusted. The Oregon Short Line, at a great expense, has constructed and has now in operation 90 miles of railway which runs from Blackfoot to the White Knob Smelter at Mackay.

IDAHO COUNTY.

Big Buffalo.—This mine, at Hump, keeps its 10-stamp mill busy and is doing its usual business. It is rumored that the company is opening some good new ground north of the shaft on the No. 1 level.

Crackerjack.—This mine, at Hump, has started its new mill. The mine is opened to a depth of 150 ft. A lower tunnel will be started to give 150 ft. additional depth. The present manager, W. A. Stevens, it is said, put up the money for the development and construction of the mill, the building of the roads, etc., for a one-third interest in the property, which consists of 2 claims, the Crackerjack and the Santa Rosa.

Wise Boy.—This mine, at Hump, has all of its heavy machinery on the ground, but as the owners have to saw all their lumber for construction it will be September 1 before the stamps are dropping.

LEMHI COUNTY.

(From Our Special Correspondent.)

Kittie Burton Gold Mines Company.—This property, 7 miles from Salmon City, in the Indian Creek

District, under the management of R. L. Edwards, is making extensive improvements at its plant. A new stamp mill is under construction. An aerial tramway, having a capacity of 450 tons, has been ordered from the A. Leschen & Sons Rope Company, of St. Louis, Mo.

OWYHEE COUNTY.

Addie.—Several strikes of high grade gold-silver ore have been made in this group of claims, on War Eagle Mountain, near Silver City. A 5-stamp mill has been erected, which it is expected will be in operation by August 15. The mill will have 850-lb. rapid drop stamps, 12 ft. of copper plates, with "splash" plates at the mortar discharge; 2 4-ft. Frue vanners, a Wheeler amalgamating pan and a settler. The ore will be trammed direct from the mine to the upper part of the mill, and will be dumped on to grizzlies, will pass through the rock breaker to the bins, and will be fed to the battery by a Challenge feeder. A 20-h. p. electric motor will be installed. Arrangements for power have been made with the Trade Dollar's Swan Falls plant. A small boiler will be put in for heating the amalgamating pan.

Flint District.—A rich strike of silver ore is reported in the claims owned by White Brothers & Adams at Flint.

ILLINOIS.

MACOUPIN COUNTY.

(From Our Special Correspondent.)

A. G. Simpson, a mining engineer of New York City, who has been in Springfield for a month, has secured options on 31,000 acres of coal land on the lines of the Chicago & Alton, the Illinois Central, and the Jacksonville & St. Louis Railroads. It is conceded by many mining men that Seam No. 5 of the General Geological Survey of Illinois can be found from 6 to 8 ft. thick in all parts of the 31,000 acres. Mr. Simpson is prospecting with the diamond drill. It is not generally known who is at the bottom of the deal, but the Chicago, Burlington & Quincy Railroad, which lately bought the Jacksonville & St. Louis, is supposed to be behind it.

MADISON COUNTY.

(From Our Special Correspondent.)

Logwood-Decamp Coal and Coke Company.—This company, of St. Louis, Mo., has secured options on about 2,000 acres of coal land in the celebrated Staunton coal field along the lines of the Wabash and Litchfield & St. Louis Railroads.

INDIANA.

DELAWARE COUNTY.

(From Our Special Correspondent.)

Standard Oil Company.—This company has purchased a large tract of a valuable oil land and leases from individuals and other oil companies and from private parties.

GREENE COUNTY.

(From Our Special Correspondent.)

Eclipse Coal Company.—This company, of Indianapolis, has been incorporated. The directors are J. H. Huffman, Silas Car and George Harcourt. The company will maintain an office in Indianapolis and mine coal in Greene and Sullivan counties.

United Mine Workers' Convention.—There is much interest in the convention to be held at Indianapolis Thursday to determine how the soft coal miners of this and adjacent States shall aid the anthracite strikers. Railroads, manufacturing concerns, electric and power plants all over the State have been laying in coal, fearing a general strike.

VERMILION COUNTY.

(From Our Special Correspondent.)

Maple Valley Coal Company.—This company, of Clinton, has been organized. Nelson C. Anderson heads the Board of Directors.

WARREN COUNTY.

(From Our Special Correspondent.)

Brazil Block Coal Company.—This company, of Brazil, has bought the coal rights on 4,000 acres of land in this county held by T. R. Weiber, of Chicago. The coal is said to be of better quality than the Clay County block, and the field more extensive. The Chicago & Eastern Illinois Railway is building a belt line touching the field. The Otter Creek Coal Company and the I. McIntosh Company are sinking shafts on surrounding property.

KANSAS.

CHEROKEE COUNTY.

(From Our Special Correspondent.)

Baxter Springs.—Another rich prospect is developed by a drill at a depth of 55 ft. at Baxter Springs, 10 miles from the present western limits of this district. The drill was in high grade ore for 20 ft. A shaft sunk by the Iowa & Oklahoma Development Company on a previous drill strike is finding ore at 48 ft.

C. V. Petracus & Co.—This company has been

building a new lead smelter at Galena. It has notified the citizens' committee that the plan is completed. The citizens of Galena agreed to give a cash bonus of \$2,000 and a site in the city limits, and the citizens were to hold a lien on the smelter to insure its operation for 10 years. The committee which will inspect the smelter consists of W. B. Stone, E. B. Schermerhorn, J. K. Williams, J. P. McCann and W. F. Sapp.

LOUISIANA.

ACADIA PARISH.

(From Our Special Correspondent.)

Jennings Oil Wells.—The daily sales now amount to over 1,000 bbls. The tankage capacity is inadequate, and must be increased.

Northern Oil Company.—This company will start drilling a well 150 ft. east of Southern No. 3, and the Hogg Swayne Syndicate has rigs ready to begin 5 wells.

SAINTE MARY PARISH.

Belle Isle.—This salt deposit is being developed by a Chicago, Ill., company, of which F. A. Randle is the head. A shaft is being sunk by the freezing process, and the company may be mining rock salt in September.

MARYLAND.

ALLEGANY COUNTY.

W. D. Althouse, who sold his mining property along the Berlin Branch Railroad, near Altoona, Pa., to the Somerset Coal Company, has bought the Neff farm of 233 acres, near Mt. Savage, paying \$32,000 for it, and will at once commence the erection of a mining plant.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Arcadian.—Thirteen power drills are in commission, and a medium sized force is employed. The maximum production is 180 tons. General Manager N. F. Leopold, of Chicago, recently inspected the property.

Baltic.—An electric lighting plant from the B. F. Sturtevant Company, Boston, Mass., is in commission at this mine. A large amount of work is under way on surface. No. 3 shaft is making an increased output since the new hoist went into commission. This shaft is sinking below the 8th level. Forty power drills are in commission, and nothing but selected rock is shipped to the mill.

Calumet & Hecla.—Capt. Thomas Wills has resigned the management of the underground operations at the Hecla branch, and is succeeded by Capt. Thomas Wilson. Very little surface work is under way, and only a moderate force is required. No building is being done.

Franklin.—Miners are working down to the 36th level of No. 5 shaft.

Lake Superior Smelting Company.—This company will increase the capacity of the Hancock Works and may put up additional furnaces.

Osceola.—This company has increased its coal dock facilities at Dollar Bay. The work of building the skip road in No. 1 shaft at the North Kearsarge branch has progressed nearly to the 7th level. At No. 3 shaft a new Nordberg cross compound air compressor is ready for installation in the new compressor house, now building.

St. Mary's Mineral Land Company.—This company is to move the diamond drill to section 11 and explore the northern portion. Work on section 22, T. 53, R. 35, has been without favorable developments.

Tamarack.—Twenty power drills are in commission in No. 5 shaft blocking out ground. The lode is not so rich as at No. 2 shaft, to the south.

Tecumseh.—Developments in No. 2 shaft, which recently tapped the copper courses making southward from the Osceola No. 6 shaft, continue favorable. John C. Watson, of Boston, president of the company, will inspect the mine this month.

Trimountain.—This company has received part of the pumping machinery from the Nordberg Manufacturing Company, of Milwaukee, Wis., and a large force of machinists is busy at the location putting it in position. The remainder is in transit, and the mill will start stamping with 2 heads before August 15. No. 1 shaft is sinking to the 9th level, No. 2 to the 7th and No. 3 to the 7th. Nos. 1, 2 and 3 shafts are connected from the 1st to 4th levels inclusive. Shipments of poor rock from the bottom to the bins at the stamp mill are going forward at the rate of 200 tons per day. Forty-two power drills are in use.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Allouez.—The 3 shafts on the Allouez conglomerate lode are unwatered. An examination is being made, and a report will be submitted to the Boston officials.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—The electric locomotive for the Butler tunnel is ready. This is the first mine in the county to use an electric tram.

Mass Consolidated.—This company is considering sinking a new shaft from surface on the Knowlton lode, a formation carrying stamp copper. William Trevarrow is to be assistant head mining captain. The June output was 179 1-5 tons, the largest month's product yet secured. Twelve thousand tons of rock were treated.

Michigan.—A hoist for A shaft, with a maximum capacity of working to 3,000 ft., has been ordered from the Webster Camp & Lane Company, of Akron, O. It will be delivered next winter. Another boiler has been installed at B shaft. The cross-cut from A shaft at the 9th level has encountered the Minnesota lode. The 8th level drift is producing mass and barrel copper.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—The market last week was the most exciting in the history of the district. On Monday \$39 was given for many lots of ore; \$40 offers came Tuesday, and on the curb market Wednesday night the top price rested at \$41.50, with very few sellers. Thursday morning \$42 was given for the Excell, the Perry No. 3 and the Marion ore. This price carried with it the Edith, the Lenox and the Vandalia and other ores that had been sold early at the top price. There was no assay price for ore fixed anywhere in the district. The Carnegie ore, which assays 65 per cent, sold at \$38 a ton on a 60 per cent assay basis, while the Marion, a 64 per cent ore, sold at \$40 a ton on the 60 per cent basis. Prices were variable all over the district.

Zinc ore has not been so high since the last week in October, 1899. It then sold for \$43.50, but fell the next week to \$40. The highest price ever paid for zinc ore was in the last two weeks of April, 1899, when the top price was \$55 per ton.

During the corresponding week of last year the top price of zinc was \$28 per ton; the shipment then was greater by 510,940 lbs. of lead, less by 572,780 lbs. of zinc, and the value was less by \$49,450. For the corresponding 28 weeks of last year the sales of lead were greater by 2,676,530 lbs., the sales of zinc ore less by 7,309,520 lbs., and the value less by \$653,551.

Following are the sales from the various camps for the week ending July 12.

