

# The Engineering and Mining Journal

VOL. LXXXI.

NEW YORK, MARCH 10, 1906.

NO. 10.

Published Weekly at

505 PFARL STREET, NEW YORK

London Office: 20 Bucklersbury, London E. O., England

Subscription, payable in advance, \$5.00 a year of 52 numbers, including postage in the United States, Canada, Mexico, Cuba, Porto Rico, Hawaii or the Philippines.

To Foreign Countries, including postage, \$8.00 or its equivalent, 83 shillings; 33 marks; or 40 francs.

Notice to discontinue should be written to the New York office in every instance.

Advertising copy should reach New York office by Thursday, a week before date of issue.

Copies are on sale at the news-stands of the following hotels:—Waldorf-Astoria, New York; Brown Palace, Denver; Palace Hotel, San Francisco, and the leading hotels in the principal cities.

Copyright, 1906, by

THE ENGINEERING AND MINING JOURNAL.

Entered at New York Post Office as mail matter of the second class.

During 1905 THE ENGINEERING & MINING JOURNAL printed and circulated 454,250 copies, an average of 8735 per issue. Of this issue 8500 copies are printed. None sent regularly free. No back numbers beyond current year.

## Ancient History and Modern Investments.

BY R. W. RAYMOND.

American mining engineers are familiar with speculative schemes, based upon the real or supposed former productiveness of the mines upon which they are started. To say nothing of such enterprises as that of Richard Burton, who thought he had re-discovered in Egypt the sources of Solomon's treasure (itself somewhat mythical), there are more recent instances in abundance. The books of Humboldt and Ward on Mexico gave rise, in the first half of the nineteenth century, to an immense and disastrous investment of English capital in the unwatering of old Mexican gold and silver mines, on the strength of reports from "government archives," showing their immense production, and sundry legends, accounting for their temporary abandonment. In the prospectuses of such schemes, references to pestilence, war, quarrels among owners, etc., as the causes of the interruption of an almost incredibly profitable business, are well-known features.

No doubt, all ancient evidence, whether historical or legendary, has its value for mining enterprises; but it is well to bear in mind that Mexican miners did not usually leave rich ore when they stopped working a mine; and there is another proposition, applicable to many mines outside of Mexico, yet too often overlooked, namely: *The record of past production is a measure, not of what is left, but of*

*what is not left, in the ore-deposit of a mine.*

There is, however, a new kind of ancient evidence, the use of which, in support of mining schemes, may be equally misleading and is less honest. I refer to the quotation, without date, of old expert reports upon mining property, as evidences of its present value and promise. A fresh instance of this kind has just come to my attention.

A circular recently issued, for the purpose of soliciting from the public subscriptions to the stock of "The Arlington Mining Company," operating the old Hite mine, at Hite's Cove, near the Yosemite Valley, in California, contains, besides statements made upon other authority, a paragraph citing as "references," among others, "Rossiter W. Raymond, U. S. Mining Commissioner" and "Horatio C. Burchard, Director of the U. S. Mint;" and a slip inclosed with the circular presents quotations from these authorities, including a paragraph from a report by James D. Hague, quoted in one of my reports as U. S. Mining Commissioner. These and other "references" are characterized in the circular as "public men of the highest standing," who "tell *what they know* about the Hite mine."

Now, the passage quoted from me was published in 1875, after my visit to the Hite mine in 1874—thirty-two years ago. The visit of Mr. Hague was likewise made in 1874, and his report was published in 1875, thirty-one years ago. The quotation from Mr. Burchard will be found in his report as Director of the Mint on the Annual Production of the Precious Metals in the United States for 1882, twenty-three years ago. The mere suppression of these dates by the author of the circular mentioned is disingenuous and misleading.

So far as Mr. Burchard is concerned, I may say, without disparagement of that estimable gentleman, that, after I had prepared eight annual reports as U. S. Commissioner of Mining Statistics, that work was discontinued, and the subject, so far as gold and silver were concerned, was turned over to the Director of the Mint, with an annual appropriation about sufficient to cover the salary of an extra clerk, and the cost of subscribing to local newspapers, in order to get "mining news."

The subsequent annual reports of the Director of the Mint on this subject were nothing more than compilations of newspaper-clippings and local correspondence. I have found them valuable as a directory of the mines which existed twenty or thirty years ago, and a record of what interested parties said about these mines.

But the worthy Mr. Burchard did not tell in these volumes "what he knew;" for he never knew, or professed to know, anything whatever about any of the mines which his anonymous extra clerk indexed.

For the opinions expressed, thirty-odd years ago, by Mr. Hague and myself, concerning the condition and prospects of the Hite mine at that time, we are doubtless professionally responsible. On my own part, I might say that, in visiting a mine for the purpose of obtaining statistical information for the Government, I neither did nor could make such a critical examination as would have been my duty if I were acting for private clients. So far as I can now remember my visit to the Hite mine (among the hundreds which I visited during the eight years of my Commissionership), I made no measurements, took no samples for assay, and claimed no authority to go behind the records of the stamp-mill or the statements of the responsible officials of the company. But I need not emphasize that point in this particular case, though it may be important in some other case, in which my official reports may be treated as if they were critical expert opinions. As to the Hite mine, I have no reason now to believe that the statements I reported in 1874 were not then reasonable and truthful.

Mr. Hague's report, quoted by me in my official volume for the following year, was evidently a thorough piece of professional work. It evinces the well-known acuteness, skill and caution of its distinguished author. And it declares that in 1874, when Mr. Hague's examination was made, there were in the mine developed reserves of ore, estimated at 30,000 to 40,000 tons, of the net value of from \$750,000 to \$1,000,000, and that "the promise of the mine for the future beyond these developed resources," was "unusually good."

This statement is not quoted in the circular before me. But I notice that Mr. Hague gives the total product of the mine to the end of 1874 as "something over \$1,250,000," whereas the circular declares that the total yield up to this time has been "over \$2,500,000 in gold." It follows, apparently, that the reserves estimated by Mr. Hague have been extracted since 1874.

Mr. Burchard's reports, already characterized as useful in certain ways, though not as guides to investment, reveal something more, not quoted in this circular, as to the history of the mine. The report for 1883 shows that, in that year, the Hite mine and other property of the Hite Gold Quartz Mining Company had "reverted to J. R. Hite, the former owner, who has not yet had time to determine

his future course in this regard." The passage in the circular, entitled "History," should certainly contain some account of this reversion, and of Mr. Hite's subsequent course.

But the climax of audacity is reached by the statement in this circular that "in addition to the above, the Arlington mine has been investigated by the United States postal authorities." This means, I suppose, that the circular has not been excluded from the mails as an evident, vulgar, "green-goods" swindle.

