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### TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.



AN EXAMPLE of extremely low costs of mining and milling in a mine on the Mother Lode in California is given in the letter published in another column. We call special attention to this, not only because it well deserves consideration; but also because it is an example of the service which correspondents can render to us and to the mining world generally. Such statements of actual experience are helpful and stimulating to mine managers, and it is desirable to get as many as can possibly be secured for comparison.



A RECENT reference in our columns to a new ore dressing plant in the Missouri soft lead district, calls attention to the number of large plants now in existence in that district. There are now in operation at least five crushing and concentrating mills having capacities of 700 tons and over per day, and ranging from that figure up to 1,400 tons. These plants include, in the order of their size, those of the St. Joseph Lead Company, the St. Louis Smelting and Refining Company, the Doe Run, the Desloge Consolidated and the Federal Lead companies. The district is one of operations on a large scale, as the size of the plants mentioned indicates.



A LETTER in our Correspondence column gives a clear account of the so-called Wynn process, which attracted much attention in Colorado some time ago. Few, if any, engineers of standing took any stock in this process, but it was looked at hopefully by many people and believed in by quite a number. In fact, our experience shows us that almost any process for treating gold and silver ores, no matter how wild its claims, or how absurd its methods may be, will have its believers and advocates. Experience seems to count for little in these matters, and many miners and prospectors will continue to the end of time to hope for the impossible, and to believe those who claim to have accomplished it. Nor are the "solid business men" exempt from such crazes, as the career of Rev. Mr. Jernegan and his gold-from-sea-water company showed in New England, not so long ago.



A CAR-LOAD of concentrated blende, produced recently from ore mined on the Rob Roy lease, east of Joplin, is said to have assayed 65.46 per cent zinc, which is believed to be the best on record in the Joplin District. Although there may be some ques-

tion as to the accuracy of the sampling and possibly a small error in the chemical analysis, there is no doubt as to the phenomenally high grade of the ore, especially when it is remembered that pure zinc sulphide contains only 67.15 per cent of the metal. The Joplin ores are, as a rule, of very free concentrating character, but it would be interesting to know accurately what are the losses in dressing in the production of so high a grade of concentrate out of even so docile an ore. There has been a good deal of tendency in the Joplin District during the last two or three years to produce an extremely high grade of ore, assays of 64 to 65 per cent zinc being not uncommon.



ACCORDING to the telegraphic report given in our news columns last week, the triangular contest for the control of the Colorado Fuel and Iron Company ended last week in a compromise. Under the terms of this agreement the Osgood, Harriman and Gould parties named each four members of the board, while a thirteenth director acceptable to all parties was chosen, to act as a sort of arbitrator. Under this agreement the policy of the company can be controlled, of course, by two of the three parties, should they combine. It looks, however, as if a check had been interposed to the schemes of certain operators who would be disposed to turn over the property to a larger combination, or use it as an aid to their speculative interests. Under the compromise it seems probable that the local character of the management will be retained, and that the company's properties will remain, as they have been in the past, an important factor in Colorado industry.



THE COLLAPSE in the stock of the Lake Superior Consolidated Company on the exchanges, has been due to unfavorable reports as to the financial condition of the company, and the results of its operations up to date. It has been doubtless intensified by the present depressed condition of the stock markets generally and the state of the money market. With regard to the rumors which were the immediate cause of the break, they are probably exaggerated. It would naturally take a considerable time to carry out the very extensive plans of the company, and it is quite probable that portions of the works have been completed in advance of others, thus destroying for the time the proper balance which must be observed in the operations of the plant, with results which must be temporarily unfavorable. We are not ready to believe that the money expended at the Sault Ste. Marie and elsewhere has been thrown away, as some would have us believe.

On the other hand, it must be admitted that the financial management seems to have involved some serious mistakes. There has been, apparently, a disposition to discount the future and to count up profits in advance, which was not wise, to say the least. It is to be hoped that a correction of these errors will be in order, before it is too late.

AS SHOWN IN our account, on another page, of the proceedings of the Anthracite Coal Commission, the miners, or those that were managing the case for them, have undertaken to bring before the Commission the important question of freight rates, of the relations between the railroad companies and the mine operators, and of the combinations or agreements existing among the different companies. The discussion of these points would necessarily involve the tracing back of the whole history of the anthracite trade, would very much widen the scope of the inquiry in progress before the Commission, and would probably prolong its proceedings almost indefinitely. While it is, of course, impossible to predict what the action of the Commission will be, the statements by the chairman would tend to show that it is not inclined thus to increase its labors. The chances seem to be that the inquiry will be restricted to the points of wages and mining regulations which constitute the immediate controversy. Should the Commission so decide, it seems to us, that it would be entirely justified. The questions of freight rates and combinations affect the relations between the anthracite companies and the public at large, rather than those between the companies and the miners. While it is very desirable that these questions should be discussed and, if possible, decided upon, it is hardly within the proper scope of the case as committed to the Commission by the parties to the controversy.



#### IMPORTS AND EXPORTS OF ZINC ORE.

In our issue of December 6, we referred to the prospective importation of zinc ore to Iola, Kan., from the Slocan District, British Columbia, and the doubtful position of zinc ore in the present tariff schedule. Since then importations have actually been made and have been allowed to come in duty free, although we are ignorant under what construction of the law. So far as we have been able to discover, zinc ore is not mentioned in the latter, and it would presumably fall under the classification of all other ores not enumerated, which are taxed 20 per cent.

In the meanwhile the miners of the Joplin District are considering a revival of their old project to bolster up a falling ore market by the exportation of a little ore to Europe at a loss, on the theory that the loss can be squeezed out of the smelters on the ore that they must have; and a little more besides. Under present conditions the loss would be a large one. Spelter is worth about \$4.70 per 100 pounds at St. Louis and 60 per cent ore about \$30 at Joplin; in London, spelter is at a price corresponding to \$4.20 per 100 pounds and 60 per cent ore might possibly be sold on that basis so as to fetch \$30 per 2,000 pounds, ex ship at Swansea, Antwerp or Hamburg, in which event the exporter would be out the cost of the sacking, loading, freight and insurance, which would probably come to something like \$9 per ton, besides the inevitable "shrinkage."

We do not believe the Joplin miners will export any ore to Europe, because some of them will remember their experience when they actually tried it a year or two ago; but it is peculiar that they should be considering a support to the market by the shipment of a paltry thousand tons of ore while

Canadian ore is being brought to Iola. It is blindness to the changing conditions. As to the question of duty on the British Columbia ore we do not think it matters very much except to the Canadians. The smelters will buy where they can buy cheapest, and the supply of zinc ore in the Far West is so great that we do not think they have to go to British Columbia.



#### LAKE SUPERIOR IRON ORE SHIPMENTS.

The preliminary estimates for the production of Lake iron ore have been made up, and probably approach very near the fact, as only a few scattering cargoes were shipped after December 5. There remains, however, to be added the rail shipments which may amount to somewhat more this year than has been shown in previous seasons. Our correspondents estimate the production by ranges, as follows, in long tons:

Ranges.	1901.	1902.	Changes.
Marquette .....	3,254,680	3,850,000	I. 595,320
Menominee .....	3,605,449	4,270,000	I. 664,551
Gogebic .....	2,938,155	3,600,000	I. 661,845
Vermillion .....	1,786,063	2,087,000	I. 300,937
Mesabi .....	9,004,890	13,293,000	I. 4,288,110
Total .....	20,589,237	27,100,000	I. 6,510,763
Michipicoton.....	300,000	350,000	I. 50,000
Total .....	20,889,237	27,450,000	I. 6,560,763

For the Minnesota mines, the Vermilion and Mesabi ranges, the water shipments are now complete, and are shown in the following table:

	1901.	1902.	Changes.
Two Harbors .....	5,028,000	5,605,218	I. 577,218
Duluth .....	3,437,955	5,598,408	I. 2,160,453
Superior .....	2,321,077	4,180,568	I. 1,859,491
Totals .....	10,787,032	15,384,194	I. 4,597,162

The main point shown in the general table is the remarkable increase of shipments, those for the season of 1902, showing a gain of over 30 per cent on what was considered the extraordinary production of 1901. It is clear that not only were the new mines large producers, but that there was also an extraordinary gain in the output of the older mines. The total was thus pushed to a point which would have been considered impossible only a few years ago. Another point in the statement which deserves attention is the fact that the old range mines which, in the opinion of some, were almost played out a few years ago, have shown themselves still capable of a remarkable output. Thus, the Marquette and Menominee ranges together show an increase of 1,260,000 tons, while the Gogebic range mines report a gain of nearly 662,000 tons.

The mines across the Canadian border, of which a good deal had been expected, have shown comparatively little advance over the previous season. The Helen Mine, which continues to be the chief producer, shipped this year about 350,000 tons, which is only 50,000 tons more than last season, and no new mines of any importance have entered the producing list. Exploration continues active on the Michipicoton and Atikokan districts, but the development work seems to be rather slow. There is reason to think, however, that more substantial progress will be made next year. The greater part of this iron ore goes to Canadian furnaces, those at Midland and the Sault being the chief takers.

The report of shipments from the Minnesota ports shows a very large increase, not only in shipments, but in the average size of cargoes. The total of 11,203,626 tons of iron ore, which was moved from the docks at Duluth and Two Harbors this year, went out in 2,205 cargoes, an average being

about 5,100 tons per cargo. In the season of 1901 the average cargo from those two ports was 4,569 long tons. Ten years ago, it was not more than 1,000 tons. These figures show very emphatically the changes which have taken place within a decade, in the methods of Lake transportation.



#### SECONDARY ENRICHMENT.

The fact that "gray copper" has recently been encountered in the deeper levels of several mines at Cripple Creek was brought to notice in the letter from Mr. George J. Bancroft, which we published two weeks ago. We have been informed since then that some of the "gray copper" is chalcocite, while some of it is tetrahedrite or fahlerz. The difference is important. Chalcocite, or copper glance, has been recognized at Butte and in other copper districts as a characteristic product of secondary enrichment. Tetrahedrite, the antimonial sulphide of copper, is also often regarded as a secondary product, but with much less certainty. Its presence in a certain class of ore deposits having a spathic gangue would appear to indicate that it is a primary or original constituent of the ore. It certainly is original in some cases. So also chalcocite is not always a secondary product.

We hope that the "gray copper" at Cripple Creek will prove to be mainly tetrahedrite. A primary ore deposit of this kind will be of better augury for the future of the district than a secondary product, because, as regards the first, the oxidized ores of Cripple Creek do not carry any evidence of having been rich in copper so that the deeper concentration of this metal would not occur in large amounts, while if the secondary occurrence of the copper be taken as an index of a zone of enrichment in the precious metal one can have no assurance that it is extensive. If, however, the copper ore proves to be a primary constituent of the Cripple Creek lodes, and it is, as we understand, associated with rich gold ore, then one may reasonably look for a persistence of these conditions to a depth sufficient, possibly, to revive the deep mines of the district.

The idea of secondary enrichment has proved very useful in explaining certain anomalies in the distribution of ores, but we fear it will become a trap to the unwary. Promoters and other enthusiastic organizers of mining enterprises will be able to explain away the poverty of any mine workings by a skillful adaptation of the explanation that such portions of a vein have contributed, by leaching, to a lower zone of secondary enrichment, to reach which further sinking is the only step necessary. The theory will carry with it the promise of better things lower down. And when that fails the hypothesis of "zones" will come to the rescue of the perplexed promoter until facts will be stultified and our distinguished friends, the geologists, will be quoted as sponsors for half the day-dreams of the gentlemen whose mining is done through the medium of circulars.



#### MARKET CONDITIONS.

*Iron and Steel.*—So far as new business is concerned the iron market remains comparatively quiet. As the end of the year approaches, the taking of stock and making preparations for the

new year's business, absorbs considerable attention. Manufacturers are busy, however, and the present work is devoted chiefly in the effort to catch up with contract deliveries. The railroad troubles still continue, and have been intensified by severe cold weather and snow and rainstorms all over the East, and a considerable part of the central West. Furnaces still continue to be embarrassed by short deliveries of coke and comparatively few have been able to work up to their full capacity. Nevertheless, the production of iron shows an increase, the weekly capacity of the furnaces in blast reported on December 1 having been nearly 7,000 tons greater than at the opening of November. A close estimate based on the producing capacity of the furnaces and making all possible allowances for delays caused by banking and short fuel supplies, puts the production for the 5 months from July 1 to November 30 at about 7,450,000 tons. Had there been no trouble with transportation, the figures doubtless have been much nearer 8,000,000 tons.

Foreign iron continues to come in, and there has been a revival in the buying of Scotch and Middlesboro pig in Great Britain for export to this country. A recent report says that freight room for 50,000 tons of pig iron, to be shipped during December from the Clyde, had been engaged before the first of the month, and this will doubtless show an increase. The bear speculation in pig iron warrants in Great Britain seems to be over for the present, and it is said that certain parties who undertook to depress the price of Middlesboro warrants, have lost considerable sums. It is strongly hinted in the British trade that the speculation for the fall was engineered by certain American houses who wanted to buy warrants at a low rate, but this report seems to be based more upon conjecture than actual fact.

**Copper.**—The copper market continues in about the same condition as we reported last week. There can be no doubt that manufacturers' requirements are considerable, and that a good deal of buying will be necessary after the new year opens, if not before. Meantime, it is certain that stocks of copper are light, and that the position is altogether different from that of a year ago.

**Other Metals.**—Tin is still somewhat uncertain but shows a better tendency. Spot supplies are good, and while consumption continues fair, prices abroad are somewhat better, and have been more or less affected by the gain in silver, which promises to continue to be a disturbing element in the trade.

Lead continues unchanged, with about the usual demand. Consumption remains at rather a high level.

Spelter is gradually settling down to its normal value; at least that appears to be the opinion of the trade, and buyers are taking hold quite freely.

The buying of shorts in London to cover speculative commitments has produced a slight reaction in the value of silver. This seems to be temporary, however, and there is nothing yet in sight to warrant belief in a permanent improvement. A very strong effort, apparently in speculative interests, has been made in the London papers to put forward the best side of the case and to profess belief in a rise in price almost as rapid as the recent fall has been, but most of the articles in question seem to be of somewhat doubtful origin.

**Coal.**—As in the iron trade, transportation trou-

bles in the coal trade have been intensified by the severe weather and storms, interrupting movement on the railroads, while they increase the demand. The rush of coal to the lakes is at an end, but there is much difficulty in delivering supplies to the cities in the West. Stocks are not at all excessive, especially of the better grades of bituminous coal, and the trade remains somewhat demoralized.

The Seaboard bituminous coal trade continues in about the same condition as last week, except that matters have been complicated by the railroad delays in delivering coal to tidewater. Pressure from the Eastern ports for coal is considerable, and the demand is satisfied very slowly.

The anthracite trade is dependent entirely upon the efforts of the companies to get supplies to the Eastern cities. In New York conditions are a little better, and people are beginning to take matters more moderately, in spite of the efforts of certain daily newspapers to create a scare. Conditions are far from regular, however, and consumers are obliged to be content with deliveries covering their immediate needs.



#### THE ANTHRACITE COAL STRIKE COMMISSION.

We noted last week that the evidence submitted on behalf of the miners before the Anthracite Coal Strike Commission was of a character which brought out little or nothing new. A large number of witnesses were examined, submitting statements of wages, earnings, etc., and of living conditions, the object being to make out the miners' case and to prove that their earnings were insufficient and had not corresponded to the amount of labor given to the companies. Testimony of this class continued to be offered up to the close of the week, and while it was cumulative in its character, it was not conclusive, nor to any extent new.

At the hearing on December 15, a new issue was brought into the case. After the taking of the miners' testimony ended, Mr. C. S. Darrow, one of the counsel for the miners, said that he wished to present documentary evidence, showing the relations between the railroads and the companies, together with numerous other matters relating to the anthracite industry. He said that he would present a table showing the fluctuations in the industry during the past ten years, and the average amount of work given to the miners. He said also on behalf of his clients that they would claim that the last year is not a fair criterion as to the amount of wages which a miner could earn. He said also that at some future time they proposed to ask some questions about the combinations of railroad presidents and other agreements in the trade.

Mr. J. H. Torrey, counsel for the Delaware & Hudson Company, said that the companies thought the miners should present their case in full at the present time. The companies did not wish to introduce evidence on their side to meet that submitted for the miners and then find that it was necessary for them to go into the case all over again.

Mr. Darrow said that he held the Commission's authority to be broad enough to inquire into all the conditions of the case, including the question of freight rates and the connection between the railroads and the mining companies. He believed that this had a direct bearing upon the case.

Chairman Gray seemed to be somewhat doubtful as to evidence of this kind, and is inclined to hold that the scope of the inquiry was to investigate and decide upon the matters directly in controversy between the mine workers and the operators. The question of trusts or agreements, he thought, was outside of this issue. The Commission would, of course, consider these points, but would not give a final decision until the matters were actually before it. His general opinion, however, was that the

Commission would be averse to widening the scope of the investigation.

Counsel for the miners then presented a great volume of documentary evidence on these points, and the chairman said that the Commission would receive them and take the matter into consideration, but he would not promise that the Commission would go into the relations between the companies and that little could be shown that they had a direct bearing upon the controversy. Mr. Lloyd, of the counsel for the miners, then read a brief syllabus of the document he had to present, which was as follows:

"For the purpose of connecting the present facts with the past, we offer evidence of the causes, character and results of the combinations, both of labor and capital in the anthracite coal industry; the profits of the business, both of mining and transportation; the relations of transportation companies to operators and miners, and the economic, political and social consequences that have resulted. This evidence thus offered we obtained from the reports of various legislative investigations by the States of New York and Pennsylvania and by Congress from 1871 to the present time, and embraces, we believe, all the important inquiries of that character which have been made."

Mr. Lloyd read an extract from the first annual report of the Bureau of Statistics of Labor and Agriculture of Pennsylvania for the years 1872 and 1873, showing that the organization of labor was made necessary by the previous organization of employers in the anthracite fields. He submitted five points to prove that a monopoly exists in the anthracite industry as follows:

1. The ownership by certain railroads of extensive mining properties in the anthracite fields.
2. That men who are directors in one mining company are members of boards of directors of other railroads and mining companies.
3. Joint resistance of the coal-carrying railroads to the individual operators building an independent railroad to carry their product at reasonable rates.
4. The community of interests of the coal-carrying railroads and their mining companies.
5. Constant acquisition of additional unmined coal by the coal-carrying railroads.

The counsel for the companies objected to the introduction of these questions, holding that they did not bear directly upon the question of wages and other points at issue between the parties. This objection was followed by a long discussion between the lawyers on both sides as to the relevancy of the matter offered. At the close, Chairman Gray announced that the Commission was assuming that the operators could pay fair wages, and that if the business was in such condition that they were unable to do so, it was best for them to withdraw from it. In closing the matter, he said that if the companies present their side of the case, making the point that it was not possible for them to pay a fair rate of wages, then evidence on the other side would be heard in order to make the case complete.

**ROCK-SALT DEPOSIT IN BELGIUM.**—United States Consul G. W. Roosevelt reports that recent borings near Beeringen, Belgium, have resulted in the discovery of a deposit of rock-salt at a depth of about 1,000 meters. Further explorations are to be undertaken, as the discovery is considered important.

**GERMAN IRON ORE TRADE.**—Imports of iron ore into Germany for the 10 months ending October 31 were 3,445,667 metric tons, against 3,900,485 tons for the corresponding period in 1901; showing a decrease of 454,818 tons, or 11.7 per cent. The larger part of these imports were from Spain.

Exports of ore for the same period are reported as 2,370,522 tons, against 1,991,802 tons last year; an increase of 378,720 tons, or 19.0 per cent. Most of these exports were of the minette ores of Luxemburg, which go to Belgium and France.

## A WOOD BURNING MUFFLE FURNACE.

BY LOUIS JANIN, JR.

The high price of coke and the comparative cheapness of coal has caused many coal muffle furnaces to be erected in our Western mining centers, the old-time wind crucible or "pot" furnace being abandoned in the greater number of assay offices. In many places, however, coal is expensive on the account of high transportation charges, while wood is abundant and cheap in comparison. The accompanying plan shows a large superimposed double muffle furnace, erected in Ely, Nevada. Mr. R. A. Marr, the assayer of the Chainman Mining and Electric Company, was largely responsible for the design of this furnace, which gave satisfactory and economical results with wood at \$3.50 per cord (pinon pine and

stack into the fire room. A rack and pin, the latter passing through an eye at the end of the lever and into holes punched or drilled into the rack is used for convenience in regulation. The damper itself swings on a central axis passing through the stack diametrically. The draft is somewhat dependent upon atmospheric conditions and the direction of the wind, but usually a slight opening is sufficient to give the requisite draft.

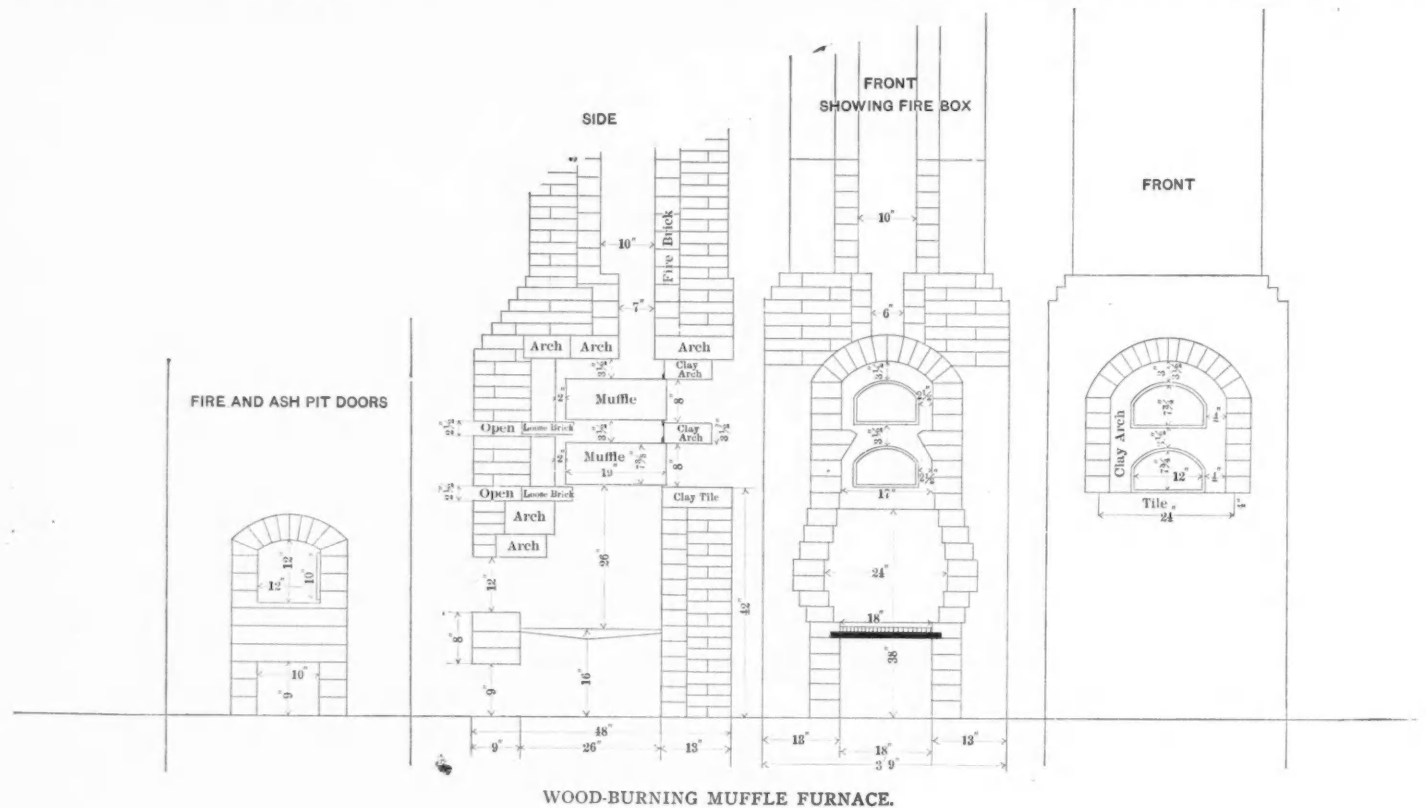
In the construction of this furnace it is essential that the spacing about the muffles, as shown in the plans, should be rigorously followed. The brickwork should be allowed to dry slowly, first at the normal temperature and then with slight firing until thoroughly dried out before firing heavily. It is advisable to build such a furnace during the warm months, but if constructed during freezing weather

## CALORIFIC POWER OF COAL.

At the meeting of the French Academie des Sciences, September 22, 1902, M. Goutal described an investigation as to the relation between calorific power of a coal and its composition as indicated by proximate analysis. This was shown to be very closely as represented by the formula,  $P = 82C + aV$ , in which P is the calorific power, C the percentage of fixed carbon, V the percentage of volatile matter, and a is a variable coefficient, which is dependent upon the tenor  $V^1$  in volatile matter of the pure fuel, that is, the fuel minus ash and moisture

$$\left( V^1 = 100 \frac{V}{C+V} \right)$$

Experiments showed that the values of the co-



WOOD-BURNING MUFFLE FURNACE.

fir). The consumption of fuel did not exceed one-seventh of a cord per day. The 4-foot cord wood was cut into 3 pieces at a cost of about \$1 per cord, so that the total fuel cost did not exceed 65 cents per diem. The drawings are to dimension, and are self-explanatory. The clay muffle fronts, arches and tiles are carried in stock by the Denver Fire Clay Company, Denver, Colo., and possibly by the Standard Fire Brick Company, of the same locality. They may be ordered like the muffles by their dimensions. All the ironwork, except the stacks, firebox front and door, can be made by the blacksmith. When a casting was used obviating the arch over the fire-door it was found to burn out rapidly. It is therefore much preferable to construct an arch and to have the casting project into it not to exceed  $1\frac{1}{2}$  inches.

The fire bars may be cast, but can be made of square wrought iron. These answer the purpose quite as well. The furnace is externally stayed,  $2\frac{1}{4}$  by  $2\frac{1}{4}$ -inch angle irons being placed at the corners. The back stays are of 1-inch round iron, and being threaded at one end and eyed at the other, one set may pass above the main muffle arch and two below, one of the latter sets clearing the fire door arch and the other the ash pit door. The stack is stayed in a similar manner. The brick stack may be carried to clear the roof. If the roof is of corrugated iron this is not essential, but the brickwork should be carried up so far that there is no danger of heating the iron stack red hot. A total height of 30 feet from ash pit to top of stack is ample for draft. The damper should cover the entire top of the iron stack and be regulated by a lever passing down the side of the

office building should be first built and provisions made for keeping the temperature there above freezing point.

Both muffles heat equally well, and both can be brought from the cold to a good smelting heat in 90 minutes. Any kind of dry wood may be used—from sage brush and mesquite, both of which give intense heat, to live oak. The cost of construction is not great, and where coal or coke is expensive and wood plentiful, the difference in primary cost may be saved in a few months.

**SOUTHERN LIMITS OF PENNSYLVANIA ANTHRACITE.**—In a paper read by Mr. B. S. Lyman at the Philadelphia meeting of the American Institute of Mining Engineers, after examining the geological evidences, the author comes to the following conclusions: "It appears probable that the anthracite region never could have extended far south of its present limits; that broad highlands originally bounded it on the south, supplying the pebbles, sand and shales that formed the coal measures; that these highlands emerged from the sea at some time before the end of the Silurian epoch (say, after the deposition of No. III., the Hudson River slates); that by strong and long-continued compression they became highly metamorphosed, and had their rock-folds repeatedly raised higher; and that they have been eroded for a much greater length of time than the anthracite region and the rest of the main Appalachians."

efficient a corresponding to different values of  $V^1$  when plotted differ but little from a straight line, the values being as follows:

$V^1$	5%	10%	15%	20%	25%	30%	35%	40%
a	145	130	117	109	103	98	94	80

In the case of anthracite, a equals 100. The average calorific power of anthracite is 8,250 calories. The calorific power rises with the content of volatile matter to a maximum of about 8,700 calories when V is between 10 and 30 per cent, and then falls as the percentage of volatile matter increases further. Goutal's formula was deduced from calorific determinations of 600 coals of different kinds and gives results which in nearly all cases agree within 1 per cent with those of experiment. (*Comptes Rendus*, CXXXV, xii, 477 to 479.) This conclusion agrees substantially with the deduction of Kent from Mahler's tests that the proximate analysis of a coal may be relied upon as a measure of its heating value with a limit of error of only about 3 per cent. He constructed a table showing the gradual increase in heating power as the percentage of fixed carbon in the pure coal, dry and free from ash, decreased to from 100 per cent to 80 per cent, after which there was a gradual decrease in calorific power down to 50 per cent fixed carbon. Below 50 per cent the law of decrease apparently failed to hold good, inasmuch as some cannel coals and lignites show a higher heating power than would be predicted from their chemical composition. (Vide *Mechanical Engineers Pocket-Book*, First Edition, p. 634; also *Steam Boiler Economy*, p. 48.)

**PROBLEMS OF LABOR AND LIFE IN ANTHRACITE COAL MINING.**

By FREDERICK L. HOFFMAN.

*Part IV.—Accidents—Concluded.*

The causes of coal-mining accidents form a distinct problem which requires special consideration, for which very limited space is available. Most of the discussions are faulty in that the percentage method is employed as a measure of improvement or deterioration. The only satisfactory method is to calculate rates per thousand employed for the different causes of accidents in exactly the same manner as has been suggested for the calculation of general rates for men in different occupations. In this manner we arrive at a definite measure of accident occurrence from different causes without regard or reference to accidents from other causes. There is necessarily no relation whatever between the occurrence of one class of accidents and another as is attempted to be shown by the percentage method employed, for example, by Mr. Roberts in his book on *The Anthracite Coal Industry*. While it is of value for certain purposes to know the percentage distribution of accidents as well as their actual number from certain specified causes, such a statement of fact does not afford a measure of the frequency of occurrence of such casualties. In the anthracite region during the ten years 1892-1901, 9.1 per cent of the accidents were due to gas, 45.8 per cent to falls of roof and coal, 18.7 per cent to cars and machinery, 3.6 per cent to falls down shaft, etc., 9.2 per cent to powder, etc., and 13.6 per cent to miscellaneous causes. This statement is not sufficiently accurate in detail, for the proportion of miscellaneous accidents is entirely too large. It, however, is shown that relatively the largest number of accidents due to any particular cause is due to falls of roof and coal, followed by accidents from cars and machinery. These, then, are the most important life-destructive elements with which those who are interested in the subject have to deal. How far the different causes of accidents contribute to the general mortality is shown by the following table, which shows for two 10-year periods the accident rates per 1,000 employed for six groups of causes:

*Causes of Fatal Accidents in Anthracite Mining—1882-1901. Rates per 1,000 Employed.*

Period	Fall of Coal and Roof	Gas Explosions	Cars and Machinery	Falls down Shaft, etc.	Powder	Miscellaneous
1882-91	1.37	0.29	0.67	0.13	0.27	0.55
1892-01	1.43	0.27	0.59	0.11	0.30	0.44

It is shown by this table that accidents from falls of coal and roof and from powder explosions have increased during the past ten years in proportion to the number of persons employed and in comparison with the preceding decade. Accidents due to gas explosions, to cars and machinery, to falls down shaft, and to miscellaneous causes have relatively decreased. This statement is in direct opposition to the assertion of Mr. Roberts that "accidents due to gas have increased about 2 per cent in the fatal and 1.5 per cent in the non-fatal column." Mr. Roberts shows the percentage of gas accidents during 1880-1899 and makes a comparison of the percentage of gas accidents during each decade. During the first the percentage was 7.96, and during the second, 10.07. It is erroneous to say that the increase was represented by 2 per cent. There was merely a change to that extent, and the conclusion that gas accidents have increased in anthracite mining is exactly opposite to the truth, as shown by the table before us, according to which the rate per 1,000 employed was 0.29 during 1882-91 and 0.27 during 1892-01. Such erroneous conclusions as to the increase or decrease of accidents in coal mining are exceedingly common, and an accurate conclusion is out of the question until the method

here suggested is adopted, and the percentage method is discontinued. Thus, to give one further illustration, Mr. Roberts claims that fatal accidents due to falls have increased 0.2 per cent. As a matter of fact, there has only been a change in the percentage distribution to this extent. The rate of accidents due to falls down shaft per thousand employed decreased from 0.13 to 0.11. The table before us is conclusive evidence that during 20 years practically no important change has taken place in the accident liability in anthracite mining, but that accidents due to falls of roof and coal, numerically the most important of all, have increased from 1.37 to 1.43 per 1,000.

It is not advisable to deal with anthracite coal mining accidents in the aggregate. *The accident liability differs very materially by districts*, and so does the occurrence of accidents from different causes. In the table which follows the rates per thousand employed have been brought together for the eight different anthracite districts for the ten years 1892-1901.

*Causes of Accidents by Districts—1892-1901.*

District	Fall of Coal and Roof	Gas Explosions	Cars and Machinery	Falls down Shaft, etc.	Powder	Miscellaneous
No. 1	2.0	0.1	0.6	0.1	0.2	0.2
No. 2	1.5	0.1	0.6	0.1	0.3	0.2
No. 3	2.1	0.3	0.6	0.1	0.4	0.6
No. 4	1.4	0.6	0.6	0.1	0.2	0.4
No. 5	1.2	0.1	0.6	0.1	0.3	0.4
No. 6	1.3	0.3	0.6	0.1	0.4	0.5
No. 7	1.2	0.2	0.6	0.2	0.3	0.5
No. 8	0.8	0.5	0.6	0.2	0.3	0.6
Average	1.4	0.3	0.6	0.1	0.3	0.4

According to this table accidents due to falls of roof and coal have been most frequent in the third anthracite district; those due to gas, in the fourth district; those due to cars and machinery in the fifth district, etc. This table localizes the causes of accidents and, in conjunction with an earlier table, enables us to localize the frequency of such accidents and the causes principally responsible for their occurrence. It is curious to note how much of error finds its way into books and articles on this subject, as, for example, the statement in the otherwise so useful and carefully prepared paper on Mining Accidents by H. Louis in Oliver's *Dangerous Trades*, where it is stated that "anthracite coal does not give off fire damp, so that the dangers of gas explosions are here excluded." It will be observed by the table before use that in the fourth anthracite district gas explosions are responsible for 0.6 fatal accidents per 1,000 of persons employed and a rate of 0.5 has been experienced in the eighth anthracite district.

It would be desirable to ascertain how far falls of roof and coal are due to either one of two principal causes. These falls, according to H. Louis, "may be subdivided according as they are falls at the working face, when they are either falls of the roof or falls of coal face, or as they are falls of roof in the roadways of the mine. Falls at the face are accountable for over 70 per cent of the total number of deaths due to falls, but unfortunately our statistics do not discriminate between falls of coal and falls of roof at the face." It is obvious, he remarks, that the two kinds of falls require entirely different treatment. He attributes a large number of falls to imperfect lamps giving a very poor light, especially after they have been burning for a few hours, making it scarcely possible for the miner to adequately examine the roof to see whether or not it is dangerous. Electric lamps\* have thus far not proven satisfactory. As a means of preventing accidents at the face he recommends a more extensive use of machinery.

How far the use of coal-cutting machines has

\* "The Danger of Electric Appliances in Coal Mines" is discussed in the *ENGINEERING AND MINING JOURNAL* for April 9, 1898, p. 435.

tended to diminish the occurrence of fatal accidents in mining is also a factor deserving of more consideration than has thus far been given to it. It would be desirable, and not very difficult, to tabulate separately the accident statistics for mines using machinery and for those operated without coal-cutting machines. It has been asserted that States such as Ohio and Illinois, where coal cutting by machinery is most common, show much lower accident death rates than States in which machinery is little used. H. Louis remarks that "a very obvious mode of reducing the accident rate at the working face should be found in the more extensive use of coal-cutting machinery. In the first place, the number of men necessary to be employed at the coal face for a given output would be very considerably reduced, and hence the number of men exposed to this danger would be proportionately diminished. Furthermore, as the machine cuts rapidly, and must be kept moving constantly if it is to be economically successful, the men working it will always be under a comparatively fresh roof, which is far less liable to sudden falls than a roof that has been laid bare for some time." In this manner each class of accidents, its relative frequency of occurrence, and the possible means or methods of prevention should be intelligently and thoroughly inquired into and well-founded conclusions should take the place of misleading generalities, for as Mr. Thomas Reed in a recent article properly remarks, there is a Latin proverb which says that "error lurks in generalities, and to talk of doing something by means of something, if we do not specify the something to be done, or the way to do it, is a waste of time." It is doubtful whether on any single subject which has been prominently before the public so much has been set forth in generalities and so little by way of specific evidence as to conditions of labor and life in anthracite coal mining. Thus, for example, the responsibility for accidents is, in a brief generalization, disposed of by Mr. Roberts in the words that "men of very wide experience in mining affirm that 50 per cent of the accidents are due to the carelessness of the men." One may always reasonably question a statement which expresses itself in round percentages. Inspectors naturally are not likely to assume the responsibility for accidents which they can so readily shift upon the employees. German government statistics, which may also safely be assumed not to err on the side of government responsibility, attribute only 36 per cent of the accidents to the fault of the victims, and 58.2 per cent to the inherent danger of the occupation. It is no doubt true that in course of time men become somewhat indifferent to dangers which surround them, and yet we know, after careful investigation, that the greater the danger, once properly realized and understood, the more rapid the diminution of the risk. This is true, for illustration, in the manufacture of high explosives, intrinsically the most dangerous of all occupations, but actually, in England at least, reduced to a comparatively harmless employment, less dangerous now than coal mining. It is safe to assume that, if proper technical instruction preceded employment in anthracite mines, accidents would very rapidly diminish and become of less frequent occurrence. The problem is not solved by shifting the responsibility upon men who must make their living by producing as much coal as possible in a given length of time, or whose very ignorance of the language precludes a thorough understanding of the rules and regulations intelligently framed for the health and safety of men employed in this occupation.