Joplin	2,500,530	451,500	\$60,859
Galena-Empire	1,061,770	202,580	22,911
Webb City-Carterville	1,802,180	323,360	38,398
Duenweg	702,770	115,300	16,120
Spurgeon	222,950	31,450	3,196
Aurora	765,500	23,240	10,998
Zincite	592,880	14,070	8,299
Oronogo	327,490	42,820	7,078
Central City	170,030	1,430	2,589
Prosperity	408,320	47,250	8,802
Nuck City-Alba	189,830	9,620	4,027
Cave Springs	102,920	37,970	2,900
Carthage	310,360	.....	6,207
Carl Junction	319,670	.....	6,393
Sherwood	44,230	5,310	835
Granby	153,000	45,000	2,965
Springfield	132,000	.....	2,244
Total	9,606,420	1,352,490	\$204,880
Total 28 weeks	291,831,680	34,252,200	\$4,940,090

Zinc value, week, \$172,437; lead, \$32,453. Zinc value, 28 weeks, \$4,205,184; lead, \$742,912.

Brown Land.—George Brown, of Carthage, has sold 40 acres adjoining the South Carthage Mining Company tract to John Gund, of La Crosse, Wis., for \$25,000. The Grier Mining Company has the first lease on this land, and 3 mines are being operated, the sales of ore from which will aggregate over \$1,000 a week.

Marion.—This mine, on the Continental land, has developed a new level at 175 ft. from which an ore assaying 64 per cent zinc is being taken. The mill will be run double shifts as soon as overhauled. It handles 150 tons of ore per shift, and its output in the past 18 months has been 2,000 tons of high grade concentrates.

ST. FRANCOIS COUNTY.

(From Our Special Correspondent.)

Mine la Motte.—The deal has been closed, and Daugherty & Albers, of New York City, have purchased the estate for \$1,500,000, it is stated. The tract consists of about 37,000 acres, only a small portion of which is lead lands, the greater part consisting of farms, timber lands and granite. The production of pig lead in recent years has ranged from 2,500 to 3,500 tons, smelted on the premises. This property is at the southern end of the disseminated lead belt and lies partly in St. Francois and partly in Madison County. It has been a small producer of lead from shallow surface diggings since 1719, and on a larger scale since the deeper disseminated ores were discovered by a diamond drill in 1871. It

has also produced nickel and cobalt ores to the extent of about 50 tons a year.

MONTANA.

FERGUS COUNTY.

The mining camp at Spotted Horse, near Gilt Edge, was visited by a fire on July 12 that practically wiped out the mining plant and other buildings. The fire is believed to have been of incendiary origin. There was no insurance. The plant will be rebuilt.

The Spotted Horse Mill had been idle since last October. It was built in 1887 by Messrs. Hauser and Holter, of Helena, who spent \$80,000 on the original structure and \$20,000 on an addition.

LEWIS & CLARKE COUNTY.

Big Indian.—Between 40 and 50 men are employed in erecting the 60-stamp mill at this mine, under the direction of Allen C. Mason, president of the company, and Colin McIntosh, the superintendent. The frame of the building is up, the iron and concrete battery foundations down and over half the mortar blocks have been placed. In all 1,700 ft. of tunnel have been driven. The main tunnel is 6 by 8 ft. A well was sunk to bedrock in a swamp behind the mine and water found to supply the mill. A cut has been made across the gulch 2,000 ft. above the mine and a concrete dam is being built to store the water.

(From Our Special Correspondent.)

Argo Copper Mining Company.—Operations on this property, situated near Hell Gate Canyon, have started after an idleness of several months.

MADISON COUNTY.

Chicago Mining and Development Company.—This company's dredge, near Adler, is working a portion of the mining ground under lease from the Conroy Placer Mining Company, which owns the ground and a large part of Alder Gulch, below Virginia City. The company is building a dredge that will handle three times as much, or 8 yds. per minute.

MEAGHER COUNTY.

Copperopolis District.—This camp is showing revived activity. Several new companies are preparing to sink. A smelter for custom work is to be built by the people developing the Home Group. Several sets of leasers are mining a fair grade of copper ore. The probabilities are that a branch railroad, to be built by Meagher County people, will connect with the road running at present to Dorsey.

Copper Duke.—A Michigan company has arranged to develop this Copperopolis property under a lease and bond.

Copperopolis Mining Company.—Sinking on the North Pacific lode, at Copperopolis, is going forward under the management of President W. W. McDowell. The property is being equipped with a new station pump having a capacity of 400 gals. on an 800-ft. lift, a new hoist capable of hoisting from 1,000 ft. and an additional 80-h. p. boiler. The company has a prospecting fund of \$100,000 raised by the stockholders and placed in a bank.

Home Copper Company.—It is said that the recent development in this property, under the management of Mr. Elton, of Copperopolis, has greatly improved the ore outlook.

MISSOULA COUNTY.

Clark Ford Gold Mining and Milling Company.—This company has mining property near Plains. A 10-stamp mill is now being put in and other improvements made.

Moody.—This group of 5 gold quartz claims, 20 miles south of Bonita, a station on the Northern Pacific Railroad, is being developed by L. O. Loomis, of New York City. The main tunnel is in over 60 ft. A double shift of miners is driving it.

(From Our Special Correspondent.)

Montana Consolidated Mining Company.—Development is going forward on the property at Carlan Station, on the Northern Pacific Railway, 36 miles east of Missoula. A recent strike of high-grade copper ore in tunnel No. 2 of the Copper Queen Extension Claim is announced. A large tonnage of concentrating ore is being piled on the dumps awaiting the erection of a concentrator. The company owns 4 full claims, principal development being put on the Copper Queen, where 3 shifts of miners are employed. Plans for a concentrating mill will soon be completed. E. B. Harper, of Butte, is president and general manager.

POWELL COUNTY.

Gladstone Gold Mining Company.—This New York concern is developing the Gladstone group of 4 gold quartz claims, 3 miles west of Pioneer and 7 miles from Gold Creek Station, on the Northern Pacific Railroad. The vein is a blanket formation, and is said to be from 1 to 4 ft. thick. The Allis-Chalmers Company, of Chicago, Ill., is to furnish the machinery for a 25-ton cyanide plant.

Inter-Alta Mining Company.—This company's property is located at the head of Gold Creek, about 10

miles from Pioneer. The principal officers reside in Anaconda. There are on the property two tunnels about 90 ft. in length, showing leads of from 2 to 3 ft. in width, carrying a pay streak of gold ore averaging 12 in. The directors are: M. B. Greenwood, Louis V. Bennett, A. M. Walker, M. J. Fitzpatrick, all of Anaconda, and J. A. Diblee, of Illinois.

SILVER BOW COUNTY.

Franklin Farrell has completed payment upon the properties in the "Flat," east of Butte, and has sold a third-thirds interest to Pittsburg, Pa., men.

Clear Grit.—This group of 6 claims is located half way between Butte and Centreville. The mines adjoin the West Stewart, owned by Senator Clark, on the north, and were owned by Col. H. C. Kessler, who sold them to the Washoe Company two or three years ago. All the development consists of an inclined shaft of about 500 ft. The Washoe Company now has a crew of men busy, and will soon have 50 men employed in the development of the property.

Michael Davitt.—The hearing before William Klein, as referee, in New York City, in the suit of E. Rollins Morse against the Montana Ore Purchasing Company, at which H. H. Rogers and other directors of the Amalgamated Copper Company were to have appeared as witnesses, has been adjourned until July 24.

United Copper Company.—The stock of this company has been listed on the Boston Stock Exchange. The official statement filed with the Exchange gives the following particulars: The stock authorized is 50,000 shares preferred and 750,000 common, all of \$100 par value. Only the common stock is listed. There have been issued 50,000 shares preferred and 450,000 shares common stock; the remaining 300,000 shares are reserved for future contingencies, to be issued only on vote of two-thirds of both classes of stock (of equal power in voting), and by a vote of three-fourths of the Board of Directors. The officers of the company are as follows: F. A. Heinze, president; Arthur P. Heinze, vice-president; John MacGinnis, vice-president; Stanley Gifford, vice-president; Richard Lacey, secretary. The directors are: F. A. Heinze, J. Langeloth, A. A. Brownlee, John MacGinnis, Stephen E. Nash, G. Reusens, Arthur P. Heinze, Frederick W. Whitridge, Henry Budge. The principal office of the company is at the Hudson Trust Company, Hoboken, N. J. The transfer agents are Hallgarten & Co., New York; registrar, Metropolitan Trust Company, New York. New York certificates will constitute a good delivery until Boston certificates are ready, when due notice will be given.

The company was organized for the purpose of acquiring and holding stocks and bonds of certain corporations which together own all the Heinze copper properties in the Butte District, as follows: Montana Ore Purchasing Company, Nipper Consolidated Copper Company, Corra-Rock Island Mining Company, Minnie Healy Mining Company, Belmont Mining Company. The financial statement shows assets as follows: Stocks and bonds owned, \$49,810,000; cash, \$190,000. The liabilities are \$5,000,000 preferred and \$45,000,000 common stock. The stocks and bonds included in the assets are: 76,791 shares and \$1,000,000 first mortgage bonds Montana Ore Purchasing Company; 123,500 shares and \$2,500,000 first mortgage bonds Nipper Consolidated Mining Company; 950,000 shares Belmont Mining Company; 1,900,000 shares Corra-Rock Island Mining Company; 2,850,000 shares Minnie Healy Mining Company.

(From Our Special Correspondent.)

The development work on the claims across the "Flat," at the base of East Ridge, is favorable, and work is being pushed on the Sinbad, Ida and the claimers near Columbia Gardens.

Butte Mining and Development Company.—The 3-compartment vertical shaft on the Emma is down 725 ft. The lead was left at the 350-ft., and no cross-cutting will be done until a depth of 800 ft. is reached.

Jennie Dell.—A new shaft has been started on the Jennie Dell, an extension of the Pauline vein.

Pittsburg & Montana Mining Company.—This new incorporation succeeds to the property and assets of the Farrel Copper Company. It is understood that the plans of the company for the near future include new reduction works.

Speculator.—This mine has shut down. Lee Mantle is suing for an interest in the property.

NEVADA.

LINCOLN COUNTY.

Bamberger-De La Mar Mines Company.—It is stated this company is being organized to take over the mines at De La Mar. Frank Janney, mechanical engineer, who has charge of equipment, has ordered \$30,000 worth of material from the General Electric Company for an electrical plant about 8 miles below Calientes. The order for an additional battery of Chilean mills, which will permit the handling of 300 tons of gold ore daily, has been placed with the manufacturers. In the treatment of Magnolia ores,

in which free gold occurs, it is said amalgamation will be added to the main process.

NYE COUNTY.

Tonopah Water and Power Company.—This company proposes to pipe water 65 miles from Twin River, at the head of Smoky Valley, to the town of Butler, and later to any adjacent mining camps that may require water or electric power for the reduction of ores. The reduction plant to be constructed at Tonopah will have a capacity of 250 tons per day.

NEW MEXICO.

SANTA FE COUNTY.

Argo Mining Company.—This company, capitalized at \$50,000, is controlled by Milwaukee, Wis., men. Henry Smith is president, William Schoen secretary and Julius Tozer treasurer. The company owns what was formerly known as the Hazleton group, which was exploited by a badly mismanaged \$1,000,000 company some 12 years ago. The property was tied up by litigation for some years. A strike of rich gold ore is now reported.