In this decision, the Post Office Department was undoubtedly right. It is a perfectly legitimate thing to invite from the public subscriptions in aid of the resumption of an abandoned mining enterprise; and I do not suppose that the officials of that department are either bound or qualified to inquire into the force of the evidence adduced in favor of such an enterprise. But to parade their decision as an additional guaranty of the offered investment, and particularly to say, on the strength of it, that "the Arlington mine has been investigated by the United States Postal authorities," would be naturally interpreted as evidence of dishonesty, if it were not so clearly evidence of inanity.

In short, I have, upon my present knowledge, no reason for denouncing an enterprise, based upon the old Hite mine, as utterly without merit. The mine was a good one, in its day; and it may deserve further exploration. But if this enterprise has been undertaken in good faith, its promoters have been most unfortunate in their manner of presenting it to the public.

#### White Portland Cement.

*Tonind.-Zeit.*, XXIX, (1905) p. 1843, describes the experiments of Dr. Wormser on the whitening of cement. To a usual mixture of the ordinary crude materials, 2 to 5 per cent. of ammonium chloride was added during the preliminary grinding. During the burning, the iron compounds, to which the dark color of portland cement is mainly due, were volatilized as chlorides, as were also the discoloring sulphur compounds. The resulting white clinker had, after grinding, all the properties of portland cement, and was readily workable. In a large work, it would be advantageous to collect the gases, containing ammonia, and iron and ammonium chlorides, in water in order to recover ammonium chloride. The investigator also tried zinc chloride for the same purpose, but with less success, since the cement retained a green tinge, and contained zinc oxide.

Nitro-gelatine is now largely employed in the Cœur d'Alene mines; also in those of the Witwatersrand. It is safer than dynamite and less objectionable in other respects.

#### Pig-Iron Production in Canada.

The American Iron and Steel Association has received direct from the manufacturers the statistics of the production of all kinds of pig iron in Canada in the calendar year 1905. Full and complete reports have been received from every pig-iron maker in the Dominion.

The total production of all kinds of pig iron in Canada in 1905 amounted to 468,003 gross tons, against 270,942 tons in 1904, an increase of 197,061 tons, or over 72 per cent. The production in 1905 was much the largest in the history of the Dominion and exceeded that of 1902, the year of next largest production, by 148,446 tons, or over 46 per cent.

In the first half of 1905 the pig-iron production of Canada amounted to 210,206 tons and in the second half to 257,797 tons, an increase of 47,591 tons. Of the total production in 1905 432,870 tons were made with coke, 4836 tons with charcoal and coke mixed, and 30,297 tons with charcoal.

The production of basic pig iron in Canada in 1905 amounted to 172,102 tons, against 70,133 tons in 1904, and the production of bessemer pig iron to 149,203 tons, against 26,016 tons in 1904. Basic pig iron was made in 1905 by three companies owning six furnaces and bessemer pig iron by two companies owning three furnaces. The basic pig iron was all made with coke for fuel, but the bessemer pig iron was made with coke alone, charcoal alone, and charcoal and coke mixed. Canada has not made spiegeleisen or ferro-manganese since 1899, when small quantities of both metals were produced at Bridgeville, Nova Scotia, by a furnace which has since been abandoned.

The production of malleable bessemer pig iron in Canada in 1905 amounted to 3300 tons; foundry pig iron, 139,528 tons; forge pig iron, 3500 tons; and white and mottled and miscellaneous grades of pig iron, including castings made direct from the furnace, 370 tons. Neither ferro-silicon nor ferro-phosphorous was made. The quantity of limestone consumed for fluxing purposes by blast furnaces in Canada in 1905 amounted to 290,310 tons.

The following table gives the total production of all kinds of pig iron (including spiegeleisen and ferro-manganese) in Canada from 1894 to 1905. Prior to 1894 the pig-iron production of Canada was not ascertained by the association.

1894.....	44,791	1900.....	86,090
1895.....	37,829	1901.....	244,976
1896.....	60,030	1902.....	319,657
1897.....	53,796	1903.....	265,418
1898.....	68,755	1904.....	270,942
1899.....	94,077	1905.....	468,003

On Dec. 31, 1905, Canada had 14 completed blast furnaces, of which nine were in blast and five were idle. Of the total 10 usually use coke for fuel and four use charcoal. In addition one furnace, to use coke, was being built and three coke furnaces were partly erected on Dec. 31.

Work on the partly erected furnaces was, however, suspended some time ago.

During the first half of 1905 Canada had 13 of its completed furnaces in blast, and during the last half it had 12 furnaces in blast. In the first half of 1904 it had 10 furnaces in blast, and during the last half of the year 10 furnaces were also running.

#### Patience in Speculation.

In buying industrial securities, as, indeed, in buying other types, patience is an important requisite, says Charles A. Conant in the *Atlantic Monthly* for February. The man who becomes discouraged after buying a security at 90, because he sees it hanging about that quotation for several weeks or months, is not well fitted to buy securities for the rise. It is not often possible even for the most skilful speculators to buy at the lowest point. If they are sure that the securities they hold represent sound assets and steady earnings, they need not be frightened by a temporary gust of depression in the stock market. If they are satisfied that the properties are capable of progressive development and are under sound management, they must be willing to wait months, and sometimes years, for them to advance in value.

It is in this element of time, perhaps that more mistakes are made than in almost any other element of the problem. The results may come eventually which the sanguine promoter and speculator anticipate. The logic of the situation may seem to exclude the possibility that such results shall not come. But it often happens that the patience and capital of the pioneers are exhausted before the fruition of logical reasoning and sound hopes is attained. Then others reap where the first have sown. This has been the case over and over again with railways, whose profits have finally gone into the hands of those who have acquired them under foreclosure or reorganization, and with some of the great trusts, from which the water has been squeezed by unexpected changes in general trade and financial conditions, even when the enterprise itself was sound.

Over 780,000 h.p. in power stations equipped for electrical operation has been installed, or is planned for use, in New York City and its immediate vicinity. Of this amount the 74th St. station of the Interborough furnishes 100,000 h. p., the 59th St. station as much more at present, with further capacity to be provided, and the 96th St. station of the Metropolitan (surface) system furnishes 60,000 h. p.; the Kingsbridge station of the same system has an ultimate capacity of about 100,000 h.p. The Edison illuminating stations furnish the balance; the first four named are used for electric traction exclusively.

**National Mining Company's Mines.**

(EDITORIAL CORRESPONDENCE.)