The prevention of accidents in coal mines is also a subject regarding which it would be desirable to have more definite and intelligent information for a knowledge of the principles which underlie the causes of accidents and a study of practical methods by which such accidents can be pre-

vented. We have abundant practical illustrations, mostly from abroad, as to how such investigations should be made and how rules and regulations should afterwards be framed for the purpose of diminishing the at present excessive rate of fatality. At the last Paris Exposition the Courrières collieries of France exhibited a method of preventing falls of roof which, if adopted in this country, would, without question, reduce the number of fatal accidents in anthracite mining by more than one-half. A report on the subject was printed in full in the *ENGINEERING AND MINING JOURNAL* of Oct. 13, 1900 (and a detailed report by C. Le Neve Foster, Chief Inspector of Mines for Great Britain, will be found in *Mines and Quarries* for 1899, Part II. As the result of the experiment at the Courrières collieries, the average death rate from falls of ground per thousand persons employed underground was reduced from 0.76 during 1870-79 to 0.24 during 1880-89, and finally to 0.15 during 1890-99. In other words, fatal accidents due to this most important cause were practically done away with. As Mr. Foster points out, if this method were universally introduced in England it would mean a diminution in the death roll from falls of ground from 450 to 90, or a saving of 360 lives annually, to say nothing of the prevention of many hundreds of non-fatal accidents. We know of no document which is deserving of more serious consideration than this brief report on the methods of preventing falls of roof, adopted at the Courrières collieries, amply illustrated so as to make clear exactly how this much-to-be-desired result is to be obtained.

As a final subject of inquiry it would be advisable to have some definite data as to the methods and means employed to afford medical and surgical relief to injured miners, either in the mines or by means of hospitals outside of the mines. This subject, so far as we know, has received very little general consideration. The subject has been discussed at some length in a paper read before the International Mining Congress by Dr. George W. King, of Helena, Mont. Most of his suggestions are deserving of very careful consideration, for it is evident that, regardless of legislation on the subject, much remains to be done in the direction of adequate provision for proper medical and surgical aid at a time when it is needed most. The annual reports of hospitals in the mining region give much valuable statistical and medical information, but the general medical literature is almost barren of expert evidence on the subject of miners' diseases and the proper treatment of injuries. A digest and detailed analysis of the experience of miners' hospitals would contribute materially towards our knowledge of the results of accidents, and such reports as we have examined give only meager information.

It has not been possible in this brief survey of the more important factors determining conditions of labor and life in anthracite coal mining to deal with more than the essentials of a great problem. The writer has discussed at length the general occurrence of fatal accidents in coal mining in *The Mineral Industry* for 1897, and in annual articles to the *ENGINEERING AND MINING JOURNAL*, of which the last, on the Accident Record for 1901, will be found in the number of that publication dated October 25, 1902. Two papers, entitled "Suggestions for Improved Coal Mining Accident Statistics," will be found in the *ENGINEERING AND MINING JOURNAL* for June 2 and 16, 1900, where the more important aspects of the necessary statistical evidence of accidents, according to age, nationality, length of employment, etc., are discussed. Aside from the general literature of the subject, it may not be out of place to call attention to a careful discussion of the diseases of miners in Dr. Weyl's *Handbuch der Hygiene*, Part II, *Hygiene der Berg-, Tunnel- und Hüttenarbeiter*, Jena, 1895. An attempt to construct a mortality and invalidity table of Prussian miners

was made by A. Morgenbesser, published in Berlin in 1882. A special treatise on Ankylostomiasis, by Dr. Hugo F. Goldman, as a special occupation disease of miners was published in Leipzig in 1900. H. Louis' article on Mining in Oliver's *Dangerous Trades* will be found exceedingly useful in that he refers to numerous official reports made by the German and British governments on mining accidents, spontaneous combustion of coal, etc. A brief discussion of the diseases of miners will be found in Lloyd's *Diseases of Occupations*, Volume III, *Twentieth Century Practice of Medicine*, and several important articles on the same subject are contained in the *Diseases of Occupations* by Arlidge.\* But the most ambitious and the only real scientific attempt at an investigation into the social and economic condition of miners was published by Swan Sonnenschein & Co., London, 1894, entitled *Moravian and Silesian Miners*, by Benno Karpeles. Of this important publication we have only Part I, dealing entirely with wages. Part II, which was to deal with the anthropometry of miners, their diseases, mode of living, etc., has not, so far as we know, been published in English. The reports of the different British Royal Commissions on mines and mining are too well known to require special mention. The entire subject demands reconsideration and the official reports of mining inspectors require to be digested and brought together in a convenient form. There is a vast amount of useful information, excellent advice, and determining data contained in the annual reports of the Mine Inspectors of Pennsylvania for 30 years, but the reports are not indexed and the information is accessible with great difficulty even to those who have the reports on file, and it is now quite difficult to secure complete sets since most of the earlier issues are no longer available. For 30 years a large number of faithful and intelligent inspectors have placed on record their observations and recorded the facts of their experience, often contributing special data of more than usual value, but the data are lost in the immense mass of information contained in the reports. An intelligent analysis of these reports has never been made, nor is there any evidence either in the book of Mr. Roberts or the special report of Mr. Virtue on Anthracite Mine Laborers, in *Bulletin* No. 13, of the Department of Labor, that the entire ground has been gone over with the necessary degree of thoroughness.

It is to be hoped that the Anthracite Commission will examine thoroughly into all the phases of the subject and bring together a mass of data on questions of labor and life which will determine the actual status of anthracite coal mining as a factor in our civilization and social and economic progress. There are those who think lightly of official reports and believe that the often voluminous evidence of Congressional or other commissions amounts to little in the end. There could be no more serious mistake. Most of our knowledge of the conditions of labor has come to us through the plain statement of the facts and the published evidence presented to Parliament and Congress by conscientious and intelligent commissions. Whether the Anthracite Commission succeeds in settling the labor difficulties in anthracite mining or not is almost secondary to the question as to whether it shall fail to make use of an exceptional opportunity to place before the public for all time the actual status of one of the most important industries in this country.

NOTE. I wish to call attention to a few errors which inadvertently crept into the previous articles of this series. In the first paper, printed in the issue of Nov. 22d, on page 676, second column, third line from bottom, read "exclusive" instead of "inclusive," as printed. In the second paper, found in the issue of November 29, on page 709, first column, fourth line in third paragraph, read "the elementary facts of family life," instead of "the elementary facts of female life," as printed. On page 710, about the middle of

\* An interesting and valuable little manual on the Health and Diseases of Coal Miners is *Gesundheitsbuch für den Steinkohlenbergbau*, by Dr. P. Stolper, published by Carl Heymanns Verlag, Berlin, 1898.

the second column, read "since reports to the Insurance Department are for the State as a whole," instead of "are not," as printed. Also, in the same column, same page, in the next paragraph, add the words "for education" after expenditure, in the sentence beginning "In contrast, the per capita expenditure was \$2.49 for Philadelphia," etc.

#### MICROSTRUCTURE OF ZINC.

Ernest A. Lewis has examined the microstructure of zinc, both pure and contaminated with 0.5 per cent of an impurity, added intentionally. (*Chemical News*, LXXXVI, 211, October 31, 1902.) We summarize his notes as to the effect of lead, cadmium, and iron, which are the common impurities in commercial spelter.

Pure zinc consists of large primary crystalline grains, and inside the primary crystals, on deeper etching, are seen secondary crystals. The fractured surface shows brilliant, large, bluish-white crystals.

Zinc containing 0.5 per cent of lead consists of both primary and secondary crystals. The primary crystals are similar to those of pure zinc, but the secondary crystals are surrounded by what is probably a solid solution of lead in zinc. The fractured surface is similar to that of pure zinc.

Zinc containing 0.5 per cent of cadmium consists of small crystals of a cadmium-zinc alloy surrounded by zinc. The fractured surface is very finely crystalline.

In zinc containing 0.5 per cent of iron, the latter separates out in the crystalline form; it does not appear to form a true alloy with zinc. It probably is dissolved by molten zinc, and on cooling it is thrown out again as crystals of iron. The fractured surface is fibrous.

A BRITISH COLLIERY ACCIDENT.—The *London Colliery Guardian* says: "On December 1 a heavy fall of roof occurred at No. 9 pit Coneycgre Colliery, Dudley, in one of the gate roads, temporarily blocking the airway and entombing 56 men. Rescue parties were formed, and after several hours 54 men were brought to bank in safety. Two men, however, were overwhelmed by the fall, and their bodies were not recovered until the following day."

GERMAN IRON PRODUCTION.—The output of the German blast furnaces in October is reported by the Iron and Steel Union at 479,346 metric tons, being 28,618 tons more than in September and 97,947 tons more than in October, 1901. For the ten months ending October 31 the production was as follows, in metric tons:

	1901.	1902.	Changes
Foundry iron .....	1,255,337	1,317,137	I. 61,800
Forge iron .....	1,135,922	997,021	D. 138,901
Bessemer pig .....	393,358	326,631	D. 66,727
Thomas (basic) pig .....	3,732,369	4,276,948	I. 544,579
Totals .....	6,516,986	6,917,737	I. 400,751

The total increase this year was 6.2 per cent. By far the greater part of the gain was in basic pig. There was also a smaller increase in foundry iron.

SHAFT ACCIDENTS IN BRITISH COAL MINES.—The *London Colliery Guardian*, of November 15, says: "We noted recently in these columns the lamentable frequency of shaft accidents of late weeks. This week has added two more to the tale, both attended with fatal results. On Monday, at the Beeston New Pit, near Leeds, which the Low Moor Company have just finished sinking, three men engaged on a scaffold in finishing off the mouth of the shaft were precipitated to the bottom, a distance of 157 yards. The accident was caused by a coping stone, which was being lowered by a jenny, slipping from the clutches and breaking through the scaffold. The other accident occurred at the South pit of the Ocean Colliery Company at Treharris, where 30 men were being raised in a double-decker cage, when, about 250 yards from the surface, a breakage occurred in one of the pumping columns. The men were rescued by means of a bowk, but not before five of their number had succumbed. The shaft is the deepest in South Wales, being close on 800 yards deep."

## THE NEW SMELTER AT SALIDA, COLORADO.

BY ETIENNE A. RITTER.

Near Salida, Colo., the mesa has been cut by a large secondary valley, and forms a cliff from 50 to 100 feet high, which extends for two miles in length. The cliff faces southwest, towards the snow-clad peaks of Chaffee and Saguache counties. On this picturesque site, specially well fitted for the purpose, the Ohio & Colorado Smelting Company has erected the new Salida Smelter. The building of the smelter has just been completed, and the first lead furnace was blown in a few weeks ago. The last lead furnace and the two copper-matte furnaces were started only a few days since. The building of an independent smelter, able to treat 600 tons of lead ore and 500 tons of copper ore a day, is of much importance for the various mining camps of the central and western part of Colorado.

Four railroad tracks, with various switches, bring the ore and the coke on top of the flat area of the mesa, alongside the cliff. The ore is stored in large bins, 30 feet wide and 100 feet deep, of a capacity of 2,000 tons. The first seven bins are in plain view in the photograph. There are 25 such bins, giving a total storage capacity of 50,000 tons. Above the two first bins filled with limestone one can see the top of the office building.

To the right is the sampling department. In the upper building, which is long and narrow, are 26

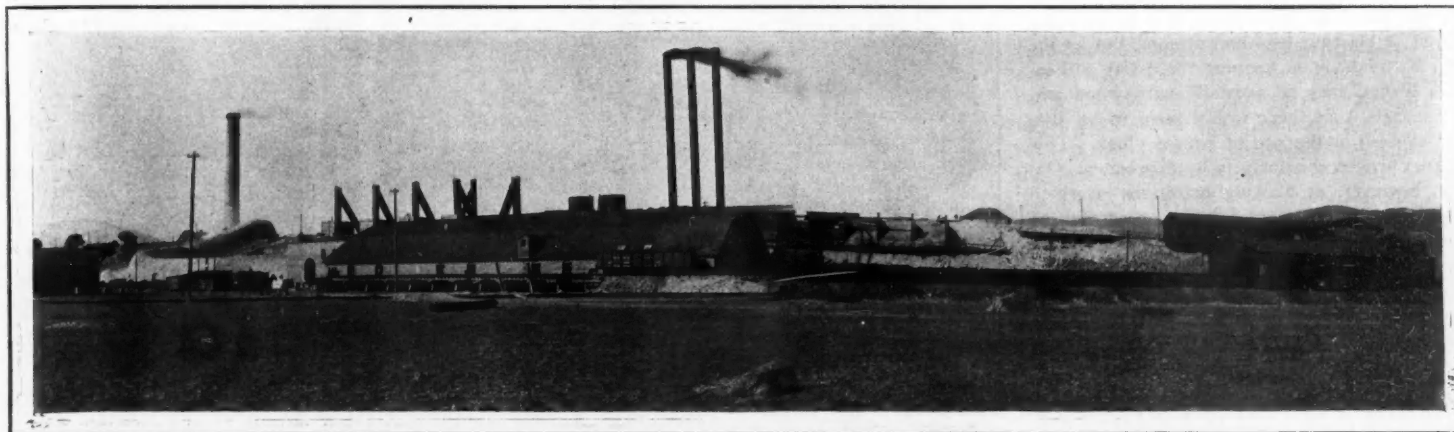
180 by 38 inches, with flanged steel jackets and cast iron auxiliary jackets above. The furnaces have a capacity of 250 to 300 tons a day each. For these furnaces the ore is brought from the bins in wheelbarrows and weighed on scales placed on the charging floor. The weights required have been fixed previously by the foreman for each scale, so that the men have only to see if their charge in the wheelbarrow is right and then dump it at the top of the furnace.

The lead furnace building is 180 by 60 feet, and contains four furnaces of the oval type, 144 by 42 inches, 20 feet high, which have a capacity of 125 tons each. With very favorable ore they can treat 150 tons a day. They have eight tuyeres on each side and do not present any specially new features. The slag is not poured in a forehearth, as is sometimes done, but simply into a slag pot. Later on all the copper-iron matte and the very rich slag at the bottom of the pot are taken out and re-smelted in the copper furnaces. The lead is tapped at intervals of half an hour from an automatic feeder. The slag is tapped a little oftener. The slag cars are taken out by a side door and dumped alongside the cliff, to the extreme left of the photograph.

The engine room is 100 by 300 feet. One-third is allotted to the three 150 horse-power boilers. There is a slide valve engine, with a flywheel 16 feet in diameter and 4 blowers. These can be connected 1-3 and 2-2, sending the air of one or two blowers

sulphur, phosphorus and other impurities; but the outcrops are generally too lean to be mined as ore. The banded hematite in the softer rocks has been denuded or gouged out and later filled with a depth of surface clay, so that drills are required to explore the underlying rock. The chief explorers last season were the Algoma Commercial Company, of Port Arthur, which had 50 men at work under direction of Mr. G. H. Brotherton; their main work in 1901 was in exploring and mapping out the country. This season diamond drilling has been carried on at several points. Mr. R. H. Flaherty had a diamond drill at work just east of Nipigon Lake, but did not find any ore-bodies as large as were thought to exist there.

2. Active interest has been manifested in the whole stretch of country from Whiskey Jack Lake past Saporoe Lake and along the Atikokan River to the west end of Steep Rock Lake, a distance of 25 miles; and southwest from Steep Rock Lake over a belt 25 miles long and 5 to 6 miles wide. Magnetic iron ore only has been found from the eastern extremity of the ranges westward to below the east arm of Steep Rock Lake; but from this point for about 6 miles in width the drift carries pebbles of a fine grade of hematite, and is itself strongly colored red and yellow, constituting, with the favorable rock formations of alternating compact and soft, largely



THE NEW SMELTING WORKS AT SALIDA, COLORADO.

bins, 4 feet wide by 10 feet deep, where the samples of crushed ore are put when taken from each car-load as it reaches the smelter. The ore passes through two Blake crushers and two sets of rolls, and is stored in the lower building, where a row of 50 bins each, 5 by 7 feet, built along the walls, receive the samples of pulverized ore. In the center of the room an iron floor, 64 by 128 feet, is used for the quartering of the samples. The assay office is in the office building. The power for the crushers and the rolls is furnished by a dynamo and transmitted from the engine house to a station at the east end of the sampling department.

The pathway seen at the bottom of the storage bins is on a level with the charging floor on top of the six furnaces. There are two groups of furnaces; the copper furnaces, of a smaller size than those of lead, are in a building nearer the cliff and on a floor 10 feet higher, so that the tops of all the furnaces are on the same level, the level of the charging floor. The four lead furnaces are in a building in front of the copper furnaces.

Between the two groups of furnaces runs the long flue chamber, as can be recognized from the direction of the down smokestacks of the two copper and of the four lead furnaces, which connect the six straight stacks with the flue chamber. The flue chamber, of a beehive shape, is 24 feet wide and 800 feet long. It stretches to the great smokestack on top of the mesa, which is 150 feet high and 12 feet in diameter.

The copper furnace building is 120 by 40 feet. The furnaces are rectangular, of the ordinary type,

to the copper furnaces and of two or three to the lead furnaces at will.

The pressure furnished is about 2 pounds to the square inch. The dynamo furnishes the power to the sampling department during the day and lights the plant at night.

The ore treated at the smelter comes from Leadville and Monarch, from Gunnison and Hinsdale counties, from Bonanza and Silver Cliff, and will come from a larger number of camps in the future.

## THE OUTLYING IRON RANGES OF WESTERN ONTARIO.\*

BY W. E. H. CARTER.

The iron ranges outside of those actually worked in 1901, on which some exploration has been done include (1) The Nipigon and Long Lake ranges, and (2) The Atikokan and Steep Rock ranges.

1. The country surrounding Lake Nipigon and from 30 to 70 miles away has been explored during the past two seasons by numerous parties, working along the main tributary rivers and lakes. The best showings are between Nipigon and Long lakes, where a large area has been taken up by operators and partly explored by surface work, and by the diamond drill. The iron occurs both as hematite and as magnetite finely interbanded with chert, jasper or other less compact siliceous rock. So far as found, the quality of the ore is good, as it is almost free from

chloritic schists and a series of cherts, conglomerates and quartzites (more prevalent in the immediate vicinity of Steep Rock Lake), indications of the presence of soft iron ore (hematite) on which the different operators base their hopes. There are only a very few outcrops of hematite, and these have not yet proved to be important. The present exploratory work for hematite consists in boring with the diamond drill chiefly in the deep clay deposits filling depressions in the trap rocks at the bottom of which the soft schists occur carrying, it is believed, the iron ore. The bodies of magnetite which outcrop at various points throughout the whole district are also receiving attention, but not to the same extent latterly as the hematite, probably for the reasons that most of them contain a considerable percentage of sulphur, and having a banded character are small in comparison with the immense soft ore deposits that occur in similar rocks in the Minnesota iron ranges further south of which it is expected duplicates will be found here.

The operators in the district include R. H. Flaherty, Wiley & Co., Mackenzie, Mann & Co., all of Port Arthur, and T. H. Hogan, of Atikokan, with the last of whom several capitalists and others interested in iron mining are associated. All of the above are concentrating their efforts on the locations of the district immediately on and southwest of Steep Rock Lake, while in the older magnetite area to the east R. M. Hunter, of Duluth; Mackenzie, Mann & Co. and Grahame & Horne, of Port Arthur, are largely interested.

\* Abstract from paper on the Mines of Ontario, in the Report of the Bureau of Mines of Ontario for 1902.

During several months last fall Mackenzie, Mann & Co. explored several of a very extensive group of claims along the course of the Atikokan River with two diamond drills, making several interesting and probably valuable finds of magnetite. T. H. Hogan and his associates have located an extensive series of points for bore holes mostly over the clay areas filling the hollows between the outcropping ridges of tougher rocks and at eight of these, all just south of the Canadian Northern track and a mile or so west of Atikokan station, preparatory pits have been sunk from 12 to 25 feet deep (to water level), in which wells two churn drills are to bore.

Along Seine Bay, Rainy Lake, lots 11 and 12 in the third concession of the township of Watten have been acquired by Messrs. Dan Mosher, of Fort Frances, and J. T. Horne, of Fort William, Ont., as iron locations, and are to be thoroughly tested by diamond drill. Considerable surface stripping has been done, the magnetite deposit being now traceable for several hundred feet with a width of about 30 feet, surface samples assaying metallic iron, 49.10 per cent, sulphur 0.14, and phosphorus 0.019 per cent.

#### NOTES ON RECENT EXPERIMENTS WITH MECHANICAL TAMPS.

By W. R. CRANE.

Many attempts have been made to substitute wood and metal for earthy materials, as tamping mediums. The idea was probably taken from the use of plugs as employed in blasting logs and stumps, but as the conditions attendant upon forming the cavity and securing the charge vary so radically with wood and rock or minerals, that there would seem to be little chance of success in the use of simple plugs. This has also been proven conclusively by experiment. Occasionally, however, in blasting materials in which rough and irregular holes are formed, on account of their heterogeneous character, simple plugs have been employed successfully, but, as a rule, drilled holes are cut and worn so smooth that they present but little hold or bite to the plug. As a rule, then, we may say that it is a waste of time, energy and powder to attempt to use simple plugs, wood or metal, as tamping mediums.

Humble's India rubber and Johnson's phosphor-bronze plugs, besides several more recent devices are examples of attempts made toward mechanical tamping or stemming. That none of these have proven practical is evident from the fact that they are not in general or even local use.

There seems to be a large field here, open to investigation, and it is to be hoped that some practical and efficient mechanical tamping device will soon be placed on the market. The requirements of such a device may be outlined as follows:

1. It should be easily placed and removed, thus saving time in placing and danger in removing, provided the charge fails to be ignited.
2. It should be so constructed that the hold or bite of the tamp, on the walls of the hole, is directly proportional to the force of the explosive.
3. The action of the tamp should be positive and rapid; that is, it should be independent of the quickness of the action of the explosive. This can only be obtained by extreme simplicity of construction.
4. It should be strong enough to withstand all strains coming upon it and so constructed that, if distorted, straightening and reforming will be simple and inexpensive.
5. The cost should be so slight, in quantities at least, that it would be within the reach of all.

As looked upon, from the standpoint of the mining world, utility and cheapness are, probably, of the first importance, while protection to life and limb, although of vital importance, is a secondary consideration. In few occupations is the element of chance of injury so prominent as in certain phases of mining, such as blasting, etc., and men accustomed to work with dangerous materials and in hazardous occupations, often become inexcusably careless, which may even border on foolhardiness. Many, how-

ever, of the risks run, are unavoidable and anything which would tend to lessen the danger and risks of such work, should be gladly welcomed.

One of the most dangerous operations in connection with blasting is the removal of a charge which fails to explode. True, such a charge may be fired, especially if dynamite, by a second charge placed a short distance away, or on top of the original charge on removing some of the tamping, but there is always danger of exploding the charge, already in place, in preparing a seat for the second charge. Then, too, there is the loss of time and the expense of the extra charge, which must be taken into consideration. A device which can be removed at will, thus laying bare the charge, has, it will be granted, some decided advantages.

With a few such points in mind the writer has carried on a series of experiments tending toward a solution of the problem.

The apparatus used in the experiments recorded here consists of a standard and two cylindrical wedges with serrated faces. In addition to the tamp

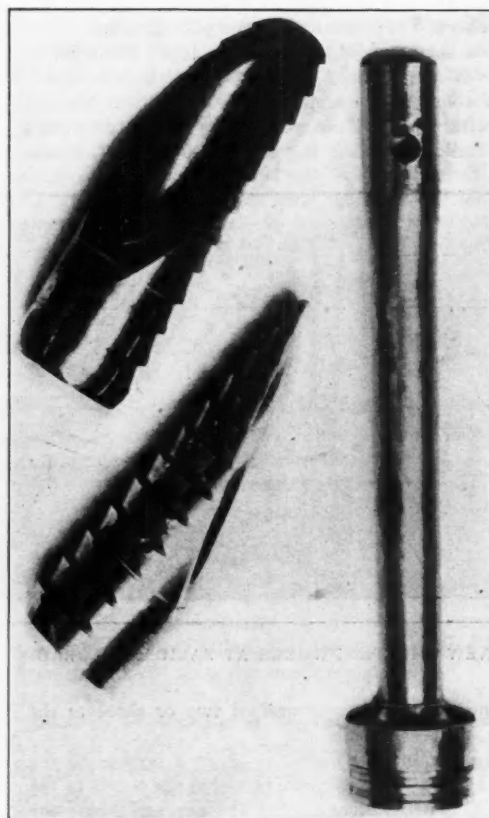


FIG. 1.—No. 1.

proper, is a setting pipe or holder employed in placing the tamps in dry holes; that is, holes extending upward; and this may be used in wet holes, but, in the latter case is not necessary. The various parts of the tamp are shown in Fig. 1, Nos. 1, 2 and 3; in which the standard and wedges are shown in No. 1, a cross section of the tamp with wedges set, or pushed down as far as they will go, in No. 2, and a side view of the complete tamp, with wedges in the position that they would occupy, when being placed on a charge, No. 3. The holder, mentioned above, consists of a length of pipe sufficiently long to reach the bottom of the deepest hole tamped, and when in use fits over the upper end or head of the tamp, and is locked to it by engaging a pin, set in the side of the head, with a slot having a right-angled offset. By a slight turn of the holder the pin is thrown in or out of the offset, thus locking or unlocking the two parts at will. When the pin is out of the offset the holder can be pushed down upon the base of the upper wedge or removed from the head as desired.

The opening in the wedges is, as shown in the cross section, eccentric, or shifted to one side—the side opposite that which bears the teeth—and is large enough to allow a considerable lateral move-

ment and a consequent expansion of the tamp by the action of the wedges upon each other. This expansion is about  $\frac{3}{8}$  inch in the tamp used in the following tests.

As drilled holes are not regular in diameter, it is safe to say that a hole drilled by a  $1\frac{1}{2}$ -inch drill will only take a tamp the head of which is  $1\frac{1}{4}$  inches. A hole extends throughout the whole length of the standard, the purpose of which is to receive the fuse or wires, whichever is used in exploding the charge.

To hold the wedges in proper position, while placing the tamp, a rubber band is slipped over them, which does not, however, interfere in the least with their action, and is a positive advantage in bringing the wedges back into their normal position, if it is desired to withdraw the tamp from the hole.

The inverted conical portion of the head of the standard also centers the upper wedge when it is drawn up by the wire attached to it. This wire, together with a second wire fastened to the head of the standard, provide a means of removing the tamp from the hole—the former loosening the wedge, the latter withdrawing the tamp from the hole in wet

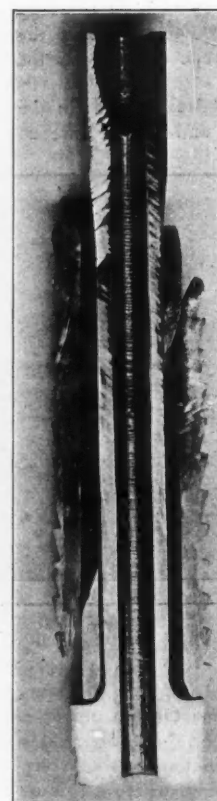


FIG. 1.—No. 2.

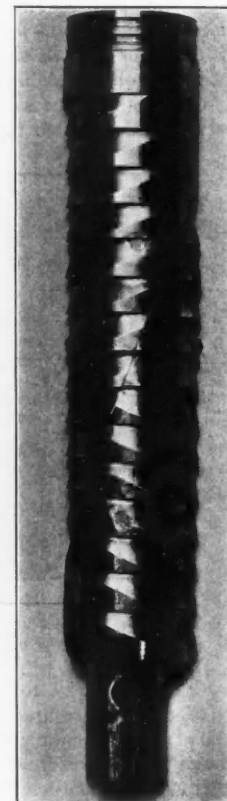


FIG. 1.—No. 3.

holes. When dry holes are worked with, the loosening or detaching wire is all that is necessary for both operations, for as soon as the wedges are freed from their bite, gravity will cause the tamp to drop from the hole.

When very wet holes are worked with, the lower end or base of the standard is slipped within the waterproof covering of the charge, which is then gathered about it, and made fast by a cord tightly wrapped over the paper on the base, which will sink into the grooves cut in the sides of the base, thus not only fastening the tamp and charge firmly together, but making a water-tight connection. Water can be kept from passing down through the fuse hole, in the standard, by working clay into the hole about the fuse, or if the fuse is in danger of becoming wet a small tube or firing barrel can be screwed into a seat provided for it in the top of the head.

A series of experiments were made using gas pipe as the receptacle for the charge, the ends of which were closed with tamps. The pieces of pipe as they appeared after the tests, are shown in Fig. 2. The tests were made as follows:

Test No. 1.—A piece of butt-weld pipe 18 inches



long and  $1\frac{1}{4}$  inches inside diameter, was used, which was tested to stand a pressure of 600 pounds to the square inch. A charge of 0.8 pound of FF black powder was used. The heads of the standards projected just beyond the ends of the pipe. Portions of the pipe were thrown a distance of 5 rods, A, Fig. 2. One tamp was recovered.

Test No. 2.—A piece of lap-weld pipe, 16 inches long and  $1\frac{1}{4}$  inches inside diameter, was used in this test. It was tested to stand a pressure of 800 pounds per square inch. The charge was 0.72 pound of FF black powder. The tamps were set flush with the ends of pipe. Only a few pieces of the pipe were found, and those recovered were picked up from 15 to 20 rods from where the explosion took place, B, Fig. 2. Both tamps were readily found.

In the two tests given above, bombs were in reality formed. The idea was to test the ability of the wedges to catch and hold on the hard, smooth sides

into a clay bank as before, and as the drive end was closed no dirt entered the pipe. A charge of 1.12 pounds of FF black powder was placed, after which followed the tamp. On firing the charge a large cavity was formed, to one side of which was found the very much fractured and distorted pipe, D, Fig. 2.

A peculiarity, noted in connection with the last two tests, was that the lower portion of the cavity, formed by the explosion, was larger than the upper part; the charge seemed to act down, rather than upward. This was probably due to several causes, as the comparatively soft formation which presented little resistance to the rending action of the blast and to the fracturing of the lower portion of the pipe before the upper part gave way—the line of least resistance being downward. The pipes also shared in the downward and lateral thrust, as they were found in the bottom of the hole; in no single instance were they expelled from the cavity formed by the blast. At the bursting of the pipe the tamp

either, but breaking along an irregular line some distance from the welds, E, Fig. 2. A larger cavity was formed in this case than in any of the previous tests, due probably to a larger charge being employed and possibly to the greater strength of the enclosing case, thus requiring a greater accumulation of force to burst the case and consequently an increased rending action on the surrounding earth. The ruptured pipe remained in the cavity, while the tamp was projected so far that it was not recovered.

Several other tests were made with the attendant conditions similar to those mentioned above, and the results were fully as satisfactory, not in a single instance did the tamp fail to act promptly and hold firmly on the smooth, even surface of the pipes.

Tests were then made on limestone in drilled holes. A limestone stratum 5 feet in thickness was chosen. Holes were drilled both in the vertical face and on top of the stratum, and tests were made with the following results.

Test No. 6.—A  $1\frac{1}{2}$ -inch hole was drilled at an equal distance from both top and bottom of the stratum, and to a depth of 18 inches. It was given an inclination of about  $10^\circ$  with the horizontal. A charge of 1.1 pounds of FF black powder was used, upon which the tamp was placed. The whole head of the tamp projected from the hole beyond the face of rock; there was, therefore, but about 4 inches of the tamp in the hole. The fuse was ignited, but failed to explode the charge. The tamp was quickly removed, and a new fuse inserted and the tamp again put in place. This time the charge exploded, fissuring the stratum horizontally from 10 to 15 feet in both directions, and vertically both above and below the site of the charge, and heaving the whole upper part of the mass several inches. A slab of rock of about 2 cubic feet contents was broken from the face. The tamp was thrown into a tangle of brush and briars and was not recovered.

Test No. 7.—A vertical hole of  $1\frac{1}{2}$  inches in diameter and 20 inches deep was drilled on top of and several feet from the edge of the stratum. A charge of 1.25 pounds of FF black powder was used, the tamp being lowered onto the charge and was about an inch below the surface; when fired a mass of rock of  $\frac{1}{2}$  cubic yard contents was broken off. The tamp was thrown upward for a distance of about 50 feet and fell a few feet from the site of the hole.

Other tests were made with similar results, and in only one case did the tamp fail to hold when properly placed. The failure mentioned was due to the hole, where the tamp was seated, being very oblong, caused by the drill striking a flint nodule or mass, which are common in this stratum of limestone. As first placed the wedges did not come in contact with a sufficient amount of the surface of the hole to hold, but on a second trial, when more care was taken in placing, the work was done satisfactorily.

The tamp can be placed in one or two minutes, and can be removed in less time; in fact, a sudden tamp, when it can be lifted or will fall from the hole without further trouble.

The experiments described above have made it clear that a mechanical tamping device should incorporate the following features:

1. It must be so simple and easily operated that it can be quickly placed and as quickly removed.
2. It must be quick in action, and firm in its bite or hold.
3. It must be inexpensive, as a large per cent will be lost and damaged.

The difficulty often experienced in obtaining the proper tamping materials as well as the delay and expense attendant upon placing them, also the danger of tamping, as usually practiced, would be largely obviated by the use of some such device.

The main objection, it would seem to the use of such tamps, is in the cost of construction. They should be so cheap as to be within the reach of all classes of users.

LARGE COAL CARS IN ENGLAND.—The London *Colliery Guardian* says: "We learn that the Great Northern Railway Company is introducing for the working of the coal traffic between the col-

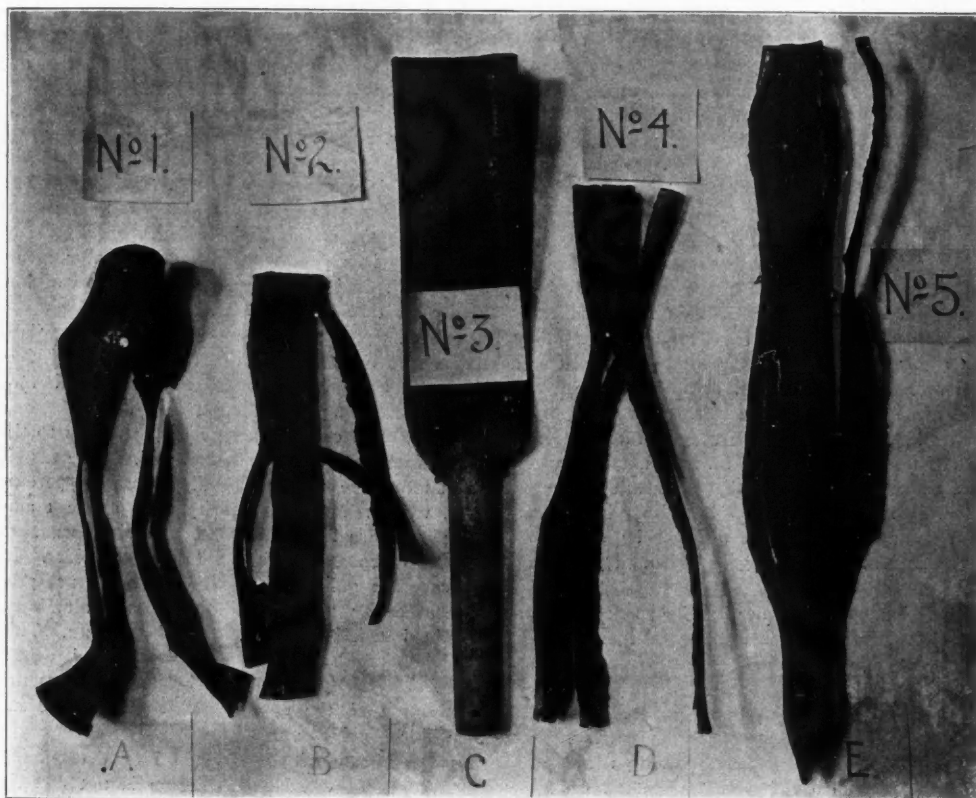


FIG. 2.—MECHANICAL TAMPS.

of the pipe. The wedges were set by simply pulling on the wire attached to the standard. The same result could be obtained either by pulling on the holder, after placing the tamp, or by unlocking the holder and forcing it against the head or base of the upper wedge, thereby forcing the wedges apart against the sides of the hole.

The next series of tests made was on pipes driven into the ground, thus re-enforcing the pipe and providing a means of forming holes quickly, and although not as strong as drilled holes, resemble them in all other respects; with such holes one tamp is all that is necessary.

Test No. 3.—A piece of butt-weld pipe, 24 inches long and  $1\frac{1}{4}$  inches inside diameter, was driven into a firm bed of clay, flush with the ground. As the end of the pipe was not closed, it acted as a drive pipe and partially filled with clay. A charge of 0.96 pound of FF black powder was placed, upon which rested the tamp, the top or head of which was several inches below the surface. The result of the explosion is partially shown at C, Fig. 2. A large cavity was formed at the bottom of which was found the fractured pipe.

Test No. 4.—Another piece of pipe (lap-weld) 20 inches long and  $1\frac{1}{4}$  inches inside diameter was used, but in this case one end (the drive end) was closed by pounding it flat, thus forming a chisel-shaped edge. This piece of pipe was also driven

was freed, otherwise both pipe and tamp would have been projected from the cavity.

In the last two tests the tamps were thrown quite a distance, only one, the latter, being found at the time of the test, and the other was picked up some time later.

The idea of placing a stone over the hole before firing the charge, suggested itself, which was found to materially shorten the distance to which the tamp was thrown and thus rendered its recovery much less difficult. As a further aid, in locating the tamp, a piece of cloth was attached by a stout piece of picture wire to the head of the standard, which indicated the direction of the flight of the tamp. When, however, a stone was placed over the hole, to stop the tamp, or shorten the distance to which it was thrown, it was found that the wire was occasionally cut or torn away, and it was seldom that it would serve for more than three tests.

Test No. 5.—Two pieces of lap-weld pipe of 26 inches in length and of a  $1\frac{1}{4}$  and  $1\frac{1}{2}$ -inch (internal) diameter were employed, the smaller being placed within the larger and one end of this double pipe welded together and formed into a point. The combination was then driven into a bed of well-packed clay and gravel. A charge of 1.60 pounds of FF black powder was placed with the tamp, and the charge exploded. The two pipes were burst open almost the entire length, not following the weld on

lieries in the West Riding and Nottingham districts and London a number of high-capacity steel bogie freight cars, with a carrying capacity of 30 tons. A special feature of these wagons, which are 30 feet in length and 8½ feet high, is the provision of a removable hinged flap above each of the six double folding doors, which enable a barrow to be wheeled into the wagon from a loading bank without obstruction."