OREGON.

BAKER COUNTY.

At Sumpter the North Pole will put in 20 stamps, in addition to the present 20 stamps, and a small cyanide plant.

Badger.—The new concentrating mill is about completed, and will soon be in operation. Work has started on the 600-ft. adit level to strike the shaft at 500-ft. depth.

Cracker-Oregon.—At this property, at Sumpter, Mr. Cable superintendent, a strike of high grade ore is reported in the No. 2 tunnel.

Golconda.—The 20-stamp mill at this mine, near Sumpter, is reported in operation. Underground developments are said to show good ore reserves. Mr. Robbing is manager, and Mr. Meikie superintendent.

JOSEPHINE COUNTY.

Curry.—C. R. Ray has purchased these quartz and placer mines of W. H. Caine and others.

Jason.—H. C. McIntosh has disposed of this placer property on Coyote Creek, consisting of 85 acres of ground, pipes, giants and water right, to Wm. A. Payne, lately of Iowa, for \$2,000. The property adjoins the Ruble placers.

PENNSYLVANIA.

BITUMINOUS COAL.

It is stated that Joseph Wharton, of Philadelphia, has bought 2,500 acres of land in Blacklick and Burrell Townships, Indiana County, for \$59,150.

It is stated that J. L. Mitchell, who formerly had mines at Gallitzin and Sonman, has purchased 9 pieces of coal land in Cambria County, the total cost being \$48,518. He is said to be acting for New York City men. Mr. Mitchell sold his operations at Gallitzin and Sonman to the Webster Coal and Coke Company over a year ago.

Frank Miller, of Quemahoning Township, Somerset County, recently sold 1,100 acres of coal lands to D. B. Zimmerman. The land is located near Mt. Moriah, convenient to the Quemahoning branch of the Somerset & Cambria Railroad. The price is said to have been \$35 per acre. Mr. Zimmerman is reported to have about 3,500 acres of coal in the Mt. Moriah field.

Berwind-White Coal Company.—This company has purchased land in Indiana County—1,600 acres of coal under the farms of John Kirkland and John Houk, in Cherryhill and Rayne townships—paying \$25 an acre.

Blaine Coal Company.—This new company proposes to develop 1,200 acres of coal lands, and after the mines are equipped it is believed the daily production will reach 4,000 tons. It will ship principally by river.

Dilworth Coal Company.—This company has opened a mine in the Monongahela Valley at Rice's Landing, and expects to be mining shortly. Five large electric coal mining machines have been installed.

Penn Manor Shaft Company.—This company, which controls coal properties in the Irwin field, was recently purchased by an Eastern syndicate headed by W. & H. A. Kuhn, of Pittsburg. The stock and bond issues of the company aggregated \$700,000. The property lies on the line of the Pennsylvania Railroad, 30 miles east of Pittsburg. It is a tract of 1,000 acres, mostly undeveloped.

Pittsburg & Wabash Coal Company.—This is a new independent interest in the Pittsburg District which is to develop a tract in Mt. Pleasant Township, Washington County, the product of which will go to the lake ports of Buffalo and Cleveland. The company will start operations with a capital investment of \$250,000. The H. C. Wick interests, extensive jobbers in coal at Buffalo and Cleveland, are said to control the new company. The property includes 1,000 acres of coal and 125 acres of surface

property, on which a power plant will be located. Contracts will be let in a short time for the opening shafts. The coal tract immediately adjoins the property of the Midland Coal Company. Shipping outlets to the lakes will be provided by the new Western Washington Railroad, recently constructed by interests of the Midland Coal Company. The coal vein is over 5 ft. thick.

COLUMBIA COUNTY.

Almedia Lead and Zinc Company.—This company has erected a complete concentrating plant near Berwick under the direction of Herbert Dent, of Joplin, Mo.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Elliptic Mining Company.—A deep shaft is started on the Polo Creek divide. The company owns about 400 acres of ground.

Golden Crest Mining Company.—An ore shipment is ready at the mine awaiting the completion of the Burlington Railroad to within easy hauling distance. The company has a good supply of ore in sight.

Highland Chief Mining Company.—Denver parties are in on a deal for the property, situated a mile from Deadwood. The cyanide plant has closed down.

Imperial Mining Company.—The new shaft in Blacktail Gulch is in commission. It is 220 ft. deep, and ore is being mined in 3 shoots. The cyanide plant at Deadwood is treating 150 tons a day, with W. B. Milliken in charge.

Montezuma.—J. T. Gilmore and associate owners are shipping 120 tons of fluxing ore daily to the Golden Reward Smelter in Deadwood. The ore carries 45 per cent sulphur, 35 per cent iron, from 1 to 3 per cent copper and \$2 gold. It takes the place of the Homestake concentrates at the smelter.

Penobscot Mining Company.—Headquarters have been removed from Deadwood to Garden City. The new 40-stamp cyanide plant is well under way, as are developments on the Penobscot and Realization groups.

Rossiter Cyanide Mill.—John Lundberg, who has a lease on this mill, is doubling its capacity by improved machinery and deeper tanks. Electricity is utilized for power wherever possible.

Ruby Gulch Mining Company.—A wagon road has been completed to the Portland Mine, near Galena, and ore is to be shipped.

Shamrock.—Brosnahan, Cunningham and Christian, owners, are loading ore said to show an average value of \$45 the ton, mostly silver and lead, with some gold. Two shipments have been made during the last few months.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Black Hills Copper Company.—Ore is being mined in a shallow incline on the Benedict group, recently purchased. A small Chilean mill, purchased of H. D. Dibble and others and moved from Smith Gulch, is in use. J. B. Taylor, of Rochford, is superintendent.

National Smelting Company.—New contracts have been made with different mine owners, and the plant at Rapid City is guaranteed all it can handle during the coming year. The plant is running full capacity.

TENNESSEE.

DECATUR COUNTY.

Beech River Phosphate Company.—This company, capitalized at \$150,000, in which a number of Nashville men are interested, has been formed to mine phosphate rock. The company controls 4,000 acres of land.

TEXAS.

(From Our Special Correspondent.)

GALVESTON COUNTY.

Atlantic & Pacific Company.—This company has erected a derrick and started drilling. The company has a lease on 1,500 acres.

HARDIN COUNTY.

(From Our Special Correspondent.)

Sour Lake Springs Oil Wells.—On July 11, at Guffy No. 2 well, being drilled about 1,800 ft. east of the present producers, gas was encountered at about 880 ft., and the pressure grew so strong that the roar could be heard for miles. The rotary drill, derrick, etc., were blown away, and mud, rocks and oil thrown in every direction. Finally the well caved in, and will probably have to be abandoned.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Beaumont Oil Field.—The pressure on Spindletop still declines. Some 15 wells are being pumped. Shipments are heavy; crude ready for delivery is

not plentiful, and is bringing higher prices. It will be a month before the many pumps ordered can be operated, and with increasing consumption the outlook for filling the depleted, or recently completed, tankage is not promising. Two new companies, the Texas Pumping Company and the Eclipse Power Company, have been chartered. They intend to supply power for pumping the wells of companies owning property so small as to preclude the erection of pumping plants, and there are many such.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—For the week ending July 12 the banks report settlements on ore and bullion as follows: Gold bars, \$20,200; bullion, \$95,500; gold, silver and copper ores, \$155,700; auricyanides, \$4,300.

BEAVER COUNTY.

(From Our Special Correspondent.)

Annie Laurie.—Manager Charles Rader is placing the balance of the orders for material to be used in increasing the mill capacity.

Butte & Beaver.—This property, a short distance from the Majestic Company's ground, has passed into the hands of J. J. Trenam and associates. The price is not given out.

Frisco Shipments.—For the week ending July 12 the Horn Silver sends to the smelters 4 carloads of lead-silver ore.

Horn Silver.—It is stated that the mill has closed temporarily owing to a lack of water. The forces underground have been somewhat reduced owing to the difficulty over smelter charges.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—For the week ending July 12 the following consignments were sent to the smelters in Salt Lake Valley: Star Consolidated, 2 cars ore; Yankee Consolidated, 6 cars ore; Ajax, 4 cars ore; Eagle and Blue Bell, 1 car ore; Bullion Beck, 6 cars ore; Mammoth, 3 cars ore; South Swansea, 2 cars ore; May Day, 2 cars concentrates; Carisa, 2 cars ore; Geminii, 4 cars ore; Tetro, 2 cars ore.

South Swansea.—It was reported that this mine would shut down owing to trouble with water. The report is denied, and it is stated that the mine has been closed temporarily for repairs.

Tesora.—The mine and mill have closed down for an indefinite period by order of the controlling company, the Bingham Consolidated, which has practically nearly all the shares.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Alta Shipments.—During the week ending July 12 the Grizzly & Lavinia marketed 1 car ore; City Rocks, 1 car ore, and the Montezuma, 2 cars ore.

Bingham Shipments.—For the week ending July 12 shipments from Bingham are as follows: Albino, 1 car ore; Willow Springs, 1 car ore; Chicago, 1 car concentrates.

American Smelting and Refining Company.—The second furnace of this company's smelter at Murray is in commission. Much new ore is being shipped in from Nevada and Idaho.

Bingham Copper and Gold Smelter.—Shipments to refineries continue regular, and for the week ending July 12 were 180,000 lbs. copper bullion.

Utah Consolidated.—The usual 240,000 lbs. of copper bullion were sent to the Eastern refineries during the week ending July 12.

SUMMIT COUNTY.

Daly-West.—Two powder magazines at the 1,200-ft. level of this mine, at Park City, exploded at about 1 a. m. July 16, causing an unknown loss of life. The dead bodies of 40 men have been taken from the mine, and several men rescued in a dazed condition. These were all brought out through the Ontario Mine shaft, a mile distant from the Daly-West. The 1,200-ft. level of the Daly-West Mine is connected by tunnel with the 600-ft. level of the Ontario. In the Daly-West Mine between 100 and 150 men were at work. In the Ontario were nearly 100. The disaster extends to the Ontario, as the gases from the explosion are known to have caused several of the deaths. Three of the dead men worked in the Ontario Mine, one of them being at least a mile from the magazine that exploded. There were 2 powder magazines at the 1,200-ft. level of the Daly-West, one at each side of the shaft, with a capacity of from 1 to 2 cars of powder each. A car of powder was added to the supply a few days before the explosion.

(From Our Special Correspondent.)

Park City Shipments.—Shipments for the week ending July 12 were as follows: Daly West, 2,362,420 lbs. ore; Anchor, 216,900 lbs. ore; Ontario, 668,250 lbs. ore; Silver King, 1,475,872 lbs. ore.

O'Donovan Group.—Chicago and St. Paul investors recently acquired this group, and development

will be undertaken. The territory lies between the Daly-West, the Keith and Kearns and the Daly-Judge.

Silver King.—The new steel gallows frame is in commission. Everything about the mine is working well.

Steele Group.—E. H. Airis has taken a block of the treasury stock at a price not reported. The group is very favorably located.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—For the week ending July 12 the Ophir Hill shipped 19 cars concentrates, and the Hidden Treasure 8 cars ore.