The National Mining Company, affiliated with the United States Steel Corporation, owns a large area of undeveloped Pittsburg seam to the southwest of Carnegie. Its mines Nos. 1 and 2, now four years old, are reached by the Bridgeville and McDonald Branch of the Pittsburg, Cincinnati, Chicago & St. Louis Railway, the "Panhandle" Division of the Pennsylvania lines. Mine No. 1 is at Sygan, 14 miles from Pittsburg and No. 2 is at Treveskyn, a mile further, up Millers Run. As the two mines are alike in nearly every detail, the following description will be confined to No. 2. The predominating features of both mines

few local depressions. It lies 25 ft. below the bed of the run.

*Plant*—All surface structures are of brick or steel. Power is supplied by three Stirling boilers of 300 h. p. each, working at 100 lb. pressure. Their feedwater is taken from the creek, which is contaminated with oil from the petroleum field through which it passes and with acid water from other mines. The Scaife softening and filtering system is used to remove these impurities by adding caustic soda first, then sodium carbonate, and lastly filtering out the precipitates.

The generating plant consists of two 200-kw. Westinghouse dynamos of 550 volts and 364 amperes. Each is driven by a direct connected 18 $\frac{1}{4}$ x21-in. Buckeye engine. Four entirely separate wiring

Bullock motor. The crushed coal is then hoisted by bucket elevator and chuted into the railroad cars. The demand for slack coal from the users of mechanical stokers is greater than can be supplied by the screenings from run-of-mine coal, and at times half the day's output, or 1000 tons, will be crushed before shipping.

The fan is a 16x8-ft. Capell, enclosed, with its engine, in a brick house. It is driven at 135 r.p.m. by a Harrisburg Standard engine, at which speed it maintains a pressure of 1.85 in. of water. At 120 r.p.m. it passes 132,000 cu.ft. of air per minute. It acts as a blower during the winter and as an exhaust in summer.

Blacksmith, carpenter and machine shops permit nearly all repairs to be made on the spot.

*Mining*—The main entry is driven quadruple, the two on the north side being airways, up or down cast according to the season; the third is the main haulage way and is driven on an individually designed grade, as will be explained under *haulage*; the fourth is the return way for empty cars; chain pillars 60 ft. thick are left between the main headings. Another pair of short entries affords traveling and supply roads. The main entries cut the cleat nearly quartering; from them, double face entries are turned to the right with a deflection angle of 50 deg., and from these, double butt entries, spaced 350 ft. apart, are turned perpendicularly to the right. The butt entries seen in Fig. 2, turned at once from the main entries, at an angle of 40 deg. to the left, were for the purpose of extracting a small area, now nearly exhausted. The great body of coal lies to the right of the main entry. The above system brings the butt entries as nearly as possible to the rise, while conforming to the principal cleat of the coal. Only 50-ft. chain pillars are left between entries.

Rooms are turned at right angles from the haulage butt only. They are spaced 39 ft. between centers, and are driven 300 ft. deep, to within safe distance of the airway of the next butt. In the earlier work, rooms were started 9 ft. wide, and at 21 ft. in were widened squarely to 24 feet. To save transportation of the roof slate during this first stage of a room, the method shown in the second half of Fig. 3 was adopted. The room starts 15 ft. wide and begins at once to widen, reaching its full width at 21 ft. from the entry. This method not only gives room for packing the gob, from the start, except from the first two cuts, but it also obviates the payment of extra rates for narrow work, the 9-ft. necks of the old style rooms commonly being paid for on the same expensive basis as all other entry work.

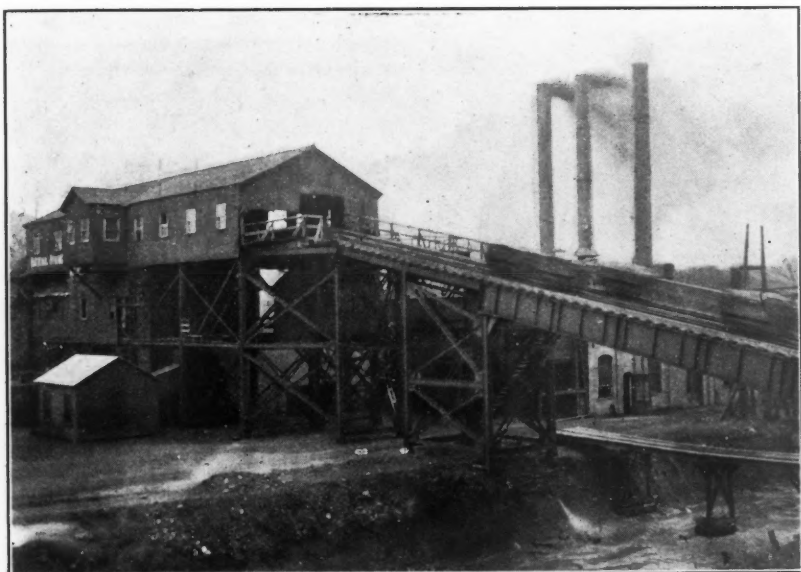


FIG. 1. NO. 2 TIPPLE.

are the application of electricity to nearly every purpose below and above ground, and the use of chain hauls in the main slope instead of the more usual hoisting engines.

*Coal*—The workable seam is overlain by alternating bands of coal and slate, the roof coal ranging around 1 ft. thick. The draw slate below this is 9 in. thick and is removed in mining, leaving the roof coal to form the permanent roof. The breast coal is 3.5 ft. deep, followed by a 4-in. band of "bearing-in" coal bounded above and below by  $\frac{1}{8}$ -in. partings. Below this, the upper bottom, or "brick" coal, 10-in. thick is followed, without sharp distinction, by the lower bottom coal, 1 ft. thick. The floor is limestone. Between 6 and 8 in. of the bottom coal is left on the floor, because the undercutting machines can not cope with it, and, too, the coal itself is of inferior quality. This leaves about 5 ft. of clean coal to be taken out of the breasts. The seam at this point is nearly horizontal, but has a

systems, each with its own switchboard, supply respectively the locomotives, the chain haul, the undercutting machines and the coal crusher. A small Westinghouse dynamo supplies the lights with which the haulage entry and the important stations in the mine are provided. This division is intended to prevent delays throughout the mine in case one system gets out of order. It is found that the mining machine circuit suffers more often than the others, owing to the greater number of motors, and the varied intelligence of their runners.

The steel tippel has two Phillips dumps, both kickbacks returning empties to the same down track. Screens and chutes are arranged to deliver run-of-mine, or lump, nut or slack. In any case, the coal that passes over the 1 $\frac{1}{4}$ -in. screen, is weighed in hanging pans before being dumped into the railroad cars. By changing the arrangements, the whole wagon load may be delivered to a Williams breaker, belt-driven, by a 150-h.p.