#### THE TREATMENT OF CUPRIFEROUS GOLD ORES BY CYANIDE OF POTASSIUM.

By LOUIS JANIN, JR.

Although there are numerous occurrences of gold ores, containing copper, with, however, sufficient value in gold to render their treatment of economical consequence, few papers have treated this subject. An exception is an article published in the *ENGINEERING AND MINING JOURNAL* of August 17, 1901, erroneously credited to the translator, the present writer, but the *kudos* obtaining to which should belong to A. Scrymgeour. This was read before the International Congress of Mining and Metallurgy at the Paris Exposition, and attracted considerable attention. Since the date of Mr. Scrymgeour's paper there has been a notable invention in this branch of metallurgy, which will be referred to later. For the sake of comparison I will mention the three most advocated methods, arriving at the same end; the elimination of the copper, partially or entirely, and the consequent protection of the cyanide of potassium. These are:

1. Leaching by sulphuric acid, preliminary to cyanide treatment.
2. Scrymgeour's method of dissolving copper minerals in a solution of cupro-cyanide of potassium containing no free cyanide of potassium.
3. Bertram Hunt's method of leaching with an ammoniacal cyanide solution.

Owing to the known solubility of many copper minerals in sulphuric acid the first method readily suggested itself. Its drawbacks were not apparent at first. The consumption of acid is high when lime or magnesian carbonates are present in the ore, as they may be often in highly siliceous ores. Moreover, there may be a tendency for the ore to cement and pack in the tanks after the acid treatment. A neutralizing agent, such as a solution of caustic soda, must follow the acid treatment or otherwise the object of the treatment will be nullified, and more cyanide will be decomposed than if the ore had been treated direct. This is an extra expense, and, as additional solutions as well as thorough washings are necessary, where water is scarce this treatment becomes doubly expensive. Since acid solutions are employed, thoroughly permeating the mass of ore in the tanks, burned lime, the common, efficient and economical neutralizing agent for the natural acidity of ores, cannot be employed to normal advantage. This will be seen to be a three-stage process: 1. Leaching of the ore with dilute sulphuric acid. 2. Neutralization with caustic alkali. 3. Cyanide treatment proper.

The time of the first is dependent upon the amount not only of copper in the ore but the contents of bases with which sulphuric acid will combine. Furthermore, as in any leaching proposition, the percolation rate of the pulp plays an important part. This latter, however, may be slower with sulphuric acid than with other liquors, as there is a tendency with that reagent to form gelatinous silica having cementing properties.

Scrymgeour's method depends upon the property of cupro-cyanide of potassium to dissolve copper in certain minerals. This cupro-cyanide is obtained by heating the cupriferous ore with cyanide solution sufficiently dilute. When the cupro-cyanide solution has dissolved its maximum of copper, in the form of a sub-cyanide, the excess of copper is precipitated electrolytically. Then the ore is ready for the ordinary treatment with dilute cyanide solution. This method is then a two-stage one, employing separate electrolytic precipitation tanks and separate storage tanks.

Hunt's method is, however, extremely simple, and is essentially a one-stage process. It depends upon the protective influence of ammonia as well as its dissolving powers for copper. The ammonia and cyanide are employed in the same solution.

It is well known that the double cyanides of copper and potassium exert a solvent power for gold but not so well known is the solubility of the cyanides of gold, silver and copper, and other base metals in ammonia. In treating cupriferous gold and silver ores by this process the strength of the solution in ammonia is varied according to the copper contents as well as the combinations in which the copper is found. On material containing a few pounds of copper per ton, such as Comstock tailings, where the copper is commonly found as cupric oxide, being a secondary product after reduction of the copper sulphate used in pan-amalgamation to metallic copper by the iron of the pan and the oxidation of the sulphides of copper resulting from the reactions between the silver minerals and the cupric sulphate. It was found necessary to use as high as 8 pounds of caustic ammonia to the ton of solution. The strength in cyanide was, however, 0.05 per cent or 1 pound to the ton. On this material, which could not be treated by ordinary cyanide methods, the loss of cyanide was confined to 0.6 pound per ton. The original tailings assayed \$1.45 in gold and 3.05 ounces silver per ton. The highest residues assayed \$0.25 in gold and 1 ounce in silver, and the lowest tailings, after treatment, showed a perfect extraction of the gold, and 85.9 per cent of the silver, being considerably higher than the percentages extracted by ordinary cyanide treatment. This increased extraction is probably due to the energetic oxidizing powers of a solution of cupric oxide dissolved in ammonia. Furthermore, when an excess of cupric oxide is dissolved in ammonia containing less cyanide than will combine with the copper, then cupric-cyanide of the alkali is formed which exerts a solvent action on gold equal to that of cyanide of potassium itself. Finally it has been found by the present writer that ammonia unaided by cyanides has some solvent power on gold as found in some ores.

This solution employed on the Comstock tailings is somewhat higher than would be ordinarily employed on tailings of the same grade in copper, owing probably to the total solubility of the copper in this case, which would rarely occur in an ore or tailings where the copper was native to the original ore.

At the cyanide plant of the Brooklyn Mining Company at Dale, San Bernardino County, Cal., a complex ore is treated with no more ammonium chloride per ton of solution than caustic ammonia was used on the Comstock ore.

This ore contains lead carbonate, cupriferous iron pyrites, with copper in various conditions, notably as silicate. This latter mineral, being soluble in cyanide the loss of cyanide on ordinary treatment ran as high as 7 to 8 pounds per ton. This is properly an ore which should be concentrated prior to cyaniding the tailings, but the results by employing an ammoniacal solution were highly satisfactory in decreasing the consumption of cyanide. An addition of 6 pounds of ammonium chloride per ton to a 0.15 per cent cyanide solution brought the loss down to 1 pound of cyanide per ton of ore; 7 to 8 pounds of burned lime were added to the ore, while the ammonium chloride was added with the cyanide necessary to bring the solution to normal strength in the stock tanks. The solution was allowed to remain in contact with the ore for 12 hours, then draining and washing was continued for a total of about six days.

Any salt of ammonia may be employed instead of the hydrate, provided lime or other alkali is added to the ore. An oxidizing agent may be employed also. If the ore contains any ferrous salts these should be removed by adding the ammonia solution and an oxidizing agent previous to adding the cyanide. Atmospheric oxidation may be also used. This prevents the formation of ferrocyanides.

At Dale ordinary zinc box precipitation is used.

It presented no difficulties, but as would be thought the product is somewhat low grade, from \$3,500 to \$7,000. No acid, however, is used. By this means the product could be doubled in value. In South Africa the presence of copper in cyanide solution in limited amount is held to aid precipitation on zinc, but Mr. Scrymgeour mentions that when the solution ran over 0.01 to 0.02 per cent it enveloped the zinc and prevented the precipitation of the gold. The use of zinc shavings previously subjected to the action of a lead acetate solution was attended with good results, the precipitation of both copper and gold being increased. Precipitated gold, however, has a tendency to redissolve in cupriferous cyanide solutions. It has commonly been found advisable to strengthen the solution with cyanide at the head of the boxes, when ammonia is not employed also.

Alkaline sulphides would naturally suggest themselves as precipitating agents where the amount of copper in ammoniacal and cyanide solutions is large. This precipitation, however, is attended with some dangers. Should an excess of the sulphide be used and the cyanide be regenerated the copper and the gold will be dissolved in part, so that the precipitation to be effective must be delicately adjusted.

On the whole, the electrolytic method seems preferable. Mr. Scrymgeour recommends it for the precipitation of cupriferous cyanide solutions. In the Siemens-Halske process both gold and copper are precipitated as a hard coating adherent to the cathode, though the accumulation of a cupro-cyanide of iron on the iron anodes causes excesses of currents locally with final short circuiting. Currents of low density must be employed.

In Hunt's process the employment of peroxidized lead anodes on aluminum cathodes seems advisable. The anodes are best peroxidized in a solution of permanganate of potassium previous to use.

With these a current density of 3 amperes to the square foot may safely be employed. Whereas, if lead anodes are used, gradually becoming peroxidized, when the current density rises above 1 ampere per square foot reactions occur with formation of basic carbonates of lead and lead cyanides. In this case the gold, silver and copper are not precipitated as an adherent coating to the aluminum cathode, but fall as a sludge to the bottom. This may be collected and refined or directly melted into ingots. Through this precipitation there is a partial regeneration of the copper which does not occur when zinc shavings are used.

As the nitrate of silver method of determining the strength of cyanide in solution is not directly applicable where the solution contains ammonia and base metals a brief description of the method employed may be of value. To the solution add an excess of mercuric chloride or mercuric oxide, with a few drops of caustic soda. Boil off the ammonia causing precipitation of base metal oxides. Filter and wash. Precipitate the mercury in the filtrate with slight excess of sodium sulphide. Neutralize excess of the alkaline sulphide with carbonate or basic acetate of lead. Filter, wash and titrate filtrate with silver nitrate solution in the ordinary way.

Hunt's process may be said to have the following advantages:

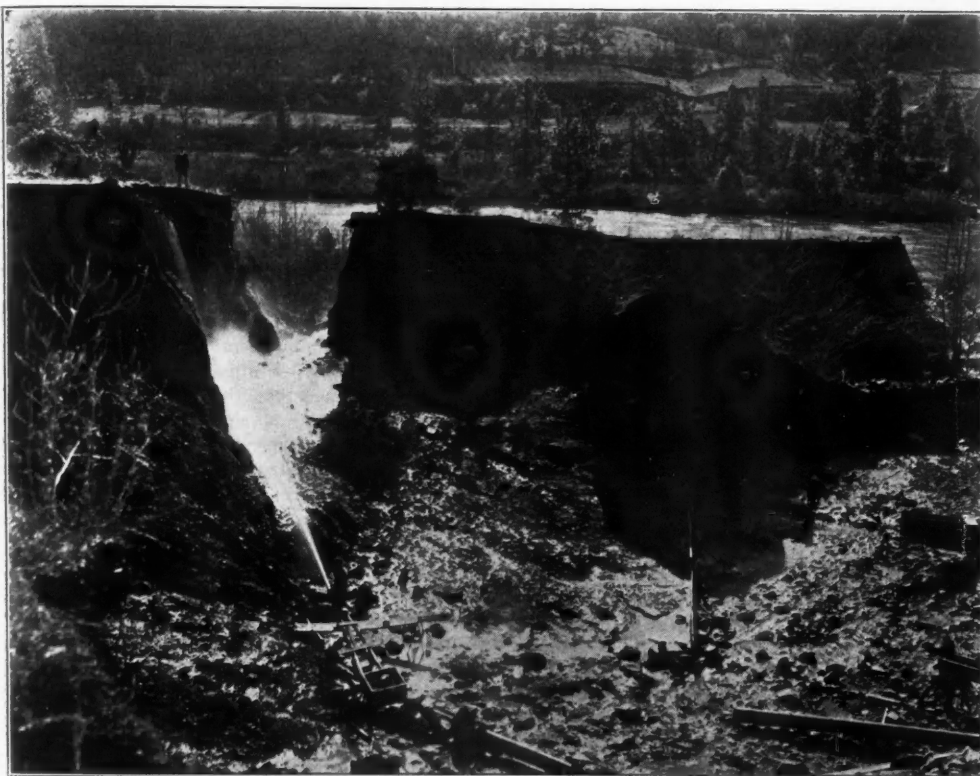
1. It brings within the range of cyanide treatment many ores heretofore considered impracticable to treat.
2. In many cases where ores are now being treated its use will result in increased economy through reduction of cyanide consumption.
3. It has the merit of simplicity above the other proposed methods, and simplicity ordinarily means increased money saving.
4. The cost of the reagents employed is not high when compared with that of cyanide. Part of this may, in some cases, be partially made up by the value of copper extracted.
5. Unlike the acid treatment, calcareous ores are desirable.
6. There is no limitation to the copper contents of the ores which can be treated economically under ordinary local conditions, though with extremely

high-grade copper ores, the plant would have to be built for ammonia recovery.

In conclusion, I may say that I am of the opinion that when greater experience has been had with the process and all details have been thoroughly worked out, it will come into general use for oxidized copper-gold tailings or ores, though the difficulties now found with pyritic ores may be corrected.

#### HYDRAULIC MINING IN OREGON.

In our issue of November 1 last we published an article describing the work now being done in hydraulic mining in Southern Oregon. Since then we have received a number of photographs from correspondents, from which we have selected two for reproduction. The first is a general view of the Hays hydraulic mine, showing the general situation of the deposit, with the giants at work. The second shows a hydraulic elevator in use at an Oregon mine. Both of these illustrations give familiar



HAYS HYDRAULIC MINE, GOLD HILL, OREGON.

phases of hydraulic mining and indicate workings of considerable extent.

#### CYANIDING CONCENTRATES BY PERCOLATION AT CHOUKPAZAT.\*

By C. M. WRIGHT.

At the Choukpatat in Burma the concentrates consist of 30 to 40 per cent sulphides and 60 to 70 per cent coarse sands; of the sulphurets, other than iron pyrites, 5 per cent consists of franklinite, galena, chalcopryrite, and a very little altaite. Of these minerals the franklinite is by far the richest, assaying from 7 ounces per ton and upwards; the galena holds practically no gold, and the chalcopryrite and iron pyrites vary from about 0.9 gram per ton to 2 ounces per ton, depending on the general value of the ore.

Our mode of treatment is simple. After an alkaline or plain water wash, follows a weak solution wash (catch-sump strength 0.10 to 0.12 per cent KCN) and then nine washes of 0.3 per cent strength; the contents of vat are carefully turned over and 0.3 per cent solutions follow until for two successive days the effluent comes down to 0.26 per cent, when the treatment is considered complete. Two more solutions, catch strength

of strong solution sump, usually 0.25 per cent, are followed by two weak solution 0.07 per cent washes, and by a final water wash, or two if required.

Every solution and wash that passes through the percolation vat passes into the same sump through the same zinc box. A careful check is kept of cyanide used, of solutions taken from weak solution sump, and of strong solution thrown on to tailings vat, so that the level of the special sump is kept constant and at same time the somewhat loaded strong solution is exchanged for a cleaner weak solution.

The check upon consumption of cyanide and zinc is complete and automatic. Usual tonnage charged monthly, 17 to 20 tons; duration of treatment, 24 days; extraction, 84 per cent. Formerly the zinc in zinc box was made up mid-monthly; this was found to be not necessary and wasteful of zinc. This zinc box is now carefully packed at the commencement of the treatment and left

large scale. I am aware that there is an objection to the use of niter, but there would seem to be no great chance of loss of gold by the method in use.

To preserve our graphite pots and give no chance for the reduction of the base metals, clay liners are used; they last, with care, four or five fusions; using Carr's patent furnace it was found convenient and quite practicable to smelt the slimes as if each melt was an assay. Upon a good bed of hot coke, the pot, with liner filled with mixture to within one inch of top, is placed and carefully packed; until the fusion is complete, in 90 to 120 minutes, the only attention needed is the addition of a little fresh coke at the end of an hour round the pot as it sinks. Immediately after pouring, the pot is re-filled and replaced in the furnace; a second pot and liner stand ready to take the place of the one in use, if the liner is found to be cracked. The charges are, for slimes, +30-mesh (which have been acid treated in their own vat), borax, 45 per cent; soda, 22½ per cent; sand, 27 per cent; niter, 16 per cent; for slimes, -30-mesh (own acid treatment), borax, 27 per cent; soda, 13 per cent; sand, 18 per cent; niter, 10 per cent. There are no prills in the slags, which vary in value, but seldom exceed 8 ounces per ton. Fineness of bullion from the +30 slimes from 500 to 540; from the -30 slimes from 560 to 600.

I have detailed the method to account for the high costs of reduction which, however, are being gradually reduced by small savings here and there and should not much exceed 24 cents per ounce fine gold in the future.

A statement of costs for five months' work, upon fresh Wilfley table concentrates giving no trouble to treat shows for a total of 89 tons, an assay value of 161.7 ounces fine gold. The assay value of the residues was 27.4 ounces. The actual bullion saved was 135.7 ounces. The extraction was 84 per cent.

The average costs were as follows: Share of pumping, 13.5 cents; supervision, 85; labor, 11; cyanide consumed, 5.12 pounds, 133; zinc, 0.85 pound, 7; reduction, assaying and sundries, 58.5 cents; total, \$3.08 per ton.

**WATER-PROOF BRIQUETTES IN GERMANY.**—United States Consul B. H. Warner reports from Leipzig: "All briquettes which have hitherto been manufactured by means of soluble cements (such as dextrin molasses, lixiviated cellulose, oxidized lignine, resinates of ammonia, etc.) dissolve in water. Richard Bock, an engineer of Merseburg, Saxony, has found a method for making briquettes which are entirely water-proof. He heats the finished briquettes until the cement is wholly or partly carbonized, which makes them indissoluble. In case the ignition temperature of the cement is likely to be attained, the heating must take place in an air-tight case or by means of hot gases."

**NEW IRON WORKS IN ENGLAND.**—The London *Colliery Guardian* of December 5 says: "The directors of the Weardale Steel, Coal and Coke Company, Limited, and Cargo Fleet Iron Company, Limited, last week inspected the extensive new works in progress at Cargo Fleet. These consist of a new cokemaking plant complete, with coal-washing and compressing machinery, and by-products plant. The coke will be automatically conveyed to the furnace and charged into it by machinery. The furnaces are being equipped on the American system of charging by a skip traveling up an inclined way, and the blast will be provided by gas engines driven by furnace gas. Molten metal will be taken from the furnaces to the steel shop, where it will be converted into steel by the Talbot process. From there it will be delivered in the form of ingots to the mills, which will largely consist of machinery removed from the Tudhoe Works, Spennymoor."

absolutely untouched till the clean-up; it is an eight-compartment 1,000-ton per month box, and each compartment is filled.

Reduction costs are high; our slimes carry nearly as much silver as gold in -30-mesh slimes; in +30-mesh slimes practically no silver, and much copper, all zinc being first copper-coated immediately after being put into use.

Dried slimes fused with borax give very poor bullion, averaging about 100 fine; in no case could bullion be got better than 275 fine gold. Bullion got after the slimes had been washed with even 20 per cent niter ran little over 400 fine gold. Furthermore, it was found impossible to use a graphite pot more often than two ordinary melts, and it was evident that the metallic oxides, principally copper, ate away the carbon and were reduced. In despair the washed slimes were sent to London refiners, but the costs were so high and the results so uncertain that we returned to local reduction. Never having seen the work done, I had to depend on reading, and after two or three months experimenting have evolved the following method, which, though not original, has practically solved the problem.

Very careful cold acid treatment and thorough subsequent washing, slow drying in enameled basins and fluxing with borax, soda, sand and niter as if each melt was an ordinary assay on a

\* Paper read before the Institute of Mining and Metallurgy, London.

### FUEL OIL ON THE PACIFIC COAST.

By Our Special Correspondent.

Several lives were lost and a number of persons injured by an explosion on board the oil tank steamship *Progreso* while lying at the dock of the Fulton Iron Works in San Francisco Bay, on December 3. The vessel herself, valued at \$175,000, was broken in two and utterly wrecked and burned. She was being transformed into an oil-carrying vessel, and was nearly ready for sea. One tank, holding 400 barrels, had been filled the day previous, ready for fuel at sea. It was the gas or oil on this tank which exploded and did all the damage. It was a "fuel oil," not crude petroleum, and as such was a mixed oil. That is, some of light gravity was mixed with the heavier Kern County oil. It was found by testing some oil remaining in the tanks of the tug which filled the *Progreso's* tank,

furnished by oil companies to their consumers and suggest that your honorable board formulate an ordinance requiring all oil furnished for fuel purposes in boilers to stand a flash of not less than 150° F. We consider the present ordinance of 110° F. as too low for perfect safety.

"There is absolutely no danger from fuel oil, provided it will stand the flash test as above. Any one familiar with fuel oil can almost tell by looking at it, without any test, if the oil is of the proper consistency.

"Companies with light oils of high specific gravity and low flash test pretend to mix them with heavier oils. This should not be allowed as to the mixture is not permanent, even if properly done, which is exceedingly difficult, the heavier oil having to be heated at the time of mixing. It is a mooted question, which experts are not yet agreed



HYDRAULIC ELEVATOR ON AN OREGON MINE.

that it flashed at 85°, and some at 101°. The law requires that oils to be safe shall not flash at less than 110°.

The matter is being thoroughly investigated, in view of the many hundreds of users of oil for fuel in San Francisco, and on steam vessels on the Pacific Coast. It is found that light oils have been mixed with the heavy to cause a ready flow. The gas generated from the lighter oils in the *Progreso's* tanks was doubtless ignited by some of the vessel machinists' fires or forges on board the vessel, where repairs were being hurried to completion.

The California Petroleum Miners' Association has sent the following petition to the Board of Supervisors of San Francisco, which is self-explanatory:

"To the Honorable Board of Supervisors, San Francisco, Cal.—Gentlemen: The California Petroleum Miners' Association, in view of the recent lamentable accident on the steamer *Progreso*, desires to call your attention to the quality of oil

on, whether, after cooling, the heavier oil does not sink, leaving the higher gravity oil on top to form gas. The above suggested ordinance would work a hardship to no one, as there is an abundance of low-grade oil with a flash of over 200° to be had.

"We earnestly request your honorable body to act on this matter at once, and thereby avert further accidents."

This communication was referred to the Fire Committee for its action. The United States local inspectors of steamboats, O. F. Bolles and John K. Bulger, will take testimony regarding the explosion and its causes as far as the licensed officers of the *Progreso* are concerned, their jurisdiction going no further.

### DETERMINATION OF SULPHUR IN COAL AND PYRITES.

A. Reitlinger has modified the method of Antony and Lucchesi so that it can be rapidly carried out (*Journal russisch physical chemistrie Gesellschaft*, XXXIV, 457 to 461; *Chemiker Cen-*

*trale*, 1902, II, viii, 610; *Journal Society Chemical Industry*, XXI, xx, 1298, October 31, 1902). Half a gram of the sample is mixed with 1 gram of  $MnO_2$ , 0.5 gram of  $K_2CO_3$  and 0.5 gram of  $MgO$ , and ignited in a platinum crucible, the temperature being raised gradually. After cooling, the crucible is immersed in hot water and 10 c.c. of concentrated HCl are added. The liquid is boiled until the mass is thoroughly digested, after which ammonia is added to precipitate iron and the solution is then filtered off. In this way the silica is separated completely and evaporation with HCl is avoided. Sulphur in pyrites can be determined in a similar manner, by igniting 0.5 gram of the sample with 2 grams of  $MnO_2$ , 1 gram of  $K_2CO_3$ , and 1 gram of  $NgO$ .

### ANALYSIS OF LITHOPHONE.

Lithophone is prepared by precipitating a solution of zinc sulphate by means of barium sulphide. The latter is obtained by reducing barium sulphate by testing with carbon and leaching with water. In the latter operation there is a certain decomposition into sulphhydrate and hydroxide, which in precipitating the zinc throw down corresponding proportions of zinc sulphhydrate and hydroxide. Upon calcination these compounds are converted into zinc sulphide and zinc oxide, respectively. The final product is therefore a mixture of the above compounds of zinc, together with barium sulphate. Its value depends largely upon the percentage of zinc. There has been considerable discussion recently as to the best method for determining the latter (see this *JOURNAL*, November 1, p. 578). Ch. Coffignier reports analyses of lithophone from five different makers ranging in nominal composition from 15 to 34 per cent ZnS. He found that lithophone contains a proportion of zinc oxide varying from 0.38 to 2.68 per cent, of which 0.12 to 5.14 per cent is soluble in water. P. Drawe has described a method of analysis (*Zeitschrift fur angewandte Chemie*, 1902, XV, viii, 174, and *Journal Society of Chemical Industry*, March 31, 1902, XXI, vi, 427) in which 1 or 1.5 grams of the sample is treated with 10 c.c. of chlorhydric acid of 1.19 sp. g. and a pinch of potassium chlorate, and evaporated on the water bath until half the liquid has disappeared. The solution is then diluted, treated with a little dilute sulphuric acid and the insoluble matter filtered off. The filtrate is cautiously neutralized with sodium carbonate and the zinc precipitated. After washing and ignition the precipitate is weighed as  $ZnO$ , corresponding to the total zinc in the pigment. Another 1 or 1.5 grams is digested for half an hour at ordinary temperature with 1 per cent acetic acid. The insoluble portion is filtered off and treated in the same way as the first portion. This gives the zinc existing in the pigment as sulphide; the zinc as oxide, which is soluble in the dilute acetic acid, being computed by difference. Coffignier does not find this method quite satisfactory, and considers that the zinc soluble in dilute acetic acid should be calculated as  $Zn-OH$  instead of  $ZnO$ .

References: *Zeitschrift fur angewandte Chemie*, 1902, XV, viii, 174; *ibid.*, XV, xxxii, 802 to 808; *Journal Society Chemical Industry*, XXI, vi, 427; *ibid.*, XXI, xvii, 1145 and 1146; *Bulletin Societe Chimique*, XXVII, xv, 829; *ibid.*, XVII, 943; *Chemiker Zeitung*, Repert., 1902, XXVI, 229; *ibid.*, XXVI, 297.

CANALS IN BELGIUM.—United States Consul G. W. Roosevelt, at Brussels, Belgium, writes under date of November 21 as follows: "As the canal connecting Brussels and Charleroi is the cheapest means of direct transportation for coal from the mines at Charleroi, the Department of Public Works is pushing the work of widening it. There is under consideration a new system for mechanical towing of boats by electric engines. Contracts for the work will not be made before the latter part of 1903."

### RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

**LIABILITY OF MINE OWNER UNDER LAWS OF WASHINGTON FOR LACK OF PROPS.**—Under Ballinger's *Annotated Code and Statutes* (Washington), Section 3178, providing that "the owner of any coal mine shall keep a sufficient supply of timber at such mine where the same is required for use as props, so that the workmen may be able at all times to properly secure the workings from caving in, and shall send down into the mine all such props when required, the same to be delivered at the entrance of the working place," the failure of the owner of a mine to furnish props and timbers when called for by the workmen is negligence rendering such owner liable for any injury thereby resulting to the workmen. Where the operator of a coal mine violates such statute and one is injured by reason of such failure the employer cannot plead assumption of risk, even where the miner knew of the violation.—*Green v. Western American Company* (70 *Pacific Reporter*, 311); Supreme Court of Washington.

**WHEN CONVEYANCE OF MINING PROPERTY WILL NOT BE SET ASIDE.**—A conveyance of mining property to a mining corporation in consideration of capital stock of the corporation is supported by a valuable consideration within the meaning of the Laws of Colorado (Mill's *Annotated Statutes*, Section 490) authorizing corporations to purchase property for their business and issue stock to the amount of the value of same, and Section 542, providing that any mining company may issue fully paid stock in payment of mining property so purchased. The mere fact that a mining corporation paid no money for mining property purchased, but issued stock in payment of the same is, in a suit by creditor of the grantor to set aside the conveyance as fraudulent, no proof of an intent of putting property beyond the reach of creditors of the grantor, the transaction being permitted by law. In such a suit, the notes evidencing the indebtedness, without proof of their execution, and the judgment recovered against the grantor in a suit brought subsequent to the conveyance, do not show, as against the grantee, that the indebtedness existed prior to the time of the conveyance.—*Homestead Mining Company v. Parks* (70 *Pacific Reporter*, 422); Supreme Court of Colorado.

**WHAT MAY BE SHOWN REGARDING THE PIT-BOSS IN ACTION FOR DAMAGES.**—In an action for damages arising from failure to furnish sufficient timbers through the incompetence of the pit-boss, questions as to geological formations, changes, etc., of the duties of the pit-boss as to inspecting the working places; as to keeping the chutes clear of coal; as to timbering or fixing the bulkheads for the purpose of keeping the rocks from falling through the chutes; in relation to repairing defects when complained of; as to whether or not, when the chutes become blocked or clogged, it is extra hazardous to start to unblock them; and as to whether there was a general complaint among the miners of the insufficiency of timbers, are competent on the question of the competence of the pit-boss. The complainant should be permitted to show that the pit-boss did not perform his duty to see that the coal in the chutes was removed and the driveways cleared; in timbering the chutes and crossings, and placing and repairing bulkheads to keep the rocks from falling through the chutes and crossings; that the miners made complaint of such neglect and were discharged; that he employed ignorant and incompetent men; that he told them there was no danger when the work was hazardous; that there was general complaint in the mine that the men could not get timbers and props sufficient for their protection; and also that the mine owner could by reasonable care have known of the incompetency of the pit-boss and of his want of proper supervision of the workmen and of the mine; also the general reputation of the pit-boss for incompetency and disregard for the

lives and limbs of the miners under his charge. In such an action evidence of specific acts of incompetency of the pit-boss, and that he did not have regard for the lives of the men under his charge is admissible under a general allegation that he was ignorant and incompetent.—*Green v. Western American Company* (70 *Pacific Reporter*, 310); Supreme Court of Washington.

### ABSTRACTS OF OFFICIAL REPORTS.

#### *St. John del Rey. Mining Company, Brazil.*

The report of this company for the six months ending August 31, 1902, shows that 79,141 tons of rock were raised from the mine, of which 8.1 per cent was sorted out as waste, leaving 72,700 tons of ore to be worked in the mill of 120 stamps. The average return and costs per ton for the half-year were as follows:

Gold recovered, first process.....	\$7.2838
Gold recovered, second process .....	1.8237
Total .....	\$9.1075
Taxes and Brazilian royalties .....	\$0.4850
Working costs in Brazil .....	5.1000
Development and renewals .....	0.6100
General expenses .....	0.1500
Total expenses .....	\$6.3450
Net balance, per ton.....	\$2.7625

The accounts as stated from the London office show that the bullion realized £137,953. The total expenses, including royalties, were £96,278, leaving a balance of £41,675. From this payments were made for interest, etc., £8,066; new machinery, additional water power, etc., £17,570; dividend—6d. per share—£14,510; total, £40,146, leaving a balance of £1,529 forward to current half-year.

The directors' report says: "Exchange has remained steady at about 12d. during the half year, and the average of the milreis in the cost is 12.02d. The mineral bullion has realized 38s. per ton crushed, and the profit allows of the payment of a dividend of 6d. per share, after providing for the expenditure incurred during the half year of £17,570 on additional power and the works in connection with the new deep shaft. The works for additional power under the Gaia scheme have been completed, and the charge to be paid out of revenue during the current half year will only be for the progress made in sinking the new shaft. The engine house and engine are finished and charged in the half year now under consideration.

"The satisfactory financial working of the half year, although with a higher rate of exchange, is partly due to the improvement in the yield of the mineral, partly to the low working cost from economies effected, but chiefly to stores and materials being taken out of stock at the cost price—a large portion of the stores consumed having been purchased when exchange was at a lower figure.

"The Winze going from No. 11 Horizon in the north branch of the lode, at the approximate angle of dip of the lode, was sunk in mineral of good quality (for the north branch) the whole distance of 448 feet to open out a new horizon, No. 12, at a vertical depth of 300 feet below Horizon 11, and reached the required depth at the end of the half year. Winze No. 12 from the south part of the Indent and about 330 feet east-southeast of No. 11 Winze had on September 30 reached a depth, at the same angle as No. 11 Winze, of 256 feet; this winze will be sunk to the same depth as No. 11, and a cross-cut will be then made to the lode at Horizon 12, and a level driven westward to communicate with that coming eastward from No. 11, ensuring abundant ventilation and stopping facility.

"The Gaia Rego and Electrical Plant were in successful operation early in September, transmitting power to work motors at Morro Velho, compressing air for machinery and plant underground, and especially for the large engine at the horizon of No. 8 for hauling the rock excavated in sinking the new vertical shaft E, and subsequently for hauling the bulk of the mineral from horizons 12, 11 and 10 to the tramway at 8. The cars will be then hauled to

surface through shafts C and D, a total vertical haulage to the adit level of 3,300 feet. The expenditure on these two works has been so far met by the issue of 11,397 new shares by the £20,091 taken out of revenue last year, and by the £17,570 from the half year to August 31. The directors expect the current profits will allow provision for the expenditure on works during the present half year, and the payment of the same rate of dividend next June.

#### *Daly West Mining Company, Utah.*

The following circular statement from the directors is dated Salt Lake City, Utah, December 5: "Owing to the recent decline in the price of silver, and consequent decline in the market value of the shares of this company, the directors deem it advisable to issue a statement of the affairs of this company. Our business for the current year has been very prosperous, so much so that we felt justified in increasing our monthly dividends from 40 cents to 60 cents per share, commencing in July last. Up to this date we have earned all fixed charges and dividends monthly, occasionally leaving a handsome balance to be carried forward to our surplus account. We have no indebtedness whatever, excepting current expenses, which are paid monthly. Our mine is well equipped and the developments are far in advance of the ore extraction. We have large ore reserves blocked out, more than at any time heretofore, and are increasing the same daily. We have a large area of undeveloped territory, which we are continually exploring.

"In order that you may understand to what extent the fluctuation of the price of silver affects the earnings of the Daly West Mining Company, we will state that our output of ore for the 11 months ending December 1, 1902, was as follows: About 57,000 gross tons of ore and concentrates, containing about 11,700 tons of lead, 422 tons of copper, 2,975,000 ounces of silver, and 2,611 ounces of gold, making an average of about 5,100 tons of ore and concentrates monthly, averaging 20.5 per cent lead, 53.6 ounces of silver, 0.045 ounce of gold and 0.8 per cent copper per ton net, or, approximately, 271,000 ounces of silver per month. The output for September, October and November shows an increase of about 1,000 tons of ore per month, with an average of about 350,000 ounces of silver per month for these months.

"Notwithstanding the extraordinary expenses, which were extremely large during the past year—caused by litigation with the Quincy Company, which has all been adjusted by the purchase of the Quincy property, and by the deplorable accident which occurred at the mine in July last, which is now nearly all adjusted—we have now in the treasury about \$250,000 and other valuable securities, which are estimated to be worth \$100,000.

"In view of the above your directors feel justified in saying that, notwithstanding the serious decline in the price of silver, the Daly West Mining Company can pay handsome dividends to its stockholders for a number of years to come. Information about the condition of our mine and the company's affairs will be cheerfully furnished by the management of the company."

### 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*.

- Facts about Alaska.* Issued anonymously. Pamphlet, 32 pages.
- The Ironmonger Diary for 1903.* Thirty-fifth year. London, England; *The Ironmonger.* Pages, 556.
- The Conversion of Amorphous Carbon to Graphite.* By Francis J. Fitzgerald. Philadelphia; reprinted from the *Journal of the Franklin Institute.* Pamphlet, 28 pages.
- Thirty-third Annual Report of the State Board of Health of Massachusetts.* Dr. Samuel W. Abbott,

Secretary of Board. Boston, Mass.; State Printers. Pages, 616.

*L'Année Technique. 1901-1902.* By A. da Cunha. With Preface by Emile Trelat. Paris, France; Gauthier-Villars. Pages, 280; with 114 illustrations. Price (in New York), \$1.25.

*Calculations in Hydraulic Engineering. Part II. Hydro-Kinetics.* By T. Claxton Fidler. London New York and Bombay; Longmans, Green & Co. Pages, 204; with diagrams. Price, \$3.

*Transactions of the American Institute of Mining Engineers. Volume XXXI; 1901.* Edited by Dr. R. W. Raymond, Secretary. New York; published by the Institute. Pages, 1080; illustrated.

*Ancient and Modern Engineering and the Isthmian Canal.* By Prof. William H. Burr. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 488; illustrated. Price, \$3.50.

*Elektrometallurgie. Die Gewinnung der Metalle unter Vermittlung des Elektrischen Stromes.* Part I. By Dr. W. Borchers. Leipzig, Germany; S. Hirzel. Pages, 288; illustrated. Price (in New York), \$3.25.

*The Civil Engineer's Pocket Book.* By John C. Trautwine. Revised by John C. Trautwine, Jr., and John C. Trautwine, 3d. Eighteenth Edition, 1902. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 1080; illustrated. Price, \$5.

*The Evolution of Mine Surveying Instruments.* By Dunbar D. Scott and others. Reprinted from the *Transactions of the American Institute of Mining Engineers.* New York; published by the Institute. Pages, 324; illustrated. Price, in cloth, \$3.50; half morocco, \$4.50.

#### BOOKS REVIEWED.

*Mysore Geological Department. Report of the Chief Inspector of Mines for the year 1901.* W. F. Smeeth, Chief Inspector. Bangalore, India; printed for the Geological Department. Pages, 24; with tables and maps.

Mysore, which is one of the Native States of India, which are closely controlled by British influence, is best known by the productive mines of the Kolar Gold-field. These are by far the most important mining industry of the State. There are, however, minor products of some importance, including salt, iron ore, asbestos, corundum, mica and soapstone; in addition to which there is a large production of bricks and other clay products, and several quarries of limestone, granite and other building stones. Dr. Smeeth's report gives full statistics, and in addition many details as to methods of working in the gold mines, surveys, accidents and other particulars. It treats also of water supply, and of the condition of miners. It is accompanied by a number of mine maps and plans, and shows thorough work.

*Abstract of the Mining Laws in Force in the Philippine Archipelago.* Compiled by Charles H. Burritt, First Lieutenant Eleventh Cavalry, U. S. V., Officers in charge of Mining Bureau. Manila, P. I.; Bureau of Public Printing. Pages, 232.

The mining law in force in the Philippines when the islands were first occupied by the United States forces, consisted of a general law promulgated by the Spanish Government in 1867, with several supplemental decrees. The law had not been generally enforced, and no attempt had been made to abstract this law and collect its scattered and extended provisions under proper headings, or to note the amendments made. This much-needed work has now been performed by the Mining Bureau, under charge of Lieutenant Burritt. The result appears in the present volume, which contains an abstract of the Royal decree of 1867, with references and cross references covering the regulations and subsequent decrees. The

law is now published for the first time in a clear and intelligible form. It is not expected that this will constitute the permanent code; but it can be understood in its present shape and constitute the basis for changes and amendments. The work of putting the law into shape has been a considerable one, and the volume shows that it has been carefully and intelligently done.

*The Potash Salts. Their Production and Application to Agriculture, Horticulture and Industry.* By Dr. L. A. Groth. With Preface by Dr. Samuel Rideal. London, England, 1902; the Lombard Press, Limited. Pages, 292.