Bill Nye.—Some excellent specimens have been taken from this group, which adjoins the Queen of Sheba, at Deep Creek. If further developments continue to show strong ore bodies, it is not at all unlikely that next season a mill will be erected.

Mono.—The management has decided to increase the boiler capacity to handle the low grade ores on the dumps of the Mono and neighboring mines.

VERMONT.

BENNINGTON COUNTY.

Reports of a gold discovery near Searsburg, in the Deerfield Valley, have caused considerable excitement among the farmers in the neighborhood. The "gold ore" is reported to be arsenical pyrites, and newspaper accounts of the so-called mine do not show that any accurate assays of the ore have been made.

WASHINGTON.

LEWIS COUNTY.

Mineral Creek Mining Company.—John T. Davis, of Tacoma, has sold to an Eastern syndicate control of an arsenic property at Mineral Creek, owned by this company. The arsenic mines are reported developed by 1,400 ft. of shafting and tunneling, with 5 miles of wagon road, sawmill, electric plant and hoisting machinery. A tramway 1,500 ft. long is being constructed. The purchasers, it is said, will have reduction works completed in September. The products will be sulphide of arsenic and oxide of arsenic.

OKANOGAN COUNTY.

Wauconda.—This mine and mill are reported closed. The cause of the shutdown is not stated, though it is believed that financial matters have had much to do with it. Several attachments are said to have been issued against the property for wood supplied or cut for it. It is also reported that the management has given a mortgage on the teams and vehicles of the company for a small amount. The main tunnel is in about 1,300 ft., and the mine is said to look as well as at any time. The ore is low grade, and the mill was built to use a special process. Several alterations were made in the mill after it first started work, but officers of the company recently reported that the plant was satisfactory.

WYOMING.

ALBANY COUNTY.

Freeport.—Dr. Clark, of Salt Lake, Utah, has sold this group of 5 claims in the Jelm Mining District, south of Laramie, to the Interocean Mining Company. The claims are said to carry gold and copper ores.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The total output of the Witwatersrand mines in operation in June is reported at 142,780 oz. fine gold, against 138,602 oz. in May. The total for the half-year ending June 30 was 656,864 oz. fine gold, or \$13,577,379. In 1901 the operation of the mines began in May and the total reported to June 30 was 27,257 oz., or \$573,737.

CANADA.

NOVA SCOTIA—GUYSBORO COUNTY.

Doliver Mountain Mining Company.—This company states that it is erecting an 80-stamp mill on its property near Isaacs Harbor, and has 67 men on the payroll. It has expended from May 1, 1901, to July 1, 1902, \$190,000.

DUTCH EAST INDIES.

SUMATRA.

Redjang-Labong Gold Mining Company.—This company reports for the month of May a total saving of 2,293 oz. gold and 13,421 oz. silver.

MEXICO.

DURANGO.

(From Our Special Correspondent.)

Avino Mines, Limited.—This company has started up its leaching plant recently installed.

MINING STOCKS.

(Complete quotations will be found on pages 102 and 103.)

New York. July 17.

There was a little more life in the market this week, owing partly to the improvement in copper share prices. Efforts to remove the unfavorable spell that keeps the coppers at low ebb are gradually awakening interest, but the public is still weak-kneed on the copper question. As was expected Amalgamated declared a quarterly dividend of $\frac{1}{2}$ of 1 per cent—same rate as in May. Amalgamated is now quoted at about 6 points lower than when the last quarterly dividend was paid on May 26. This represents a depreciation in the market value of 1,538,879 shares issued of over \$9,000,000, which is equal to three years' dividends at the present rate. Anaconda, after selling below par for the first time in a long while, recovered later when sales were more frequent.

United Copper, of Montana, now listed in Boston, made a few sales on the New York curb at \$34 $\frac{1}{2}$ @\$35 $\frac{1}{2}$. Greene, of Mexico, fluctuated between \$26 $\frac{3}{4}$ @\$28, selling in hundred-share lots. Tennessee is firm, at one time selling at \$18 $\frac{1}{2}$. British Columbia hovers around \$7 $\frac{1}{4}$, while Montreal & Boston shows larger sales at \$2 $\frac{1}{8}$ @\$2 $\frac{1}{2}$.

Ontario Silver, of Utah, brought \$8.75. Blocks of Standard Consolidated of California sold at \$3 $\frac{3}{4}$ @\$4. Quicksilver common changed hands at \$3.65 and the preferred at \$9.75.

In the Colorado list the Cripple Creek shares are weak. Elkton, which is again in trouble with the heavy flow of water in the mine, sold down to 45c. Portland, upon the passing of another quarterly dividend, is quoted at \$1.75. A little has been done in the Leadville stocks, Iron Silver selling up 5c. at 90c.

The Comstocks are heavy as a result of pending assessments. Consolidated California & Virginia sold at \$1.35@\$1.40, Ophir at \$1.30, Mexican, 59c., and Hale & Norcross, 40c.

Boston. July 16.

(From Our Special Correspondent.)

Copper shares give no response to the late firmness displayed in Amalgamated. No interest is manifest, and unless something is done pretty soon speculation here is likely to be pretty quiet this summer. Even the listing of Heinze's United Copper shares on the Boston Stock Exchange gave no relief. This stock made its bow at \$35.12 $\frac{1}{2}$, and it has varied but $\frac{1}{8}$ from this price since.

The serious calamity at the Daly-West Mine knocked the price off \$6.50 to \$48, but the selling was in small lots, some 500 shares coming out to-day on the announcement of the explosion. Very little of the stock is held here, but it is feared that there will be a dribbling out of the stock as the worst is learned.

American Zinc, Lead and Smelting sold up \$3.12 $\frac{1}{2}$ to \$16.12 $\frac{1}{2}$, but settled to \$15 again. It is learned that an offer has been made of \$20 per share for the stock, and deposits are asked for by the trustees, W. H. Coolidge and E. A. Clark. Negotiable receipts are issued for stock deposited. The option runs until January 1, 1903, and provides that depositing stockholders shall, if plans in hand are consummated, receive not less than \$20 cash or an equivalent in the stock of any new corporation organized to take over the company. The capitalization is small, being 60,000 shares, par \$25. It is inferred that some zinc smelting combination is looking for the property. The higher price quoted for zinc ore does not benefit the company to any great extent, as its business is now on a royalty basis.

Old Dominion mining sagged to \$18, but spurted to \$20 on the buying of about 1,000 shares by a floor trader. No significance is attached to the movement, except that it possibly discounts the favorable report expected to be made any time now.

Dominion Iron and Steel has moved up \$5 to \$59.25, on what is said to be renewed buying by Canadian interests. These people have made a turn on the up and on the down side of this stock, and perhaps are making ready to make another turn on the up side again.

Copper Range has fluctuated \$2.25 by rising to \$54.50. Centennial declined to \$17.50, but recovered to \$18.75. Mohawk has made \$1 gain to \$43, and Osceola has sold at \$59.50@\$60, with little doing in either case. Bingham is quiet around \$32. Good reports come from this property, but nothing is given out for publication. Utah Consolidated touched \$19.50. Quincy mining was not affected by the reduced dividends, selling at \$131@\$130.50 for small lots.

The United States Coal and Oil Company will spend about \$300,000 to build a railroad and \$500,000 to develop the property. With the cash carried over from the original oil company the treasury will have some \$950,000 to its credit. The company will work out of the oil business when the coal lands have been sufficiently developed.

The reports of mining companies filed for taxation

purposes in Montana do not inspire the holders of copper shares, but it is thought that perhaps the best story was not told.

Colorado Springs. July 11.

(From Our Special Correspondent.)

The volume of trading improved somewhat during the past week, although prices did not show any material gain. Portland, El Paso and Vindicator have shown considerable strength, while Elkton has again proved weak. The latter stock opened on July 7 at 55 $\frac{1}{2}$ @55c., but broke the next day, and has been going down ever since, selling as low as 46c. to-day. The immediate cause of the drop is the re-flooding of the eighth level, owing to the breaking down of the two pumps at that point. These have been repaired, however, and this working is again clear of water. The company has reduced its working force from 250 to 150 men employed on the extraction of ore and development work. The report of Expert Mudd on the water situation will be given to the stockholders in an abbreviated form at the annual meeting next Monday, and will say in part that the water problem of the Elkton Mine will never be successfully solved until a deep drainage tunnel is run to this property. He states that the present water level in the mine is 125 ft. above the new ninth level, where the two new pumps are to be installed in the next 90 days.

Portland sold from \$1.80@\$1.85 during the week, closing at \$1.82 and \$1.81 $\frac{1}{2}$ to-day. The starting of the new mill of the company at Colorado City has precipitated matters with the United States Reduction and Refining Company, and the suit over the use of the Sloan filter patent will, it is announced, be commenced next week in the Federal court. The mining company will give its bond and continue the operation of its mill during the pendency of the suit. The Portland directors voted to pass the usual quarterly dividend of \$180,000 this week.

The advance in Vindicator during the week furnishes a little brightness for the market. These shares sold from 93 $\frac{1}{2}$ @95c., closing to-day at 95. The company declared its usual 3c. dividend and an extra one of 2c. a share, making \$55,000 to be paid out July 25.

El Paso was strong during the week at 51@51 $\frac{1}{2}$ c., showing considerable activity at the latter figure. The insiders are supporting this stock in commendable style, and succeeded in arresting a vigorous bear raid on it to-day, when it was inclined to break in sympathy with Elkton. Isabella sold at 27 and down to 26 $\frac{1}{2}$; the last sales were made at 26 $\frac{3}{4}$ c. to-day. Mollie Gibson showed a little strength, advancing from 12 to 12 $\frac{1}{2}$ c. The Argentum Juniata Company again endeavored to hold its annual meeting at Council Bluffs yesterday, but failed of a quorum. The stockholders did not respond to the proposal of a voluntary assessment, and the property is in danger of being sold for an indebtedness of \$50,000.

Salt Lake City. July 12.

(From Our Special Correspondent.)

The market has improved during the week, both in the number of sales and in prices. The tables of sales look somewhat checkered, but most of the properties have advanced in price. Sales for the week have been 152,267 shares, which is three times greater than those of last week. The most active stocks have been the Park City properties, of which Daly-West records 3,259 shares sold at prices between \$54.25 and \$55.75, while Daly-Judge reports 2,200 shares at from \$7 to \$8.25. This is an advance of \$1.20 per share. Daly stock has advanced from \$2.13 to \$2.17 $\frac{1}{2}$, with a drop to \$2.08 at close, and records 2,908 shares transferred.

Of the Tinti properties, the heaviest sales have been those of South Swansea, 26,500 shares at 23@30c. Ajax records 11,800 shares at 29@32c.

Yankee Consolidated stock advanced from \$1.13 at the close of last week to \$1.25, with sales of 700 shares. Of the Mercur properties Sacramento has advanced in price from 26c. at the close of last week to 33c., 9,400 shares changing hands. California has been somewhat of a surprise, advancing to 19c., with sales of 32,900 shares.