30 cuts with one set of bits. With the chisel-edged bits, 10 or 12 cuts was the average of the whole chain, but in fact, every bit was changed after every room. This kept 4 men busy all day sharpening them, while 1 man now keeps all the pointed bits, 600 per day, in shape. Before finally adopting the pointed bits, the company made a careful test of the power consumed. A 5-ft. cutter as now equipped used 32 to 35 amperes of 550-volt current, an average of 18.5 kw. or 24.7 h.p. This proved to be about 25 per cent. less than was required for the same work, with flat bits. It is possible that pointed bits are more destructive to the chain than are flat ones, owing to the greater torsional stresses that they induce, but, if so, the loss in this direction is amply compensated by the saving in power and labor.

upward, at the same inclination, to the tippie floor, the total length of the double-tracked incline being 380 ft. Cars are carried one by one, up and down, by chain hauls built by the Link Belt Engineering Company. The up haul has 18 in. links, and the car catches are spaced 21 feet. It is driven at the rate of 4 cars per minute by a 100-h. p. motor. Five safety catches, distributed along the trestle, engage the chain, to stop it in case of a break; the cars themselves have no safety appliance. A short uphaul delivers the empty cars to the down chain. This has 12-in. links, and the car catches are spaced 10 ft. The empties leave the main slope before they reach the bottom of the incline, and are distributed through their own entry. From the bottom of the incline, the loaded track retreats up-grade  $1\frac{1}{2}$  per cent. for 500 ft. so that the loads

### Tin Prospects in Victoria.

According to the *Australian Mining Standard*, the high price of tin has failed to stimulate prospecting in Victoria, although tin ore has been found in several localities. The production of tin ore was an important industry in Victoria over 40 years ago, but in the interval it has declined, and now the output is only about 100 tons per year.

E. J. Dunn, director of geological survey, points out that in the county of Delatite, in the Strathbogie district, there is an outcrop of granite which has been proved to be stanniferous. Further south at Buxton, almost in a direct line, the granite outcrops again, and is tin bearing. Continuing the line south, the granite outcrops with tin at Beenak, and then at the most southerly point of Victoria, Wilson's

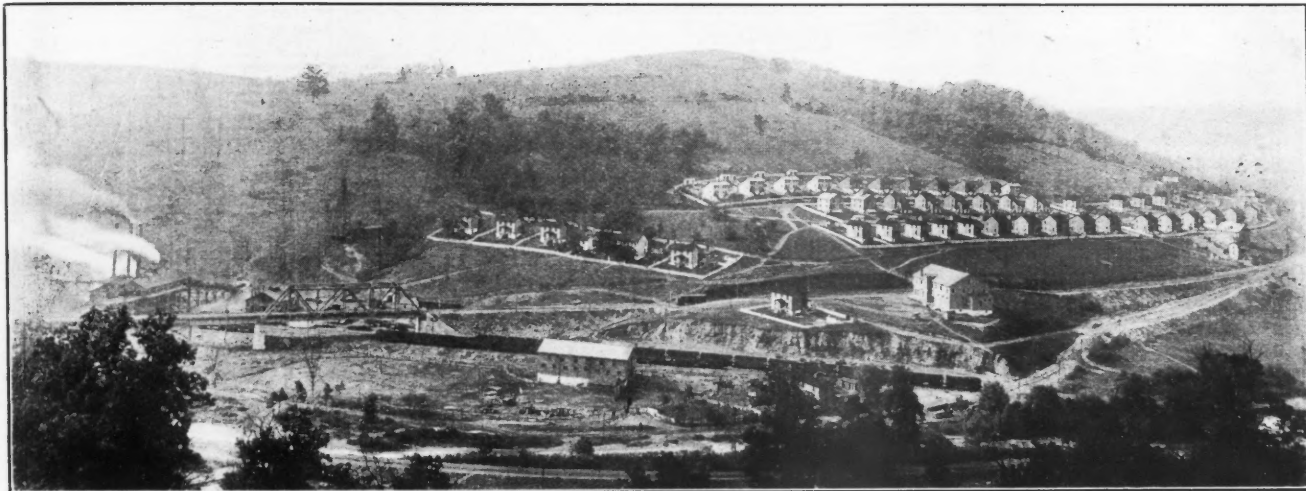


FIG. 4. WORKS AND TOWN AT NO. 1 MINE.

**Haulage**—Steel rails are used throughout the mine, even in the rooms. The main entry, where the heaviest locomotives run, is laid with 50-lb. rail; the face entries, with 40-lb.; the butt entries, with 25-lb.; and the rooms with 16-lb. rail. The mine wagons hold 2 tons of run-of-mine coal and weigh 2,100 lb. when empty. They are hauled by mules, three at a time, to making-up stations. Six-ton Jeffrey electric locomotives run into the butt entries and bring out 10-car trips. On the main road, a 10-ton locomotive handles 25-car trips. This motor, built by the General Electric Co., is one unit of a tandem; it may be coupled to a similar unit, and the two operated as one 20-ton locomotive, from one controller, one trolley and one brake wheel. This will be done as the haul lengthens. On the main entries, 0000 trolley wire, and on the butts, 00 wire is used.

From the surface, the main haulage entry extends for 150 ft. down a 20% grade until its floor is 16 ft. below the bottom of the coal. In the opposite direction, a steel trestle, carries the tracks

will run themselves down to the foot of the incline, being liberated, one at a time, from the trips. Back of the high point, the main level is down grade between 1 and  $1\frac{1}{2}$  per cent., for 4000 ft. to its inward end, making a long hard haul for the motors.

**Labor**—A potent factor in the smooth running of these mines is the benevolent treatment accorded to the workmen by the management. They work eight hours and are paid the union scale for  $1\frac{1}{4}$ -in. coal; in the past three years, no friction has developed sufficient to shut down work for a single day. The miners are comfortably lodged in substantial houses, and the managing and overseeing force have electric lights in their homes. A view of No. 1 mine and dwellings taken from the top of an oil derrick, is shown in Fig. 4. The company's department store would be creditable to a metropolis. At Gradatim, in the vicinity, a manual training school receives the joint support of the National Mining and the Pittsburgh Coal Company, the majority of whose employees are foreign born.

Promontory, the granite and tin outcrops are again met with. The continuation of this rock across Bass' Straits to Tasmania is shown by the chain of islands of similar formation, which, at one time, connected the mainland with the northeast coast of the island.

Thus there is apparently a continuous belt of granite extending from the northeast of Victoria to the northeast of Tasmania. It has been proved to contain tin in various parts of Victoria, where it outcrops, and in Tasmania rich returns have been obtained from it. The Tasmanian portion of the belt is more frequently met with on the surface, and therefore has been more subject to weathering than the Victorian portion. This has resulted in the rich tin washes, which enable the northeastern tin companies to obtain the excellent returns reported recently.

It is well to put wire strainers, or "spout guards," into conductor pipes where they open into the eave trough or gutter. This is to prevent leaves and other flotsam of the air from entering the pipe.