The deposits of potassium salts are found almost exclusively in Germany, and their development has given rise to a large and important industry. In France about 2,000 tons of potassium salts are annually produced by evaporation, and in India about 20,000 tons of potassium nitrate are likewise obtained. At Kalusz in Galicia, the only potash mine outside of Germany, 1,200 tons of potassium salts are annually produced. There are also one or two places in the western portion of the United States from which potassium nitrate has been obtained. The present demand of 3,000,000 tons a year is supplied almost entirely by the Stassfurt deposits controlled by the "Kali-Syndikat." Twenty mines are now in actual operation, and eleven more are being developed. Borings in the different mines show sandstone, clay, gypsum, anhydrite, rock salt and potash salts. The potassium salts consist of either potassium chloride or potassium sulphate, alone or combined with magnesium or calcium chloride or sulphate. Tables showing the percentage composition of the mineral in the different mines at various depths are given in the book.

These potassium salts are sometimes used directly as mined, but generally they are first refined, and the resultant salts used partly in the chemical industry and partly for agricultural purposes. While nitrates and phosphates have long been used extensively as fertilizers, potassium salts have only recently been utilized for this purpose. With the exception of Germany the United States is the largest consumer of potassium salts for chemical and agricultural purposes. Statistical data of the production, value, number of men employed in the works and results of experiments on vegetables, grasses and cereals with manures containing potassium salts form an interesting section of the work. Considering the growing importance of this subject it is to be regretted that Dr. Groth has given so little really new information, his work being mainly a compilation of numerous articles and statistics of the industry in Germany to the end of 1900. The chief feature of the work is the section devoted to the application of potassium salts in agriculture (pages 118 to 180). The concluding section (pages 183-286), which is devoted to a popular description of steam and electrical machinery and blasting, is very weak. These subjects, if discussed at all, should naturally be referred to a work on engineering.

*Die Entwicklung des Niederrheinisch Westfälischen Steinkohlen-Bergbaues in der zweiten Hälfte des 19 Jahrhunderts.* Published by the Verein für die Bergbauischen Interessen im Oberbergamtsbezirk Dortmund, in common with the Westfälischen Berggewerkschaftskasse and the Rheinisch-Westfälischen Kohlensyndikat, through Julius Springer, Berlin.

This great work is to comprise seven large volumes, as follows: I. Wirtschaftliche Entwicklung, Geologie. II. Ausrichtung, Vorrichtung, Abbau, Grubenausbau. III. Schachtabteufen. IV. Gewinnungsarbeiten. Wasserhaltung. V. Forderung. VI. Wetterführung. VII. Tagesanlagen. Of these, volumes II and V have just been published; the others will follow later. The price for the series is 160 marks; it is not intended to sell single volumes. This work is one of the

greatest undertakings in technical literature in recent years. Dealing comprehensively with the conditions existing and methods employed in the most important of the coal producing regions of Germany, it constitutes the latest and most valuable treatise upon coal mining in Europe.

Volume II. comprises 378 pages, with many illustrations in the text and numerous large plates. The pages are 7½ by 4½ inches (of type), which is approximately the same as those of *The Mineral Industry*. It is made up of contributions by various authors. The section on Ausrichtung is by Bergassessor Wolff. That on Geschichtliche Entwicklung von Vorrichtung und Abbau is by Bergassessor Trainer, who is also the author of the sections on Vorrichtung and Abbau, which represent the main body of the volume. Grubenausbau, the last section, is by Bergassessor Wolff.

Volume V, which has 516 pages, and is in all respects a companion to Volume II, is divided into four sections upon the following subjects: Fördermaterialien, Grubenforderung, Schachtforderung, and Tagesforderung. This is entirely the work of Bergassessor Wilhelm Müller, with the exception of the single chapter on Motoren der Schachtforderung, which is due to Herr Oldenburger.

The typographical work in and the make-up of these volumes is above criticism, and the engravings are excellently done, although we regret that the latter have not been more fully dimensioned.

It is also to be regretted that the volumes are not indexed.

The work is, we understand, meeting with the high degree of appreciation in Germany, to which it is certainly entitled, and although the improbability that it will be translated into English, and its high cost will limit the demand for it in Great Britain and America, it should surely find a place in all of the more important libraries, while to such colliery engineers as can afford it, it will doubtless be well worth the money.

#### 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 Method of Copper Matte Concentration.*

Sir: In your issue of December 6 appears an article entitled "A new method of copper matte concentration," a method more fully described in *Oesterreichs Zeitschrift* for November 1 last, and one for which it is supposed that a patent issued to Thofehrn and St. Seine about a year ago. In fewest words the process is to melt copper matte in a reverberatory and then to blow upon it steam, air and fine sand.

This notion seems first to have matured in the mind of John Hollway, who says that it is not entirely his invention. His patent is United States 234,129, November 9, 1880. On the same day, from the same patent office, was issued a patent to Cyprien Tessi du Motay, and was numbered 234,212. His notions of this particular process are clearer and better than those of John Hollway, but his machinery is a bit unsuited to the work proposed. The next inventor, Benj. J. B. Mills, describes the method completely in English patent 583, of the year 1884. Then come these patents: McTechnie, English patent 12,053, of 1886; Peter Kirk, United States patent 688,651, of 1901; Thomas Roberts, United States patent 568,700, of 1896.

Among the many other inventors of the process came Tyson, Everett and the writer in 1901, who tried to patent it, but fortunately failed to do so. We had worked it out at our Elizabeth Mine at Strafford, Vermont. My own opinion is that the process is perhaps the best one now known, and

further, that none of the patents upon it would now be held as valid by the courts.

WILLIAM GLENN.

Baltimore, Dec. 15, 1902.

#### Mining Costs on the Mother Lode in California.

Sir: Some recent mining costs on the Mother Lode in California—where there is to be found some of the best and much of the worst practice in the United States—may be of interest.

At the Melones Mine in Calaveras County during the month of November 8,500 tons of ore were mined and 6,500 tons milled. The average costs per ton are shown in the following table:

For:	Cents.
Drilling .....	12.0
Breaking rock in stopes .....	6.0
Shoveling and tramping .....	8.0
Foremen, blacksmiths and timbermen .....	8.5
Supplies and timber .....	8.0
<b>Total mining labor and supplies .....</b>	<b>42.5</b>
Hauling 550 ft. underground, with six 1¼-ton cars in train, by horse .....	3.0
Hauling 4,900 ft. underground, with four 8-ton cars in train, by electric motor .....	4.0
<b>Total haulage .....</b>	<b>7.0</b>
Milling and concentrating, labor and supplies .....	26.0
<b>Total cost per ton, for labor and supplies .....</b>	<b>75.5</b>

Adding general charges for management, superintendence, office, assaying, experimental work, insurance, taxes, etc., and for power, will bring the total costs up to about \$1—into the near neighborhood of that much abused dollar a ton.

Knowing that to practical workers a statement of costs is of little value without knowing the conditions, I may say that the wage rate is \$3 per day. The rock is slate, hard greenstone and quartz. The width of stopes is irregular, varying from 4 to 30 feet. The lode dips about 70° from the horizontal, and has generally a fairly defined hanging wall, and no foot wall. Air drills are used. The levels are timbered along the hanging; cross-cuts are driven and timbered for chutes, where the ore extends into the foot country far enough to require it.

The broken ore is carried in the stopes close to the backs. The surplus is drawn off through chutes, trammed to shaft and dropped 425 feet to a pocket; then trammed 550 feet to another shaft and dropped 225 feet to another pocket. From this last pocket it is loaded into 8-ton cars and hauled, by electric motor, 4,700 feet to the outside mill bin. From this bin it is trammed 150 feet to the crusher, which drops the crushed ore into a hopper, from which it is again trammed and distributed to 60 stamps.

FRANK LANGFORD,  
Superintendent.

Stockton, Cal., Nov. 30, 1902.

#### The Collapse of the Wynn Process.

Sir: Purely as a matter of interest to the industries of mining and metallurgy, might I be permitted to make use of your columns in calling attention to the exposure of the Wynn process, which, under such captions as "Collapsing of Wynn," "How Gold is Grown," etc., etc., is being brought to public notice in Denver through the medium of its daily press?

Colorado has fathered the Wynn process, it is (by adoption) parent to the Beam process and to kindred processes, and it seems to me that the State of Colorado has borne more than its share of the burden of metallurgical "fakes." It escaped (for geographical reasons) notoriety in the scheme for the extraction of gold from sea water, which was so successfully "worked" by some reverend gentleman on the Atlantic side—but brine has been imported into Colorado; neither was Colorado concerned in the Keely motor revelations; but take it all around, it has been a good field for organized metallurgical quackery. Cape Nome, as I saw it in 1900, suggests a parallel in the way that it was made the dumping ground for every imaginable mechanical contrivance—a few sensible, some foolish and some inane—for rocking and concentrating out the fine gold

contained in the beach sands. These devices and mechanical curiosities lined the beach for a distance of over four miles, and were a curious sight.

The Wynn process has been shorter lived than some of its predecessors. It is about a year and a half ago that the extraordinary claims of its inventor attained publicity, and it is now nearly a year since its inventor died.

The process, in short, was one whereby it was claimed that the extraction of gold under its working was many times in excess of what is generally known as the assay value of a given ore. The peculiar merits claimed for the process were such that the waste of ordinary milling processes and the waste rock discarded by most mines became exceedingly profitable through its operations. Through this invention the waste piles of mines and mills contained untold fortunes. Mill tailings that showed by assay test values ranging from \$1.50 to \$2 per ton were particularly desirable, this material being more than ordinarily amenable to the process. Sample shipments were welcomed, and all sorts of shipments in canvas bags, gunnysacks and larger lots deluged the offices of the professor, who was destined to perform the alchemistic operation.

If the claims of this Prof. Wynn were to be credited there must be more values going to waste from the mills and smelters than was known to the most pessimistic among miners and prospectors.

The fame of this man and his process rapidly spread, and many were the stories in circulation reflecting the extraordinary laboratory tests that had been made in the presence of disinterested witnesses, etc., etc. There were tests that yielded buttons of gold in such proportion to assay values that whereas the assay had failed to indicate more than the customary "trace," the extraction by the Wynn process was such as to give the ore, or rock material, a value running from \$25 to \$35 per ton and upwards, and in some cases into hundreds of dollars per ton. Ore that by assay test had been found to be worth \$3.20 a ton, produced in a 100-pound charge a gold button worth \$89 in fine gold, etc., etc. This latter item instances only one of hundreds of similar results claimed for the process. To the skeptical the inventor might be imagined as saying, "Apparently incredible, gentlemen, but there is the button, figure it out for yourselves." Then also to give their laboratory test some semblance of practicability, the people who associated themselves with the inventor in forming a stock company, went so far as to buy mining property and mines that were known to be of so low a grade that the ore could not be worked by ordinary processes with any profit.

I would suggest a more concise definition of this process as being "the art of extracting gold from rock in which it does not exist in appreciable quantities—and incidentally parting a man and his money."

In order to secure the "secret" of this process and to provide against the contingency of the inventor's demise, the men interested with Wynn had, or caused to be placed in escrow, in the vaults of a Trust Company, the papers purporting to give the formula involved in the mysterious process, such papers being subject to order of the court. Whether these papers have been taken out of escrow is not known, but as the business of the process has been carried on by one or more of the surviving associates of Wynn, it may be presumed that these men have been initiated into the "secrets" enclosed within the cover of the escrow papers.

A private corporation had been meanwhile formed to take over the mysteries of the Wynn process, and its affairs were not made public as long as business interests remained harmonious. In reply to inquiry at the company's headquarters there came the reply that the experiments being made in connection with the process were invariably successful and extraordinary results were a matter of daily occurrence; also that the process was yet in the laboratory stage, and that arrangements were being made to test the thing on a larger scale with a view to demonstrating its commercial success. This went merrily along, and

the public was not taken into confidence—far from it. "We are a private corporation," they said; "we have nothing to sell," "the measure of our success is no concern of the public," etc., etc., but now comes a rupture in the directorate of the company, and the "denouement."

The former vice-president of the Wynn Gold Extraction Company, capitalized at \$2,000,000, publishes what he knows—through his repeated handling of the process—to be the ingredients that go into the mixture used by Prof. Wynn. Here is the formula for a 1,000-pound charge of ore:

"Lime, 50 pounds; sea salt, 30 pounds; nitric acid, 20 pounds; potassium sulphide, 20 pounds; water, enough to dissolve chemicals and other ingredients and cover the ore; agitate until the values are out of the pulp.

"Let settle a short time after agitation ceases and add c. p. ammonia 10 pounds, to raise values to the surface; skim this off, and add red oxide of iron 5 or 6 ounces in water solution to 'develop' the values; agitate enough to mix well, and let stand for a time at blood heat; this is where the gold 'grows.'

"Add distilled water, 1 part to 10 parts of the solution, and then add the precipitate; chemically pure iron sulphates, green, 4 ounces; lithium carbonates, 3 ounces; a little ammonia; stir slightly as it is settling; pour off the solution and dry and melt the precipitant by methods as in assaying."

The same authority goes on to say that this was varied on occasions by substitution of sulphuric acid 20 pounds and nitric acid 5 pounds, for nitric acid 20 pounds and by using "straight potash instead of potassium sulphide."

The details of this ludicrous concoction might, without harm, be subject to a variation in all and any respects except in the introduction of the one essential ingredient of "aurum"; to omit this might be fatal.

Use of salt and lime (lime chloride, bleaching powder and other salts of lime), and the use of sulphuric acid with a charge of ore is common to many chlorination processes—old and new—and the use of iron sulphate (ferrous sulphate) as a precipitant is quite general, to wet processes. But

(a) To senselessly add chemicals of one sort and another to complicate and interfere with otherwise well-known reactions in metallurgical chemistry.

(b) To "develop" the values by skimming, and

(c) To "let stand for a time at 'blood heat,'" and

(d) Giving the gold the opportunity to "grow," these are the things, the material things, which constitute the "secret." I believe that another matter in which the operator was to be cautioned, was in the liability of the process at some stages to form the "fulminate of gold," an explosive to be carefully avoided.

Experiments that were made when the Professor or his right-hand man were present, were generally successful; experiments made independently of them and in personal research, were flat failures.

One man, who had the foresight (and perhaps temerity) to add \$5 worth of gold chloride to the charge, came out with \$1.66. He may be congratulated on disentangling even that much from the chemical mess into which he consigned his gold.

And this thing was actually believed in by many respectable men, men prominent in business, men well known in railroad circles, etc., etc. It had the backing of a prominent lawyer of Denver. He put his money into it and so did many others. Some have got their money back through threats of exposure; some have lost their money.

Perhaps it is true that every decade brings a new crop of, let us say, over credulous people, and that some of them are not dead yet is evidenced by the news that otherwise responsible men are to-day building a mill in Colorado to install this process for the treatment of their low-grade ores.

Why is it, Mr. Editor, that mining and metallurgy have to carry so great a burden of foolishness and criminal humbug as they have to do?

FORBES RICKARD.

Denver, Colo., Dec. 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.

**Molybdenum.**—Will you state through your columns if there is any demand for molybdenite; also who are the parties buying it.—R. C. W.

**Answer.**—Your question was answered in this column in our issue of November 8 last, page 627; it has also been answered in previous issues. We cannot undertake to repeat answers indefinitely.

**Cryolite.**—Can you tell me if cryolite is mined in the United States? If not, where is it mined?—N. M. D.

**Answer.**—The only place where cryolite is mined in the world is at Ivigtut in Greenland. The mines there belong to the Danish Government. The output is about 9,000 tons a year. In 1901 there were 5,283 tons brought to the United States, the balance going to Copenhagen. All the cryolite brought to this country is for the Pennsylvania Salt Manufacturing Company, which has a contract with the Danish Government.

**Coeur d'Alene Mines.**—Has any complete description of the Coeur d'Alene mining district been published, showing its present or recent condition?—L. L. D.

**Answer.**—Many monographs and papers on the Coeur d'Alenes and the mines of the district have been published in the ENGINEERING AND MINING JOURNAL and elsewhere. The latest monograph on the district is a paper on the Mining Industry of the Coeur d'Alenes, Idaho, by J. R. Finlay, which was presented at the Philadelphia meeting of the American Institute of Mining Engineers, in May last.

**Bauxite.**—I am the owner of 160 acres placer ground, a deposit of bauxite covering the whole 160 acres; the deposit lays in 6 strata, together 50 feet thick; between the bauxite strata are strata of brown iron ore, the latter containing gold 0.2 to 0.45 ounce to the ton. Analyses of the bauxite show 62 per cent bauxite and 18 per cent halosite. Will you kindly inform me where the material is used in the United States?—H. E.

**Answer.**—Bauxite is used as raw material for making aluminum; also in making aluminum sulphate and crystallized alum. The production in the United States last year was 18,905 tons, and 18,313 tons were imported. The chief users are the Pittsburgh Reduction Company, Niagara Falls, N. Y.; the Pennsylvania Salt Manufacturing Company, Natrona, Pa.; the Nichols Chemical Company, New York; the Illinois Chemical Company, Chicago.

## THE JAPANESE GOVERNMENT IRON WORKS.

Recent consular advices from Japan state that the official draft of the law which is to govern the transformation of the Imperial Iron Works into a joint-stock company has been published. The company will be allowed several special facilities. It is to succeed to all the rights and obligations of the Imperial Iron Works, the capital being made up of the 20,000,000 yen which has been invested by the Government in the foundry and works connected therewith. This sum will be invested by the Government in the form of shares, while 7,500,000 yen will be raised by public subscription, the face value of each share being 100 yen. The directors are to be elected from among those shareholders holding 50 or more shares, six candidates to be recommended to the Government, which will duly select three. No dividend will be paid to shareholders without the approval of the Minister for Finance. The approval of the same minister must be obtained in the event of the company wishing to raise a loan or

to issue debentures. The Government is to receive its dividend out of the surplus remaining, after a dividend of 8 per cent has been paid to the shareholders. The Government will guarantee the payment of 6 per cent interest on the capital subscribed by the public for 15 years from the formation of the company, and, in addition, will advance a sum not exceeding 50,000,000 yen free of interest, in case further capital should be required. The money so advanced will be available for 11 years, and will have to be repaid in 20 yearly installments. Moreover, the Government agrees to buy from the company all the iron and steel required for national purposes. The company will be exempted from the imposition of business tax for 15 years, commencing from the year following that of the flotation.

**UNITED STATES PATENTS.**—The Secretary of the Interior in his annual report states that for the first time in the history of the Patent Office the total number of applications in all branches exceeded 50,000 during the fiscal year ending June 30, 1902. The report of the Commissioner of Patents shows that there were received 45,562 applications for mechanical patents, 1,807 applications for designs, 139 applications for reissues, 1,849 caveats, 2,460 applications for trade-marks, 1,020 applications for labels and 270 applications for prints. There were 27,387 patents granted, including reissues and designs, and 1,864 trade-marks, 750 labels and 163 prints were registered. The number of patents that expired was 20,335. The number of allowed applications which were, by operation of law, forfeited for non-payment of the final fees was 4,123. The total receipts of the office were \$1,491,538, the total expenditures were \$1,329,924 for the year.

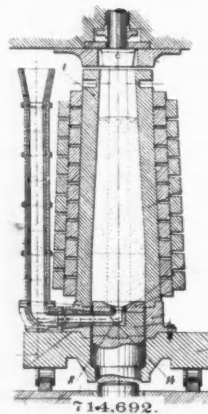
## PATENTS RELATING TO MINING AND METALLURGY

## UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents.

Week Ending December 2, 1902.

714,692. **PRESS FOR COMPRESSING LIQUID STEEL IN CONICAL INGOT-MOLDS.**—Henri Harmet, St. Etienne, France. An ingot-mold formed in two parts, the inner mold properly so called and the base, the said base being provided with a lateral passage for the inlet of the liquid



metal, the said passage coinciding when metal is flowing in with a passage formed in the movable bottom which is housed in the base, the said bottom being capable of upward movement by the action of the press by which it is actuated at the moment of compression.

714,697. **APPARATUS FOR COATING METALLIC ARTICLES.**—Josef Hronek, Worms, Germany, assignor to Friedrich Horn, Worms, Germany. The combination of a support or base, a table mounted to turn thereon, a nozzle carried by the table, and means for holding an article on the table in such position that the nozzle will be within the article.

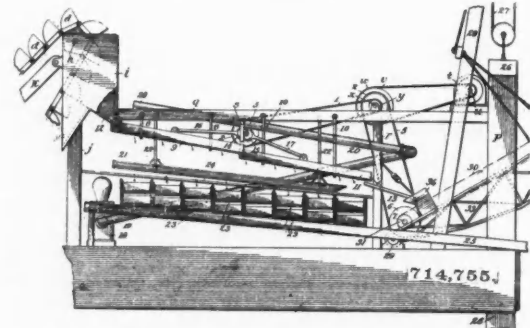
714,700; 714,701 and 714,702. **HOISTING APPARATUS.**—Charles W. Hunt, West New Brighton, N. Y. The combination of hoisting-ropes, separable guides for said ropes respectively and drums connected respectively to said guides to effect movement thereof, one of said drums hav-

ing portions of different sizes whereby the rate of movement of one of said guides with respect to the other is varied during the movement of both guides.

714,710. **CONTINUOUS HEATING-FURNACE.**—Henry B. A. Keiser, Edgewood Park, Pa. A furnace having an opening through which the same is charged or drawn, a carrier extending through the opening, and arranged to support an ingot in vertical position, and doors arranged to form an air-lock, said doors having means for causing them to normally close the opening, and arranged to contact with the ingot and be opened thereby.

714,735. **METHOD OF MAKING BUTT-WELD PIPE.**—Peter Patterson, McKeesport, Pa., assignor to National Tube Company, Pittsburgh, Pa. A method of forming butt-weld tubing consisting in charging a U-shaped or approximately tubular skelp longitudinally through the rear of the furnace and into a protecting-recess in the furnace-bed, raising the upwardly-extending edges of the skelp to welding heat while the body rests in the recess and is thus protected from the furnace-heat, and thereafter drawing the heated skelp longitudinally through the front end of the furnace and through a welding-bell.

714,755. **ORE CONCENTRATING AND DREDGING APPARATUS.**—Adelbert B. Stetson, Milwaukee, Wis., assignor to the Bucyrus Company, South Milwaukee, Wis. In an ore-concentrating apparatus, the combination of a plurality of longitudinally-inclined shaking screens; an intermediate shaft and eccentrics adapted to simultaneously reciprocate the screens in opposite directions; a distributing-pan provided with a foraminous bottom, below the series of screens; a deflecting-plate with oppositely-inclined sec-



tions below the distributing-pan; a series of concentrating surfaces on each side of the deflecting-plate; a series of longitudinally-extending spray-pipes above the shaking screens; and means for feeding the material to be treated to the screens.

714,763. **APPARATUS FOR DRAWING METAL.**—Edwin W. Vaughan, Worcester, Mass., assignor to the American Steel and Wire Company of New Jersey. The combination with a die, a draw-head, and means for actuating the latter, of a friction-clamp through which the skelp passes, and a roll for flattening the skelp between the friction-clamp and the die, whereby buckling of the skelp is prevented.

714,772. **WELL-DRILL.**—Philip H. Boothe and Fount L. Woods, Collins, Miss. A drill comprising a reciprocatory nut, a tubular drill-stem having threads engaged with the threads of the nut, a thimble at the lower end of the stem and having discharge-openings communicating with the bore of the stem, a drill engaged with the thimble and a regulating-valve at the upper end of the stem.

714,804. **MEANS FOR LIFTING CRUCIBLES FROM FURNACES.**—David Laird, Forfar, Scotland. A cradle for lifting crucibles consisting of a foot to pass under the crucible, a curved band connected with the foot for embracing the side of the crucible and uprights having hooked ends to engage the top edge of the crucible in pouring, said cradle having handles.

714,807. **APPARATUS FOR MAKING SAND BRICKS.**—Lynn T. Leet, Montreal, Canada. The combination of a cylinder capable of sustaining great pressure, a container for slaking lime and means for preventing water of condensation from coming in contact with the lime in the container.

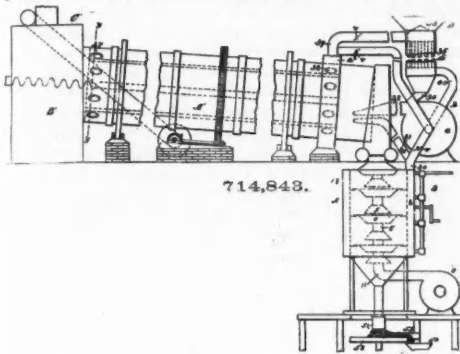
714,812. **SUPPORTING-ROLLER FOR CONVEYERS.**—William I. Mann and Norwell C. Neemes, Pittsburgh, Pa., assignors to themselves and Eugene L. Messler, Pittsburgh, Pa. A trough-shaped conveyer-belt and a support therefor, comprising a group of independently-rotatable rollers or pulleys of different diameters, the peripheries of which unitedly form a concave bearing-surface for said belt.

714,818. **APPARATUS FOR CASTING PIG-IRON.**—Karl Orth, Donawitz, near Leoben, Austria-Hungary. In a casting apparatus, a reciprocating bed, parallel rows of molds extending the width of the bed; in combination with a distributing-ladle extending across the bed and arranged to receive molten metal direct from a furnace and a number of pouring-spouts on said ladle corresponding to the number of moulds in a row.

714,842. **ART OF MANUFACTURING CEMENT.**—Robert F. Wentz, Nazareth, Pa. An improvement in the art of treating cement ore, consisting in subjecting the ore to a calcining operation by the combustion of pulverized carbon and the gaseous products from hot cement clinker when treated with water in liquid form and air.



714,843. APPARATUS FOR THE MANUFACTURE OF CEMENT.—Robert F. Wenz, Nazareth, Pa. In an apparatus for the treatment of cement ore or clinker, the



714,843.

combination of a kiln, means for introducing into the kiln a solid fuel in a finely reduced or divided condition and water-supplying devices.

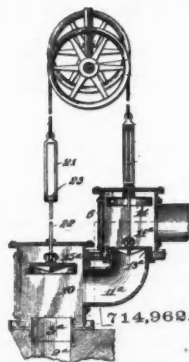
714,846. PROCESS OF MAKING SODA ALUM.—John F. White, Buffalo, N. Y. A method of producing soda alum which consists in dissolving in water niter-cake, which is composed mainly of sodium sulphate and free sulphuric acid, introducing into the solution alumina which combines with the sulphuric acid to aluminum sulphate, adding the additional quantity of aluminum sulphate required for the formation of the double salt, boiling the solution to a syrupy consistency, allowing the same to cool and harden to an amorphous mass or cake, and then calcining and finishing the product.

714,861. PROCESS OF ELECTROLYTIC SEPARATION OF COPPER AND NICKEL.—David H. Browne, Cleveland, Ohio, assignor to the Canadian Copper Company, Cleveland, Ohio. In the art of copper separation, a process which consists in: first, treating copper-nickel matte to form copper-nickel alloy substantially free from sulphur; then treating said alloy with chloride and a solvent for cuprous chloride.

714,914. PROCESS OF OBTAINING METALS FROM THEIR ORES.—Nathaniel S. Keith, Arlington, N. J. A process of separating a metal from its ore and gangue; which consists in grinding the ore and gangue with carbon; heating the ground mixture in an open furnace, containing an atmosphere of reducing gases, to the temperature of the fusion of the particles of ore only; and then submitting the thus-treated mixture to mechanical concentration to obtain the metal.

714,961. EJECTOR.—Thomas S. Smith, Los Angeles, Cal., assignor to Pacific Coast Manufacturing Company, Los Angeles, Cal. An ejector, for use in pumping wells with compressed air, comprising a casing adapted to be screwed onto the end of the delivery-pipe, said casing having an internally-projecting flange in the lower portion.

714,962. GAS-VALVE APPARATUS FOR OPEN-HEARTH FURNACES.—John A. Sobolewski, St. Louis, Mo. The combination of an inlet-box and an outlet-box having communication with each other, circulating-flues and escape-flues having communication with said outlet-box,



714,962.

valves arranged to control communication between said inlet-box and outlet-box and said escape-flues, means for operating said valves, and means in said valve-operating means whereby lost motion is obtained during the period of the seating of one of said valves and the unseating of the other of said valves connected to the corresponding operating means.

714,984. PROCESS OF MAKING MAGNESIUM SULPHATE.—Herbert H. Wing, New Brighton, N. Y. A process of obtaining magnesium sulphate which consists in subjecting any compound of magnesium decomposable by sulphur dioxide in the presence of moisture to the action of sulphur fumes containing sulphur dioxide and air, in the presence of moisture, whereby the sulphite and sulphate of magnesium are produced, then exposing such mixture of sulphite and sulphate to oxidizing conditions, whereby the sulphite is converted into sulphate.

715,004. APPARATUS FOR DISCHARGING RETORTS.—Leon Bertrand, Paris, France. In an apparatus for discharging coke from gas-retorts, a plurality of extensible

sections; independent advancing means for each of said sections; and means for locking said sections together.

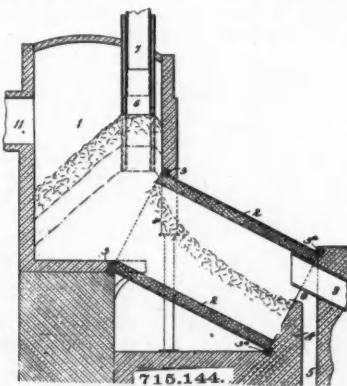
715,023. PROCESS OF TREATING ZINC SULPHIDE ORES.—John C. Clancy and Luke W. Marsland, Sydney, New South Wales, Australia. A process for the elimination of zinc and the recovery of lead silver or other metals from sulphide ores consisting essentially in the following step-by-step operations: (a) roasting the pulverized ore with the addition of lead sulphate at such degree of heat as will not volatilize the lead contained in the ore or the added lead sulphate; (b) transferring the roasted ore while still very hot immediately from the roasting-furnace into a vat containing a solution of sulphuric acid and water and thereby causing the solution to become heated to boiling-point, or thereabout; (c) agitating the whole mixture in the said vat during the process of charging, lixiviating, extracting, and dissolving of the zinc in the same; (d) recovering lead oxide by concentration from the ore and solution while undergoing treatment in the said solution; (e) converting the lead oxide so recovered into lead sulphate to be used for adding to succeeding charges of ore to be roasted in the furnace; (f) conducting the residual ore and solution into a settling-vat and separating the solution from the ore by drawing off the solution into a separate vat; (g) extracting the zinc from the solution so separated and recovering from the said solution the sulphuric acid therein contained for use in treating succeeding-charges of roasted ore; and (h) recovering the lead silver and other metals contained in the residual ore by smelting the same in any suitable smelting-furnace.

715,024. EXTRACTING METALS FROM COMPLEX OR SULPHIDE ORES.—John C. Clancy and Luke W. Marsland, Sydney, New South Wales, Australia. In a process of extracting and recovering gold, silver, lead, zinc and other metals from mixed or complex sulphite ores consisting essentially in the following successive operations, heating the ore with the addition or admixture of lead sulphate in a cupola or blast-furnace so as to convert the required amount of lead and the whole of the zinc and other volatile metals contained in said mixture more or less wholly into fume, spraying dilute sulphuric acid upon the fume and gaseous products of decomposition to convert the fumed metallic oxides into their corresponding sulphates, recovering the lead sulphate used for mixing with the ore and the zinc and other volatile metals from the sulphates deposited in the first-named or fume chamber, recovering the metallic contents from the residue remaining in the furnace by smelting.

715,029. HEATING-FURNACE.—Charles I. Dailey, Cleveland, Ohio. In a heating-furnace, the combination with a heating-chamber and means for inserting and advancing a row of billets or other articles to be heated therein, of means located in the hotter end of the heating-chamber for separating and holding one or more of said billets from said row, and ejecting mechanism operated independently of the charging means and adapted to dislodge said separated billet or billets and discharge the same from said heating-chamber.

715,080. ORE-ROASTING FURNACE.—Albert C. Johnson, Baltimore, Md. A tilting ore-roasting furnace having alternately and reversely arranged and inclined beds or shelves superimposed one above another.

715,144. GAS PRODUCER.—John Radcliffe, Wrexham, England. An apparatus comprising a stationary fuel-chamber provided with a gas-outlet, a feeding means within said chamber, a rotary inclined chamber in communication with



715,144.

the lower edge of said fuel-chamber, a blast-pipe extending within the lower edge of said rotary chamber, and an air-trap adapted to receive the ashes from said rotary chamber.

715,141. PROCESS OF SHUTTING OFF WATER IN DRILLED OIL-WELLS.—William Plotts, Whittier, Cal. A method which consists in drilling a larger hole to a short distance below the water-bearing stratum which it is desired to shut off and casing the same; then drilling a smaller hole in the bottom of the larger hole down into the oil-sand and putting in a casing in the smaller hole; after which the larger casing is loosened and kept moving up and down; feeding packing material between the casings and tamping said packing material around the inner casing below the water-bearing stratum by the movement of the outer casing; then feeding between said casings a puddling material

and tamping said puddling material around the inner casing upon the packing material by the movement of the outer casing.

715,142. METHOD OF MANUFACTURING SULPHURIC ACID.—Nathaniel P. Pratt, Atlanta, Ga. In the manufacture of sulphuric acid, the method of withdrawing the uncombined gases from the acid-chambers, cooling and mixing with freshly-generating gases, and returning to the acid-chamber along with the freshly-generated gases.

715,160. MAGNETIC SEPARATOR.—Carl Scholl, Göppingen, Germany. In a magnetic separator a rotary separating-drum in combination with a series of electromagnets for producing a partial magnetic field on the surface of the drum; a rotary sectional current-distributor ring; two brushes for supplying current of one polarity and so arranged as never to impinge against adjoining distributor-sections, a third brush impinging against an intermediate section and arranged to supply current of opposite polarity, and connections between the coils of the electro-magnets and the sections of the current-distributor, whereby current is fed only to a portion of the coils and a portion of the surface of the separating-drum is thus constantly non-magnetic.

715,188. HOT-BLAST STOVE.—Robert Young, Tacoma, Wash. In a hot-blast stove, a casing having brick checker-work therein, means for highly heating said checker-work, means for passing steam therethrough and means therein for decomposing said steam.

715,211. METHOD OF TREATING SCRAP-METAL.—John M. O'Connor, Port Washington, Wis., assignor to the Connorite Manufacturing Company, Port Washington, Wis. A herein-described method of utilizing German-silver scrap-metal, consisting in placing the same in a crucible, adding thereto a small quantity of soft metal, such as lead, and subjecting the mass to a proper heat for a length of time sufficient to thoroughly mix and fuse the same into a homogeneous mass; then mixing therewith a small proportion of aluminum, and immediately thereafter pouring the entire mixture into suitable molds.

715,214. PROCESS OF CONVERTING LEAD SULPHATE INTO LEAD CARBONATE.—Alexander S. Ramage, Cleveland, Ohio. A process which consists in subjecting a charge of lead sulphate to the action of a solution of an alkali carbonate, said carbonate being in amount sufficient to convert all of the lead in the charge into carbonate and in excess of that theoretically requisite, separating the resulting solution, containing alkali sulphate and carbonate, from the lead carbonate, and subjecting it to the action of an excess of lead sulphate, to convert the remaining alkali carbonate into sulphate.

715,218. PROCESS OF GENERATING WATER-GAS.—Hugo Strache, Vienna, Austria-Hungary. A method which consists in first disposing the fuel in a layer having relatively great breadth and little thickness, secondly, igniting said fuel and using a portion of the heat generated thereby to heat a heat-storer, third, depositing a fresh supply of fuel in a thin layer on the first layer of fuel as a support for said fresh layer of fuel and effecting the distillation of said fresh layer of fuel by the heat from said first layer of fuel and from the heat-storer and simultaneously bringing together a body of water and another portion of the heat from said ignited fuel so as to evaporate the water, fourth, conducting the vapor generated into operative contiguity to the heat-storer so as to superheat the vapor, and, fifth and finally, conducting the thus-superheated vapor through the layers of fuel.

715,228. BUCKET-DUMPING APPARATUS.—William R. Wilcox, Saratoga, Wyo. The combination with a suitable frame, of a bucket provided with a depending ring attached to its bottom, a device suspended on the frame and composed of two separated arms, a part connecting said arms and bowed outwardly therefrom on one side, a device pivoted between the arms at their lower extremities and having a hook adapted to engage the ring of the bucket as the latter is lowered to rest thereon, the arrangement being such that the bowed part prevents the bucket from tipping rearwardly, while the pivoted part is shaped to cause the bucket to tip forwardly.

GREAT BRITAIN.

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

Week Ending November 13, 1902.

18,716 of 1901. GRINDING MACHINES.—F. E. Whetham, Sowerby Bridge. In grinding minerals, having the preliminary and finishing grinders on the same shafts and balanced.

21,017 of 1901. LEACHING COPPER ORES.—W. M. Cranston, London. For leaching copper ores and sprinkling them in pulverized condition into a solution of sulphuric acid, nitric acid, salt and permanganate of potash at nearly the boiling point of water and agitating.

25,336 of 1901. COAL MINING MACHINES.—G. S. Waterfall, Sheffield. Means for retaining in position the two parts of the frame of extensible coal boring machines.

19,154 of 1902. BALL MILL.—J. Freymuth, Bromberg, Germany. A ball mill with preliminary and final grinding in the same grinding drum.

## PERSONAL.

Senator W. A. Clark, of Montana, has returned from Europe.

Mr. C. L. Dignowity, of Salt Lake, Utah, is to spend the winter in Boston, Mass.

Mr. L. W. Tatum, mining engineer, of Chicago, Ill., was in Denver, Colo., last week.

Mr. J. J. Hoban, of Idaho Springs, Colo., will spend the winter at Wilkesbarre, Pa.

Mr. J. E. Bamberger, manager of the Daly-West, left Salt Lake for the East last week.

Mr. J. H. Henley, superintendent of the Elkton Mine in the Cripple Creek District, has resigned.

Mr. A. A. Blow, consulting mining engineer of London, Eng., spent a few days in Denver, Colo., last week.

Mr. S. Hoskin, the well-known mining man of Central City, Colo., has returned from a visit to Wisconsin.

Mr. A. B. Lewis, of Frisco, Utah, manager of the Majestic Copper Company, is in New York City on business.