San Francisco. July 12.

(From Our Special Correspondent.)

Business was not especially brisk after the holidays, though trading improved towards the close of the week, and quotations were better. Some of our prophets predict a little boom, but it is hard to see what will start it.

Some quotations noted are: Consolidated California & Virginia, \$1.35; Ophir, \$1.30; Caledonia, \$1; Union Consolidated, 19c.; Occidental, 17c.; Gould & Curry, 5c.; Savage, 4c.; Crown Point, 3c.

On the Producers' Oil Exchange trading was slow, and business is still dull. Prices, however, are fairly well maintained. Home brought \$3.20; Sterling, \$1.50@\$1.53; Monarch, 16c.; Bear Flag, 6c. Most

of the trading was in the low-priced stocks, though some business was done in Home Oil.

London. July 8.

(From Our Special Correspondent.)

Though the coronation did not take place as arranged, most of the last week was kept as holidays, and business was to a large extent suspended in the city. The Stock Exchange has consequently been quite lifeless. Very little has been done in any branch of South Africans. The bears in the West Australian market appear to have had their innings as far as depressing prices is concerned, and they are now bent on raising prices once more. Rumors of rich strikes at depth are now being circulated with regard to mines that a month ago were alleged to be petering out, so no doubt their policy now is to sell at a handsome profit. The public is at present decidedly tired of West Australian market manipulations, so the movements will not be on a great scale.

The meeting of shareholders of the Le Roi Company was held the other day to discuss the report of the investigation committee that I mentioned last week. The shareholders adopted the committee's suggestion, namely, that work should go on as before with a new directorate and manager in place of those who now wish to be relieved, and without any reconstruction. One of the members of the committee, Mr. Williamson Milne, disagreed with his colleagues, and has issued a minority report in which he recommends that the company should be reconstructed and new capital raised so as to wipe out the indebtedness to the Bank of Montreal. He points out that the eyes of the mine are being picked out in order to make the profits sufficiently large to pay off this debt, with the result that the mine will eventually become a large low grade proposition. His recommendation was that the company should amalgamate with Le Roi No. 2, and that money should be raised by assessment to pay off debts. Mr. Milne is an accountant who has considerable experience in mining companies, and his proposition is a good one from a business point of view. Unfortunately, however, Stock Exchange requirements were too strong for him, and shareholders welcomed any scheme not involving assessment. In a London mining company the working of the mine is not the chief consideration, but the buying and selling of shares at a profit. Many policies otherwise inexplicable are made clear when this fact is remembered. At the present time the direction of the Le Roi is being handed over to Mr. A. G. McMillan, who is well known at Rosslund, and it remains to be seen whether he will be able to make a success of a mine that has a gigantic and only partially secured debt hanging over it.

The Palmarejo & Mexican Gold-fields Company has at last, after many misadventures, got on its legs. The cyanide plant is completed and is now in operation. The full 50 stamps commenced work a week or two ago. The pulling of this property out of the mire is a notable achievement, and Mr. Oxnam, the manager, deserves great credit. It is to be regretted that his health has given way with the strain of work and hard climate. The new manager, Mr. Andre P. Griffith, is well known as a capable gold mining man, so the future of the mine should now be assured.

A good deal of discontent has been caused among shareholders in the Bischof White Lead Company, Limited, by the failure of the directors to get to work on a commercial scale. The company was floated 18 months ago, under the auspices of members of the firm of Brunner, Mond & Co., to work Dr. Bischof's new white lead process. The experimental works near London, where the process had been worked out, had yielded sufficiently good results to suggest the advisability of working on a large scale. The company was floated with large capital, but the business of the company has never been proceeded with. The directors state that the difficulty is their inability to obtain a suitable site for the new works. The experimental works have been continued and the process has been further developed and improved, but it has not been possible to work it at a profit on a small scale. At the meeting of shareholders many angry recriminations were made, and several shareholders advanced the opinion that the flotation had been premature. It is to be hoped, however, that the company will work out all right in the end.

The shareholders in Stratton's Independence have received another staggering blow by the publication of Mr. Hammond's most recent report. This report announces that the ore reserves are nearly exhausted, and all that remains is chiefly in pillars and odd corners. He estimates that during the next six months a profit may be made of \$100,000 after providing for development work. The prospecting work has so far been unsuccessful, and no payable ore-body has been found. The shares in the company continue to fall and can be had in any quantity at 5s. apiece. This value is entirely due to the fact that there is a large sum of undivided profits in re-

serve which will be devoted to obtaining new properties.

COAL TRADE REVIEW.

New York. July 18.
ANTHRACITE.

Interest this week has centered on the probable action of the delegates of the United Mine Workers, who assembled on July 17 at Indianapolis. It was generally recognized that prophecies as to the action of the convention are little better than guesswork. The decision of the Hazleton convention of anthracite miners to strike was so entirely unexpected that there has been little reliance placed in the stories in the daily press that purported to be based on information from confidential sources. The general impression has been that the miners would not vote to strike; in fact, the matter of a general strike would not even be voted on. Instead, there would be resolutions of the kind to be expected and a pledge to raise some large sums of money, the larger the better, for the anthracite men on strike. This would give the labor leaders a chance to make glittering promises, to hold in line the rank and file for a few weeks longer. It is not believed by persons at all well informed that the United Mine Workers will be able to raise the enormous sum necessary for regular weekly payments of any size to all men and boys idle in the anthracite region. The prospects are still that the strike will gradually collapse. The operators are as firm as when the strike first started.

Meanwhile a considerable number of washeries are running without interruption, and more are likely to start next week. Were all the washeries in the anthracite region to run night and day they could easily produce 500,000 tons monthly of the steam sizes. Compared with a monthly shipment of 5,000,000 tons of all sizes, the washery output is of slight account, but it will go far in helping the operators to supply those steam producers who must have anthracite.

Trade at all points is very quiet. In the northwest there is still some coal left on the docks at the head of the lakes. In Chicago territory supplies are slowly diminishing and dealers are restricting deliveries still more, supplying only favored customers or those having regular contracts. Along the lower lakes the market shows little change from last week. Demand is generally light, though wholesale prices at Buffalo are reported to show no advance above the regular raise of 10c. on July 1. Trade along the Atlantic seaboard is very dull indeed. At New York, Philadelphia and Boston buying for domestic purposes is so very light that the supply available will last longer than seemed probable when the strike was declared. The weather is warm, and householders are not troubling much about next winter's coal supply. At New York Harbor the newspapers that were making the most fuss about the increased use of bituminous in office buildings and factories are hunting for new sensations, the elevated is getting enough coal from various sources to supply its locomotives, and interest in the miners' strike has fallen wonderfully. The regular July prices for free-burning white ash coal, f. o. b. New York Harbor ports, are: Broken, \$4.05; egg, stove and chestnut, \$4.30. What coal is picked up outside of that still supplied by some firms to certain old customers changes hands at \$7@8 per ton.

BITUMINOUS.

During the past week the Atlantic seaboard soft coal trade has become much quieter. Consumers have generally rather withdrawn from the market in a speculative way, apparently waiting for the questions before the Mine Workers' Convention at Indianapolis to be acted on in some way. As a result, speculative prices have dropped about 50c., and at this writing good Clearfield coal can be bought for \$3.25 f. o. b. New York Harbor shipping ports; while reports are heard of even lower prices. The speculative market is likely to show wide variations if any unexpected action is taken at Indianapolis. It is believed that even now some speculators have been hit rather hard. As to the regular trade, it seems to be the general belief that deliveries have been made of quotas equal to a 6-months' supply by 50 per cent of all producers shipping on contracts closed in April, and fully 95 per cent of all contractors have their full quotas to present date delivered. This indicates that the regular market is likely to be easier if no radical action is taken by the bituminous miners.

In the far East consumers have received heavy shipments during the week, and the speculative market fell there sooner than elsewhere. Along Long Island Sound consumers are taking all of the better grades of coal they can get, but are showing more discrimination in taking speculative coal. At New York Harbor points all contractors are pretty well attended to, and orders are filled with fair speed. The speculative market has fallen, though the chances are that it will advance after the action of the Indianapolis convention is known, even though the miners vote against a general strike, since consumers are

believed to have withdrawn from the market a little too soon, and their stocks will get so low during the time they are out of the market that they will have to come in again, thus advancing prices. All-rail trade has felt the reduction in speculative prices, and buyers in this trade, if they can find any producer with coal unplaced at tidewater, can get some very cheap coal; as low as \$1.50 at the mines is mentioned, but this is an exceptional figure, and \$2 is probably a fair price for low grades of Clearfield at the mines.

Transportation from the mines to the shipping port is good, though at times irregular, and cars are coming through in less than schedule time. Car supply at the mines is nearly up to the wants of producers—90 or 95 per cent of the demand—and no one is complaining. In the coastwise vessel market vessels are in plentiful supply, while rates are weak. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 50@60c.; Boston and Salem, 65@70c.; Portland, Wareham and Portsmouth, 70c.; Lynn, 80c.; Newburyport, 85c.; Bangor and Bath, 75c.; Saco, 85@90c., and towages; Gardiner 75c. and towages.

Birmingham. July 14.

(From Our Special Correspondent.)

The coal production in Alabama will within a few days be back at its usual output. The scale which has been signed gives concessions to the United Mine Workers, in that there is now a uniform contract for the day laborers and in places where there are no scales trams are to be taken out and weighed or estimated during the day to strike an average. In mines where there is a 5 per cent grade the companies are to place the tram cars at the face of the coal. The maximum rate for mining coal remains at 55c. per ton. There are no changes in the old contract further than those mentioned above. The 11,000 men remained out well, reducing the production right from the start.

The development in Alabama during the next few months promises to be heavy. The production the coming winter will be heavier than ever before. The miners anticipate the maximum wage for the balance of the year. The signing of the new scale on the part of the miners caused general good feeling in the entire Birmingham District.

Chicago. July 15.

(From Our Special Correspondent.)

Wholesale trade in bituminous coals is still brisk, being decidedly better than it usually is at this season of the year. Retailers and large consumers are laying in stocks in anticipation of a possible strike at the mines. The shortage of anthracite has boosted retail prices and turned many users of anthracite to the better grades of bituminous. There is especial demand for smokeless at \$3.50 for lump and egg; nut, \$5.25; run-of-mine, \$3.10. Other prices continue as last week: West Virginia, \$3.15; Youghiogheny, \$3.20; Indiana block, \$4.45; Indiana semi-block, \$4.10; Clinton lump, \$1.90; Indiana lump, \$1.85; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2; blacksmith's coal, of which the supply is still not over plentiful, \$3.35; Hocking, \$3.10 for city and \$2.90 for country delivery. The stock of soft coal in city yards is extraordinarily large, having been much increased in the last week.

Nobody is doing any anthracite business; old customers are allowed small orders from the steadily diminishing stocks, which, unless the soft coal situation changes, are good for two or three months yet.

Cleveland. July 16.

(From Our Special Correspondent.)