**Hoisting Methods at Butte.**

BY A. H. WETHEY.\*

The following is a communication which was addressed to the secretary of the

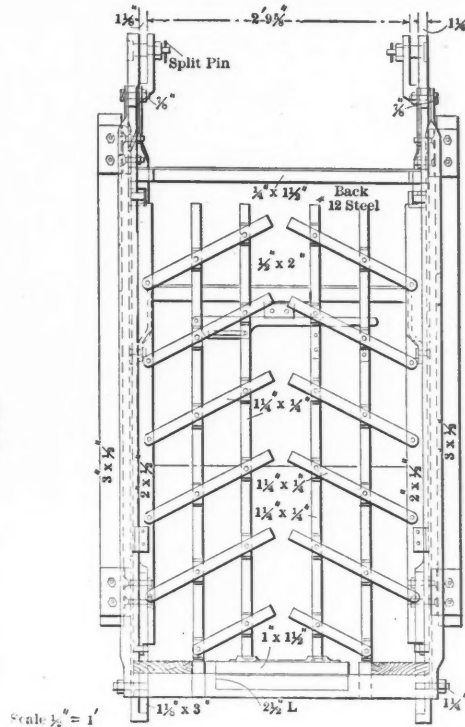
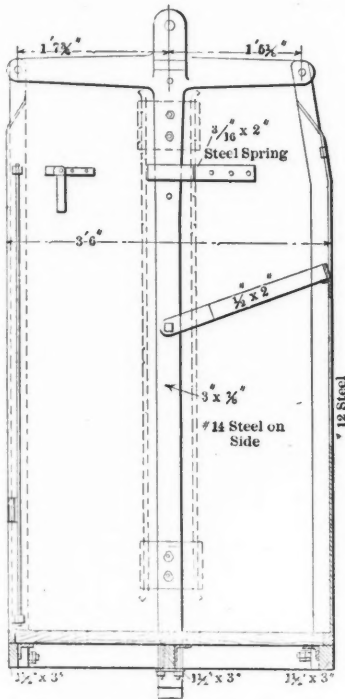
wear so rapidly as they would with a solid center. We have tried the lang lay and the lock coil, but they have not proved as satisfactory as the ordinary lay.

In our mines the water is impregnated with copper and sulphuric acid, and we

deep mining such as you have in the Transvaal.

When a new rope is put into commission and has run for two days, the cages are lowered to the bottom of the shaft and the rope removed and allowed to hang loose, thus giving the rope an opportunity to uncoil. The rope is then attached again to the cages. We find this a good preventive against kinking. When a wire rope 1½ in. in diameter gets kinks in it, it is detrimental to the life of the rope.

The rope is attached to the crosshead of the upper cage, with a large clevis, made from 2½-in. round steel, with a removable pin. A large oval thimble 6 in. wide, filled with cast-iron filler to prevent compression, is inserted in the clevis. The rope is placed around this thimble, the end being carried up on the main rope about 8 ft., to which it is clamped with eight or nine bulldog clamps well tightened up. The lap and portion of the rope passing around the thimbles are literally coated with a cable compound or grease before the weight of the cage is allowed to come on the rope. The cages and clamped portion of the rope are then lowered below the collar of the shaft. Two pieces of 5x10-in. timber, with a V-shaped receptacle gouged out, and with a hole in the bottom large enough to permit the rope to pass through, are then placed around the rope. The two pieces are held together by two bolts, the whole being supported by pieces of timber placed across the shaft. Some old clothes, or a piece of soft hemp rope, is wrapped



W-8. LOWER DECK CAGE AT ORIGINAL MINE.

Transvaal Commission on Safety in Hoisting, Johannesburg, South Africa:

THE ENGINEERING AND MINING JOURNAL Oct. 7, 1905, published a list of inquiries, which appear to have been formulated in connection with your commission, on which you invite information.

Much of the information you ask for is technical and such as the manufacturers of wire ropes could perhaps better reply to. I shall, however, be pleased to give you the result of 18 years' experience with hoisting in this district in the mines owned and controlled by Senator W. A. Clark.

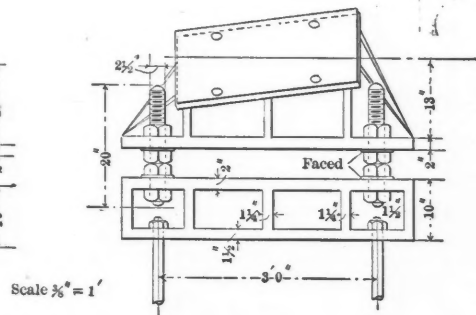
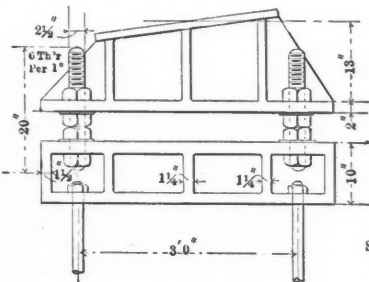
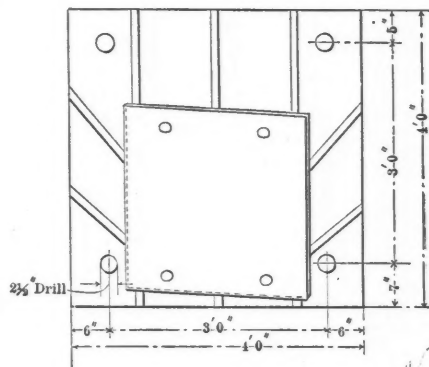
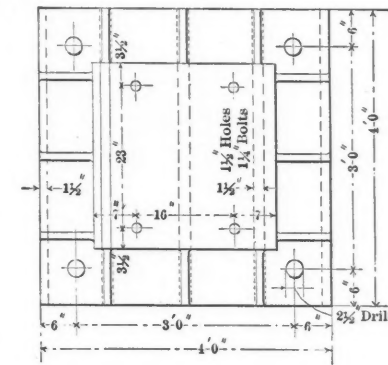
We have found that steel wire ropes give the best satisfaction. The ropes we are using are 1½ in. in diameter. The approximate breaking strain is 100 tons of 2000 lb. each. The allowable working strain is 17 tons. Our load is 13 tons. The drums on our hoisting engines are 12 ft. in diameter, and 10-ft. diameter overhead sheaves are used.

We find that sheaves lined or filled with hard wood are more easy on the rope than solid cast-iron sheaves.

Our wire ropes consist of six strands, with 19 wires to the strand, with a hemp core. We prefer the hemp core, as it forms a sort of bedding for the wires when passing around the sheaves and drums, and we believe the wires do not

grease the ropes to preserve them from the action of the acid copper water.