Mr. Lew Humphrey, of Central City, Colo., is home again after several months spent in examining mines in Mexico.

Mr. Charles I. Rader, manager of the Annie Laurie Mine, has returned to Salt Lake from his trip to Chicago.

Mr. Percy Williams has left Salt Lake for New York City to accept a position with the Guggenheim Exploration Company.

Mr. L. J. Hartzel, formerly assayer for the Granite Bi-Metallic Mining Company at Phillipsburg, Mont., is now located in Butte.

Mr. H. Foster Bain, formerly manager of the Consolidated Franklin Company, at Idaho Springs, Colo., will reside at Cripple Creek.

Mr. W. R. Rust, of Tacoma, Wash., was a recent visitor in Gilpin County, Colo. He is now associated with the smelting business in the Northwest.

Mr. C. B. Rogers, superintendent of the Modoc Mining Company, Modoc, N. M., has resigned, and will devote his attention to personal interests.

Mr. E. S. McDowell, formerly in the employ of Capt. J. R. De La Mar, has accepted a position with the Majestic Copper Company, at Milford, Utah.

Mr. P. E. Murray, superintendent of Zubiata Mine, Sonora, Mex., who had been in San Francisco, Cal., purchasing machinery, has returned to the mine.

Mr. W. L. Cobb, of the Wright-Gilman Company, of San Francisco, Cal., is in Mexico examining mining properties in the interests of Eastern parties.

Mr. R. W. Hollis, manager and part owner of the Esmeralda Mine in Minnie Gulch, San Juan County, Colo., spent a few days in Denver recently.

Mr. G. W. Helm, of Warren, Idaho, who recently sold his Thunder Mountain properties to New York City men, will spend the coming winter in California.

Mr. W. F. De Camp, former superintendent of the Portland Mine at Cripple Creek, lately visited Ouray, Colo., to examine a property for Eastern clients.

Mr. Edwin E. Chase, mining engineer, of Denver, Colo., left a few days ago for the San Juan country, and on his return will start on a professional trip to Mexico.

Mr. Frank S. Lewis has resigned as president of the Consolidated Lake Superior Company, that controls various enterprises promoted by Mr. F. H. Clergue.

Major S. O. Alers, manager of the What Cheer Mining Company in the Encampment District, Wyo., has returned to his home in Rhode Island to spend the winter.

Mr. Martin J. Heller, mining engineer, of San Francisco, Cal., has been examining platinum deposits in Shasta County, Cal., and is now en route for Sinaloa, Mex.

Mr. William H. Hampton has resigned as manager of the Columbia Mines Company at Lacer, Ore., and has opened an office as consulting engineer in general and mining work.

Mr. H. McCormick, who has had charge of the Aberdeen Consolidated Gold and Copper Company at Lordsburg, N. M., has resigned to accept an appointment in Durango, Mex.

Mr. J. T. Redmon, of Oskaloosa, Ia., in company with officials of the Mount Zirkel Copper Mining Company, Pearl, Colo., recently inspected the properties of the company.

Mr. C. E. Bunker has lately resigned from the superintendency of the Keystone Consolidated Mining Company at Amador City, Cal. His successor has not yet been appointed.

Mr. Frederic Irwin has been appointed manager of the Trade Dollar Consolidated Mines, Silver City,

Idaho, succeeding Mr. James Hutchinson, who recently resigned on account of ill health.

Mr. Charles T. Lincoln, of Boston, Mass., is at Socorro, N. M., and will have charge of the assaying and chemical department at the School of Mines, under his brother, Prof. F. C. Lincoln.

Mr. John Isgrig, formerly with Fairbanks, Morse & Co., of Denver, Colo., is now manager of the mill at Idaho Springs, Colo., recently owned by the Idaho Springs Mining and Reduction Company.

Mr. D. M. Nichols, who has been superintendent of the Twin City Development Company at Turret, Colo., has been appointed general manager of the company's properties, which include the Vivandiere Mine.

Mr. Barry N. Hillard, who has spent the greater portion of the past 10 years in the East, has returned to Wallace, Idaho, and will give attention hereafter to his mining interests in that section.

Mr. George G. Blackwell, of the firm of George G. Blackwell Sons & Co., Liverpool, sailed from New York City December 13 on his return home from a long business trip to the United States.

Mr. George R. Adams has resigned as superintendent at the Oquirrah Mine, Bingham, Utah, and goes to South Africa to take charge of a large mining property. He is succeeded by Mr. H. A. Brown.

Mr. Emery Slater, who has spent the past few years in the Klondike region, recently visited Nevada, Colo., en route to the East, where he will spend the winter, returning to the Northwest in the spring.

Mr. Edwin Arkell, of Colorado Springs, Colo., well known in Cripple Creek, Aspen and other districts of Colorado, has gone to Reno, Nev., to take charge of a mine in which Colorado people are interested.

Mr. N. A. Loggin, manager of the Cache Creek placer mines, owned by the Twin Lakes Gold Mining Syndicate, of London, England, has gone to his home in England. He will return to Granite, Colo., about April 1.

Mr. J. J. McSorley has resigned as superintendent of the What Cheer Mine, Calaveras County, Cal., and taken charge of the Dower and Calaveritas mines. Mr. H. J. McSorley has taken charge of the What Cheer Mine.

Mr. Arthur Winslow, general manager of the Liberty Belle Mining Company, of Telluride, Colo., has returned from his trip abroad. He was toast master at the recent mine operators' banquet at the Adams Hotel in Denver.

Mr. R. W. Rodda, superintendent of the Horse-shoe mines, near Terry, S. Dak., was in Clear Creek County, Colo., recently looking for copper-iron sulphide ores to be used as a flux at that company's Rapid City smelter.

Mr. John D. McGillivray, mining engineer, who went to the Klondike section in 1897, has returned to San Francisco, Cal., from which place he goes to London on business regarding mining properties, near Dawson, N. W. T.

Mr. W. H. Linney, superintendent of the Bamberger-De Lamar Gold Mines Syndicate, De Lamar, Nev., has resigned, and Mr. Frank P. Janney will now act as general superintendent, he in turn being succeeded as superintendent by Mr. F. A. Keith.

Mr. George S. Gennaer, manager of the Taxco Mining and Milling Company, of Alma, Colo., was in Denver recently. His company is engaged in boring some diamond drill holes to demonstrate the continuity of the Leadville contact on the eastern side of the range.

Mr. W. L. Clark has been appointed manager of the properties of the Quentin Investment Company in the Cripple Creek District. The Quentin Company succeeded the Ramsay C. Bogy Investment Company, and Mr. Clark was manager of the Bogy Company some years ago.

Mr. Charles H. Merrill, of Philadelphia, Pa., manager of the Monitor Rock Company, operating in the Twin Lakes section, near Leadville, Colo., was in Denver last week en route to Philadelphia to spend the holidays. He reports a good-looking vein in the breast of the tunnel.

Mr. Otto Mears, the pathfinder of the San Juan, has come back to Denver for the purpose of pushing work on the Silverton & Northern Railway to Lake City, a route that will develop a section rich in low-grade ores. The extension will open another excellent feeder to the Rio Grande Railway, at both Silverton and Lake City.

Mr. T. F. Griffin, of Cleveland, O., who has been manager of the ore department of Corrigan, McKinney & Co., for a number of years, owing to failing health, is to spend the winter at El Paso, Tex. The firm, in recognition of his services, provided a special Pullman for his use on the trip from Cleveland.

Mr. John P. Reese, president of Iowa District, United Iron Workers of America, a recently defeated candidate for Congress, and one of the leaders in the National Organization of Mine Workers, has entered

the employ of Iowa coal operators at a salary of \$2,000 a year. He is expected to act as an intermediary to adjust all differences arising between the miners and their employers.

Mr. William B. Fairbanks, of San Francisco, has been appointed manager of the Western division of the Northern Commercial Company in Alaska, embracing Circle City, Steele Creek, Eagle, Forty Mile and Dawson. The company's steamers on the upper Yukon River come under his supervision. Mr. Fairbanks has been for some time manager of the company's store at Dawson, N. W. T.

Mr. Charles Du Pre Smith has arrived in Denver for a short visit. He is a graduate of the Colorado State School of Mines, and for 10 years was associated with the Guggenheims in Mexico. He afterwards operated on his own account for 4 years in South America. He has at present interests at La Paz, Bolivia. He expects to make his home in Denver, though he will return to South America early in the year.

Mr. W. F. Ferrier, who went to Rossland, B. C., 5 years ago as engineer in connection with the War Eagle and the Center Star mines, but who has latterly been manager and engineer of the Gooderham-Blackstock syndicate's Western mining interests outside of the properties specified, has accepted a position in a similar capacity with an English corporation having extensive mining interests in Canada, the United States and Mexico.

## OBITUARY.

W. Buskett, one of the best known mining men in the Northwest, died December 8 from heart disease at Helena, Mont. He was 73 years old, and lived in Montana 30 years. He formerly was manager of the Alta Mining Company at Wikes.

George W. Prescott, one of the founders and the first president of the Union Iron Works, of San Francisco, Cal., was found dead in his apartments at the Palace Hotel, San Francisco, December 12. He was 65 years old. It is believed that death occurred from heart failure. He was a native of Maine.

Dr. J. N. Rice, one of the independent anthracite operators, who had been before the Strike Commission, at Scranton, Pa., since it convened, died suddenly December 2 of heart failure, after a few hours' illness. He was president of the Riverside and West End coal companies and a member of the committee of independents which went to New York City to protest against a settlement of the strike.

Major Alexander Shaw, a financier and coal operator, died at his home in Baltimore, Md., on December 14, of heart failure. Alexander Shaw was born in Long Branch, N. J., in 1837. He came to Maryland 20 years later, and became identified with the coal mining industry of Allegheny County. He was closely identified with the West Virginia Central & Pittsburgh Railway Company in its early stages, but sold his large holdings to Senator Henry G. Davis, who recently sold the road to the Wabash. He served as director and chairman of the finance committee of the Baltimore & Ohio for several years before its reorganization.

Capt. James H. Reed, one of the best known men on the Marquette Range, died at Ishpeming, Mich., on December 6, aged 48 years. He had been engaged in sinking a difficult sand shaft at Eveleth, on the Mesabi Range, during the fall and up to a few weeks ago, when he came home ill with acute stomach trouble. His condition was not considered serious until within a few days of his death.

Capt. Reed was born in England and came to this country with his parents when 11 years of age. He lived in New Jersey for 8 years, until 19 years old, when he went for the copper country. He remained there for only a short time, and soon settled in Marquette County. Shortly after he entered the employ of the Cleveland-Cliffs Company, gradually rising till he held the position of captain. Up until 8 years ago he had charge of the Cleveland Lake Mine. Since then he has held important positions at various places on the several iron ranges. He is best known for the numerous sand shafts that he sank. He made a specialty of this work, and became an expert, doing his work with rapidity and thoroughness. His reputation as a master at this business extended throughout the entire peninsula, and his services were always in demand. Last summer he sank a particularly difficult shaft for Pickands & Mather on the Mesabi Range. He is survived by a wife, a son and 2 daughters.

## SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB, OF PHILADELPHIA.—At the meeting on November 15 20 members were present. Nominations for officers were made as follows: President, Edwin F. Smith; vice-president, Horatio A. Foster; secretary, J. O. Clark and L. F. Rodinella; treasurer, George T. Gwilliam.

**HARVARD UNIVERSITY.**—This year's catalogue shows a total of 4,261 students in the university, 120 more than a year ago, and the largest in any American institution of learning. Counting Radcliffe College and the summer school, the total number of persons enrolled during 1902 was 5,206. The number of instructors in the university proper is 534, or 51 more than last year. The greatest increase is in the college, which has 2,100 students against 1,003 in 1901, and the Lawrence Scientific School, which has 534, a gain of 6 per cent. The law school shows a steady gain, this year's total being 640, including graduates of 94 colleges. The requirement of a college degree as a qualification for admission to the medical school, the full force of which is felt this year for the first time, results in a decrease of about 50.

#### INDUSTRIAL NOTES.

The Aultman & Taylor Machinery Company, of Mansfield, O., is said to be figuring on a large Indian contract for boilers.

The Joshua Hendy Machine Works, of San Francisco, Cal., has been given the contract for a 100-ton mill for the Iron King Mine, Yavapai County, Ariz.

The Harbison & Walker Company, of Pittsburg, Pa., is reported to have placed orders with George G. Blackwell, Sons & Co., Limited, of Liverpool, for the importation of some fair-sized lots of chrome ore.

The J. H. Montgomery Machinery Co., of Denver, Col., has taken a contract through its Mexican agents at Monterey for a surface gravity tramway complete and a concentrating plant to be used in connection therewith.

The old firm of John Taylor & Co., San Francisco, Cal., dealers in assayers' supplies, chemicals, etc., which was established in 1849, has been absorbed by the firm of F. W. Braun & Co., of Los Angeles, Cal., who will take possession January 1, 1903.

Adam Cook's Sons, of New York City, report receiving many testimonials to the merits of Albany grease as a lubricant for all kinds of machinery. Recent testimonials include one from the Cuban Ice Manufacturing Company, of Havana, Cuba.

The J. George Leyner Engineering Company, of Denver, Colo., last week shipped 45 Leyner air drills to its agents in Johannesburg, South Africa. This, with other shipments recently, makes 100 drills the company has sent to that part of the world.

The Rowley Lead Company, St. Louis, Mo., recently incorporated with a capital stock of \$250,000, has leased a large building, which it is equipping for the manufacture of white lead. The officers are: M. Shaughnessy, president; H. V. Kent, vice-president, and Wilson H. Rowley, secretary and treasurer.

The Carbon Limestone Company, of New Castle, Pa., recently put in compressed air Ingersoll-Sergeant drills, and has spent about \$12,000 in this improvement. This is said to be the first compressed air outfit used in the Valleys for quarrying limestone.

Mark Dickinson, of Tower, Mich., has ordered from the M. Garland Company, of Bay City, Mich., a No. 0 8-ft. Garland spring tension band mill, with wheels 11½-in. face, together with an improved three block, 40-in. carriage, fitted with boss dogs. Also a 6 to 20-in. lumber trunnion.

A 6-year agreement has been entered into between the International Pneumatic Tool Company, of Chicago, and the Bergmann Electrical Works, of Berlin, Germany, whereby the latter concern will manufacture pneumatic tools for German consumption exclusively for this term of years.

The Mesta Machine Company, of Pittsburg, Pa., through its Southern agents, Shook & Fletcher, has sold 6 additional long cross-head type blowing engines in the Birmingham District. The engines are 44 by 84 by 60 in. high-pressure, and 84 by 84 by 60 in. low-pressure, and will be arranged to work compound.

The Ward-Corby Company is having its plants in Chicago and Pittsburg supplied each with 150-h.p. boilers furnished by the Pittsburg Gage and Supply Company, of Pittsburg, Pa. This concern is also supplying the Pittsburg Tool and Drop Forge Company, of Cheswick, Pa., with a 150-h.p. water tube boiler.

Among recent orders taken by the Colorado Iron Works Company, of Denver, Colo., were the following: A 30-stamp mill and concentration plant for the El Carmen Copper Company, of Durango, Mex.; 24 impact screens, crushers and rolls for the Gold Road Mining and Exploration Company, of Acme, Ariz.

The structural steel for the new buildings and departments of the smelter being built by the Federal Lead Company east of Alton, Ill., has arrived, and is being set in place rapidly. A force of 500 men is now employed, and this force will soon be greatly

increased. Daily shipments of the finished products of the plant are being made. Work on the new blast furnace is being rushed, and that part of the plant will be the next completed.

An experimental coke plant, built by the Jones & Laughlins Steel Company, adjoining the Eliza furnaces at Pittsburg, has started this week. The plant consists of 100 ovens constructed under plans prepared by Prof. Lowe, of California, and provides for the utilization of all the gases of the coke ovens. If the partial by-product scheme does not interfere with the quality of the coke, the company will install more plants of a similar character.

The Llewellyn Iron Works, of Los Angeles, Cal., states that it makes structural steel and carries in stock for quick shipment enough to satisfy almost any demand. The company has just shipped the steel work for the buildings of a complete 500-ton concentrating plant for the Shannon Copper Company, Clifton, Ariz. The Gold Road Mining and Exploration Company at Acme, near Kingman, Ariz., has purchased a cyanide plant, with a capacity of 150 tons, and a Cornish crushing roll, 40 by 16 in. The foundry and machine shop is well equipped for doing first-class work and making prompt shipments.

At the last meeting of the board of directors of the Allis-Chalmers Company, the office of consulting engineer for all the works of this corporation was created, and Edwin Reynolds, so long and favorably known in connection with the Edward P. Allis Company, of Milwaukee, was promoted to that office. Irving H. Reynolds succeeds him as chief engineer, and Philetus W. Gates was elected third vice-president and appointed general superintendent. Joseph H. Seaman, formerly third vice-president, was made fourth vice-president and secretary, and J. W. Young, the former secretary, manager of the London office. Irving H. Reynolds still retains the position of superintendent of the Milwaukee works, and E. N. Dickson is office manager of the Milwaukee works. Arthur Niedermeyer is superintendent of the Chicago and Scranton works.

The Brown Hoisting Machinery Company, of Cleveland, through its Pittsburg, Pa., office, has secured a contract for erecting an automatic unloading, conveying, storing and filling plant at the blast furnaces of the Sharon Steel Company at Sharon, Pa. The plant will include a car dumper, which picks up a railroad car of 50 tons capacity and dumps the load into a transfer bin, from which it is dropped into 2 7½-ton buckets on a transfer car and carried into 3 buckets over bridges, 300 ft. long, to storage bins or a pile, whence the grab buckets take it to the furnace. The plant will include 2 bridges, and will be of capacity to store and feed all the ore required in the 3 furnaces at South Sharon. The mechanism will unload 300 railway cars, or as high as 15,000 tons, in a 10-hour day. The Brown Company has already installed a cantilever bridge at the South Sharon works.

The Chicago Pneumatic Tool Company reports the business outlook very promising for December, and sales show an astonishing increase over December, 1901. The following are a few of the concerns for whom it has installed pneumatic machinery during the past week: Townsend & Downey Ship and Engine Company, New York City; Ross Iron Works, Brooklyn, N. Y.; William Cramp Ship and Engine Company, Philadelphia, Pa.; American Locomotive Company, Schenectady Works, Schenectady, N. Y.; Shapley & Wells, Binghamton, N. Y.; Boston Bridge Works, East Cambridge, Mass.; Kensington Shipyard, Philadelphia, Pa.; Ricard Boiler and Engine Works, Toledo, O.; U. E. Rogers Granite Works, Sembury, Mass.; Baldwin Locomotive Works, Philadelphia, Pa.; Rogers Locomotive Works, Paterson, N. J.; Louisville & Nashville Railway, New Decatur, Ala.; Lake Erie & Western Railway, Lima, O.

The Salem Iron Company, of Leetonia, O., has contracted with William B. Scaife & Sons Company, of Pittsburg, Pa., for a 2,500-h.p. We-Fu-Go water softening and purifying system. The Salem Iron Company tried many methods of water purification without success, and after going into the matter very carefully, decided that the We-Fu-Go system would meet the requirements. Among some of the other recent contracts which William B. Scaife & Sons Company have closed for both the Scaife and We-Fu-Go systems, are the following: Pittsburg Plate Glass Company, Elwood, Ind., 2,500 h.p.; Rochester & Pittsburg Coal and Iron Company, Dubois, Pa., 2,500 h.p.; Toledo Furnace Company, Toledo, O., 4,000 h.p.; Buffalo & Susquehanna Iron Company, Buffalo, N. Y., 6,000 h.p.; Edw. E. Rieck Company, Pittsburg, Pa., 500 h.p.; Pennsylvania Salt Manufacturing Company, Wyandotte, Mich., 1,750 h.p.

The Cleveland Cliffs Iron Company is about to install an electric power distribution system for operating mixers and blowers in its Gladstone, Mich., plant. It recently purchased from the Westinghouse Electric and Manufacturing Company 2 75-kw., direct-current generators, and 8 10-h.p., direct-current motors. The Pioneer Iron Works, of Marquette,

Mich., owned by the Cleveland Cliffs Company, will also be equipped with electrical apparatus, which will be used for the operation of mixers and blowers, as in the Gladstone plant. Apparatus recently purchased from the Westinghouse Electric and Manufacturing Company for the Marquette plant includes 10 10-h.p., direct-current motors, and 2 150-kw., engine-type generators, to be direct connected to 2 Westinghouse compound condensing engines. The company has also ordered a Baldwin-Westinghouse electric locomotive to be used for shifting cars in its yards.

The Greensburg Foundry and Machine Company, of Greensburg, Pa., owing to its rapidly increasing business, has been compelled to get larger quarters, and for this purpose has purchased the Gondola Works, at Jeannette, Pa., with 13 acres of ground. The company will have there 2 foundry buildings, one 73 by 103 ft., the other 73 by 164 ft.; a wagon making and blacksmith shop, 75 by 60 ft.; machine shop, 60 ft. square; pattern shop, 3 stories high and 46 ft. square, for the exclusive use of storing patterns; tool house, 40 by 30 ft., and storage house, 40 ft. square, as well as other smaller buildings. The company will employ about 100 men at the start in making boilers, engines, pumps, steel mine cars, wagons, car wheels, etc., and expects to turn out from 25 to 40 tons of castings per day. The buildings are about ready for new machinery. The working force will be much increased later. The officials are: Thos. Donohoe, Jr., president; M. A. Prugh, secretary and treasurer, and W. W. Truxell, general superintendent.

Judge Kirkpatrick of the United States District Court has discharged the receivers appointed by him a few weeks ago in the bankruptcy proceedings against the National Salt Company. He declines, however, to dismiss, on technical grounds, the creditors' petition, seeking the corporation's adjudication as a bankrupt. Richard A. Lindabury, counsel for the company, demurred to the original petition in contesting the bankruptcy proceedings, on the ground that not enough facts were stated to give the court jurisdiction, and that the claims of the petitioning creditors, the Detroit Salt Company and Thompson Brothers, a corporation, and Samuel R. Underhill, Jr., all of Detroit, were not set forth with sufficient particularity. Leave was granted subsequently to amend the petition, despite the claim of the corporation's counsel that an amendment could not be made after the filing of a demurrer unless judgment were first given on the matter. Judge Kirkpatrick holds that the defects which existed in the original petition can be corrected by amendment.

#### TRADE CATALOGUES.

"Pneumatic Tools" is the title of No. 6 of the pamphlets issued as parts of a technical library by Joseph Ryerson, of Chicago, Ill. The 104-page pamphlet describes Beyer, Chicago and Little Giant flue rollers, reamers and tappers, and Beyer and Chicago hammers, chippers, calkers, riveters, yoke riveters, hoists and pneumatic accessories and Gardiner air compressors.

The Borden & Selleck Company, of Chicago, Ill., has issued a 28-page pamphlet, describing the construction and operation on Howe gas and gasoline engines. These engines made by the Howe Scale Company, of Rutland, Vt., are "built for business," and are claimed to be the highest type of engine that skill can produce. An electric igniter, simple and durable, is employed. The company states that the igniter will not get out of order nor short circuit. The air valve is opened by a cam insuring a positive mixture. The engine is of the 4-cycle type, using either gas or gasoline or both at the same time. Its construction is shown in detail by excellent half-tone cuts.

The Laurent-Cherry system of cable hoist conveyors and the Bleichert system of wire rope tramways are described in circulars sent out by the Trenton Iron Company, of Trenton, N. J., for which Cooper, Hewitt & Co., of New York City, are agents. The distinguishing feature of the Laurent-Cherry system is the absence of tail-rope carriers for supporting the hoisting rope. The distinguishing features of Bleichert tramways are the patent locked-coil track cable, and the Webber compression grip, which dispenses with buttons, lugs or knots on the traction rope.

The Keller assay balance, said to be a marvel of ingenuity, compactness and simplicity, is described in an 8-page pamphlet published by the Salt Lake Hardware Company, of Salt Lake, Utah. The Keller portable assay balance, which weighs to 1-100 mg., has a 5-in. beam, and is carried in a case 15 in. long, 7¼ in. wide and 6¾ in. high, is listed at \$100. The Keller New Idea balance, which will carry 2 gm. in each pan and weigh to 1-400 mg., hasagate knives and planes, and a most carefully made 5-in. beam. It is listed at \$250.

The Chicago Pneumatic Tool Company, of Chicago, Ill., is mailing to the trade a 4-page circular, desig-

nated as Special Circular No. 32, illustrating the Tynan patent annealer and the Tynan rivet heating forge. The company has secured the entire control of these devices, and will be the exclusive manufacturer in the future. The annealer and rivet forge fit in nicely with the line of pneumatic appliances which the company manufactures, as compressed air is used with crude oil as a fuel. They are designed for the various classes of repair work incident to shipyards, railroad shops, etc. Both machines are light and easily removed from place to place—an important feature in the work for which they are adapted. The company states that the orders received for these devices during the short period they have been manufactured by the company are so numerous that the company finds it difficult to supply the demand, and is arranging to increase its facilities to a considerable extent in order to fill future requirements satisfactorily.

#### GENERAL MINING NEWS.

**Mineral Oil Exports.**—In November the United States exported: Crude oil, 9,903,483 gals.; naphthas, 2,188,152 gals.; illuminating, 58,314,794 gals.; lubricating and paraffin, 6,167,396 gals.; residuum, 4,366,278 gals.; total, 80,940,103 gals. For the 11 months ending November 30 the exports were 954,086,189 gals., against 968,838,436 gals. in the corresponding period last year; showing a falling off of 13,752,247 gals., principally in illuminating oil. It is noteworthy that the shipments of crude oil this year have increased 12,028,152 gals., the total being 127,495,066 gals., as against 115,466,914 gals. in 1901. Residuum exports have grown from 24,547,514 gals. in 1901 to 37,363,888 gals. this year, or 12,816,374 gals.

#### ARIZONA.

##### COCONINO COUNTY.

**Coconino Copper Company.**—This company has completed its pipe line to bring the water from what is known as Big Spring, 6 miles south of its plant at Ryan City. The company was obliged to force the water over some high ridges.

##### GRAHAM COUNTY.

(From Our Special Correspondent.)

**Arizona Copper Company.**—The production of copper for November was 1,310 tons of 2,000 lbs. each.

##### YAVAPAI COUNTY.

(From Our Special Correspondent.)

**Gold and Copper Consolidated Mining Company.**—Superintendent Peckerell has 18 steel tanks in the cyanide plant in place. The plant is located about 12 miles south of Prescott.

**Senate.**—This mine, at Congress, is to be worked by C. N. Keeney, of Le Roy, N. Y., under a lease and bond.

**United Verde Copper Company.**—It is expected that the mines of this company at Jerome may start work in February.

#### CALIFORNIA.

##### CALAVERAS COUNTY.

(From Our Special Correspondent.)

**Black Cat Oil and Mining Company.**—This company, at Mokelumne Hill, is about to develop the Keystone, Occident, Belvoir and Black Metal mines, formerly owned by W. T. Robinson.

**Emma Consolidated Mining Company.**—This company, near Mokelumne Hill, Mr. McIntyre superintendent, is shortly to have a 10-stamp mill.

**Dower and Calaveritas Hill.**—These placers, near San Andreas, are now about to be worked by Dr. W. I. Nelson, of New York City, with J. J. McSorley as manager. About 100 men are widening the McDermott ditch, and 2 miles of pipe have been laid.

**Old Stiff.**—Application for license to mine by the hydraulic system has been made to the California Debris Commission by A. Lundberg for this mine, near Vallecito. The mine drains into Wades Gulch, thence into Coyote Creek and Stanislaus River.

**Wild Goose.**—This property at Douglas Flat, J. Evans manager, is to have a water power hoist.

##### EL DORADO COUNTY.

(From Our Special Correspondent.)

**Crystal.**—This mine, near Fairplay, is now owned by the Alexander Mining Company. Men are timbering the 1,000-ft. tunnel. A new mill is to be built.

**Griffith Consolidated.**—This mine is to resume work shortly. It is owned by the Jumper Gold Mining Company, of which Mark B. Kerr, of Stent, is general manager.

**Golden Gate.**—For this mine at Grizzly Flat, Jas. Richards, superintendent, the new machinery is being put in. The shaft is down 1,000 ft., and sinking has been resumed.

**Jasper Gold Mining Company.**—A company has been organized to work this mine near Shingle

Springs. The company is an Oakland one, with the following directors: J. F. Bluett, J. Fearn, J. R. Fearn, H. R. Wiley and W. A. Withart. Mr. J. F. Bluett is superintendent. Machinery for a new mill is being hauled in. The mill is to be operated by water power.

**Larkin.**—This mine, near Diamond Springs, is to resume work after being idle some time.

**Michigan.**—This drift gravel mine, near Fairplay, George Mongesser superintendent, is to resume operations. Ten men are employed, and a new mill will be built to crush the gravel.

#### INYO COUNTY.

(From Our Special Correspondent.)

**Cecil R.**—This company, owning mines in South Park District, 68 miles south from Johannesburg, has made a \$600 clean-up from 5 days' run with its 2-stamp mill. A 20-stamp mill will shortly be completed. U. S. G. Todd is manager.

#### KERN COUNTY.

(From Our Special Correspondent.)

**Big Blue.**—This company, at Isabella, has hoisted the pumps from the Clara Belle shaft. Some ore is about to be crushed at the Hooper Mill.

**Caliente District.**—Only superficial work has been done thus far at the mines near Caliente, but the ore is of high grade. Lack of capital has prevented any great developments.

**Kern River Oil Field.**—The oil companies operating on Kern River have decided to put a series of levees in the river, dividing it into ponds to collect the oil and prevent serious damage to crops, etc., at places where the water is used for irrigation. The landowners and irrigation companies threatened to sue for damages unless the oil was kept from the river water.

#### MADERA COUNTY.

(From Our Special Correspondent.)

**Gambetta Mining Company.**—The Montana company which has bonded this property at Grub Gulch has taken charge, and Edmond D. North, of Butte, has relieved Mr. Porter as superintendent. The old shaft is to be sunk 200 ft., and drifts are to be run. Another 10,000-gal. oil tank is being put in for fuel oil. This company has also bonded the Josephine Mine at Grub Gulch.

**Jessie Bell Mining and Milling Company.**—This company, of Los Angeles, has bought the C. Olinger copper claims at Daulton, including the Copper Queen, Daulton, General Shafter and Rising Sun. Col. S. H. Baker is superintendent. There are several small shafts on the property, none of them over 60 ft. deep. Houses are to be put up and men set at work.

**Rez.**—Active work has started at this mine in Grub Gulch, under Superintendent C. M. Ward. The mine is owned by John Day, of San Francisco.

#### MARIPOSA COUNTY.

(From Our Special Correspondent.)

**Anderson Group.**—These claims, near Bagby, under bond to H. C. Kennedy and J. E. Gilbert, are being opened by a tunnel, which will strike the vein at 150 ft.

**Diana Group.**—This group on the North Fork of the Merced River, near Coulterville, is to be worked by a newly incorporated company. The ore has been worked in adstras. The new company has men repairing shafts, running tunnels, etc., and intends erecting 20 more stamps, putting in concentrators, etc., the power to be from a turbine.

**Golden Gate.**—Good ore is being taken from this mine at Whitlock. W. H. Cavin manager.

**J. Teats.**—Ore from this mine at Whitlock is being crushed at the Ellingham Mill.

**Mountain View and Rebecca.**—These claims near Mount Bullion, owned by C. A. and M. Overton, are being opened by a tunnel.

**Princeton Mill.**—A better water supply is being provided for this mill at Mount Bullion, owned by the Mariposa Commercial and Mining Company, Chas. C. Derby manager. A Carratt triple-action pump, to be driven by electric power, is being put in to force the water a mile and a half to the mill. The additional water supply is expected to keep the 50 stamps running steadily.

**Pumpkin.**—This mine, near Coulterville, owned by James Dolan, is expected to start shortly.

#### MONO COUNTY.

(From Our Special Correspondent.)

**Standard Consolidated Mining Company.**—At this mine, near Bodie, R. C. Turner superintendent, the cyanide plant has closed for the winter on account of cold weather.

#### NEVADA COUNTY.

(From Our Special Correspondent.)

**Blue Tent Mining Company.**—In this mine at Blue Tent, 6 miles from Nevada City, a rush of quicksand at the bottom of the new 300-ft. shaft, has done great

damage. The miners were changing shifts at the time of the inrush. The mine is owned by Chris Jepson and others.

**Champion Mining Company.**—This company, at Nevada City, is to put a new plant on the Merrifield similar to that on the Empire at Grass Valley. The incline shaft is to be enlarged. On the Nevada City Mine a new hoist is to be put in. The company has been incorporated with 125,000 shares at \$5 par value. A new chlorination plant is to be put up among other improvements. E. R. Abadie is superintendent and B. N. Shoecraft is secretary, with offices in the Crocker Building, San Francisco. Fred Zeitler, first vice-president of the California Miners' Association, was for many years superintendent of the Champion, and is still one of the directors.

**Union Blue Gravel.**—The new mill for this property at North Bloomfield is nearly completed.

#### RIVERSIDE COUNTY.

(From Our Special Correspondent.)

**Tip-Top and Iron Chief.**—At these mines, near Walters, owned by Pittsburg, Pa., men, the miners recently drove the superintendent, J. E. Collins, away from the mines. A sheriff has gone out to settle the trouble.

**Wright-Lawrence Mining Company.**—This company now owns mining property opposite Parker on the Colorado River, about 75 miles from Needles. J. W. Peebler, of Chicago, Ill., who is interested, says that a proposed smelting plant at Needles will be built by this company. The ores carry copper and gold.

#### SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**New York.**—These mines consist of 8 claims, about 5 miles southeast of Manvel. A side track has been put in. Prospecting is being done.

**Orange Blossom Group.**—Work has been resumed on this group 8 miles from Bagdad. The ore carries copper and silver.

**Roosevelt.**—S. Washburn, of Pasadena, is perfecting plans to put a lot of machinery on this mine near Ludlow.

**Waterloo Mining Company.**—D. D. Connell is working a lease on the properties of this company at Ludlow. A 15-stamp mill is in operation.

#### SAN DIEGO COUNTY.

(From Our Special Correspondent.)

**Glade Mining Company.**—This company, an English corporation, has recently come into possession of the Noble mines, near Descanso. J. H. Thring, representing the stockholders, is looking over the mines. There has recently been installed a stamp mill, with concentrators, etc., all run by gasoline engine. Development is going on.

#### SHASTA COUNTY.

(From Our Special Correspondent.)

**Clear Creek Gold Mining Company.**—A strike is reported at the end of the long tunnel on Clear Creek, 10 miles from Redding. B. F. Rogers is superintendent.

**De Lanmar and Bully Hill.**—Electric power will be furnished in a few days to the copper properties at Bully Hill. The mines and smelters have been idle for some weeks. There is a rumor that the pending deal between the Great Western Gold Mining Company and the De Lamar interests has been declared "off," and that the Bully Hill properties will be started up by the De Lamar people alone.

**Mountain Copper Company.**—The smelters at Keswick still remain closed down, owing to the smeltermen's strike and the town is almost deserted. Manager Lewis T. Wright says that he discharged certain union men because they did not do the work for which they were hired, and he refuses to treat with these men or reinstate them.

**Northern California Power Company.**—This company has suspended all work on the big Cow Creek electric power plant, and will do nothing more at present. This is another result of the strike at the Mountain Copper Company's mines and smelters.

#### SIERRA COUNTY.

(From Our Special Correspondent.)

**New Independence.**—The Nevada County men owning this property at Downieville are pumping out the old 200-ft. shaft preparatory to running drifts from the bottom. George Nihell, of Nevada City, has succeeded C. Root as superintendent.

#### SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Cherry Hill.**—On this mine at Yreka 35 hands are employed. Superintendent Turner will keep the mill running until Christmas, when it will be closed until spring.

**Helena Gold Mining Company.**—This property at Callahan, sometimes known as the McKeen Mine, from its superintendent, James McKeen, has closed for the present. Arrangements had been made to

install air drills. There are extensive cyanide works at this mine. A. D. Chidsey, of Easton, Pa., is president and the principal owner. The mine has been steadily producing for a year or so, but there has been thus far, it is said, little profit in the operations. Considerable development work has been done and machinery put in.

**Quartz Hill.**—This mine at Scott Bar, J. F. Boyle superintendent, is having its ditches, flumes, etc., reconstructed. Pressure pipe for large power capacity is being put in, and a 40-stamp mill is to be installed. The property is owned by the Scott River Mining Company.

## SONOMA COUNTY.

(From Our Special Correspondent.)

**Healdsburg.**—In this company's quicksilver mine on the Wall Farm, steam hoisting works have been put up, and the shaft is now down 80 ft. The ore so far found runs  $1\frac{1}{2}$  per cent in mercury. Fred Kruse and Jerome Hobson, of Healdsburg, are the principal owners.

**Socrates.**—This quicksilver property at Pine Flat has reverted to its owners by reason of failure in payments on the part of the recent purchasers, H. C. Davey is now in charge.

## TRINITY COUNTY.

(From Our Special Correspondent.)

**Five Pines.**—This mine at Bragdon has been taken by the company which has held the bond on it for some time. Superintendent Mahan is doing active development. A tunnel is in 400 ft. Sixteen men are employed. The company expects to install a 20-stamp mill next spring.

**Three Peaks Mining Company.**—A 10-stamp mill is being put on this mine, near Abrams. Superintendent J. J. Chambers has 15 men putting up buildings, etc.

## TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Mohican Mining Company.**—At this mine, near Groveland, Felix Chappet superintendent, sinking has begun. A new wagon road is being built and a mill is contemplated.

**Placer Mining.**—The rains have filled ditches and reservoirs so that a number of mines which closed down last fall have been started again.

## COLORADO.

(From Our Special Correspondent.)

In the battle for the control of the Colorado Fuel and Iron Company, a compromise gave the Hawley-Harriman-Gould interests due representation, yet the direct management went to the Osgood faction.

A mining engineer, who claims a thorough familiarity with the Sunnyside Mine in San Juan County, says that the suggestion of salted values is unjust. He says the mine has been developed by Judge Terry on legitimate lines from a prospect to a million dollar property, and it is the Judge's reluctance to sell and not the fault of the property that negotiations do not result in a deal.