Impelled by the fear that the meeting to be held Thursday by the representatives of the bituminous coal miners will result in a general strike, the railroads of this territory have started to confiscate large quantities of coal for their own use after the strike has been called. Some of the steel mills, blast furnaces and factories of this region have become apprehensive that they may need a surplus of coal to tide them over an embarrassing situation, and they likewise are laying in a large supply of coal. What material is mined in excess of the needs of the coal carrying railroads and of the steel mills, blast furnaces and factories is being sent first to the domestic consumers and then the residue, which is small, is turned over to the lake shippers for transportation to the Northwest. Under the circumstances, it is but reasonable to suppose that the supply of coal for lake shipment is nothing to boast of. In fact, boats chartered to carry coal are lying three and four deep in front of the lake docks waiting for their cargoes, and their delays have been extended at times to three or four days. Those who are interested in the lake shipment are becoming apprehensive for the results of the season's work. Soft coal shippers have been delayed all summer by a scarcity of cars, and it is now becoming evident that the hard coal movement will be reduced to the minimum. If the bituminous coal shippers are now to be subject to a delay occasioned by a strike the lake movement

will probably be lighter than it has been in years, and, even as it is, the prospects are none too bright.

Pittsburg. July 16.

(From Our Special Correspondent.)

Coal.—All interest in coal matters this week is centered in the special convention of the United Mine Workers, which opens in Indianapolis tomorrow. The delegates from the Pittsburg District have gathered at the headquarters and will leave to-night. They are reticent as to what action is likely to be taken, but it would not be surprising if they voted for a general suspension, in support of the strikers in the anthracite coal field. The shipment of coal by river on the last rise, which ended yesterday, amounts to a little over 21,000,000 bush, most of which was sent out by the Monongahela River Consolidated Coal and Coke Company. There is still about 6,000,000 bush in the pools and harbor ready to go out as soon as navigation will permit.

Connellsville Coke.—There is but little change in the coke situation. The scarcity of cars, due to the Eastern shipments, has somewhat interfered with the deliveries to the Valley furnaces, but none suffered seriously. The price East is \$3.50 a ton for furnace coke, and even a higher rate is mentioned. For the Western consumers, most are still getting furnace coke at the circular price of \$2.25, but paying a premium for prompt shipment. The Courier in its last issue gives the production for the previous week at 234,660 tons. The shipments for the week aggregated 11,574 cars, distributed as follows: To Pittsburg and river tipples, 4,014 cars; to points west of Pittsburg, 5,347 cars; to points east of Connellsville, 2,213 cars. This shows a decrease in the shipments of the previous week of 858 cars.

San Francisco. July 12.

(Special Report of J. W. Harrison.)

During the week there have been the following coal arrivals: Four from British Columbia, 19,618 tons; 2 from Oregon, 600 tons; total, 20,218 tons. It is rather a singular coincidence that during the week there has not been a single arrival of coal from Washington, and yet the amount delivered here from British Columbia will amply supply all requirements. Business generally in the fuel line is very quiet. Prices remain unchanged; in fact, values have declined so much lately that it would naturally be inferred that bed-rock quotations had been reached. Screenings are to-day selling for higher figures than at any time within the past 12 months. This is attributable to the small amount now on hand. Coal freights from Australia and Great Britain have slightly improved. This is mainly caused by the low outward rates on grain now ruling. The loading list of coal carriers from Australia does not seem to decrease in number. For every vessel arriving here from there another new name is added on the other side. Fuel oil is being generously used. Consumers are buying same on most favorable conditions. Jobbers and retailers are complaining of their light sales for household purposes, but at this season of the year such sales will naturally decrease. Consumers of domestic coals are pretty well assured of prices being considerably lower next year than they were last fall.

Prices.—Our special correspondent reports yard prices to dealers at San Francisco for coast coals as follows: Wellington, \$8 per ton; Southfield Wellington, \$8; Coos Bay, \$5.50. Rocky Mountain descriptions are \$8.45@8.50 per ton of 2,000 lbs., according to brand. Cargo lots of Eastern and foreign coals are quoted per ton: Pennsylvania anthracite, \$14; Cumberland, \$12; Welsh anthracite, \$14; cannel, \$11; Wallsend, \$8.50. Coke is quoted at \$15 per ton in bulk and \$17 in sacks.

Foreign Coal Trade. July 17.

Export trade continues quiet, and there is little to note. About the usual business is doing to the West Indies and South America, but there is nothing new in the European trade at present. There is a prospect that ocean freight rates will be lower, as the cutting down of the military establishment in South Africa will release a large tonnage which has been employed in carrying supplies.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of July 5 that there is no change in the general tone of the Welsh coal market. Monmouthshire descriptions are perhaps slightly easier, but best Cardiff sorts and smalls remain steady. Quotations are: Best Welsh steam coal, \$4.02@ \$4.14; seconds, \$3.96; thirds, \$3.66; dry coals, \$3.60; best Monmouthshire \$3.30@3.48; seconds, \$3.12; best small steam coal, \$2.16; seconds, \$2.04; other sorts, \$1.80.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market has shown more activity, but Mediterranean and South American rates are some-

what easier. Some rates quoted from Cardiff are: Marseilles, \$1.35; Genoa, \$1.32; Naples, \$1.32; Singapore, \$2.64; Las Palmas, \$1.50; St. Vincent, \$1.12; Rio de Janeiro, \$2.88; Santos, \$3.24; Buenos Aires, \$3.06.

IRON TRADE REVIEW.

New York. July 17.

There are no special items of interest this week, and the situation is generally well covered by the local reports, which follow.

Southern furnaces are now beginning to sell for 1903 delivery, which they have heretofore hesitated to do. The settlement of the Alabama coal strike has removed all fear of a curtailment of iron supplies from that source.

The pressure for structural steel continues, but in other lines matters are easing off somewhat.

The quantity of steel rails now under contract for 1903 is put at about 850,000 tons, and this will be increased probably within the next month.

Birmingham. July 14.

(From Our Special Correspondent.)

The differences between the coal miners and operators were settled on Friday evening last and work resumed to-day throughout the State at the mines, and by the end of the week several of the furnaces which have had fires banked or have been running slack will resume in full. Six furnaces were either blown out or had fires banked during the past two weeks. The Woodward Iron Company made a temporary contract with the miners and kept on in full blast right along.

Quotations have not changed, though a statement was made recently that some No. 1 foundry sold as high as \$19 and \$20. The latter price is believed to have been an exaggeration. The following quotations are given: No. 1 foundry, \$16.50@17; No. 2 foundry, \$16@16.50; No. 3 foundry, \$15.50@16; No. 4 foundry, \$14.50@15; gray forge, \$14; No. 1 soft, \$16.50@17; No. 2 soft, \$16@16.50.

The report is heard that considerable iron has been sold for 1903 delivery. One of the larger companies has sold into March of next year.

The report of the Southern Iron Committee for the month of June has been issued and a decrease in the shipments as compared to those in May is shown. The report shows the following shipments by districts:

Districts.	Pig Iron.	Cast Iron Pipe.
Anniston	19,440	1,960
Birmingham	71,449	7,383
Nashville	9,928	.....
Sheffield	17,680	.....
Middlesboro	5,060	.....
Chattanooga	23,667	3,742
Total	147,222	13,985

The total shipments during June amounted to 160,307 tons against 169,739 tons in May, this year. The steel shipments last month amounted to 8,490 tons against 11,000 and over during the month of May. The export movements were: Pig iron, 345 tons; cast iron pipe, 148 tons. The shipments during the month of June were equal to the production.

There was a slight accident at No. 2 furnace of the Republic Iron and Steel Company, by a choke breaking hose. Fortunately no one was hurt, but a quantity of iron was lost.

The steel output has been steady. At the rolling mills the work has not been so steady since the first of the month, the coal miners' suspension being felt. It is intended, however to resume active operations just as soon as the supply of coal is steady again, which will be about the end of this week.

The trouble among the machinists has disturbed four of the larger shops in the city. There is plenty of work on hand and considerable in prospect. The foundries are also doing well. Other industries in the district employing iron and steel are doing well and anticipate a steady operation through the balance of the year.

The Oxmoor Furnace Company has been incorporated, with capital stock at \$100,000, with power to increase the stock. T. T. Hillman, G. B. McCormack and Erskine Ramsey are among the incorporators, and it is announced that the two old furnaces at Oxmoor belonging to the Tennessee Coal, Iron and Railroad Company have been purchased. President Bacon believes that it is better to concentrate the furnaces of the company at Bessemer and Ensley, hence his recommendation of a sale of the Oxmoor property. One of these furnaces is partly dismantled, but the new company proposes to put them in shape, and have them in operation by fall. Other works will be constructed by the Oxmoor Furnace Company. The incorporators are all practical industrial men who have been long in the district and know full well what they are about.

Buffalo. July 15.

(Special Report of Rogers, Brown & Co.)

Interest is now centered in the market for the early months of next year, and while a good many buyers have not yet taken the subject under active consideration, the number of orders which have al-

ready been placed aggregate a considerable tonnage. There seems to be a difference of opinion as to the probable trend of the market after the close of the present year, but it is a noticeable fact that some of the shrewdest and most conservative buyers have deemed it wise to cover for their requirements during the first half of 1903. In the meantime consumption continues at a rapid rate. Many furnaces are now banked or out of blast on account of the labor troubles in the coal-fields, and the resultant gap in the available supply of pig iron has been keenly felt by many foundries in western New York. Because of the scarcity of iron for delivery before January and the consequent wide variance in prices asked and paid for such odd lots as are now and then obtainable, it is practically impossible to correctly indicate just what is the present market schedule, but the following may be considered an index as to the general condition in this territory. These prices are on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$24.25; No. 2 \$23.25; Southern soft, No. 1, \$23.50@24.50; No. 2, \$22.50@23.50.

Chicago. July 15.

(From Our Special Correspondent.)

Activity of sales for next year's delivery continues. Fancy prices are being paid for small lots of iron to be delivered immediately. One sale of less than 1,000 tons Southern No. 2 is reported at \$22.75 Birmingham, or \$26.40 Chicago. There are other sales around this price, due to the frantic eagerness of some purchasers for iron at any price. Doubt as to the actual Southern labor conditions is expressed to-day. Although there are reports of the settlement of labor difficulties in the Birmingham District, the fact has not yet become positively known to Chicago men interested in pig iron. Most sales now being made are of Southern for delivery next spring at \$20.15@20.65 Chicago for No. 2, with No. 1 the customary 50c. higher and No. 3 shading from no difference to 50c. lower than No. 2. Sales of Northern are fairly active for the first half of 1903 at \$22 for No. 2, and some large contracts are reported.

Coke is now coming in well from the Connells-ville District, but has become scarce from the West Virginia fields. Foundries are getting a fairly good supply, for the first time in many weeks. The price of foundry coke is somewhat lower. Quotations for the week have ranged \$5.75@6.25; good sized contracts can be made to-day at the lower figure.

Cleveland. July 16.

(From Our Special Correspondent.)