We are hoisting at present from a depth



Z-20. BASE FOR HEAD-FRAME AT ORIGINAL MINE.

of 2000 ft. vertically. Our engines are capable of sinking to a depth of 3000 ft. We have, therefore, not had experience in

around the wire cable and forced close around the cable at the bottom of the V groove to act as a packing, and to prevent

\*General manager, W. A. Clark's mines, Butte, Mont.

any waste of the lubricating material. A lubricant of grease or cable compound is then poured into the V-shaped receptacle as the rope is slowly lowered into the shaft, thus coating the entire rope with a lubricant and preserving compound.

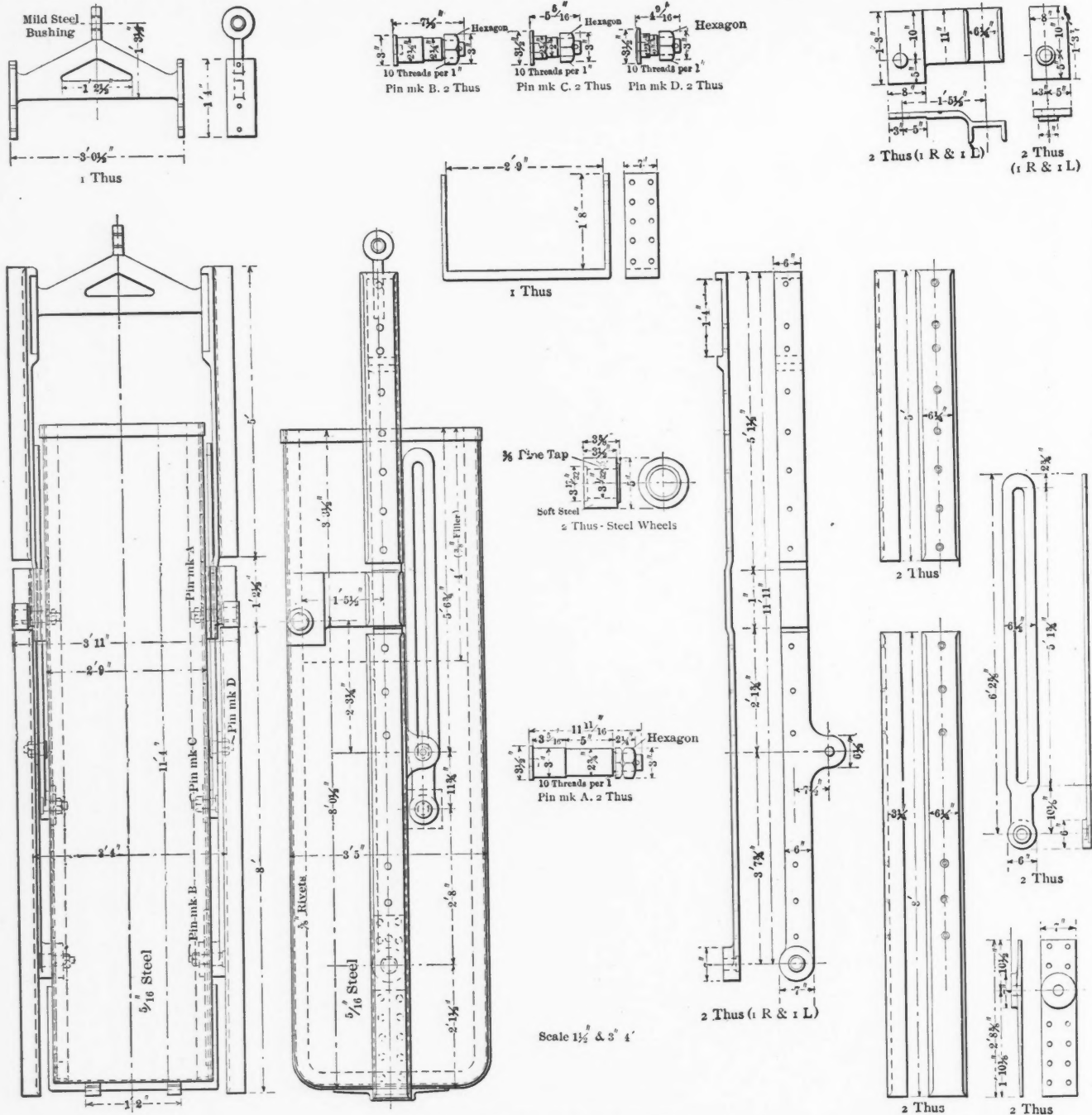
Under the conditions prevailing here we find the life of a round cable is from

used. The drawings submitted are as follows:

Z. 17—This shows the design of the Original mine head-frame, with ore bins attached as at first erected. This head-frame stands on the side of an old gulch; on one side the foundations for the head-frame are built down to the original sur-

in vertical and dumped positions. This drawing does not apply to the present arrangement of the head-frame and bins now in use, but shows the principles which we have simply elaborated upon.

Z. 29—This is the general drawing of the new steel dump and additional ore bins added later, which proved to be an



W-18. DETAILS OF ORE SKIP FOR ORIGINAL MINE.

12 to 18 months. Competent rope men examine the ropes once a week and observe the wear and breakage of wires, and the ropes are coated with a cable compound once a week.

As further showing the system adopted by us at our principal mine here, the Original, I submit herewith a series of blueprints which show the head-frame with ore bins and the dumping arrangement, and also drawings of the cages and skips

face. The other side of the frame over the gulch stands on filled ground, and it was necessary to drive piling to a depth of 40 ft. in order to carry the foundations upon which the head-frame stands.