A big strike of good ore is reported in the Bonhomme tunnel in Burrows Park, San Juan County, by the Scantic Company. A body of ore 50 ft. wide, largely of shipping grade, has been encountered 1,650 ft. from the portal of the tunnel.

The report of the Stratton's Independence for the week ending November 21 shows a production of 1,715 tons, valued at \$33,250.

**Colorado Mine Operators' Association.**—This organization, of which Arthur Winslow, of Kansas City, Mo., is president, held its first semi-annual meeting in Denver on December 13. There was a large attendance from the different mining districts of the State. Much interest was shown by those present, and it was decided to broaden the scope of the society with a view to increasing the society's usefulness through a larger membership.

An executive committee of active and non-active members was appointed to handle matters of interest to the association. Frank J. Campbell was elected first vice-president to succeed J. H. Weddle, and T. Walker Beam was appointed chairman of the finance committee, succeeding the late Arthur L. Collins.

Resolutions were passed, expressing the society's respect for Mr. Collins, and extending its sympathy to his family.

A general notice was issued, stating that no distinction will be or has been made between union and non-union labor by the members of the society, but both will be employed in all camps. Steps were taken for the organization of a central employment bureau in each district, so that men need not be put to the expense of visiting mines to secure work. The secretary of each association will be kept advised by telephone of the needs of different mines.

In the evening the society had its dinner at the Adams Hotel. Covers were laid for 100 guests. President Winslow, in a brilliant speech, called atten-

tion to the resources of Colorado and the society's purpose. In response to various toasts President Palmer, of the Colorado State School of Mines; Franklin Guiteman, general manager of the American Smelting and Refining Company; A. B. Seaman, attorney of the Liberty Bell Company; T. B. Stevens, of Sturms, Roger & Co.; P. A. Leonard, correspondent of the ENGINEERING AND MINING JOURNAL, and Congressman Hogg made replies. Mining men generally are well pleased with the result of the meeting.

## CLEAR CREEK COUNTY.

**East Red Elephant.**—R. C. Vidler, of Georgetown, has organized this company, which will own and operate the territory which Mr. Vidler purchased 2 years ago on Red Elephant Mountain. The territory comprises 55 lode claims, a mill site and 2 tunnel sites, aggregating an area 6,000 ft. long and 3,000 ft. wide. The Red Elephant group produced very heavily in former years, and closed down because the pumps were unable to check the water, which made pumping expenses very high. The 2 deepest shafts were down 565 and 728 ft. Mr. Vidler is associated with Colorado Springs and Boston men, and his company will drive a tunnel about 4,500 ft. east of the new Reynolds tunnel.

## CUSTER COUNTY.

**Custer City Mining and Realty Company.**—This company, which promoted the town of Custer City, will, it is said, be shortly reorganized, the president of the company, Francis I. West, of Pueblo, having died a short time ago. The change will occur some time in January.

**Phoenix Lead Company.**—This company has brought suit against the Bull-Domingo Mining and Leasing Company for the recovery of \$1,000 and possession of the Johnny Bull, Domingo, Tom Paine and Little Dorritt Nos. 1 and 2. They were leased by the Phoenix Company to the defendant, and were later sub-leased by the Bull-Domingo to the Neptune Mining Company. According to the lease, which was executed early in 1900, the premises were to be kept free from incumbrances, and all taxes were to be paid by the lessee.

## GILPIN COUNTY.

(From Our Special Correspondent.)

**Boston & Denver Consolidated Mining and Milling Company.**—A number of stockholders, principally from New York City, have been looking around the properties at Black Hawk, in company with Melvin P. Dalton, the well-known mining man of Denver.

**Four Mile Gulch Tunnel and Mining Company.**—This company has increased its capital stock from \$500,000 to \$1,000,000. Chicago, Ill., men are interested, and are operating a large group of claims in the Enterprise District. J. Bruhl, Central City, is in charge, and active developments are kept up, with day and night shifts, and some silver-lead ores are taken out.

**Spur Daisy.**—After being in litigation for about 10 years, all differences have been adjusted, and the property is to be operated again within 30 days. Trouble arose among the owners over the management, and the proceeds of the property, and there were adverse suits on account of claims overlapping. The property consists of 14 patented lodes, the main working that of 240 ft. being on the Two Sisters. The surface ores, which were principally shipped to the mills, gave values of from 10 to 15 oz. gold per cord, or from 1 to 2 oz. per ton. There is machinery on the Two Sisters, and operations will be conducted through that shaft. Dan Monday, Central City, will be in charge.

**Town Topics Gold Mining Company.**—This company operating the East Notaway property in Russell District has declared its 7th dividend of  $\frac{1}{2}$ c. per share. The company is operating entirely on the leasing system. The ores are nearly all smelting, and are above the average. M. D. Draper, Central City, is superintendent.

**Woodbury Gold Mining Company.**—St. Joseph, Mo., men are interested in the Herbert group as the above company, and they are making arrangements to resume operations. The shaft is down 225 ft., and the property is equipped with buildings and steam plant. The shaft is to be put down deeper this winter. John Dickey, Central City, is to be in charge.

## GUNNISON COUNTY.

**Gold Brick District.**—This district is in the northern part of the county gold belt. A number of properties are producing and shipping ore from about Ohio City. During the past two months two or three new producers have been opened. The chief properties are the Whig, Chloride, Cortland, Granite Mountain, Golden Islet, Farley, Calumet, Williams and Yukon. The Whig has ore opened in its old tunnel, also in the lower levels of the new shaft, and recently commenced to ship. The Golden Islet, Farley and Williams have recently opened ore, and will soon be shipping. The Chloride, Cortland, Calumet and

Granite Mountain have been in shipping ore for some time.

**Gold Hill District.**—This district, near Tin Cup, is a busy center this winter. The West Gold Hill Mining Company is operating its group on West Gold Hill. A long tunnel is to be driven. The Brunswick Company is pushing work on the new Jimmy Mack tunnel, which is to be driven in 1,500 ft. The company expects to have abundance of ore for its 100-ton concentrating plant on West Willow Creek, near the entrance of the new tunnel. The Jimmy Mack has been a heavy producer. The Gold Cup and Robert E. Lee mines are in good ore, and have shipped considerable.

**Revenuc.**—The New York parties who recently purchased this group, expect to start developments soon. The building of a wagon road to the mine from Ohio City, and the erection of buildings on the property, is the first work contemplated.

## LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

**Leadville Output.**—The production the past week averaged 2,750 tons daily of all classes of material. The smelters are still handling lower grade ores without a penalty. It is expected that the manganese market will open early in January.

**Siliceous Ore Treatment.**—The American Smelting and Refinery Company announces a reduction of 50c. to \$1 a ton on low-grade siliceous oxides. There are great bodies of this material on the gold belt, and the smelter needs that material at present.

**Boston Gold-Copper Smelting Company.**—This company's pyritic plant has been sold to W. A. Miles, of Cleveland, O. Mr. Miles is heavily interested in mining here, and was for a long time secretary of the New Monarch Company. He heads a new company that bought the smelter and announces that several hundred thousand dollars will be spent at once in altering the smelter and increasing its capacity to 500 tons of low-grade ores daily. A plant for this low-grade material is badly needed.

**Fanchon Mining Company.**—A shipment just made from this Sugar Loaf property gave net returns of \$1,155. The shaft is down 225 ft., with one drift on the vein 125 ft., and the other 175 ft.

**Fryer Hill Mines Company.**—One hundred tons a day are shipped. Many old workings and drifts being cleaned out, show both low and high-grade ore. A great deal of work in virgin territory is being carried on, and a new shaft is under way. W. H. Rockefeller, of New York City; F. W. Ridgeway and J. R. Kendig, of Albany, N. Y., large owners, have been on the ground this week.

**Gold Basin Mining Company.**—A drill hole is going down from the bottom of the shaft to locate the vein below. In the present workings the vein is small, but very rich, the last returns being 3.9 oz. gold, 96 oz. silver, and  $12\frac{1}{2}$  per cent copper.

**Ohio & Colorado Smelting Company.**—Manager Goodwin, of the Salida Smelter, states a 100-ton lead refinery will be added at once. The company is handling several hundred tons a day from its Monarch mines in Leadville and also taking other ore.

**Small Hopes Combination.**—The heaviest producer is the Marian shaft of the R. A. M., which is shipping 125 tons of zinc sulphides. Considerable exploration and prospecting is under way in the lower levels.

**Tripoli Deposit.**—Mr. Musgrove, at his ranch near Leadville, has opened up 200 ft. of a deposit about 4 ft. thick, running about 96 per cent silica, and intends placing the product on the market.

**Valentine Mining Company.**—The pumps are being lowered preparatory to draining the old workings, which will require some 6 weeks.

## SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

The grand jury appointed to investigate the assassination of Arthur L. Collins and various acts of lawlessness perpetrated by the local miners' union, including the riot of July, 1901, in which 8 unarmed men were murdered, on December 15 returned 57 indictments against 22 persons. Wholesale arrests of members of the local union are expected, and it is hoped that public sentiment will be strong enough to secure trial and conviction of the ringleaders.

**Ophir Consolidated Mines Company.**—At the annual meeting in Telluride the old officers and directors were re-elected, J. O. Buckley, president and general manager; W. S. Buckley, vice-president and resident manager; Thomas Somers, secretary and treasurer. The directors spent several days looking over the property and inspecting the company's books.

## TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

**Mining Taxation.**—Much interest is taken in the taxation of the non-producing mines in this district, as many men think the taxes exorbitant. A meeting was held at the Mining Exchange this week to discuss

the matter, and developments are watched with interest. At present the mining stock market is so low, and the sale of treasury stock so poor that a number of smaller companies are compelled to borrow considerable money to pay their taxes or let the property go.

**Copper Mountain Gold Mining Company.**—A meeting was held this week by some of the stockholders to arrange for the organization of a new company. No business was transacted, however, as not enough stock was represented. The property consisting of 5 claims on Copper Mountain, adjoining the Flourine Mine, was sold sometime ago to satisfy a judgment held by J. F. Burns. The property was bid in by C. E. Brady, and was afterwards bought by Mr. Cockburn and a number of others who are stockholders in the Copper Mountain Gold Mining Company. The property, though not producing ore in any quantity, is one of the best prospects on the outskirts of the Cripple Creek District.

**Empire State Mines Company.**—There is no doubt that the property shipped a large amount of ore during the past year, and the specimens shown by visitors would indicate there is some very rich ore in the property. It is reported that an effort is being made to consolidate this property with the Isabella, which adjoins it. The Empire State owns the property originally held by the Orphan Bell Company, consisting of 4 claims, or about 14 acres.

**Free Coinage.**—The Shell and Barr lease on the main workings of this property is closed down, as the lease has expired. It is understood that all the leases on this property will expire by January 1, and a great deal of interest is shown as to what will be done in the future. The property is owned principally by the estate of the late Sam Strong.

**Golden Cycle Mining Company.**—In the pending litigation application was recently made before Judge Hallett, of the United States Court, to have the various suits transferred to the Federal Court, on the grounds that the company is incorporated under the laws of another State, and that President Milliken is not a resident of Colorado.

**Independence Consolidated Gold Mining Company.**—Some very good ore is being mined from the lower levels by the Cripple Creek Mining Company, R. P. Russel manager, which has a lease on the Hull City placer, belonging to the Independence Consolidated. A large amount of ore has been shipped from the property during the last year, and enough money paid in royalty to free the company from debt and leave something in the treasury, and the company is in better shape than for several years. The property is west of the Vindicator, and has the extension of some rich ore shoots.

**Lexington Gold Mining Company.**—Work has been resumed on the main shaft under lease to Potvin and others. It is understood that a 3 years' lease has been granted them. The property is located on Gold Hill adjoining the Anchoria Leland. It has produced a large amount of ore in the past, but of late has not shipped much.

**Sedan vs. Sunshine.**—A new trial of this case has been set for December 15. The second trial resulted in a mistrial, owing to one of the jurors being caught soliciting a bribe. The property is situated on Galena Hill.

**Stratton's Cripple Creek Mining and Development Company.**—The report of George Bancroft, who has been making a careful examination of all of the Stratton properties, is nearly completed. Work at the properties goes on as usual. A new 24-drill compressor has been installed at the American Eagle Mine. It has been reported that a large amount of the Stratton territory is to be let under lease, but careful investigation seems to show this is not the case as regards any large amount of territory.

**Theresa Gold Mining Company.**—To make the Golden Cycle controversy more complicated a suit has been filed by the minority stockholders of this company against Messrs. J. T. Milliken, of St. Louis, Mo., L. E. Hill and others, alleging that questionable transactions were used by Mr. Milliken in getting control of the Theresa. The plaintiffs also allege that rich ore was known to exist in the Theresa before it was bought by the defendant, and that on the purchase of the property Milliken gave Hill a 4 years' lease at the very low royalty of 15 per cent, and that the defendants refused to pay certain indebtedness they had agreed to pay. The Theresa adjoins the Golden Cycle on the east, and the control was formerly owned by Judge A. E. Colburn.

**Wild Horse.**—Work is under way to move the dump to the Arequa Mill, there to be treated by the cyanide process. The whole dump has recently been worked over by Mr. Miller. Mr. Heller, who has a lease on the Arequa Mill, has bought the remains of the Wild Horse dump, and it is understood that the entire dump will be shipped to the mill. The price that Mr. Heller paid is 30c. per ton.

## IDAHO.

## IDAHO COUNTY.

(From Our Special Correspondent.)

**Gold Dust Mining Company.**—This company is to install a 10-stamp mill on its property at Leesburg.

**Jumbo.**—It is stated that Patrick Clark, of Spokane, Wash., and associates have thrown up their \$225,000 bond on this mine at Hump.

## SHOSHONE COUNTY.

**Ambergris Mining Company.**—This company has brought suit at Wallace over the Ambergris claim. The complaint says the company located the Ambergris in October, 1901, and that the Hercules Company restaked the claim in October, 1902, under the name of the Anna & Nellie Consolidated claim. The complaint prays that the Hercules people be made to abandon all rights to this property. The defendants in the case are Harry L. Day, August Paulson, S. Markwell, C. H. Reves, Dan Cardoner and H. F. Samuels, principal owners of the Hercules, located at Burke.

**Golden Bricks.**—Daniel Sieger, of Spokane, has sold his half interest in this claim to the Golden Chest Mining Company, which is operating claims near Murray. The property was located in 1891, and adjoins the Chest Mine.

**Wake-Up-Jim Gold Mining Company.**—This company, capitalized at \$1,200,000, has as directors C. S. Crysler, J. M. Savage, B. M. Crysler, G. H. Stephenson, all of Delta, and J. F. Griffin, of St. Paul. The capitalization is \$1,200,000.

The property lies 2 or 3 miles east of Delta at the head of Trail Gulch. It was bonded a short time ago by C. S. Crysler for \$55,000 from the Ward Brothers. Considerable development work has been done.

**Wild Rose.**—A suit has been started in the district court at Wallace by E. R. Mathews against M. A. Ellis and J. A. Morrow to recover a sixth interest in this property at Pierce City, on which a rich strike was made a short time ago. The property consists of 5 claims—the Wild Rose, the Albert Edward, the Little Anna, the Lillian, the Chronicle and a mill site. It is rumored that an option has been given on the property for \$140,000.

## INDIANA.

**Coal Shipments.**—The railroads are unable to transport the coal that is waiting at the mines for delivery, and the situation at Indianapolis is precarious. Factories have had only a day's supply ahead for some time. Some of the Sullivan County mines have been able to work but 2½ and 3 days a week, because the sidings are full of cars waiting locomotives.

## CLARK COUNTY.

(From Our Special Correspondent.)

**American Cannel Company.**—This company's mines will open again in a few days, after lying idle 2 years. The company will prospect for more coal.

**Indiana Coal Combine.**—The soft coal combination is again talked of, this time the combination is said to be financed by Rock Island men, including Dan Reed and William Leeds. It is said that the proposition will be taken up again, and that Crawford Fairbanks, of Terre Haute, will be president. The plan is to capitalize at \$25,000,000, half common and half preferred.

## MICHIGAN.

(From Our Special Correspondent.)

**Copper Shipments.**—Navigation at copper country ports is closed, and the last shipments of refined copper by lake vessels have been made. The Calumet & Hecla, Quincy and Bigelow-Lewisohn smelters are bare of metal. As copper accumulates it will be shipped all rail.

## COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

**Calumet & Hecla.**—This company has erected a precipitation filter at the Lake Linden stamp mills in a corrugated iron building constructed especially for the purpose. It was installed by the New York Continental Jewell Filtration Company, of New York and Chicago, and has a capacity of 500,000 gal. of water every 24 hours.

**Mayflower.**—A cross-cut 15 ft. east of No. 1 shaft on this property has encountered a promising amygdaloid lode at a depth of 560 ft. Drifting north and south on the formations under way. Work is confined to this point.

**Old Colony.**—The drift north from the bottom of the last exploration shaft opened on this property is in 200 ft. Drifting will continue for 150 ft.

**Oscocla Consolidated.**—At the Tamarack Junior branch No. 2 shaft is producing 200 tons of rock daily from stores at the 9th, 11th and 12th levels. A winze is sinking from the bottom of No. 2 shaft, 3,250 ft. from surface, on the pitch of the lode which will explore the ground beneath the present workings. No. 1 shaft is hoisting water only. One hundred men are employed at this branch.

**Quincy.**—A large amount of mass copper is coming from the lower levels of the Pewabic shaft. Sinking in the Mesnard, or No. 8 shaft continues. The ground is opening well in the bottom of the shaft. Very little stoping has been done as yet.

**Winona.**—This mine is shipping 200 tons of rock daily to the Atlantic Mill, a lease having been secured on the head recently released by the Champion. Work is confined to No. 2 shaft, where some good stopes are opening. Ten thousand or 15,000 tons of rock will be stamped as a test.

**Wyandot.**—The exploring shaft on section 28 has encountered the ledge at 95 ft. The shaft is 6 by 8 ft. inside of timbers. After it is in solid rock some little distance cross-cuts will be extended to the southwest and northeast. Frank Van Orden is superintendent and Thomas Buzzo mining captain.

## COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

**Mohawk.**—The rock for the head in commission at the new mill is coming from Nos. 1 and 2 shafts. Twenty power drills are in use, and the number will be increased gradually. The output is 500 tons of rock daily.

## COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

**Michigan.**—This mine has shipped 20 tons of mass and barrel to the smelters on Portage Lake. The rock was taken out in the course of regular development work.

## IRON—MARQUETTE RANGE.

**Breitung Hematite Company.**—At this company's property near Negaunee, a new boiler house is nearly completed, and the 100-h.p. boiler has been put in. The new 4-drill compressor will be in operation in a short time. Two diamond drills are at work near the shaft. A third drill is on hand. The new engine has arrived. The iron stack from the boiler house is 74 ft. high.

The shaft is down 70 feet. Some difficulty has been experienced from water.

**Hartford.**—This mine near Ishpeming, is to have the finest shaft house on the range. The building is 126 ft. high and rests on concrete foundation. The American Bridge Company is erecting it. The Hartford shaft is down 700 ft., and the ore exposed is said to be of bessemer grade. About 15,000 tons were shipped this year, and 10,000 are in the stock pile. The mine is controlled by the Oliver Mining Company.

**Section 16.**—A fire in this mine, at Ishpeming, has stopped all work below ground for a week. All openings to the mine were promptly closed, and it is believed that the fire has been smothered. Part of the Lake Angeline Mine workings are idle on account of the gas that comes in from the Section 16.

The improvements being made at the shaft house, trestle and crusher plant at Section 16 are completed. The ore will be handled more economically and to better advantage than formerly. The trestle work is 15 ft. higher, so that the ore going to the crusher will be handled but once. The ore is dumped into a car, which will operate on a trestle on a level with the pockets of the plant. The trestle is built on a slight incline so that power will not be necessary to get ore to the crusher. The same will be true of the trestles going to the stocking ground in the opposite direction. The empty cars will be returned to the shaft by a small plant located on the trestle.

## IRON—MENOMINEE RANGE.

**Menominee Range Ore Shipments.**—According to the Crystal Falls Diamond Drill the shipments from the mines about Crystal Falls for the past season were as follows:

Armenia	110,000
Bristol	129,000
Columbia	185,690
Dunn	3,000
Crystal Falls	190,000
Great Western	50,000
Hope	8,873
Hemlock	125,000
Lamont	37,000
Mansfield	31,181
Michigan	53,273
Tobin	70,000
Total	1,025,570

The shipments from the Iron River District for the season are: Riverton and Dober, 125,590 tons; Baltic, 64,000 tons; Hiawatha, 75,000.

The lands of the Sheldon estate and Luke Welch in Iron County are being explored under the direction of Herman Fesing, a graduate of the Michigan College of Mines. Of late Mr. Fesing has been in the Steep Rock Lake District, in Canada, examining mineral lands for his principals.

**Hemlock River Mining Company.**—This company has taken an option on what are known as the Levine lands in Hematite Township, adjoining the Hemlock Mine on the north. The company has started exploring thereon. The lands are owned by the Levines and Gibsons, of Champion, and Mrs. Wilson,

of Madelia, Minn. There has been a disagreement among the owners which has kept the lands from being in shape to option.

## MINNESOTA.

## IRON—MESABI RANGE.

(From Our Special Correspondent.)

The State lease now owned by Pickands, Mather & Co., and recently bought by them from Kimberley and Duluth parties, has, since purchased, been explored to add 5,000,000 tons to the amount shown when bought.

The United States Steel Corporation is exploring in the n. w.  $\frac{1}{4}$  of the n. w.  $\frac{1}{4}$  of section 15, T. 58, R. 19, and in the s.  $\frac{1}{2}$  of the s. e.  $\frac{1}{4}$  of section 10, same town. So far no ore has been shown, but indications are excellent. Continued explorations in that vicinity are showing up much ore, and that will be an important district before long.

**Mesabi Range Shipments.**—Shipments have been: Auburn, 38,200 tons; Adams, 1,240,000; Aetna, 190,000; Burt, 100,000; Cloquet, 23,000; Day, 106,000; Duluth, 150,000; Fayal, 1,920,000; Genoa, 400,000; Glen, 23,000; Clark, 300,000; Chisholm, 250,000; Mountain, 1,428,000; Hull, 421,000; Oliver, 5,000; Saunty, 300,000; Sellers, 192,000; Spruce, 514,000; Pillsbury, 237,000; Rust, 242,000. These are all United States Steel Corporation shipments, as are minority interests in Bwabik and Mahoning and one-half Union, which shipped as follows, respectively: 623,000, 1,025,000 and 103,000. The Interstate Mining Company shipped: Lincoln, 88,000 tons; Grant, 52,000. Corrigan, McKinney & Co. shipped: Stevenson, 1,450,000 tons; Jordan, 148,000; Commodore, 66,000. Pickands, Mather & Co. shipped: Corsica, 59,000 tons; Elba, 212,000; Sparta, 255,000; Malta, 180,000; Minorca, 35,000; Colonial and Roberts Mining companies shipped 108,000 tons; Fay Exploration Company, 100,000 tons; Sellwood et al., 100,000 tons; Republic Iron and Steel Company et al., 240,000 tons; Steubenville Iron Works, 71,000 tons; Deering Harvester Company, 50,000 tons.

Total shipments of the United States Steel Corporation from all lake ranges have been a trifle over 16,000,000 gross tons, and of all other interests about 11,000,000 tons.

**Buffalo & Susquehanna Iron Company.**—Papers transferring the lease on the n. w.  $\frac{1}{4}$  of the s. e.  $\frac{1}{4}$  and the n. e.  $\frac{1}{4}$  of the s. w.  $\frac{1}{4}$  of section 6, T. 57, R. 20, to this concern have been closed. It is expected that a mine will be opened the coming year to feed the furnaces of the company at Buffalo. About 10,000,000 tons of ore are known, and the probability is that the total will be much larger.

**Cass Mining Company.**—This company is developing a mine near the old Cincinnati, and is sinking a shallow shaft. Ore will be shipped to the Duluth furnace, which owns the mine and several important explorations nearby. The ore is of a good grade, and quite coarse. The company hopes to produce sufficient ore to supply its furnaces.

**Colonial Mining Company.**—This company is sinking a shaft at its Kanawha Mine, near the Cass, and the same men have charge of both works. The mine is stock piling, and another year will ship more than the 24,800 tons shipped this season. The company's Hale Mine shipped this year 54,300 tons, and has been abandoned for the time being.

**Penobscot.**—The new owners have begun stripping north of the Great Northern tracks, where there is but 60 ft. of surface, and will mine some years by milling, connecting their proposed new underground workings with the shaft. They will thus raise the bottom of the mine about 110 ft., and cut the amount of water to be pumped, as they will be above the bottom levels of some surrounding mines. The pumping costs have been serious, and have perhaps wiped out all profits. The mine has been unable to produce more ore than was sold under a long-time contract to the National Steel Company, but by milling it will at least double the annual product the first year and decrease costs very materially.

## IRON—VERMILION RANGE.

(From Our Special Correspondent.)

**Vermilion Range Shipments.**—Iron ore shipments for the season have been as follows: Soudan hard ore, 280,000 tons; Chandler, 645,000; Pioneer, 675,000; Zenith, 167,000; Savoy, 243,000; Sibley, 77,000. This is about 300,000 tons more than for 1901, when the same mines, except the Sibley, were in operation. Chief increases have been in the Zenith, 107,000 tons, and in the Soudan, 72,000. Improvements under way will probably largely increase their output for the coming year.

**Section 30.**—This famous piece of land has been leased to an exploring syndicate of Duluth, under the name of the Section 30 Company, and the land will be developed at once. Title to the final 40-acre tract of the 320 acres in dispute was given last week to Eaton & Merritt, G. J. Lonstorf and R. H. Fagan, of Duluth, the original locattees and the exploring company was formed at once. This land covers more than a mile in length, and a half mile in width of the

ore-bearing formation, and is supposed to be rich. Half the operating mining companies of the United States are said to have been figuring for a lease there, and not much under \$1,000,000 has been spent in litigation over the land in the past 19 years and more.

## MONTANA.

## BEAVERHEAD COUNTY.

(From Our Special Correspondent.)

**Monument.**—This claim on Bloody Dick Creek, near Dillon, is being developed by a company of Butte and Anaconda men, of which J. C. Keppler, of Anaconda, is president. A 6 by 8 ft. shaft is down 60 ft. A steam hoist is used. The ore carries gold and copper.

## FLATHEAD COUNTY.

**Banner & Bangle Mining Company.**—This company has bonded its claims at Troy to Larson & Greenough, of Spokane, Wash. The bond is for one year, but the price amount has not been made public. The ores are silver, lead and zinc. M. Downey is the principal owner.

## GALLATIN COUNTY.

**Kearns Coal Mining Company.**—This company is preparing to develop its coal properties in the Trail Creek country, near Bozeman. The coal is said to compare favorably with any found in that section. The company has been incorporated by the following: W. T. Hales, Wallace, Idaho; John Kerr, Greensburg, Pa.; John W. Hill, Spokane, Wash., and J. W. McKune, Spokane, Wash. The principal offices will be at Spokane.

## MADISON COUNTY.

**Watseca Mining Company.**—Another vein has been found in the property of this company operating in the Rochester District, according to Carlton H. Hand, general manager of the company. The company is building a mill that will largely increase the output of the property. This mill will be completed some time in the spring.

## OREGON.

## JACKSON COUNTY.

**Bowden.**—This mine and the Braden Mill, near Gold Hill, were recently transferred to a corporation capitalized at \$500,000, in which Los Angeles and Redlands, Cal., capitalists, among them being F. T. Griffith and I. B. Hamilton, of Los Angeles, are interested. Several men in Greensburg, Pa., are also interested. J. J. Houck and Messrs. S. W. McClendon and L. F. Jordan, of Gold Hill, were the promoters of the deal. The original owners of the mine were George C. McDonough and James F. Davis.

## JOSEPHINE COUNTY.

**Greenback Gold Mining Company.**—This company is installing a 20-stamp mill and an electric light plant to replace the old 15-stamp mill about 10 miles from Leland. The company employs 50 men. Corey W. Thompson is general manager at the village of Greenback. W. H. Brevoort, of New York City, is president of the company, and David H. Moffat and Eben Smith, of Denver, Colo., are large owners.

**Homestake.**—This mine at Woodville has been bonded to J. M. Boyd and Walter A. Hall, of Alaska, and I. E. Moses, of Philadelphia, Pa., a syndicate of Eastern men, being associated in the deal. The Homestake was owned by Joseph Howell, of Portland; J. E. Pelton, Mrs. Lottie Pelton, G. W. Trefren and W. J. Stanley, of Ashland. The bond is for \$8,000. The deal was engineered by W. J. Stanley. The new company is beginning development.

## PENNSYLVANIA.

## ANTHRACITE COAL.

**Coe Brothers & Co.**—New coal mines are to be opened shortly by this Hazleton concern in the vicinity of its new Silver Brook colliery. The new operations will extend from what is known as the New Silver Brook Colliery to Quakake Valley, and a large modern breaker will be erected between these points.

## BITUMINOUS COAL.

**Buffalo & Susquehanna Coal Company.**—This company recently bought a large tract of land in Jefferson County, between Punksutawney and Du Bois. One of the properties taken over was known as the Brown.

**Indiana & Armstrong Coal Company.**—A tract of 5,000 acres of coal land in Indiana County has been purchased by this company. The price was \$40 an acre. The coal lies in 4 townships and was leased about 18 months ago by Col. John McLaughy for E. D. Carter and others. Among those interested are E. D. Carter, Louis Strouber and B. E. Cartwright, of New York City, and L. P. Snyder, of Clarion. Branches will be run from the Buffalo, Rochester & Pittsburgh and the Allegheny Valley Railroads to tap the field, and work will start in the spring.

**New York & Cleveland Gas Coal Company.**—This company's new No. 4 pit at Turtle Creek is completed, and the mining of coal has begun. The mine is equipped with electrical machinery.

## SOUTH DAKOTA.

## CUSTER COUNTY.

(From Our Special Correspondent.)

**Gladiator Consolidated Gold Mining and Milling Company.**—A stamp mill is to be built next year.

**Grantz Gold Mining Company.**—Ore is being sacked for shipment from the Roosevelt Group, coming from an open cut.

**White Cloud Group.**—John Collins, J. E. Pilcher and A. Wilcox own this group of 12 claims, 4 miles north of Custer. A company is being formed to be called the White Cloud Gold Mining Company. There are 3 vertical veins of free gold ore.

## LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Alder Creek Mining Company.**—An average of 64 tons a day is treated at the cyanide mill. The crushing capacity is 150 tons, and more tanks have been arranged for. The mill is supplied with quartzite and porphyry ore averaging about \$4 a ton.

**Deadwood-Standard Gold Mining and Milling Company.**—Two clean-ups are made monthly at the cyanide mill. The capacity is to be increased.

**Gold Hill Mining Company.**—Sinking will be resumed in the 300-ft. shaft. A new boiler has been purchased. An order has been placed for an air compressor and drills.

**Golden Crest Mining Company.**—The machinery is in place for the 10-stamp wet crushing cyanide mill. It will start this month. There are 14 tanks. The intended capacity is 50 tons.

**Golden Treasure Mining Company.**—The main working tunnel is in 60 ft., and the force has been increased. It will take 3 months to reach the vein, some 235 ft. distant.

**Jupiter Gold Mining Company.**—The foundation is laid for the cyanide annex to the 40-stamp mill. There will be 16 vats of Oregon fir. The ore will be amalgamated at the stamp mill and tailings conveyed to the vats in iron pipes. The contract calls for the completion of the plant by February 15.

**Victoria Gold Mining and Milling Company.**—Officers and directors have been elected as follows: A. B. Smith, Omaha, Neb., president; Henry Schoenick, Chicago, Ill., vice-president; A. J. Malterner, Deadwood, treasurer; W. M. Glass, Omaha, Neb., secretary; George S. Jackson, Deadwood, director and superintendent. The company owns 250 acres along the Spearfish River, and is developing bodies of cyaniding ore.

## PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Redfern Gold Mining and Milling Company.**—Officers have been elected as follows: John Croft, Lead, president; O. Mochon, Lead, vice-president; A. G. Stephens, Lead, secretary and manager; J. McDonald, Lead, treasurer; R. E. Hawley, Lead; H. McClellan, Alliance, Neb.; R. C. Hayes, Deadwood, and Samuel Pascoe, Lead, directors. The company is incorporated for \$1,000,000.

**Sunbeam Mining Company.**—The incline shaft is 95 ft. deep.

## TENNESSEE.

## GRUNDY COUNTY.

**Thomas Coal and Land Company.**—This company, Tracy City, has been incorporated as the Thomas Coal and Iron Company, with capital stock of \$300,000, and will develop the 60,000 acres of coal and timber lands that were purchased recently. Arrangements will be made for opening coal mines, erecting coke ovens, and an iron furnace, it is reported, will be erected eventually. W. H. Thomas, of Columbus, O., is president, and E. M. Jones is resident manager at Tracy City.

## UTAH.

(From Our Special Correspondent.)

**Ore and Bullion Settlements.**—Salt Lake banks make reports for the week ending December 12: American Smelting and Refining Company, bullion, \$116,000; ores, \$97,800; gold bullion, \$23,525; auro-cyanides, \$14,320; total, \$251,645.

## BEAVER COUNTY.

(From Our Special Correspondent.)

**Horn Silver.**—This mine at Frisco shipped 4 cars of ore for the week ending December 12.

**Majestic Company.**—A. B. Lewis, for this company, has secured the Montreal group out of Milford, owned by the Glasgow & Western Exploration Company. The price is said to be \$250,000. The Glasgow Company shipped ore to its smelters at Golconda, Nev., but the long haul made expenses high. This is probably the reason for the Glasgow Company selling.

**Washington Mining Company.**—This property has been purchased by a group of Salt Lake men, headed by Witcher Jones, for the reported price of \$50,000. The ground is said to adjoin the Imperial.

## JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—For the week closing December 12 shipments were: Lower Mammoth, 4 cars ore; Grand Central, 26 cars ore; Yankee Consolidated, 5 cars; Star Consolidated, 2 cars; Chloride Point, 1 car; Carisa, 4 cars; Eagle & Blue Bell, 5 cars; Gemini, 16 cars; Bullion-Beck, 7 cars; Mammoth, 5 cars.

**Grand Central.**—Work is again under way, and the ore shipped has passed over the new tramway. It goes to the Bingham Consolidated Smelter.

## SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham Shipments.**—The Phoenix and Columbia each shipped a car of ore, and the United States 2 cars of ore for the week ending December 12.

**Yampa.**—This Bingham property is said to be preparing to let contracts for the erection of a smelter. Sample lots of ore will be sent to the Heinze smelters at Butte to determine the best method of reduction.

## SUMMIT COUNTY.

(From Our Special Correspondent.)

**Park City Shipments.**—For the week ending December 12 the Macintosh Sampler reports the following receipts: Daly-West, 3,683,780 lbs. ore; Anchor, 390,670 lbs. ore; California, 144,700 lbs. ore; Ontario, 461,720 lbs. ore.

**Naildriver.**—The recent discoveries of surface ore while laying pipe line excavating for shaft house and grading the road are said to be all separate from the main ledges.

**Silver King Consolidated Mining Company.**—This company, incorporated under the laws of Wyoming, is capitalized at \$1,500,000 in \$5 shares. The company controls the Electric Light, Cumberland, Ural, Custer, Delaware, Vesuvius and Andes patented lode claims, directly west of the Silver King at Park City, beginning about 1,500 ft. from the latter's hoisting works.

The officers and directors are: William M. Bradley, president; Henry Cohen, vice-president; the other directors being A. R. Harrison, H. L. Miller and John C. Hamm, the latter of Evanston, Wyo. William Pishell is secretary.

The territory formerly belonged to the Bogan and the Silver King Extension Mining companies. The two blocks of ground being contiguous and practically owned by the same parties, it was decided some time ago to consolidate them. John H. Keetley will act as superintendent. Arrangements are being made for putting in hoist, pumps, air compressor, and other equipment. It is reported that the shaft on the old Bogan will be enlarged. It is now 600 ft. deep.

## TOOELE COUNTY.

(From Our Special Correspondent.)

**Consolidated Mercur.**—Experiments are being carried on to handle the slimes. As soon as satisfactory results are reached better means will be installed.

**Cyclone.**—This new property has shipped its first car of ore.

**Ophir Canyon.**—Work on the Clark electric power plant is said to be moving rapidly, as is the enlargement of the mill. When completed the output will be greatly increased.

## WASHINGTON.

## FERRY COUNTY.

(From Our Special Correspondent.)

**Ben Hur Gold Mining Company.**—This company and the Trade Dollar Gold Mining Company have made an agreement, under which the former, for 1 year, is to work its ground through the Trade Dollar shaft and south drifts on the 200 and 300-ft. levels. The Ben Hur Company will drive 19 ft. and deliver the ore broken on the Trade Dollar dump for that company's benefit. The Ben Hur gets the use of the Trade Dollar hoist, and will use it to explore the Ben Hur ground. The Ben Hur shaft is down 245 ft., with levels at 115 and 230 ft. The Ben Hur Company will install a steam hoist plant and other machinery over its own shaft, but while getting ready will explore and extract ore through the Trade Dollar workings. Work is beginning, with 8 men on two 10-hour shifts. A tramway and an ore bin will be put up over a spur of the Washington & Great Northern Railway.

**Big Iron.**—A diamond drill is at work.

**Black Tail.**—Stopping ore is confined to the intermediate level.

**Flag Hill Gold Mining Company.**—At a special trustees' meeting, held November 26, F. O. Birney resigned the vice-presidency and was elected secretary-treasurer, in place of J. A. Bangs, resigned. C. O. Barnes succeeds Mr. Birney as vice-president.

**Little Butte.**—Work is resumed.

**Lone Pine-Surprise.**—Another 100-ton lot of ore has been shipped to the Granby Smelter. Stopping continues on the upper level. The regular output is 20 tons a day.

**Minorca.**—The shaft is down 190 ft. at this claim on Fifteen-Mile Creek.

**North San Poil Gold Mining Company.**—At a special meeting of trustees on November 20, C. O. Barnes was elected secretary-treasurer to succeed J. A. Bangs, resigned.

**Orient Gold Mining and Milling Company.**—This company is applying for patent for the Crescent, Orient and Deadwood lodes.