Iron Ore.—The lake trade is now presenting the usual spectacle of boats congested at the unloading ports, because more ore is being brought down than the docks, with the present car supply, can handle, and of the upper lake ports showing more boats offered for ore cargoes than the shippers can employ. The latter situation is in part the result of a shortage of cars on the Northwestern railroads. With the double congestion, it might be supposed that the movement of the material down the lakes would be impeded, but the exact contrary seems to be the case, as the shipment is taking on a record-breaking pace which promises to place July of this year ahead of any month in the history of the ore trade. Rates are stable, being 75c. from Duluth to Ohio ports, 65c. from Marquette, and 55c. from Escanaba.

Pig Iron.—Most of the furnaces in the Mahoning and Shenango valleys are running in a hand-to-mouth fashion as to the supply of coke, and are in constant fear of being forced to suspend operations. Those furnaces, however, which banked have resumed. Material is very scarce, due mostly to the forced idleness of furnaces in other districts. There is practically no material for sale for immediate shipment, and all interest is centered in future sales, on which the prices hold at \$21 for No. 2 foundry, Vallev furnace. Southern foundry No. 2 is bringing \$17. Birmingham. Bessemer and basic producers are making no sales and quoting no prices.

Finished Material.—Sales of plates have been made in such quantities of late as to take up the entire output of the larger mills until April 1, 1903. The selling has been heavy, both of tank and boiler plates. The price has held firm at 1.70c. For immediate delivery none of the big mills has any material. Some of the smaller mills have been offering limited quantities, and one Pittsburgh mill asked 2c. at the home market, while a Cleveland mill has been quoting 2.10c. Structural steel has been selling in large blocks. One local concern took 6,000 tons; another 1,000 tons, and in addition there was a sale of 5,000 tons of ship material, including plates and shaves. On these advanced sales the association price of 1.70c has prevailed. There is no material to be had for immediate delivery, but some of the consumers have bid freely 2 1/2 to 3 1/4 c. for shapes of any description. Rails have been leaders also, with a heavy tonnage covered for delivery into the next year. No one is thinking of making sales for im-

mediate delivery, since that is manifestly impossible. Smaller bars are getting easier, and some mills promise deliveries in four or five weeks, but large rounds are as difficult to obtain as ever. The bar iron mills are still idle. Bar steel prices hold at 1.60c., Pittsburgh, for bessemer, and 1.70c., Pittsburgh, for open hearth. The idleness of the bar iron mills, the wire and rod mills, has produced the possibility of a more abundant supply of billets, but no relief has come and the material is as valuable and as scarce as ever. Sheet sales continue light, with the smaller mills making incessant inroads on the business of the larger ones by cutting the prices.

Philadelphia. July 17.

(From Our Special Correspondent.)

Pig Iron.—The situation as to foundry iron has not materially changed. The local office people take a very conservative view, and in substance say that there is no occasion for further advances; that the amount of iron that will be actually needed to fill out with during the remaining months of the year will be had; that the restriction in production due to strikes will not materially alter quotations, and that the market requirements will be quietly met. No iron is being offered this week, and production is gradually declining. Buyers of foundry are alarmed over the apparent scarcity, and are undecided how to act. For the present they are doing nothing. Users of forge are not buying except where it is necessary to keep a certain quantity ahead. In a general way mill owners are protected for some weeks to come by contracts. Quotations may be given at \$24@25 for No. 1X foundry; \$23@23.50 for No. 2X; \$22.50 for No. 2 plain, \$20@21 for standard forge, \$19@20 for ordinary, and \$22 for basic. Considerable foreign material is arriving, including some which was shipped abroad some time ago. Agents who have placed contracts for Scotch and English iron say that the indications are for much heavier orders during the summer, provided there is no material advance in price.

Billets.—German billets are quoted to-day at \$31; American \$34. The inactivity in the market is not accompanied by the weakness which was prophesied by buyers a few days ago. Consumption is very heavy.

Bars.—Store demand in city and country has picked up quickly, while orders at mills are not particularly important. All mills are now back at work, and production will soon be up to the highest June level. Refined and steel bars are selling pretty closely around 2c.

Sheets.—Those buyers who jumped at the conclusion that sheets were weaker have discovered that manufacturers think differently. Orders keep coming in as fast as manufacturers care to have them, and if there is any weakness in prices the fact is not apparent in orders booked. Most of our July business, however, is for small lots.

Merchant Steel.—The tendency in Western markets to order ahead keep prices taut both there and here. Business is of a hand-to-mouth character, but consumers who use large amounts are pretty well supplied.

Skelp.—Grooved skelp does not bring special prices. We are down to the normal again, and will probably remain there.

Boiler Tubes.—Notwithstanding there is quiet in several branches of the steel industry, tubes continue active, particularly for forward delivery. Quite a good volume of tonnage has been booked during the past few days.

Plates.—Early deliveries for small lots are now occupying attention, and, of course, top prices are readily conceded. There is a surprisingly good mid-summer demand from local sources in small lots. Quarter-inch stuff commands 2@2.10c.; universals, 2@2.05c.; flange, 2.10@2.20c.; fire-box, 2.30c.

Structural Material.—There is quite a retail demand for small lots of structural material, and exceptional prices have been named. The statement is given out that the autumn structural requirements will be very heavy, especially on account of bridge work to be erected in the winter months.

Old Rails.—Very scarce at \$25@26 for iron; old steel rails, \$21.50.

Scrap.—Consumers of scrap recognize that delays mean higher prices. Three or four of our larger gatherers of scrap have instructions to buy up any suitable sort of scrap they can get. Heavy steel is most wanted, and it is worth at times as high as \$22. Cast borings go at \$11; No. 2 light forged scrap, \$15; choice railroad scrap, \$24@25; old axles are quoted at \$30.

Pittsburg. July 16.

(From Our Special Correspondent.)

The iron and steel markets are generally quiet this week. Mills are well sold up on finished material, and but little pig iron remains for this year and for delivery in the first quarter of next year. A general

weakening of prices is noted, but there is very little offered and taken at the lower rates. A few sales of small lots have been made during the past few days at fairly high prices, but this does not indicate the tone of the market. The price of bessemer steel billets can be named at fully \$1 a ton lower than last week for delivery within six months. An offer of a fairly large tonnage is reported, but has not been accepted at the terms proposed. Sheet bars are not in as good demand as a week ago, and prices are a trifle lower. The market for sheets, wire products and tin plate is not strong, but sheets are somewhat firmer this week. German bessemer billets can be had at \$31 delivered in the Pittsburgh District, and sheet bars are quoted as low as \$32. No sales of any consequence are recorded at those figures. Plates continue scarce, and the American Shipbuilding Company and other concerns are having some difficulty in placing orders for deliveries during the next four or five months. The pool price on plates cannot be done for shipments this side of February or March. The lowest quotation this week is 0.15c. above the fixed price, and in small lots for quick shipment a higher price is readily obtained.

The pig iron market this week shows a better demand, and prices unusually firm with a limited supply. A big sale of bessemer pig, 10,000 tons, for the present condition of the market is reported for fourth quarter delivery at \$21.75, Valley furnaces. This report, however, is not confirmed. Gray forge is strong, and foundry iron is decidedly so, demand and prices continuing very firm. It is reported that a meeting of pig iron producers of the South is to be held soon to consider prices for shipment in 1903. But one Southern interest seems to be in the market for this year's delivery so far as the Pittsburgh District is concerned.

The expected advance in wages of iron workers in the union rolling mills of the country came with the bi-monthly adjustment held at Youngstown during the week between representatives of the Republic Iron and Steel Company and the Amalgamated Association of Iron, Steel and Tin Workers. The putting rate is fixed at \$6 a ton, an increase of 25c., and the wages of the finishers are advanced 2 per cent. Fully 50,000 workers are affected by the adjustment. The examination of sales sheets for tin plate and sheets also were made this week, but the result was no change in wages. This is due to the fact that prices have been under the base rate of the scale for many months.

The conference on the wage scale between the representatives of the Amalgamated Association and the American Tin Plate Company held in New York on June 30, is still exciting considerable comment. No agreement was reached, and the matter of a final adjustment was referred to the workers' lodges for a vote. It is reported that the company wants to cut wages or increase the output by removing the limit, but both reports lack confirmation.

Pig Iron.—Bessemer pig iron for delivery in the fourth quarter is quoted at \$21@21.50, Valley furnaces, but few sales are noted. The price for prompt shipment is firm at \$22. Gray forge is quoted at \$21 Pittsburgh for any delivery. Foundry No. 2 is held at \$23 Pittsburgh, for early and \$22.50 for future delivery. For next year \$21.75 and \$22 are quoted. Several thousand tons have been sold.

Steel.—A number of sales of German steel billets have been made at \$31, and more can be had. Domestic billets are quoted at \$32, but no sales are recorded at less than \$34. Wire rods are easier, and can be had at \$35. Steel plates continue at 1.60@2c.

Sheets.—The sheet market shows some indication of improvement. A few mills have been shut down for repairs. Black sheets of No. 28 gauge remain at 3@3.10c. Galvanized sheets are quoted at 4.50 in car-load lots.

Ferro-manganese.—No sales of domestic 80 per cent are recorded. The English product is quoted around \$53 and the German at \$52. There is an unusual importation of foreign ferro-manganese.

New York. July 18.

Pig Iron.—Sales are light, but the demand of prompt delivery is very strong and sales at \$25@26 for No. 1X Northern foundry at the furnace are reported. Nominal quotations for tidewater delivery are: No. 1X foundry, \$22@23.50; No. 2X, \$21@22; No. 2 plain, \$21. For Southern iron on dock, New York, No. 1 foundry, \$22@23; No. 2, \$21@22; No. 3, \$20@21. These quotations are for delivery up to 1903.

Bar Iron and Steel.—Demand is still strong. We quote on large lots on dock: Refined bars, 1.95@2.05c.; common, 1.85@1.95c.; soft steel bars, 2c. Small lots for prompt delivery are considerably higher.

Plates.—There is no change in market conditions. Mills are making their terms on prices and deliveries. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 2.05@2.15c.; flange, 2.10@2.20c.; marine, 2.20@2.40c.; universal, 2@2.10c.

Steel Rails.—Standard sections are quoted at \$28

for 1903 delivery; light rails \$30@35, according to weight.

Structural Material.—The tonnage to be used locally next year increases. We quote for forward delivery on large lots at tidewater as follows: Beams, 2@2.30c.; tees, 2@2.25c.; angles, 2@2.25c.

CHEMICALS AND MINERALS.

New York. July 17.

Heavy Chemicals.—Business is generally quiet, as the larger consumers have all the supplies they need for the present, while the glass works, the heaviest users of alkali and caustic soda, are closed down for the summer. Domestic chemicals, we quote, per 100 lbs. f. o. b. works, as follows: High-test alkali, in bags, 80@85c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.85@1.87 1/2 for futures; bicarb. soda, ordinary, 95c., and extra, \$3; sal soda, 65c.; chlorate of potash, \$7.75; bleaching powder, off-test, \$1.35; best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92 1/2c.; caustic soda, high-test, \$2.25; sal soda, 67 1/2@70c.; chlorate of potash, \$10.25@10.75; bleaching powder, prime brands, Liverpool, \$1.75; Continental, \$1.37 1/2@1.65.