Z. 20—This shows the detail of adjustable bases for the head-frame.

Z. 18—This drawing shows the system of gates used in the dump, and the manner of distributing ore into the bins.

W. 9—This drawing shows the ore-skip

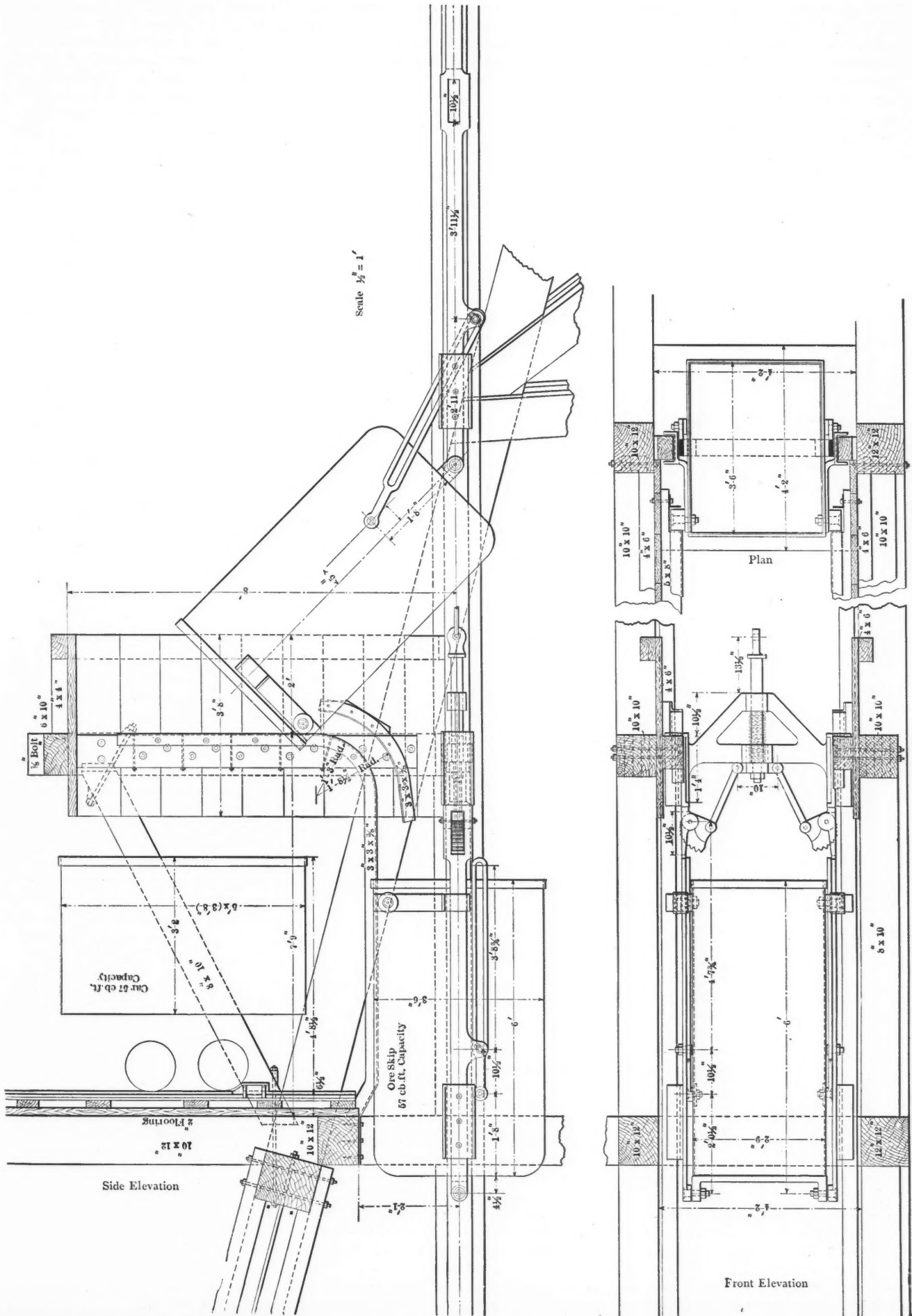
improvement upon the designs shown in drawing Z. 17.

Z. 28—This drawing shows more in detail the construction of the steel dump shown in drawing Z. 29.

Z. 25—This drawing shows the underground station bins for loading the skips. This drawing also shows the double-deck cages and skip hanging in the shaft as now operated at the Original mine.

W. 18—This drawing shows the design





W-9. ORE SKIP AND DUMP FOR ORIGINAL MINE.

in detail of the 8-ton skip at present in use at the Original mine.

W. 7—This drawing shows the style and design of the double-deck cage. The cages at present in use are similar in design, but much heavier than the cage shown in this drawing. Note the double safety dogs and lattice-work door.

W. 8—This drawing shows the style of

satisfaction. Two sets of safeties as shown on the drawing W. 18, are used on the upper cage. No safeties are used on the lower cage and skip below. These safeties are tested from time to time by tying the wire cable securely with a hemp rope and allowing a few feet of cable to slack off from the drum of the hoisting engine. The hemp rope is then cut, and

with the upper deck we found in actual practice that with two sets of safeties on the top cage it was unnecessary to have safeties on the dumping skip. As these improvements are not patented outside the United States, any mine owner not operating in the United States has the privilege of making such use of the information given as he may desire.

Referring again to the cages, you will notice from the drawings that the cages for hoisting men have sides made of sheet iron on three sides, and on the fourth side have lattice-work gates. This makes the cage a very safe one for hoisting and lowering men, as in case of a man fainting, as sometimes happens, it is impossible for him to get caught in the shaft.

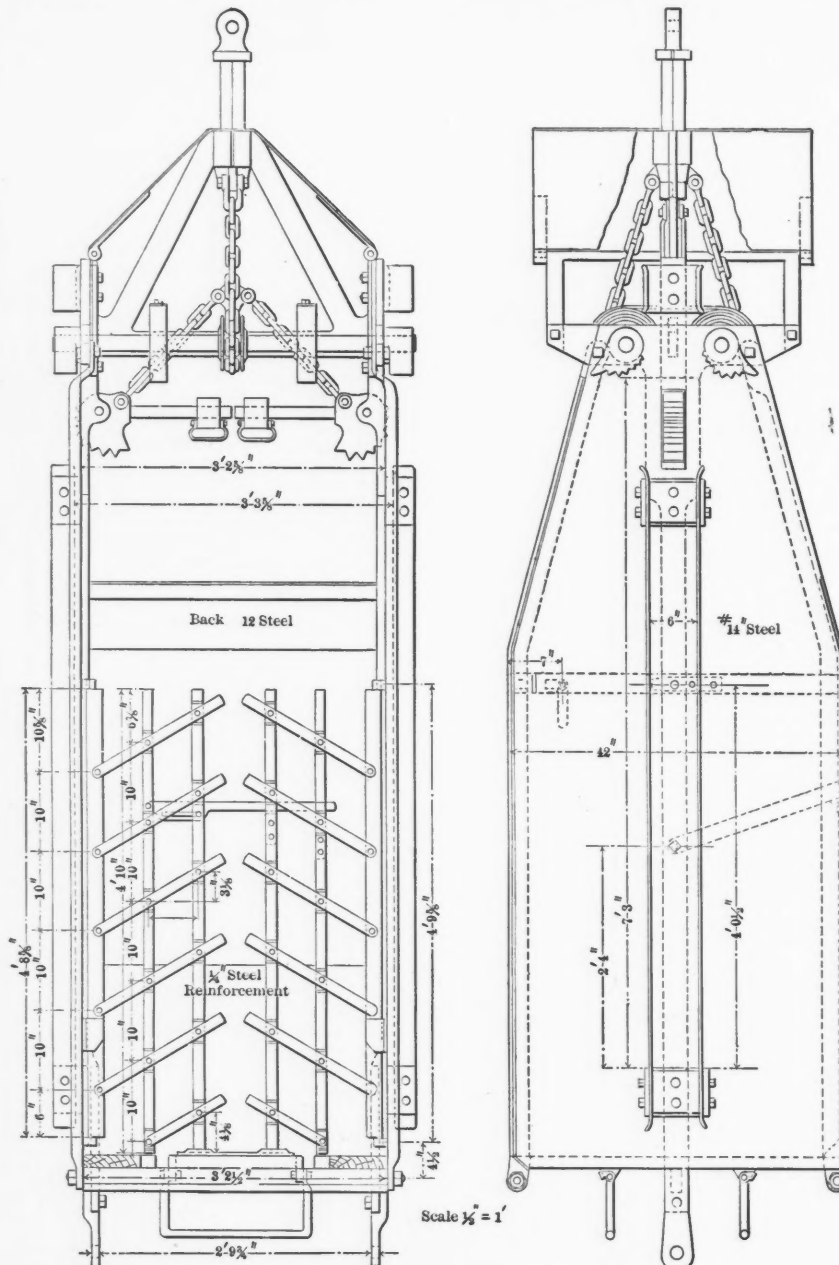
The Legislature of the State of Montana passed a law requiring all mines operating to a depth of over 300 ft. to have cages that are inclosed either by sheet iron or by lattice work, so as to prevent any possibility of men dropping from the same in hoisting or lowering. The idea of this law was based upon the use of our safety cages at the Original mine.