**Quilp.**—During November 32 car-loads of ore were shipped to the smelter from the mine. The company has ordered the superintendent to ship 1,000 tons to the Tacoma Smelter on Puget Sound. Shipments continue over the Washington & Great Northern and Republic & Kettle Valley railways. The No. 5 level cross-cut is in 240 ft. The winze from the No. 3 to the No. 2 level has holed through.

**San Poil.**—The station on the lower tunnel is finished and the men are laid off to await arrival of the machinery, which is now due.

**Trade Dollar.**—Work is suspended. The company's trustees held a special meeting November 20, and elected C. O. Barnes secretary and treasurer in place of J. A. Bangs.

## WEST VIRGINIA.

## DODDRIDGE COUNTY.

**Inter-Railroad Company.**—This company, capitalized at \$360,000, has been organized in Connellsville, Pa. Officers elected are: President, P. R. P. Miller, of Scottsdale, Pa.; vice-president, W. F. Soisson, of Connellsville, Pa.; secretary and treasurer, E. L. Stoner, of Scottsdale, Pa. These officers, with A. P. Henderson, of McKeesport, Pa., and James Mack, make up the board of directors. The company owns a tract of 5,200 acres of coal land, and will soon start development work.

The land faces the main line of the Baltimore & Ohio Railroad for about a mile west of Clarksburg. Back of it is a tract of 20,000 acres of coal, which may eventually be mined through the outlet of the Inter-Railroad Company. Some of the stockholders in the company organized are also members of the company owning the 20,000-acre tract. The owners of the 20,000 acres back of the Inter-Railroad company's coal are Uniontown and New York City people. The coal is said to be 9 ft. thick, and while hard enough for steam purposes, also makes a good grade of coke.

## WISCONSIN.

## PORTAGE COUNTY.

**Wisconsin Valley Asbestos Mining Company.**—This company was recently incorporated, with a capital of \$400,000, for the purpose of developing deposits of asbestos on the outskirts of Stevens Point. It is probable that a mill will be erected shortly for the purpose of manufacturing the crude product into a commercial article. The asbestos is reported of superior quality. The company is also interested in a deposit of kaolin at Ceylon, Wis.

## FOREIGN MINING NEWS.

## AFRICA.

## RHODESIA.

It is stated in London that the Chartered Company has decided to expend £2,000,000 on railways in Rhodesia. Half of this will be expended immediately, and work on this section, it is expected, will be completed by the close of 1903. At the meeting of the Matabele Mines, Limited, the chairman stated that the line to the Wankie coal-field would be opened in April next.

## AUSTRALIA.

## QUEENSLAND.

A recent consular report states that a considerable amount of attention has lately been paid by mining investors to the North Queensland tin-fields. The Stannary Hill mines are being steadily developed. The shaft on the Ivanhoe Mine is down 300 feet, and the ore body is 24 by 18 feet wide. About 1,200 tons are in the ore bins, which will bulk nearly 20 per cent. This is the largest stack of rich ore that has been seen in one heap in North Queensland. The Kitchener shaft has been sunk to a depth of 250 ft., and the ore-body opened up, without encountering the walls, is 13 by 30 ft., bulking about 8 per cent. The site chosen on Walsh River for the Stannary battery and concentrating mill has been cleared. Its erection will be immediately commenced. The 20-stamp battery being erected will treat 400 tons weekly, which, with 10 per cent ore, should show very handsome profits. The Vulcan Mine, at Irvinebank, is still on good ore, and last month the crushing of 800 tons gave over 10 per cent of oxide. They are now down about 800 feet. About 5 miles from Coolgarra rich lodes are being developed.

## NEW SOUTH WALES.

**Broken Hill Proprietary Company.**—This company reports that the output of its refinery for the four weeks ending December 3 was 1,728 oz. gold, 482-

003 oz. silver, 5,762 tons lead and 33 tons hard (antimonial) lead.

## CANADA.

## BRITISH COLUMBIA—BOUNDARY DISTRICT.

**Boundary Ore Shipments.**—Shipments from Boundary mines for the week ending December 6 and for the year are given as follows:

	Week.	Year.
	tons.	tons.
Granby Mines .....	4725	277,600
Mother Lode .....	4096	127,948
Snowshoe .....	1310	16,788
B. C. ....	957	11,777
Sunset .....	225	10,315
Emma .....	710	7,668
Jewel .....	.....	2,175
Winnipeg .....	.....	785
Golden Crown .....	.....	625
No. 7. ....	.....	482
Providence .....	.....	65
Total .....	12,023	456,228

**Granby Consolidated.**—It is reported that an accident at the power house at Cascade resulted in damage that may deprive the Granby Smelter and the Phoenix mines of power for some weeks.

**Waterloo Consolidated Mining and Milling Company.**—The difficulties of this Spokane Company obtaining clear title to the Waterloo Mine, in Camp McKinney, are reported in a fair way towards settlement. The Waterloo claim was relocated last July by George Bennett and in October by R. Venner.

## BRITISH COLUMBIA—ROSSLAND DISTRICT.

**Rosslund Ore Shipments.**—Shipments from the Rosslund mines for the week ending December 6 and for the year to date are as follows, according to the Rosslund Miner:

	Week.	Year.
	tons.	tons.
Le Roi .....	3790	206,888
Le Roi No. 2. ....	.....	52,670
Centre Star .....	1800	32,851
War Eagle .....	1440	18,036
Rosslund G. W. ....	.....	2,400
Giant .....	50	2,950
Cascade .....	.....	30
Columbia-Kootenay .....	.....	30
Bonanza .....	.....	90
Velvet .....	.....	1,220
Splitzee .....	.....	20
White Bar .....	.....	5
Totals .....	6780	317,460
Total shipments for 1901.....	.....	279,133

**Le Roi.**—The output for November was about 15,000 tons, and the estimated profit for the month is \$75,000.

**Le Roi No. 2.**—Under the new management development continues steadily. No announcement has been made with regard to resuming shipments.

## BRITISH COLUMBIA—SLOCAN DISTRICT.

**Slocan Ore Shipments.**—The Slocan ore shipments are detailed as follows for the week ending December 6:

	Tons.
Payne .....	158
Ivanhoe .....	52
American Boy .....	63
Bosun .....	20
Slocan Boy .....	21
Slocan Star .....	84
Rambler .....	44
Red Fox .....	23
Hampton .....	9
Total for week .....	494
Year to date .....	25,864

## NOVA SCOTIA—GUYSBORO COUNTY.

(From Our Special Correspondent.)

A large consolidation of holdings, comprising some 200 acres, situated between the Blue Nose and Royal Oak mining companies' properties, has recently been transferred to the Nova Scotia and Mexican Mining Company.

**Blue Nose Company.**—This company returns 505 oz. of gold from 2,203 tons of rock milled.

**Richardson.**—The large cyaniding plant erected at this mine in Stormont District by John Stymson, of New York City, did not prove the success expected under his system of treating sands. Recently Chas. D. Maze, after a series of changes in the solutions used, has succeeded in obtaining satisfactory results from the refractory concentrates.

**Royal Oak Mining Company.**—This company in Goldenville District returns from its 10-stamp mill for October and November are 548.3 oz. of gold from 723½ tons of rock milled.

## NOVA SCOTIA—HALIFAX COUNTY.

(From Our Special Correspondent.)

**New Edgerton.**—This mine, after a year or more of inactivity, has started, and returns for November 275 oz. from 1,085 tons of rock.

## NOVA SCOTIA—RENFREW DISTRICT.

(From Our Special Correspondent.)

**Thompson.**—Sixty tons of ore from this mine in Renfrew District for November yielded 306 oz. This mine maintains its rich yield, giving handsome profits to its lucky and plucky owners, the Thompson Brothers, the expense of producing the last \$6,000 brick was but \$750.



**MINING STOCKS.**

(Complete quotations will be found on pages 836 and 837.)

**New York.** Dec. 17.

Another panic has been avoided in the stock market by the action of some bankers, who came forward with \$50,000,000 to relieve the money stringency. While this protection may benefit the pool operators, it is not thought that the small investor gains much. To pour money in Wall Street for the purpose of delaying what is sure to happen is only augmenting the inevitable disaster. This may be bearish talk, but it voices the sentiments of many people.

Liquidation in the copper list has been on the increase, and prices hover around low-water marks. Amalgamated changed hands at \$54@56½, and Anaconda at \$20.75@21.50, both stocks showing larger sales. On curb the coppers were more active. Tennessee advanced from \$16½ to \$18¼; Greene Consolidated of Mexico sells at \$25@25½; United, of Montana at \$28@28½; British Columbia at \$5¼@5½, and Montreal & Boston at \$2½@2¾.

Colorado stocks are quiet, and show little change in values. Elkton, of Cripple Creek, hangs around 30c., while Mollie Gibson, of Aspen, continues to sell at 6½c.

The Comstock stocks show some improvement. Consolidated California & Virginia sells at \$1.35, as does Ophir. Transactions are not large.

**Boston.** Dec. 16.

(From Our Special Correspondent.)

Copper shares, in common with the railroad and industrial shares, have suffered declines, and, as a rule, record recessions from a week ago. It can be stated on the highest authority that things are brewing in the copper world that will clear the whole atmosphere, and when consummated the whole share list will be benefited materially. There is a general feeling of satisfaction deep down, although it is not reflected in the stock market. Here things are drifting, and traders are making what little market there is.

Calumet & Hecla lost \$15 during the week to \$425, but recovered \$10 of it. A large part of the dealings in Calumet of late have been manipulated and for a purpose, of course. Tamarack has held around \$141@140, and Osceola at \$51@50. The Lake holders of Osceola will make a determined effort to cause a change in the management at the annual meeting next spring, unless things are remedied. Meetings are being held in that region, and stockholders are planning a campaign. Capt. Parnell has promised that the mine will be worked at its full capacity after February 1 next. He says that the property can produce 20,000,000 lbs. per year at a cost not to exceed 7½c. per lb., and that the floating debt of \$630,000 can be wiped out in 1903. Quincy has lost \$5 to \$100. Copper Range has taken a \$5.50 drop to \$51.75, but recovered to \$53.37½.

United States Mining people are happy over the condition of affairs. Three furnaces are now in operation, and the remaining two are expected to go into commission early next year. The three furnaces are handling over 500 tons ore per day. The stock has been active at from \$21.12½ to \$20.37½. Utah Consolidated continues buoyant, the price ranging from \$22.50 to \$23.87½. A \$1.50 dividend is expected the first of the year. The Lewisohns are the largest owners of Utah, having about 50,000 shares.

A surprise came in the announcement that the Mohawk Mine had lost its vein of mohawkite. The stock lost \$1 to \$37. An assessment of either \$1 or \$2 is close at hand. Adventure has fallen \$1.50 to \$12.50, which is several dollars below what has been paid in. The mill returns are said to show but 1 per cent mineral. Winona was favored with \$1 advance to \$4.25 on reports that the ore is running from 42 to 49 lbs. of mineral to the ton. Old Dominion is quiet at \$15@15.87½. This company will have to sell treasury stock or raise money in some other form to remedy the furnaces so as to make a proper saving from the ore. Two furnaces are now working on the stock pile, and on ore from the upper workings. The water in the mine, as a result of the cave-in is under control. Liquidation in Isle Royale caused the stock to fall \$1.50 to \$10. Mass mining is steady at \$13@13.50, Bingham at \$27@26.50, and Centennial at \$15.25@16. Trinity was offered down to \$8, recovering a fraction. United States Coal and Oil slid off to \$13.12½, but rallied on good buying to \$14. Dominion Iron and Steel has fluctuated from \$57.75 to \$52.50, closing at \$56.50. Trading in it has been largely professional.

**Colorado Springs.** Dec. 12.

(From Our Special Correspondent.)

The market has changed but little during the past week, except that things generally were a little more demoralized this week. Trading continues to be confined to the mines list almost exclusively, and even here the buying is being conducted upon the most conservative lines. This caution is indicative of the local apprehension felt regarding the speculative value

of the market, which, indeed, at this time is at low ebb.

As to the market itself. There was some brightness injected into the scene this week by the advance in C. K. & N. shares from 10½ to 12, the stock easing off for one sale at 11¼ to-day. This company declared an initial dividend last week, since which time the shares have been in good demand. The property is being worked under lease by Eastern parties, who are in a fair way to make a good fortune out of it. It is worthy of comment in this connection to state that this mine was the first new shipper to be added to the list in the Cripple Creek District in 1902. El Paso, its big neighbor, has proved somewhat of a disappointment this week, the shares dropping from 64½ to 60, recovering to 61½ to-day. Elkton, in keeping with El Paso, declined from 32 to 30. Isabella exhibited some activity selling at 32½, 32 and 31 this week.

**San Francisco.** Dec. 13.

(From Our Special Correspondent.)

Business in mining stocks continues active and prices show an improvement. In fact, there is more doing than at any time for months past.

Some quotations noted are: Caledonia, \$1.95; Ophir, \$1.45; Consolidated California & Virginia, \$1.30@1.45; Best & Belcher, 95c.; Silver Hill, 55c.; Overman, 50@55c.; Hale & Norcross, 25@30c.; Sierra Nevada, 42@46c.; Potosi, 23c.

The sworn statements of the companies, as filed in their offices on Monday of this week, show cash on hand as follows, with all expenses paid, unless otherwise noted: Andes, \$4, with indebtedness of \$1,601; Alpha Consolidated, \$632; Alta, \$15, with indebtedness of \$2,488; Belcher, \$3,148, with indebtedness of \$7,335, and November expenses partly unpaid; Best & Belcher, \$3,236, with bills payable of \$13,000; Bullion, \$833; Caledonia, \$157, with November expenses unpaid, and a balance of \$14,779 to be collected on pending assessment; Confidence, \$2,752, with November expenses unpaid; Consolidated California & Virginia, \$5,145, with 1 car-load of concentrates to be settled for, and \$15,000 due bank; Chollar, \$1,161; Crown Point, \$2,260, with November expenses unpaid; Consolidated Imperial, \$1,825; Challenge Consolidated, \$734; Gould & Curry, \$466, with bills receivable of \$10,000, and liabilities of \$12,137; Justice, \$126, with liabilities of \$6,094; Lady Washington, \$70, with indebtedness of \$975; Mexican, \$3,728; Ophir, \$4,495, with overdraft of \$715; Overman, \$7,813 and balance of \$1,190 to be collected on assessment, with November expenses unpaid; Potosi, \$1,768; Savage, \$2,805; Silver Hill, \$19,990, with bullion value at \$3,100 in transit; Sierra Nevada, \$3,622; Standard Consolidated, \$104,850, with November clean-up and mine expenses to be accounted for; Syndicate, \$2,193; Union Consolidated, \$6,897; Utah Consolidated, \$61, with \$1,500 due bank.

On the California Stock and Oil Exchange business was moderate, showing some decline from last week's activity. Peerless sold at \$11.25@11.50; Thirtysix, \$7.75@8; Four Oil, 60c.; Independence, 8c.

The monthly record of sales on this exchange since January 1, 1902, is as follows:

Month.	Shares.	Value.
January	187,584	\$81,633
February	288,562	76,447
March	214,293	109,364
April	442,231	239,988
May	213,483	185,594
June	110,435	54,140
July	53,165	35,832
August	69,193	57,207
September	50,856	40,802
October	61,525	32,659
November	72,698	65,863
Totals	1,764,025	\$979,469

There was a slight revival in November, but sales were still far below those of the earlier months of the year.

**London.** Dec. 3.

(From Our Special Correspondent.)

This week there has been rather more activity in the mining market, due to a more cheerful view being taken of the future of Rhodesia. Some of the officials of the British South Africa Company have recently returned from tours of inspection, and they talk optimistically of developments and prospects. I understand they are to issue an official report on the position of affairs generally. A good deal of new machinery is also being shipped to the mines. Consequently, the market in Rhodesian shares has worked up a little, and Transvaal shares have become more buoyant in sympathy. Other markets, however, continue very dull and depressed.

Some interest has been evoked in Indian shares by the issue of notice of a scheme to reconstruct the Coromandel Company. This company, when originally formed in 1892 as an offshoot of the Champion Reef, was in good ground, and had excellent prospects. The grade of ore in developments fell off considerably in 1897 after dividends amounting in all to 45 per cent of the capital had been paid. The shareholders then decided on continuing exploration work

and paid up a 25 per cent assessment on their shares. At first the results were not promising, but recently good ore-bodies have been struck. Acting on the advice of Mr. Thomas Richards, the manager at Nundyroog, it is now intended to open out these new bodies on a large scale, and it is proposed to raise an additional £50,000 working capital by a second assessment amounting to 37½ per cent. There is no doubt that this second reconstruction will be accepted, although the assessment is a stiff one. Shareholders remember the history of the Mysore Gold Mining Company, which was on the point of being given up as a bad job 18 years ago.

While writing of the Indian section I ought to mention the unfortunate state of the Kadur Mysore Mines Company, not because the subject is of any great interest in itself, but to prevent your readers from connecting it and its collapse with the Mysore group managed by Messrs. John Taylor & Sons. The Kadur Mysore is a mine in Mysore territory, but its management is in the hands of an entirely different group. It was formed in 1888, and was reconstructed in 1901. During all this time no actual results were ever obtained, though money was spent in developments and erecting plant. This year the shareholders' patience was exhausted, and they determined to have the property examined independently. They naturally asked John Taylor & Sons to send some one to see the property, as their engineers on the spot are most likely to be able to form a correct judgment of the situation. The report of this firm has not yet been issued, but I expect it to be a very unfavorable one, as I hear that other engineers have stated that there is nothing payable, in fact, there is hardly anything at all in the nature of an auriferous deposit. I am afraid therefore that the shareholders will receive an unpleasant eye-opener.

The report of the Cassel Gold Extracting Company, owner of the MacArthur-Forrest Cyanide patent for the year ended September 30, shows that this company is now earning a good profit from the cyanide it manufactures. It will be remembered that in 1898 the capital of the company was reduced to one-quarter of the original, owing to shrinkage in value of the cyanide patents and the upsetting of the patents in various countries. The income from royalties is now small, and will practically cease during the present year. The company owns shares in other companies of various values, but the average return from these will probably not be great. A few years ago the company turned its attention to the manufacture of cyanide of sodium, and is now turning out a large amount. I understand the process employed is that in which the ammoniacal products of coke making or blast furnace gases are treated with carbon and metallic sodium, but as the company does not disclose its business my statement must not be taken as official. The company made a net divisible profit during the year of over £30,000, which permitted the payment of a dividend of 30 per cent and the placing of £10,000 to the reserve fund besides carrying over £4,000 to next year. These figures show that the company is still one of considerable importance in spite of the upsetting of the MacArthur Forrest patents.

**COAL TRADE REVIEW**

New York, Dec. 18.

**ANTHRACITE.**

The demand for anthracite is still urgent and comes from practically all consuming territories, though if anything consumers at points beyond Cape Cod, owing to storms interrupting coastwise traffic and increasing freight rates, are worse off than those nearer New York, where coal is more readily secured, or those at interior points who can fall back on soft coal. A heavy rain on December 16 threatened to make lots of trouble at the mines and at points along the railroads to tidewater. Fortunately, clear and colder weather brought relief. One of the mines of Coxe Brothers & Co., so far as learned, is the only one to shut down on account of floods, and the interruptions to traffic are limited to flooded switches and tracks about some mines.

The various anthracite roads are doing their best to get coal forward, and the tonnage now coming from the mines is greater than normal. Yellow journals at New York and other cities in the East have been making a great outcry about the shortage of coal, accusing the "Coal Trust" of holding coal back in order to take advantage of higher prices. As a matter of fact, the trouble at New York Harbor points now is not so much one of railroad transportation as inability of dealers to secure berths for loaded barges, a lack of barges, and a lack of men to unload coal and scarcity of carts to distribute it. It is stated by sales agents that the stories of suffering among the poor at New York City are exaggerated. The people who want coal most at present are large consumers, who are unable to lay in winter supplies. Thus one consumer applied directly to the president of a large anthracite railroad for a supply,

and the local sales agent was directed to furnish the coal. Investigation showed that the consumer wanted over 50 tons, while the sales agent was unable to supply over 5 tons. People who want 10 to 50 tons promptly, simply cannot get the coal. Although the tonnage coming forward is ample for immediate needs, it is not sufficient for every consumer to lay in winter supplies; in fact, coal will undoubtedly be in short supply through January.

At the head of the lakes there is but little coal in dock, not enough to last much after Christmas. At Chicago likewise there is a great shortage from supplies ordinarily on dock now. Along the lower lakes and in Canadian territory soft coal is burned in larger proportion than in many years.

At points beyond Cape Cod consumers are in a bad way, and retail prices at Boston have been advanced to \$12. Large arrivals are relieving the situation. At New York the regular retail price for prepared sizes is now \$7.50, while coal produced by independent operators is selling as high as \$11.

#### BITUMINOUS.

The Atlantic seaboard soft coal trade for several days has been in a nervous, excited state. Speculative prices advanced from \$5.25, f. o. b. New York Harbor shipping port, on Monday, to \$7.25 on Tuesday. This advance was brought about by cold weather increasing demand somewhat, and by the very poor car supply furnished producers by the railroads. Some speculators contend that prices will go still higher. This week a number of Eastern consumers who ordinarily place orders with Eastern agents have come to producers' headquarters in New York, and where the visit failed to get coal for shipment have gone into the open market and bought. The bad weather has affected coastwise traffic. A large number of vessels have been reported lost, and captains do not like to risk a trip around Cape Cod, but seek Long Island Sound charters. In cases where captains are willing to go around the Cape exorbitant freight rates are asked. The high New York Harbor price and the high ocean freight have raised the price of coal to some Eastern consumers so much that they are considering closing manufacturing plants, in fact, plants are reported closing already. Consumers who must pay a \$1 rail freight in addition to the ocean freight now find coal costing \$12 per ton which, under normal conditions, would cost them about \$4.25. At the same time the high prices are likely to lead to further importations of English coal, and already vessels which have been taking South and Central American business are after coal charters to New England ports. So far as car supply is concerned the situation is still in the hands of the railroads, and again sinister reports are heard of discriminations in favor of certain producers and of rather disreputable influences which secure this discrimination.

In the Far East men in the trade are inclined to be anxious. During the week heavy winds have held a large fleet at various ports to the westward of Cape Cod. These stormbound vessels are now arriving at discharging ports. Along Long Island Sound a lot of coal has been held back by tows being stormbound, but a few days of fair weather have relieved the situation. New York Harbor consumers have received better supplies than those in any other territory, but demand is still very strong. The all-rail trade is still short of coal, and is offering very attractive mine prices to secure it.

Transportation from the mines to tidewater is fairly good, coal running through in a week. Car supply at the mines is very poor, indeed, being but 25@30 per cent of the total demand. In the coastwise vessel market vessels are scarce. Freight rates are high, and are made according to individual necessities. We quote about what are current rates from Philadelphia as follows: Providence and Long Island, \$1.50; Boston and ports around Cape Cod, \$2.25@ \$2.50. From New York Harbor vessel rates are: Boston and around Cape Cod, \$2.50@ \$3; Long Island Sound and Providence, \$1.50@ \$1.60, with barge rates, \$1.40@ \$1.45, discharged, to New Haven, and 45c. to New York Harbor points.

Birmingham. Dec. 15.

(From Our Special Correspondent.)

There is a demand for every ton of coal being mined in Alabama, and more, too. The production is quite heavy, but not enough to meet all requirements. The railroad car shortage still interferes with the business. All the old mines in the State are producing much while the new mines are beginning to get out coal in great shape. The contracts for the hire of convicts during the next three years have all been settled. The Tennessee Coal, Iron and Railroad Company and the Sloss-Sheffield Steel and Iron Company will continue to work this labor, though paying more therefor than at present. The new contracts made are for coal mining at so much per ton, while the present contract is for the labor of the convicts at so much per man a month.

New coal companies are being formed in Alabama. During the past week two large corporations were

set on foot. The Bessemer Coal, Coke and Railroad Company, capital stock \$500,000, was incorporated, the object being to mine coal and ore and manufacture coke and by-products. The Mississippi River Cannel Coal Company, capital stock \$150,000, was also incorporated. The first named company will mine coal in the neighborhood of Bessemer, Jefferson County, while the latter has already started to open mines at Oakman, in Walker County. The latter company will make an effort to get into the Mississippi River trade.

Coal is holding up well as to price. The indications are that there will be no let up in the production during the coming year.

At the miners' convention last week W. R. Fairley was re-elected Alabama member of the National Executive Committee of the United Mine Workers of America, and Ed. Flynn president of the Alabama organization. J. L. Clemo was chosen secretary-treasurer again. A differential was fixed for coal mining by machinery at 7c. per ton. Some companies are to mine coal by machinery so as to increase the output.

Chicago. Dec. 15.

(From Our Special Correspondent.)

Under the brisk demand created by cold weather, wholesale coal dealers are doing a heavy business. The cold wave of a week ago has been followed by continued freezing weather, and has made the demand for coal from both city and country extraordinarily large. Immediately after the cold wave the business of leading dealers increased 100 to 200 per cent, and everybody in the trade has since been crowded with orders.

Anthracite shipments by lake have been scanty, and with the closing of navigation now settled, shut out the possibility of Chicago's getting anything like an adequate supply for the winter. In consequence prices of bituminous coal have advanced generally, and will probably advance continually for a month at least. Hocking is now \$5 for country, as against \$4.50 for two weeks ago, and \$5.50 for the city. Youghiogheny is \$5, and block \$4; smokeless (which have had a heavy sale as substitutes for anthracite), \$6, New River and Pocahontas. There is very little smokeless in market. The bulk of sales continues to be Indiana and Illinois at \$3.50, as a general average price (an advance of about 50c.). Smelting coal continues to be extraordinarily scarce, and easily brings \$6.

About 50,000 tons of anthracite have so far been brought to the city by lake. Rail shipments are 10 to 20 per cent of normal receipts. No improvement in the rail situation is noted or seems likely to occur before next spring; transportation lines are tied up everywhere, and Chicago's hope must be in bituminous coal for the winter.

Cleveland. Dec. 16.

(From Our Special Correspondent.)

The lake coal market for the present year is over. The fight to supply the consumers in the Northwest with what material they will need was a valiant one, but it did not accomplish all that was hoped for it. The last end of the year was attended by severe storms. The last spurt of shipment, despite the unfavorable conditions, was quite heavy and effective.

The domestic supply has increased with the retirement of the equipment that was used in carrying on the lake trade. The normal supply of coal at Cleveland has been so nearly restored that normal winter prices of \$7 a ton for anthracite on the retail market has been quoted, and the conditions are generally favorable to the supply of all of the imperative needs. Bituminous coal, however, does not seek its former level yet, because the retail price is still very high, being \$5 a ton, which is greater than that coal has ever known. With this seemingly indication of a shortage of coal, however, there is a sufficient supply now to warrant some of the larger shippers in placing cargoes of coal in boats to hold during the winter and deliver in the spring, which would hardly be done in the event of such a shortage as would naturally boost the prices so abnormally.

Pittsburg. Dec. 16.

(From Our Special Correspondent.)

Coal.—High prices for prompt shipment continue, and there are but slight indications of a decline this winter. The demand is heavy and the deliveries are unsatisfactory. The railroad mines are not being operated steadily, owing to the continued scarcity of cars. Another rise in the rivers resulted in large shipments to the Southern markets on Sunday and yesterday. It is estimated that fully 7,000,000 bush. of coal were sent out. Additional shipments are being made to-day, and before the end of the week it is probable that the amount will reach 10,000,000 bush. There are still about 15,000,000 bush. loaded in the pools and harbor, and all the mines with river tipples are running full. Many of the idle miners from the railroad pits have gone to the river mines. The Youghiogheny & Ohio Coal Company is preparing to engage extensively in the lake coal trade next season, and will take the entire product of the Pitts-

burg Terminal Railroad & Coal Company, which is opening 12,000 acres of valuable territory in this district. Three mines have just been opened, and five others will be opened before spring. The suit to prohibit the Pittsburg Coal Company and the Erie Railroad from interfering with the Youghiogheny Company in the use of the docks at Cleveland has been decided in favor of the Youghiogheny Company, and it will be a strong competitor of the Pittsburg Company next season for the Northwestern trade.

Connellsville Coke.—Coke shipments continue to be unsatisfactory on account of inadequate transportation facilities and fancy prices prevail. Furnace coke at the ovens brings from \$5 to \$7, and foundry coke has sold during the week at \$8. The railroads are not able to handle all the coke that is offered and the prospects are that the scarcity will continue for several months. The Courier, in its last weekly report, gives the tonnage produced during the week at 230,250 tons, an increase of nearly 20,000 tons. The shipments for the week aggregated 9,901 cars, distributed as follows: To Pittsburg and river tipples, 3,476 cars; to points west of Pittsburg, 4,797 cars; to points east of Connellsville, 1,623 cars. This was a decrease of 650 cars, compared with the shipments of the previous week.

Foreign Coal Trade. Dec. 17.

Export trade here continues quiet, with nothing new to report. Arrivals of foreign coal in New York have been light, and this business is now practically at an end.

Imports of coal and coke into Germany for the 10 months ending October 31 are reported as follows, in metric tons:

	1901.	1902.	Changes.
Coal .....	5,258,899	5,318,733	I. 59,834
Brown coal (lignite) .....	6,792,742	6,579,356	D. 213,386
Coke .....	331,984	305,455	D. 26,529
Totals .....	12,383,625	12,203,544	D. 180,081

More than four-fifths of the coal imported came from Great Britain. The brown coal all came from Austria, chiefly from the Bohemian mines. The larger part of the coke came from Belgium. The only imports from the United States were 4,861 tons of coal this year.

Exports of coal and coke from Germany for the 10 months ending October 31 are reported as below, in metric tons:

	1901.	1902.	Changes.
Coal .....	12,554,712	13,010,420	I. 455,708
Brown coal (lignite) .....	18,444	17,298	D. 1,146
Coke .....	1,768,151	1,720,847	D. 47,304
Totals .....	14,341,307	14,748,565	I. 407,258

The heaviest exports of coal were to Austria, Holland and Belgium; those of coke were to France and Austria. The exports to the United States were 13,138 tons of coke.

The production of coal in Germany for the 10 months ending October 31 is reported as follows, in metric tons:

	1901.	1902.	Changes.
Coal mined .....	90,011,847	88,653,845	D. 1,358,002
Brown coal (lignite) .....	36,506,897	34,959,543	D. 1,607,354
Coke made .....	7,999,383	7,474,648	D. 224,735
Briquettes made .....	7,709,045	7,534,516	D. 174,529

The briquettes made are chiefly from brown coal. The decrease in production was principally due to the lower demand for steam coal and fuel for manufacturing.

#### IRON TRADE REVIEW.

New York, Dec. 17.

New business is light as the close of the year approaches. The main question now is how far behind furnaces and mills will be on their contracts at the opening of the year. Undoubtedly there will be shortages on deliveries to a large extent all around.

The demand for iron and slowness in deliveries has revived interest in the import trade. Increased purchases are reported abroad, and it seems likely that a good deal of pig iron will come over, and that this branch of foreign trade will be active for some time.

Transportation difficulties still continue to affect production. Short supplies of coke are the subject of general complaint through Pennsylvania and Ohio.

Exports of pig iron from Germany for the 10 months ending October 31 were 270,108 tons, against 113,119 tons for the corresponding period in 1901; an increase of 156,989 tons, which was chiefly due to shipments to the United States. Exports of iron manufactures and steel were 2,420,751 tons, against 1,726,356 tons last year, showing an increase of 694,395 tons.

Birmingham. Dec. 15.

(From Our Special Correspondent.)

The furnaces in operation are all doing well. Williamson furnace, which had an accident two weeks ago, has been fired up again, and before the end of the week will be making iron. Mr. Rube Edwards, brother of the late superintendent and general man-

ager, who lost his life in the accident, is in charge of the furnace. There are two or three furnaces almost ready for the torch, and will probably be started up immediately after the holidays, one belonging to the Woodstock Iron Company, at Anniston, one belonging to the Tennessee Coal, Iron and Railroad Company in this city, and one belonging to the Alabama Consolidated Coal and Iron Company at Gadsden. The supply of coke is yet short. There are over 1,700 coke ovens now under construction in the State, as follows: 100 at Empire, 250 at Virginia City, 250 at Flat Top, 100 at Warner, 200 at New Castle, 100 at Trussville, 100 at Connelville, 70 at Mary Lee, 300 at Tuscaloosa, 300 at Valley Head and 70 at Thomas. Six hundred more are in contemplation, to be constructed during the coming 12 months. With all these in blast the coke ovens now in this State will come near supplying the demands of the furnaces and other industries.

During the past week quarterly reports were made of business done by the Sloss-Sheffield Steel and Iron Company and the Alabama Consolidated Coal and Iron Company. In both instances the reports were excellent, and showed great production and fine earnings. The Sloss-Sheffield Steel and Iron Company announces that had there not been such a car shortage with the railroads, the earnings for the past quarter would have shown up better by about \$30,000.

The production during the month of December promises to be large. The Sloss-Sheffield Steel and Iron Company anticipates a production from its seven furnaces of no less than 36,000 tons of iron. A letter has been sent out by this company to its customers announcing that if the railroad car shortage abates some it is the intention to clear all contracts on hand to January 1.

As to quotations there is no change. Iron is selling slowly for delivery after July 1, 1903. The consumers believe that there will be a general reduction in prices, but furnaces do not look at it in that manner. What little iron has been sold for delivery after July 1 has not sold under \$19.50 for No. 3 foundry. The following quotations prevail: No. 1 foundry, \$21@22; No. 2 foundry, \$20@21; No. 3 foundry, \$18.50@19.50; No. 4 foundry, \$17@18; gray forge, \$16.50@17; No. 1 soft, \$21@22; No. 2 soft, \$20@21.

Chicago Dec. 15.

(From Our Special Correspondent.)

Dullness continues to characterize the pig iron industry. Few sales and small are the order of the day. Everybody is waiting for the beginning of 1903, according to present indications. Nearly all sales are of Southern. Northern being almost exhausted up to July 1, 1903. The high price of Southern does not weaken noticeably for the second quarter of 1903, for which to-day's quotations are \$19, Birmingham, for No. 2, with No. 1 from 50c. to \$1 higher, and No. 3 about 50c. lower. These prices mean \$23.15 for No. 2 in Chicago and other grades of Southern, higher by the same freight rate, Birmingham to Chicago, \$4.15. Southern must drop, according to leading agents here, but will probably remain up to its present stiff figure until after the first of the year.

There is some Northern to be had in spot lots, for which the price is \$26@28 for both Southern and Northern, "spot" meaning 30 days in most cases, but sometimes extending to 60 days. Nominal quotations of Northern, for delivery in the second quarter of next year, are: \$23.50@24 for No. 1; \$23@23.50 for No. 2; \$22.50@23 for No. 3. Of course, there is some sale at these prices, but the lots are small. The trouble is with production as well as with prices, apparently. The buyers unquestionably are holding off, though feeling that prices must come down and running as closely to the wind as possible.

Coke is somewhat easier, being quoted to-day at \$10@10.50. A few large sales are possibly being made as low as \$9.50. The trouble here is one of production plus transportation. Buyers are eager to get all they can at these comparatively low figures.

Cleveland Dec. 16.

(From Our Special Correspondent.)

**Iron Ore.**—The last cargo was shipped from Lake Michigan to-day, and the movement of perhaps 28,000,000 tons of ore in this one season has been accomplished. The conditions make it impossible that all of this material should have been used in this territory, and an investigation brings to light the fact that the material has been shipped into the Eastern fields, which have either been self-sustaining or have drawn their supplies from Cuba or Nova Scotia heretofore. It is estimated that the movement East has amounted to 2,000,000 tons. This will give the shippers a leverage upon the Eastern fields next year, which will be advantageous in a high degree to the lake interests. The talk now is of advanced prices for next year, but nothing definite has been done, nor will be for a couple of months.

**Pig Iron.**—The buying of foundry for immediate shipment; some for first half delivery and a little for third quarter delivery has been the feature of the market this week. The present buying discovers a

larger present need than has been imagined, while the buying for the first half of 1903 brings to light possibilities of that market which have of late been veiled while third-quarter delivery has not been as promising as in some of the circumjacent districts. There has not been nor is there now any sign of weakness in the trade. Foundry is selling at \$23 for first half delivery for No. 2, Valley furnace, with the same grade bringing \$21 for second half delivery. Southern iron is worth \$20, Birmingham. Bessemer producers are a little timid, so far making no sales for second-quarter delivery, and naming no price, in which stand they are joined by the basic furnaces in the association. Non-association furnaces are quoting \$23 for first half and \$21 for second half on bessemer and \$21 for basic for first-half delivery.

**Finished Material.**—The mid-winter dullness seems to have settled upon the sheet trade, and there are gloomy forebodings lest it does not revive. The market is weak because the trade is light and the production heavy. Prices of sheets have not declined, and are 3.10@3.20c. for No. 27 out of stock, with the same gauge bringing 2.85@2.95c. at the mill. The bar market likewise is weak temporarily, with the situation a toss-up whether it will recover. There is a large demand apparent after January 1, which will include the material needed by the agricultural concerns. This ought to afford enough business for all concerned, provided the bar capacity, especially in the iron product, is not in excess of possible requirements for a year or so. Bar iron is shading down toward last year's prices with the general quotation now at 1.70c., Pittsburg, for the product. The smaller plate mills are finding it somewhat difficult to get orders, but have not thought it necessary to shade prices from 2c. at the mills. The jobbers have no more for sale for this year's delivery, but the material which they have for delivery during the first quarter of next year is sold at 2.25c. for sheared and 2.50c. for universal mill plates. The larger mills are not taking orders now, largely because the business for the coming year is dull just at present and very largely because they have no material for sale. Structural makers of small dimensions find some difficulty in getting orders now for immediate shipment, this being the dull season, and have reduced prices from 2@2.50c. to 1.75c. for the better orders, but without increasing the volume of the business greatly. The demand for bessemer billets might be a great deal better, while if there were a better demand for open-hearth the supply could fall short of the requirements. The price holds at about \$30, Pittsburg, with, however, very little being done in bessemer.

**Old Material.**—The market has been weak, with prices on the down grade, and with very little being done outside of mill scrap.

Philadelphia Dec. 17.

(From Our Special Correspondent.)