Acids.—Seasonably quiet. Quotations per 100 lbs. are as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Blue Vitriol.....	\$2.50@4.62 1/2	Oxalic, com'l.....	\$4.60@5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.,	bulk, ton.....
Muriatic, 20 deg.	1.62 1/2		13.50@15.50
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.	1.00
Nitric, 36 deg.....	4.00	Sulphuric, 60 deg.,	bulk.....
Nitric, 38 deg.....	4.25		18.00@20.00
Nitric, 40 deg.....	4.50	Sulphuric, 66 deg.	1.20
Nitric, 42 deg.....	4.87 1/2	Sulphuric, 66 deg.,	bulk.....
			21.00@23.00

Brimstone.—Buying is of a hand-to-mouth character only. Spot best unmixed seconds are quoted at \$23@23.25 per ton, while shipments hold at \$22@22.25. Best thirds are \$2 per ton less than seconds.

Concerning the brimstone market in Sicily Messrs. Emil Fog & Sons, of Messina, advise us under date of June 30 that there is no improvement. Exports to France and Italy have not recovered, but show a further reduction of about 9,000 tons against last year. Exports to America, too, would show a decrease, were it not for a steamer cargo shipped to St. Johns, Canada. This fresh demand for Canada is indeed very cheering. A cargo was also sold, after cessation of the war, to South Africa, and two cargoes to Australia. These new markets certainly improve prospects considerably, only they do not so far compensate the falling off in consumption in the old world. Stocks of brimstone in Sicily at end of May were 262,000 tons, against 172,000 tons last year. The only means of getting rid of this superabundance of production would be to reduce prices materially, but to such proposal the Anglo-Sulphur Company is still turning a deaf ear. Prices remain almost unaltered. Seconds declined 1s.@2s., but thirds were paid 1s. higher by an uncautious shipper caught short by the Anglo-Sulphur Company. We quote: Best unmixed seconds, prompt 82s. 3d., September, December 81s.; best thirds, prompt 75s. 6d., September—December 73s. 6d.; refined block sulphur, prompt 84s. 3d., September—December 83s.; refined roll sulphur, in 3-cwt. casks, 93s. 9d.; sublimed flowers pure, in bags, 99s.; sublimed flowers current, in bags, 90s. 9d. Freight is slightly stiffer at 7s. to New York, 7s. 3d. to Philadelphia, 7s. 3d. to St. Johns, Canada.

Pyrites.—Acid makers are buying moderately at good prices to sellers. The firm freight rates keep foreign pyrites strong, but as most of the large consumers are under contract with importers, market prices as quoted are only nominal.

Quotations are f. o. b. Mineral City, Va.: Lump ore, \$5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, \$5, and fines \$4.75. Spanish pyrites 12 1/2@13 1/2c. per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Comparatively little foreign gas liquor is being imported, owing to the recent heavy consumption abroad, leaving small stocks in makers' hands, and also to the curtailed buying in America as the quiet season is on. Spot 24@25 per cent gas liquor can be had at \$3.05 per 100 lbs., while shipments are quoted at \$2.97 1/2@3, according to position.

Nitrate of Soda.—The market continues exceptionally quiet. Steamer *Borderer* has arrived at Charleston with 28,100 bags, and the *Capac* at Baltimore with 28,400 bags. Spot is offered at \$1.95; August-September, \$1.90; October and 1903, at \$1.87 1/2 per 100 lbs. The coast market is weaker, but there are rumors that labor troubles at the nitrate ports might occur in September, which may cause an advance in price of nitrate of soda.

The European situation is unchanged, as importers are closely figuring how cheaply they can sell

when the buying season opens. On July 1 there was a visible supply, including stocks and cargoes afloat, amounting to 343,900 tons, which is the smallest quantity reported since last August. As compared with July, 1901, however, there is an increase of 30,090 tons.

Phosphates.—Export trade in Tennessee rock is much less than last year, judging from the shipments through Pensacola. In the 6 months ending June 30, only 41,182 tons of rock were exported from this port to 5 countries, which is but little more than was sent to Italy alone last year. This year Italy received something over 20,000 tons, whereas last year it bought fully 16,000 tons more. Practically the same condition exists in the export trade for South Carolina rock, which has to compete very keenly with the pebble phosphates of Florida and the Algerian rock. High grade Florida rock, on the other hand, shows some improvement in exports, but prices were not as satisfactory as last year. In June the shipments from Fernandina aggregated 20,220 tons, making a total of 95,920 tons for the 6 months this year, as against 73,564 tons in the same period last year, showing an increase of 22,356 tons, which is equal to one month's exports. It is estimated that the July shipments from this port will be about 25,000 tons, which is nearly 50 per cent larger than last year.

New discoveries of low grade phosphate rock are reported in Walker and Cataosa counties, Georgia. The rock is light gray in color, and the deposit is from 3 to 4 ft. deep.

We quote prices below:

Phosphates.	Per ton F. o. b.	or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$.65@\$.70	6 1/4@6 3/4 d.	\$9.75@10.53
*Fla. land pb. (68@73%)	3.00@3.25	4 3/4@5d.	6.65@7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4 3/4@5d.	5.70@6.00
†Tenn., (78@80%) export.	3.25@3.50	5 1/2@6d.	8.58@9.36
†Tenn., 78% domestic	3.00		
†Tenn., 75% domestic	2.75@3.00		
†Tenn., 73@74% domestic	2.40		
†Tenn., 70@72% domestic	2.10@2.25		
‡So. Car. land rock	3.25	4 1/2@5d.	5.67@6.30
‡So. Car. river rock	2.75@3.00		
Algerian (63@68%)		5 1/4@6 1/4 d.	7.48@8.45
Algerian (58@63%)		5 1/4@6d.	6.30@7.20
Algerian (53@58%)		5 @5 1/4 d.	5.50@5.78

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

Liverpool. July 2.

(Special Report of Joseph P. Brunner & Co.)

There is no new feature to report as regards the position of heavy chemicals, a moderate trade passing without change in quotations. Soda ash, nearest spot range for tierces may be called about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters. Caustic soda keeps very firm at the following quotations: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton net cash.

Bleaching powder is difficult to move as regards new business, but £6 12s. 6d.@£6 15s. per ton net cash is still nominal range for hardwood packages, with special quotations for Continental and a few other export quarters.

Chlorate of potash is dull at nominally 3d. per lb. net cash.

Bicarb. soda is selling at £6 15s. per ton, less 2 1/2 per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special quotations for a few favored markets.

Sulphate of ammonia is dull and easier at about £12 10s.@£12 15s. per ton, less 2 1/2 per cent for good gray 24@25 per cent in double bags f. o. b. here.

Nitrate of soda is nominally quoted on spot at £5 15s.@£9 per ton, less 2 1/2 per cent for double bags f. o. b. here, but there is not much going on.

METAL MARKET.

New York. July 17.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in June and Year.

Metal	Year.			
	1901.	1902.	1901.	1902.
Gold:				
Exports....	\$5,344,844	\$3,175,000	\$29,491,236	\$20,496,504
Imports....	3,260,743	1,414,316	15,927,969	10,618,867
Excess. E.	\$2,084,101	E. \$1,050,568	E. \$13,563,257	E. \$9,880,637
Silver:				
Exports....	\$4,568,905	\$3,250,066	\$28,474,062	\$22,534,624
Imports....	1,934,357	1,802,853	15,135,186	12,351,131
Excess. E.	\$2,634,548	E. \$1,447,213	E. \$13,298,816	E. \$10,183,493

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Average Prices of Copper.

Table with columns for Month, New York (Electrolytic, Lake, London Standard), and prices for various months from January to December.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper.

Average Prices of Silver, per ounce Troy.

Table with columns for Month, 1902, 1901, and 1900 prices for New York and London.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns for Name of Company, Date, Share, Total, and Latest Dividend Per Share.

ASSESSMENTS.

Table with columns for Name of Company, Location, Date, and Assessment Amount.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices from July 10 to July 16.

*Per cent.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing companies and their prices from July 10 to July 16.

Total sales, 247,467 shares. †Ex-dividend

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing companies and their prices from July 10 to July 16.

* Official Quotations Boston Stock Exchange. Holiday. Total sales, 55,557 shares. *Ex-dividend.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, Pa., listing companies and their prices from July 10 to July 16.

§Reported by Townsend, Whelen & Co., 300 Walnut St., Philadelphia, Pa. Total sales 17,234 shares. †Ex-privileges.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, July 7-12, and sales.

LONDON.

July 5.

Table of stock quotations for London, listing companies like Anaconda, Copiapo, De Lamar, etc., with columns for authorized capital, par value, last dividend, and quotations.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Am. Con., etc., with columns for par value, July 10-16, and sales.

PARIS.

June 26.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Huta-Bank, Anzin, etc., with columns for country, product, capital stock, par value, latest divs., and prices.

MEXICO.

July 4.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, Angustias, etc., with columns for shares, last div'd, prices, and sales.

SALT LAKE CITY.*

July 5.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Ben Butler, California, etc., with columns for shares, par val, high, low, and sales.

TORONTO, ONT.

July 7.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, British Columbia, Cariboo, etc., with columns for par val, high, low, and sales.

ST. LOUIS, MO.*

July 14.

Table of stock quotations for St. Louis, Mo., listing companies like Am.-Nettie, Catherine Lead, Central Coal, etc., with columns for shares, par val, bid, ask, and sales.

SPOKANE, WASH.*

July 11.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Black Tail, Lone Pine-Surp., etc., with columns for par val, high, low, and sales.

*From our Special Correspondent.

Total sales 22,000 shares. *Reported by Hunner & Harris.

All mines are in Utah. *By our Special Correspondent. Total sales, 102,207 shares.

Total sales, 152,267 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES. (See also Market Reviews.)

Main table with columns for material name, unit, and price. Categories include Abrasives, Barium, Barytes, Bauxite, Bismuth, Bitumen, Bone Ash, Borax, Bromine, Cadmium, Calcium, Ceresine, Chalk, Chlorine, Chrome Ore, Clay, China, Coal Tar Pitch, Cobalt, Copper, Cryolite, Explosives, Feldspar, Flint Pebbles, Fluorspar, Fuller's Earth, Graphite, Infusorial Earth, Iodine, Iron, Lead, Lime, Magnesite, Manganese, Marble, Mercury, Mica, Mineral Wool, Nickel, Oils, Potash, Potassium, Quartz, Salt, Silica, Silver, Soda, Sulphur, Tar, Tin, Uranium, Zinc, Zirconium.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

THE RARE EARTHS.

Table of rare earths with columns for material name, unit, and price. Includes Boron, Calcium, Cerium, Didymium, Erbium, Gluclinum, Lanthanum, Lithium, Strontium, Thorium, Uranium, Yttrium, Zirconium.