**Pig Iron.**—The news this week from the Pennsylvania furnaces does not show that much headway is being made in the keeping of contracts by the prompter delivery of iron. The reports do not show any particular increase in capacity. Consignees are still annoyed by irregular and delayed deliveries. As to market conditions there appears to be scarcely any change. Some parties who bought Southern iron some time ago are beginning to get it. Car service in that section is a little better. There is no demand this week among the small consumers, although makers know where to put any iron or any capacity they have to spare when they want to. Certain large consumers have standing orders, as it were, on file, and they will take iron any time it can be had. Some people talk of a declining tendency in iron, but it does not show itself in quotations. Importers are still in the way of doing business, and think that after the holidays there will be another rush of orders. Scotch iron is quoted from \$23 to \$24, and English iron about \$22. Gray forge is nominally \$21, though the best grades are not quoted at any price. No. 2 foundry would sell quicker than No. 1, but no maker is offering anything, and is holding nominally at \$24.

**Billets.**—American makers have been unable to give contemplating buyers any satisfaction as to when billets can be had. Prospective buyers here while willing to place orders are expecting quotations nearer \$30 than what they now are.

**Merchant Iron.**—Heavy deliveries are now being hurried forward, to car-builders for all the iron contracted for. Common iron is now being inquired for, but not with a view of immediate closing.

**Sheets.**—Stocks of sheets are light, and manufacturers say they can see no reason for the anticipated concessions which buyers are talking about, until they catch up. Mills have all they can do. Prices are firm.

**Pipes and Tubes.**—There appears to be no falling off in activities at the mills, and all capacity is well sold up.

**Merchant Steel.**—Hardware manufacturers and other branches that use up large quantities of merchant steel are not buying to any extent this month.

**Plates.**—Plate iron is strong, and orders are hard to be placed, and worrying conditions still annoy mill people. There are signs enough of big business next year, and this serves to keep quotations close to the top notch. Quotations are: Universals, 2.10c.; flange, 2.20c.; ¼-in., 2c.; fire box, 2.25c., and marine, 2.30c. to 2.40c.

**Structural Material.**—Builders and others are suffering more or less from delayed and postponed deliveries. The quotations given on a few inquiries this week were above the usual.

**Old Rails.**—Old iron rails are quoted at \$25; old steel, \$21.

**Scrap.**—There is nothing new in scrap at this time, but holders are wanting the outside cent for everything they are able to deliver. Choice railroad scrap is to be had at \$23; low phosphorus scrap is asked for at \$26.50, offered; cast borings sell as fast as produced at \$10; wrought turnings are wanted at \$16. Country scrap is quoted at \$20.50.

Pittsburg Dec. 16.

(From Our Special Correspondent.)

While the iron and steel market is quiet prices are decidedly firm in nearly every line, and there are no indications of a decline from the high basis established by the heavy demand. Buyers who are holding off for lower prices will be disappointed and delay in placing orders early may prevent many from securing material at present quotations. A few sales of bessemer pig iron were made during the week at better prices than have ruled lately. Furnaces continue to operate irregularly on account of a shortage of coke, and at the close of the year will be fully two months short in deliveries. The United States Steel Corporation is ready at any time to place a big order with the merchant furnaces for bessemer iron, but the terms offered are extremely low, considering the prices at which contracts have been made for delivery throughout the first half. The corporation agrees to furnish coke at \$3 a ton in consideration of the low price at which it expects to secure the iron needed. The outside iron bought for the first quarter cannot be delivered, it is reported, before May 1, and probably later. The sale of 15,000 tons of bessemer pig iron at \$21.25, Valley furnace, noted in last week's issue, practically fixes the minimum price for the first half. Sales for the second quarter have been made at \$21, but the market is becoming stronger, and it is doubtful if this price can be duplicated. Both forge and foundry iron are extremely quiet.

There is a scarcity of steel billets, and prices are higher. A recent sale of open-hearth billets at \$28, it has developed was a forced one, and did not represent the market price. This was shown by a large sale last week at \$31, Pittsburg, for first half delivery. A similar order for prompt shipment could not be done this week within \$2 of that figure. The structural mills are crowded with business, and will have all they can do until July 1, with orders now on the books. New business for early delivery is being rejected, and premiums offered this week are higher than ever before. Some orders are being placed abroad. The rail mills are allowing some orders for rails to go to foreign makers, and this is taken as an indication that a heavy demand for billets and sheet bars is expected. The demand for rails next year will probably exceed 3,000,000 tons. All of this business could be taken care of by American mills, but most of them are run part of the time on billets and sheet bars. The entire rail capacity of the mills in this country is estimated to be fully 4,500,000 tons.

The annual inspection tour of the United States Steel Corporation officials began in Pittsburg, and ended in Lorain, O. The party did not cover the territory embraced in the trip last year. The sites where improvements and enlargements are contemplated and in progress were visited. The party first went to Donora and looked at the plant of the Union Steel Company. This gave rise to a report that the big corporation was considering the advisability of taking over this property, but the report was promptly denied. No official information was given out as to the probable result of the trip.

**Pig Iron.**—A few small sales of bessemer pig iron were made at prices ranging from \$21.25 to \$22, Valley furnace. Gray forge is quoted at \$20.75@21, Pittsburg, and foundry No. 2 at \$22.50@23. There were no transactions this week in these grades.

**Steel.**—The steel market has stiffened considerably, owing to the scarcity of billets. Bessemer billets are quoted at \$30, and open-hearth at \$31, delivered at Pittsburg. Plates for immediate delivery could command a premium of \$8 a ton, and for shipment early in the year buyers would willingly pay an advance of \$5 a ton over the base price of 1.60c. About 12,000 tons were sold during the week for delivery next year. Steel bars are quiet, and deliveries can be guaranteed in two to three months. The price remains at 1.60c.

**Sheets.**—The market is more active than for several weeks past, and prices are firm. But little future business is being accepted at present rates. Independent mills are not quoting prices for next year.

The American Sheet Steel Company still quotes black sheets, No. 28 gauge, at 2.75c., and galvanized sheets at 75, 10 and 2½ per cent off.

**Ferro-manganese.**—The market is decidedly quiet. The foreign product is quoted at \$50@52.

**New York.** Dec. 18.

**Pig Iron.**—The market is quiet, due to approaching holidays and stock taking. We quote for 1903 delivery, Northern irons at tidewater: No. 1X foundry, \$23.75@24.25; No. 2X, \$22.75@23.25; No. 2 plain, \$21.75@22.25. For Southern iron on dock, New York, No. 1 foundry, \$24.75; No. 2, \$24.25; No. 3, \$23.75. Middleboro No. 3 pig is quoted at \$18.50, in large lots, but for small lots and spot delivery, \$20 is obtained.

**Bar Iron and Steel.**—No change in the market is reported. We quote for large lots on dock: Refined bars, 2@2.05c.; common, 1.90@1.95c.; soft steel bars, 2@2.10c.

**Plates.**—Demand is active. We quote for tide-water delivery in car-loads: Tank, ¼-in. and heavier, 2.05@2.20c.; flange, 2.15@2.25c.; marine, 2.25@2.50c.; universal, 2@2.20c.

**Structural Material.**—Buying continues good. We quote for large lots at tidewater: Beams, angles, channels and tees, 2@2.20c. For small lots and prompt delivery good premiums are paid.

**Steel Rails.**—Standard sections are still quoted at \$28, f. o. b. mills for 1903 delivery; light rails, \$30@36, according to weight. Relaying rails are \$28@30 for heavy sections and \$33@35 for light sections.

**CHEMICALS AND MINERALS.**

(See also wholesale price-list on page 838.)

New York, Dec. 17.

Little new contracting for next year's delivery is noted, while prompt business is seasonably quiet. Prices, with few exceptions, are unchanged.

President Hazard, of the Solvay Process Company, of Syracuse, N. Y., is at the head of a new \$2,000,000 company formed to manufacture coke and the by-products of gas coal. The Solvay Company already has extensive by-product coke ovens at Syracuse, N. Y.; Detroit, Mich., and Selma, Ala.

The Niagara Electro-Chemical Company, of Niagara Falls, N. Y., the electrolytical works of the Roessler & Hasslacher Chemical Company, is enlarging its plant.

Reports received from the Pacific Coast announce a combination among California asphalt manufacturers for the purpose of maintaining prices. All the Los Angeles manufacturers and the Mercantile and National, of San Francisco, are in the agreement. The new price for asphalt in San Francisco is \$13 a ton for D grade, which is considerably higher than some concerns had been selling at. Shipments to the East will not be affected by this agreement, as several refineries have contracts still to be filled at old prices. Besides, in the Eastern market competition is keen with Trinidad and other foreign asphalts.

**Heavy Chemicals.**—Alkali and caustic soda are finding more buyers who ask early shipments at present prices. Bleaching powder is easier.

We quote domestic chemicals, per 100 lbs., f. o. b. works, as follows: High test alkali, in bags, 82½@85c., for prompt shipment, and 77½@82½c., for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.65@1.70 for futures; bicarb. soda, ordinary, \$1.25, and extra, \$3; sal soda, 55@60c.; chlorate of potash, \$7.37½@7.52½ for immediate shipment, and \$7@7.12½ for contracts; bleaching powder, next year's delivery, \$1.25. For foreign goods, we quote per 100 lbs. in New York: Alkali, high-test, 90@92½c.; caustic soda, high-test, \$2.25; sal soda, 67½c.; bicarb. soda, \$1.50@1.60; chlorate of potash, \$7.50@8 for prompt, and \$7@7.25 for forward; bleaching powder, prompt, prime brands, Liverpool, \$1.75, and contracts, \$1.25; Continental, \$1.50@1.62½.

**Acids.**—Further 1903 contracts are reported on basis of current quotations. Blue vitriol, owing to recent heavy imports from Great Britain, is weaker.

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	\$4@4.25	Oxalic com'l	\$5.25@5.50
Muriatic, 18°	1.50	Sulphuric, 50°	
Muriatic, 20°	1.62½	bulk, ton	13.50@15.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.00	Sulphuric, 60°	
Nitric, 38°	4.25	bulk	18.00@20.00
Nitric, 40°	4.50	Sulphuric, 66°	1.20
Nitric, 42°	4.87½	bulk	21.00@23.00

**Brimstone.**—Sales from incoming steamers are being made at \$23.25@23.50 for best unmixed seconds, and for future shipment at \$22.50@22.75. Best thirds are nominally \$1.75 less than seconds.

Concerning the Sicilian brimstone market, Messrs. Emil Fog & Sons write us under date of November

30 as follows: Scarcity of steamers during November caused a depressing influence on exports, which remained rather under the average, whereas stocks keep on increasing. The total stock of brimstone ned October amounted to 339,000 tons, against 288,000 tons last year. Prices for seconds have declined slightly, say, about 6d. Thirds, however, not only maintained their value, but advanced further. The lower grades of current and good thirds are in great demand, and almost wanting. In former years refineries neglected these grades, burning best thirds only, but this has lately changed altogether, and they are now buying these inferior qualities in preference, owing to the low price. In Sicily, where formerly no refineries were in existence, quite a number of them have been established, and more are still building. Their production is hardly sufficient to meet the increased demand of the pulp manufacturers, who, in view of the actually small difference in price, prefer to consume refined brimstone, owing to its pureness, whereby loss in weight is avoided, instead of raw brimstone, which being melted at the mines by primitive and obsolete methods, is never entirely free from impurity. We quote per ton: Best unmixed seconds in bulk, 82s. 3d.; best thirds, 77s. 9d.; current thirds, 75s. 9d.; refined block sulphur, 86s. 9d.; refined roll sulphur in 3-cwt. casks, 97s. 6d.; sublimed flowers, pure, in bags, 101s. 9d.; sublimed flowers, current, in bags, 93s. 6d. Freight to New York, 8s. 6d.; Portland, 8s. 9d.; Baltimore, 9s.; Philadelphia, 10s.; San Francisco, 50 min., 25s.

**Pyrites.**—Importers report a good business at unchanged prices, as deliveries are mostly on extension contracts. A cargo of 2,910 tons iron pyrites has arrived at New York from Spain. Current freight rates are 10s. (\$2.40), this month's sailing from Huelva, Spain. Domestic pyrites are also in good request at firm prices.

Quotations for pyrites 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, 13@13½c. per unit, New York and other Atlantic ports, Spanish pyrites contain from 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

**Nitrate of Soda.**—The market continues firm at \$2.25 per 100 lbs. for spot, \$2 for January to March arrival, and \$1.85 for December. The European market shows deliveries in November of 40,330 long tons, which is the smallest quantity this year. The visible supply on December 1, including stocks and cargoes afloat, was 576,160 tons, which is much larger than any previous month since March, when 581,500 tons were reported. Shipments from Chile for December are cabled as 2,800,000 qtls. for Europe, and 140,000 qtls. for the United States.

**Sulphate of Ammonia.**—Early arrivals of gas liquor are quoted at \$3.02½ per 100 lbs., while January cargoes offer at \$3; but buying is small, as prices are too high to suit stocking up. Spot goods are nominal at \$3.05, the business being of a retail character.

**Phosphates.**—While shipments continue large, new orders for rock are limited, but miners are not worried, as their books are covered with good-sized spring shipments at fair prices. Florida high-grade rock shipments in the 10 months ending October 31 are reported by Messrs. Auchincloss Brothers at 419,720 long tons, showing an increase of 45,389 tons, as compared with 1901, and 116,362 tons over 1900. In fact, the shipments in 1902 are the largest on record. Land pebble business is exceptionally good, and some large sized orders for 1903 shipment are noted at better prices. Ocean freights from Tampa to France are 14s. 3d. (\$3.42), January sailing.

The Federal Chemical Company has completed its large plant at West Nashville, Tenn. Its annual capacity is 70,000 tons of all products, including acid.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.00@6.50	6@6½d.	\$0.48@10.07
*Fla. land peb. (68@73%)	3.00@3.25	4@5d.	6.65@ 7.00
*Tenn., (78@82%) export	3.25@ 3.50	5½@6d.	8.58@ 9.36
*Tenn., 78% domestic	3.00		
*Tenn., 75% domestic	2.75@ 3.00		
*Tenn., 75@74% domestic	2.30@ 2.40		
*Tenn., 70@72% domestic	2.10@ 2.25		
*So. Car. land rock	2.75@ 3.00	3½@4¼d.	5.67@ 5.98
*So. Car. river rock	2.75@ 3.00		
Algerian (65@67%)	5½@6¼d.		7.15@ 8.13
Algerian (68@69%)	4¾@5¼d.		5.70@ 6.30
Algerian (63@65%)	4¾@5¼d.		4.95@ 5.23

\*Fernandina, Brunswick or Savannah.  
\*Mt. Pleasant, Ton yon-la, Ashley River.

**Liverpool.** Dec. 3.  
(Special Report of Joseph P. Brunner & Co.)

Quiet for most lines of heavy chemicals trade is rather quiet at present, but market is steady in tone.

Soda ash firm. For tierces nearest range is 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 continue in fair request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special quotations for certain export markets. Caustic soda is quoted: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for certain export quarters.

Bleaching powder is in limited export request, and nominal spot range for hardwood is about £6 5s.@£6 10s. per ton, net cash, with special quotations for Continental and a few other markets.

Chlorate of potash is depressed at about 2½@2¾d. per lb. net cash.

Bicarb. soda is quiet, but steady at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is steady at about £11 17s. 6d.@£12 per ton, less 2½ for good gray 24@25 per cent in double bags f. o. b. here.

Nitrate of soda is still quoted on spot at £9 2s. 6d.@£9 5s. per ton, less 2½ for double bags f. o. b. here, but there is not much actual business reported.

**METAL MARKET.**

New York, Dec. 18.

**Gold and Silver Exports and Imports.**

At all United States Ports in November and Year.

Metal	November.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports	\$16,292,500	\$714,915	\$53,089,816	\$33,172,063
Imports	7,431,678	3,836,307	51,570,358	39,861,245
Excess, E.	\$8,860,822	I. \$3,121,362	E. \$1,069,458	I. \$6,689,182
Silver:				
Exports	\$4,689,301	\$3,764,674	\$50,914,919	\$43,727,779
Imports	2,796,832	2,189,353	28,358,182	23,701,933
Excess, E.	\$1,892,769	E. \$1,565,321	E. \$22,556,727	E. \$20,025,846

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

**Gold and Silver Exports and Imports, New York.**

For the week ending December 17, and for years from January 1:

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$19,814	\$5,809	\$683,225	\$32,471	E. \$614,759
1902.....	25,056,106	2,710,137	25,578,896	1,223,815	E. 46,711,020
1901.....	45,919,589	4,642,319	30,195,592	2,529,723	E. 68,943,896
1900.....	36,842,397	10,826,469	38,344,508	4,648,819	E. 59,711,617

The gold exported went chiefly to the West Indies, and the silver to London. Imports were from Central and South America and the West Indies.

**Financial Notes of the Week.**

Business generally continues good. The decline in the speculative markets has been temporarily arrested by the statement that some of the large operators were prepared to pool issues to prevent a further fall in stocks.

Exports of merchandise from the United States in November were valued at \$125,043,181, this total being \$19,284,247 less than in October, and \$11,412,458 less than in November, 1901. For the 11 months ending November 30 the statement of the Bureau of Statistics of the Treasury Department is as follows:

	1901.		1902.	
	Exports	Imports	Exports	Imports
Exports	\$1,328,434,321	\$1,212,532,093		
Imports	800,490,639	875,047,546		
Excess, exports	\$527,943,682	\$337,484,547		
Add excess of imports, silver		20,025,846		
Add excess of imports, gold		6,689,182		
Total apparent balance		\$364,199,575		

The gold and silver movement in detail will be found in the usual place, at the head of this column.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending December 13, gives the following totals, comparisons being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	\$792,760,000	\$870,373,900	\$879,371,200
Deposits	842,668,100	923,158,300	873,731,200
Circulation	30,724,000	31,879,000	45,560,700
Specie	137,655,300	164,458,800	158,859,300
Legal tenders	59,337,100	71,785,900	67,960,400
Total reserve	\$216,392,400	\$236,244,600	\$226,819,700
Legal requirements	210,667,025	230,789,575	218,432,800
Balance surplus	\$6,325,375	\$5,455,025	\$8,386,900

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	\$164,458,800	.....	\$157,655,300	.....
England	175,904,595	.....	157,987,035	.....
France	491,260,155	\$219,963,290	508,017,035	\$221,664,810
Germany	170,865,000	63,195,000	158,225,000	58,520,000
Spain	70,060,000	85,425,000	71,785,000	98,615,000
Neth'lds	28,707,000	30,657,000	23,493,000	32,634,000
Belgium	15,846,665	7,925,335	15,590,000	7,795,000
Italy	79,770,000	10,259,000	83,870,000	10,404,000
Russia	344,390,000	30,535,000	382,080,000	32,120,000

The returns of the Associated Banks of New York are of date December 13, and the others December 11, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Under the impulse of large orders confidence in silver has been, in a measure, restored, and the fall occasioned partly by buyers holding off and by the pressures of sales of panicky holders has been checked. Silver is now more settled at current figures.

The United States Assay Office in New York reports receipts of 43,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to December 4 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
	India	£7,012,910	£5,944,330
China	645,617	162,500	D. 483,117
The Straits	592,412	897,170	I. 304,758
Totals	£8,250,939	£7,004,000	D. £1,246,939

Receipts for the week were £212,000 in bar silver from New York, £75,000 from Vera Cruz, £2,000 from Central America, and £11,000 from Australia; total, £300,000. Shipments were £97,200 in bar silver to Bombay, £2,500 to Colombo, and £120,000 to the Straits; total, £219,700.

Indian exchange continues steady, all the Council bills offered in London having been taken at 16.03d. per rupee. Buying of silver for India continues very light.

The movement of gold and silver in France for the 10 months ending October 31 is reported by the Ministry of Commerce as below:

	1901.	1902.	Changes.
	Gold:		
Imports	Fr.286,246,000	Fr.354,489,000	I. Fr. 68,243,000
Exports	123,690,000	59,782,000	D. 63,908,000
Excess, imp.	Fr.162,556,000	Fr.294,707,000	I. Fr.132,151,000
Silver:			
Imports	82,312,000	80,006,000	D. 2,306,000
Exports	122,470,000	90,547,000	D. 31,923,000
Excess, exp.	Fr.40,158,000	Fr.10,541,000	D. Fr.29,617,000

Imports of copper and nickel coins, rated at their face or coinage value, were 68,000 fr., against 85,000 fr. for the corresponding period in 1901. Exports were 2,955,000 fr., against 270,000 fr. last year.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$.3894	\$.3914
Peruvian soles and Chilean pesos	.37	.39
Victoria sovereigns	4.85	4.88
Twenty francs	3.85	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

December.	Silver		Copper		Spelter			
	N. Y. Cts.	London, Pence.	Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.	Lead, Cts. per lb.		
11	4.87 1/2	47	22 1/2 @ 11 1/2	11 1/2	50 1/2	25 1/2 @ 4.10	4.82 1/2	4.65
12	4.87 1/2	47	22 1/2 @ 11 1/2	11 1/2	50 1/2	25 1/2 @ 4.10	4.82 1/2	4.65
13	4.87 1/2	48	22 1/2 @ 11 1/2	11 1/2	50 1/2	25 1/2 @ 4.10	4.82 1/2	4.65
15	4.87	48	22 1/2 @ 11 1/2	11 1/2	50 1/2	25 1/2 @ 4.10	4.80	4.62 1/2
16	4.86 1/2	48 1/2	22 1/2 @ 11 1/2	11 1/2	50 1/2	26 @ 4.10	4.80	4.62 1/2
17	4.86 1/2	48 1/2	22 1/2 @ 11 1/2	11 1/2	50 1/2	26 @ 4.10	4.80	4.62 1/2

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures.

Through a clerical error—for which the JOURNAL was not responsible—the price of silver in New York on November 20 was given in our weekly table at 49 1/2c, when it should have been 49c. This makes necessary a slight change in the average price for

November, which is, making the correction noted above, 49.07c. per ounce, instead of 49.08c.

Copper has again ruled very firm, although the demand is not quite as urgent as it was last week. Fair orders are said to have been placed for next year's delivery. At the close we quote lake at 11 1/2 @ 11 1/4c.; electrolytic in ingots, cakes or wirebars, at 11 1/2 @ 11 1/4c.; cathodes, at 11 1/4 @ 11 1/4c.; casting copper, 11 1/4 @ 11 1/4c.

The foreign market also displayed considerable strength. Standard copper, which closed last week at £50 10s., opened on Monday at £50 2s. 6d., and on Wednesday the closing quotations are cabled as £50 7s. 6d. @ £50 10s. for spot, and £50 15s. @ £50 17s. 6d. for three months prompt.

For refined and manufactured we quote: English tough, £53 15s. @ £54; best selected, £55 @ £55 10s.; strong sheets, £67 @ £68; India sheets, £69 @ £70; yellow metal, 6 1/2 @ 6 1/2d.

Statistics for the first half of December show a decrease in the visible supplies of 700 tons.

Exports of copper from Atlantic ports in the week ended December 16 are reported by our special correspondents, as follows: Great Britain, 175 tons; Germany, 609; Holland, 785; Italy, 181; Russia, 50; Sweden, 10; total, 1,800 tons. Imports were 150 tons copper from Japan and 100 tons from Mexico; total, 250 tons.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the associated companies, was as follows for November and the 11 months ending November 30, in long tons (2,240 lbs.) of fine copper:

	November.		Eleven months.	
	1901.	1902.	1901.	1902.
U. S. Reporting mines	18,128	22,997	207,352	234,530
U. S. Outside sources	3,600	2,300	38,100	35,300
Total U. S.	21,728	25,297	245,452	269,830
Foreign reporting mines	8,846	9,077	91,795	99,199
Total	30,574	34,374	337,247	369,029
U. S. exports	6,069	10,915	80,195	158,021

United States production holds up well, showing an increase of 3,569 tons for November and 31,782 tons for the 11 months. The foreign reporting mines show a gain of 7,404 tons for the 11 months. Exports from the United States in November were 1,600 tons less than in October. The total exports for the 11 months show an increase of 77,826 tons, or 97.2 per cent, over last year.

The approximate consumption of foreign copper in Germany for the 10 months ending October 31 was as follows, in metric tons:

	1901.	1902.	Changes.
Imports	50,695	65,197	I. 14,502
Exports	4,199	3,989	D. 210
Balance	46,496	61,208	I. 14,702

Imports of copper ore for the 10 months were 12,492 tons, against 3,684 tons for the corresponding period last year. Exports of copper ore were 13,388 tons, against 22,893 tons last year.

Tin has been very active throughout the week, and prices have advanced steadily. Large orders have been placed by dealers as well as consumers for future delivery. At the close we quote spot tin at 26c.; December, 25 1/2c.; January, 24 1/2c.

The foreign market, which closed Thursday at £114 5s., advanced on Friday to £116, opened on Monday at £117, and the closing quotations on Wednesday are cabled as £116 @ £116 2s. 6d. for spot, and £116 10s. @ £116 12s. 6d. for three months prompt.

Exports of tin from the Straits Settlement to Europe and the United States for the 11 months ending November 30 reached a total of 47,955 long tons. This compares with 46,280 tons for the corresponding period in 1901, showing an increase of 1,675 tons, or 3.6 per cent.

Lead is dull and unchanged, with nothing of interest to report. The ruling quotations are 3.97 1/2 @ 4.05c., St. Louis, and 4.05 @ 4.10c., New York.

The foreign market displayed considerable strength, and a large business has been done. Spanish lead is quoted £10 17s. 6d., with English 2s. 6d. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull, and a little easier. Sales of Missouri brands are being made on a basis of 3.97 1/2c., East St. Louis.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 29 that the price of silver during the week has been 12 reales per ounce. The exchange has gone up by 17 centimos, making it at present 33.80 pesetas to £1. The local quotation for pig lead on wharf has been 58 reales per quintal, which, on above exchange, is equal to £9 12s. 5d. per ton of 2,240 lbs., f. o. b. Cartagena. Exports of pig lead has been 1,113,194 kgs. to London; 350,000 kgs. to Bristol; 200,000 kgs. to Marseilles; a total of 1,663,194 kgs.

Spelter continues on its downward course, and lower prices have again been accepted. At the close we quote 4 1/2c., St. Louis, and 4.80c., New York.

The foreign market is firm, and good ordinaries are quoted £19 17s. 6d., and specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is dull and unsettled; the market seems to be somewhere around 4.60c., East St. Louis.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report under date of November 29 that owing to the improvement in exchange and in price of spelter the price for zinc ores has advanced at the mines. The shipments of this ore have also been heavy during the week, footing up a total of 9,140 tons, all consigned to Antwerp.

Antimony remains dull and depressed. We quote Cookson's, 9 @ 9 1/2c.; Hallett's, 7 1/4c.; Hungarian, Italian, Japanese and U. S. Star, 6 1/2c.

Nickel.—The price is now quoted by leading producers at 40 @ 47c. per lb., for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 72 1/2c. per gram.

Quicksilver.—Prices continue unchanged. The New York quotation is \$48 per flask for large lots, with a slightly higher price for smaller quantities. The London quotation is £8 15s. per flask, with the same figure named from second hands. In San Francisco, prices continue at \$45.50 @ \$46.50 per flask for domestic orders, while for export \$43.50 @ \$44 is quoted.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.	Ferrous	For lbs.
Aluminum			
No. 1, 99% ingots	83 @ 87c.		Ferro-Tungsten (37%)
No. 2, 90% ingots	81 @ 84c.		Magnesium
Roller sheets	4c. up		Manganese, pure (N.Y.)
Alum-bronze	20 @ 22c.		Mangan's Cop. (20% Mn)
Nickel-alum	33 @ 39c.		Mangan's Cop. (80% Mn)
Bismuth	1.50		Molybdenum (Best)
Chromium, pure (N.Y.)	80c.		Phosphorus
Copper, red oxide	50c.		American
Ferro-Molyb'dum (50%)	1.25		Sodium metal
Ferro-Titanium (10%)	90c.		Tungsten (Best)
Ferro-Titanium (20 @ 25%)	55c.		

Variations in price depend chiefly on the size of the order.

Missouri Zinc Ore Market. Dec. 13.

(From Our Special Correspondent.)

Two meetings of the Missouri-Kansas Zinc Miners' Association have been held for completing arrangements to export ore to Belgium, and 1,500 tons of ore have been subscribed. The indications are that 5,000 tons of ore may be exported before the movement is stopped. At the same time the association has been successful in its effort to curtail output. About 20 of the largest mines in the district have temporarily shut down. The decrease in production on account of shut downs is estimated to amount to 3,000 tons. The total reserve stock in the district at the end of October was 5,000 tons of ore. At the end of last week the surplus was estimated at 10,000 tons. It is the plan of the association to export ore and to curtail production until this surplus is gone. The shipment from the Joplin District was larger last week than for some time. A large quantity of ore was shipped in cattle cars, the cracks in the cars being covered by strips. The following are the shipments from the various camps for the week ending December 13:

Camp.	Zinc pounds.	Lead pounds.	Value.
Joplin	2,316,430	266,130	\$43,716
Galena-Empire	1,299,700*	168,170	21,745.
Carterville	1,457,230	244,320	27,967
Aurora	832,390	.....	13,898
Orongo	51,370	8,420	1,014
Spurgeon	198,100	21,750	1,925
Central City	44,570	17,200	985
Prosperity	392,490	76,510	8,194
Duenweg	943,200	82,150	17,236
Zincite	352,130	.....	5,634
Carl Junction	455,140	.....	7,282
Cave Springs	84,760	5,370	1,463
Neck-Alba	93,720	.....	1,500
Granby	419,000	28,000	5,380
Springfield	396,000	.....	6,912
Carthage	122,940	.....	1,906
Stotts City	84,920	.....	1,466
District total	9,484,080	917,830	\$163,093
Total 50 weeks	506,983,230	61,308,790	\$9,102,459
Zinc total, week	\$143,147	lead, \$22,946	Zinc total 50 weeks, \$7,694,453; lead, \$1,408,006.

Average Prices of Metals per lb., New York.

Month.	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.000	4.850	4.27	4.13
February	24.07	26.08	4.075	4.850	4.18	4.01
March	26.32	26.08	4.075	4.850	4.28	3.91
April	27.77	25.98	4.075	4.850	4.37	3.94
May	29.88	27.13	4.075	4.850	4.47	4.04
June	29.88	28.00	4.075	4.850	4.04	3.98
July	28.38	27.58	4.075	4.850	5.27	3.98
August	28.28	26.78	4.075	4.850	5.44	3.90
September	28.20	25.51	4.075	4.850	5.49	4.08
October	27.07	26.62	4.075	4.850	5.24	4.21
November	25.08	26.97	4.075	4.850	5.18	4.29
December	24.36	.....	4.163	.....	.....	4.81
Year	26.54	.....	4.384	.....	.....	4.38

Average Prices of Copper.

Table with columns: Month, Electrolytic, New York, Lake, London Standard, 1901, 1902. Rows include January through December and a Yearly average.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, 1902, 1901, 1900, London, N.Y., Pence, Cents. Rows include January through December and a Yearly average.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns: Name of Company, Date, Share, Total, Latest Dividend, Total to Date. Lists various companies and their dividend details.

ASSESSMENTS.

Table with columns: Name of Company, Loca-tion No., Delinq., Sale, Amt. Lists companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices for Dec. 10, 11, 12, 13, 15, 16.

†Assessment Paid.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing companies and their prices for Dec. 10, 11, 12, 13, 15, 16.

† Ex Dividend

Total sales, 822,408 shares.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass., listing companies and their prices for Dec. 10, 11, 12, 13, 15, 16.

Total sales, 75,502 shares.

PHILADELPHIA, PA.‡

Table of stock quotations for Philadelphia, Pa., listing companies and their prices for Dec. 10, 11, 12, 13, 15, 16.

‡Reported by Townsend, Whelen & Co., 306 Walnut St., Philadelphia, Pa. Total sales 26,309 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.\*

LONDON.

Dec. 3.

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., Anaconda, Ben Hur, Black Bell, Blue Bell, C. K. & N., C. C. Con., Dante, Dr. Jack Pot, Elkton Con., El Paso, Fanny Rawlings, Findley, Gold Bond, Gold Dollar Con., Golden Cycle, Golden Fleece, Gold Sov'n., Hart, Iron Clad, Isabella, Jack Pot, Last Dollar, Lexington, Little Puck, Mol. Gibson, Moon Anchor, Morning Star, National, Nellie V., New Haven, Pappoose, Pharmacist, Pinnacle, Portland, Prince Albert, Republic, Rose Maud, Sunset Eclipse, Uncle Sam, Vindicator Con., and Work.

\*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 171,200 shares.

COLORADO SPRINGS. (By Telegraph.)

Table of stock quotations for Colorado Springs, Colo. (By Telegraph) listing companies like Acacia, Alamo, Anaconda, Cripple Creek Con., Doctor Jack Pot, Elkton Con., El Paso, Fanny Rawlings, Gold Dollar Con., Golden Fleece, Isabella, Jack Pot, Last Dollar, Mollie Gibson, Moon Anchor, Pharmacist, Portland, and Work.

PARIS.

Nov. 27.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Firminy, Huta-Bank, la Marine, Anzin, Boléo, Briansk, Champ d'Or, Courrières, Dombrowa, Dynamite Centrale, Escrombrera-Bleyberg, Frasner River, Huanchaca, Laurium, Malfidano, Metaux, Cle. Fran. de, Mokta-el-Hadid, Napthe Baku, Napthe Nobel, Nickel, Pinarroya, Rebecca, Salines de l'Est, Salines du Midi, and Vieille Montagne.

ST. LOUIS, MO.\*

Dec. 13.

TORONTO, ONT.

Dec. 13.

Table of stock quotations for St. Louis, Mo. and Toronto, Ont. listing companies like Am. Nettle, Colo., Catherine Lead, Mo., Central Coal & C., Central C. & C. pf., Central Lead, Mo., Columbia Lead, Mo., Con. Coal, Ill., Doe Run Lead Co., Granite Bimet, Mt., St. Joe Lead, Mo., Center Star, Fairview, Lone Pine, Mt. Lion, North Star, Rambler-Cariboo, War Eagle Con., White Bear, Winnipeg Develop. Co., and Can. G. F. S.

\*From our Special Correspondent.

Total sales, 3,000 shares.

Table of stock quotations for London listing companies like Alaska-Treadwell, g. Alaska, Anaconda, c. s., Montana, Arizona, c. Ord., Arizona, pref., ord., Arizona, Cum., pf., Camp Bird, g. Colo., Copiapo, c. Chile, De Lamar, g. s., Idaho, Enterprise, g. British Col., El Oro, g. Mexico, Frontino & Bolivia, g., Colombia, Hall Mfg. & Sm., c. s., British Col., Le Roi No. 2, g., British Col., Montana, g. s., Montana, Stratton's Independence, Colorado, St. John del Rey, g., Brazil, Utah Con., g. (High Boy), Utah, Ymir, g., British Col., Linares, l., Spain, Mason & Barry, c. sul., Port'g'l., Rio Tinto, c., Spain, Rio Tinto, pref., Spain, Tharsis, c., Spain, Australia and New Zealand, Assec. Gold Mines, W. Australia, Broken Hill Pr'p., s., N. S. Wales, Great B'd'r Pr'p., W. Australia, Ivanhoe Gold Corp. W. Australia, Kalgurlie, g., W. Australia, Lake View Cons., g., W. Australia, Mt. Lyell M. & R. L., c., Tasmania, Mt. Morgan, g., Queensland, Wahi, g., New Zealand, Indian: Champion Reef, g., Colar Fields, Mysore Gold, Colar Fields, Nundydroog, g., Colar Fields, Ooregum, g., Colar Fields, Ooregum, pref., g., Colar Fields, African: British S. Africa, chartered S. Africa, Cape Copper, S. Africa, Cape Copper, pref., S. Africa, Crown Reef, g., S. Africa, De Beers Con., d., pref., Cape Colony, De Beers Con., def., Ferreira g., Transvaal, Geldenhuys Est., g., Transvaal, Henry Nourse, g., Transvaal, Klondike, g., S. Africa, Jubilee, g., Transvaal, Langlaagte Est., g., Transvaal, May Con., g., Transvaal, Meyer & Chariton, g., Transvaal, Namaqua, c., Cape Colony, Primrose (New), g., Transvaal, Rand Mines, g., S. Africa, Robinson, g., Transvaal, Wemmer, Transvaal.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

MEXICO.

Dec. 5.

Table of stock quotations for Mexico listing companies like Durango, Ca. Min. de Penoles, Guanajuato, Angustias, Pozos, aviadoras, An., Cincos Señores y An., aviadora, Providencia, San Juan de la Luz, Guerrero, Ciudad Miness, y Anexas., Hidalgo, Amistad y Concordia, Carmen, aviadora, Ca. Real del Monte, El Encino, aviador, Guadalupe Fresnillo, La Blanca, aviadora, La Blanca, aviadora, Maravillas y An., aviador, Maravillas el Lobo, Palma y An., aviador, Sta. Gertrudis y An., aviadora, Sta. Gertrudis y An., aviadora, Santo Tomas Apostol aviador, San Rafael y An., Trompillo, San Rafael y An., aviadora, Soledad, aviadora, Sorpresa, aviadora.

SALT LAKE CITY.\*

Dec. 12.

Table of stock quotations for Salt Lake City listing companies like Ajax, Bullion-Beck, California, Carisa, Century, Con. Mercuer., Daly, Daly, Daly-West, Eagle & B. Bell, Grand Central, L. Mammoth, Mammoth, May Day, Ontario, Sacramento, Silver King, Star Con., Swansea, So. Swansea, Sunshine, Uncle Sam, Con, Victor, West Mg. Glory, and Yankee Con.

All mines are in Utah. \*By our Special Correspondent. Total sales, 144,742 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES. (See also Market Reviews.)

Table with columns for material names, units, and prices. Categories include ABRASIVES, BARIUM, BARYTES, BAUKITE, BISMUTH, BITUMEN, BONE ASH, BORAX, BROMINE, CADMIUM, CALCIUM, CEMENT, ACIDS, ALCOHOL, ALUM, ALUMINUM, AMMONIA, AMMONIUM, ANTIMONY, ARSENIC, ASPHALTUM, BARIUM, GRAPHITE, PAINTS AND COLORS, and THE RARE EARTHS.

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.