[Owing to the large number and the size of the drawings referred to in this article we are unable to publish all of them in this issue. The remainder, which are not referred to except by name, and are self-explanatory, will be published in our next issue. They are valuable, as showing the mining practice at Butte.—Editor.]

### Electrolytic Tin Refining.

Dr. H. Mennicke, in *Elektrochemische Zeitschrift*, December, 1905, shows that the electrolytic refining of "work-tin" with a tin fluosilicate solution would be practicable and profitable. Among the advantages are the preparation of chemically pure tin, which commands a high price and is especially suited for making tin salts, tin oxide, etc. His conclusions are as follows:

1. The preparation of the tin electrolyte is much more difficult than that of the corresponding lead solution.
2. The removal of hydrofluoric acid from the solution is not necessary.
3. The regeneration and purification of electrolyte is more difficult than in the Betts lead process.
4. The current yield is lower than in Betts process.
5. Solid refined tin can be obtained under certain conditions.
6. The electrolytic refining of tin is economical in the absence of much lead. The removal of copper, bismuth and antimony is easy.
7. The extraction of tin from lead-tin alloys is possible, but not economical.
8. A combination of electrochemical and chemical processes for refined lead alloys is not economical.



W-7. CAGE AT ORIGINAL MINE.

lower-deck cage, with the exception of the cross-bar in the bottom of it for carrying the skip. The cage now in use is similar to the drawing, but is made of much heavier material. Note the lattice-work door.

The drawings themselves show the construction of the skips and cages with so much detail that it is unnecessary to enter into a written description of them.

We use guides in the shaft 4x6 in., made of oak. These guides give good

the cage is allowed to drop. It is found that the safeties in use are sufficient and immediately catch the entire weight of the loaded cages and skip, the safeties acting immediately upon releasing the strain on the king-bolt.

The design of the skip shown in the drawing is covered in the United States by a patent granted to Thomas Bryant, No. 682,784, dated Sept. 17, 1901. The patent granted shows the use of safeties on the dumping skip itself. In connection

### The Seizure of El Tigre Mine.

On Dec. 29, 1905, the Court of First Instance at Cananea, Sonora, decided in favor of The Tigre Mining Company and against the Ensenada Mining Company, in the name of which company B. F. Graham forcibly took possession of El Tigre mine, July 7, 1905, using as a pretext the forfeiture of the title of The Tigre Mining Company for alleged default in payment of the instalment of purchase price due at the Miners and Merchants Bank of Bisbee on July 6. The decision of the Cananea court was to the effect that the payment due on July 6 had been legally made by Mr. Sooy in behalf of El Tigre company, when he deposited the money in the Miners and Merchants Bank of Bisbee to the credit of the beneficiaries of the original owner of the mine, and that the contract had been complied with in every respect.

In January, 1903, B. F. Graham obtained from John F. Hohstadt an option to purchase for \$600,000 gold, a group of mining properties known as "Tigre Suertudo" and "Combinacion" located in the District of Moctezuma, Sonora. Graham organized a company to which the mines were transferred, the company being known as The Tigre Mining Company, S. A., a Mexican corporation, because the mines are situated within the frontier zone; and he organized an American corporation, known as The Lucky Tiger-Combination Gold Mining Company, to which the stock of the Mexican Corporation was transferred. Graham sold at par, chiefly in Kansas City, Mo., shares of the American company, and with money so obtained, the payments of the purchase price of the mines were made as they fell due, and the necessary capital was provided to develop the properties. He was the president and general manager of both companies, receiving a monthly salary of \$500 and all expenses. In the course of the two following years the mines proved to be rich, and Graham attempted to seize them, having first presented his resignation as general manager, giving as a reason that he desired to devote his attention to other interests.

In the deed transfer of the mines made by John F. Hohstadt to The Tigre Mining Company, S. A., he assigned to various individuals all of the unpaid part of the purchase price for which the mines were sold to The Tigre Mining Company. There being still two payments due upon the property, Graham persuaded these assignees to organize a Mexican company and transfer their credits to this company, which was called the Ensenada Mining Company, S. A., Graham being its president and general manager. At the same time, Graham obtained an option on the entire stock of the company.

When E. C. Sooy, representative of The Tigre Mining Company, accompanied by W. J. Morse, arrived in Bisbee on July 3

with a draft to make the payment that was due on or before July 6, they learned that gold coin would be exacted, which had never been done in any previous payment, and found that gold coin was not to be had in Bisbee. Anticipating some plot, they telegraphed for gold from California and on the morning of July 5 received \$48,864, which was taken to the Miners and Merchants Bank and delivered to Cashier Hood in the name of The Tigre Mining Company, S. A., in accordance with the contract. Graham having failed to prevent the payment, appeared at the bank on July 6, as attorney in fact and representative of the original creditors and made demands in their names, although their claims had been assigned to the Ensenada Mining Company the previous month. Graham concealed the existence of that company, and refused to receive the money deposited by Sooy, claiming that the distribution was not correctly indicated. Graham then went to the mine by special train, with 10 men armed with rifles, and on July 7 declared the contract forfeited, and took possession of the property.

The Tigre Mining Company immediately initiated criminal proceedings in the court of Moctezuma against Graham and associates, and was restored to the possession of its property on Dec. 13. On Dec. 29 the principal case was decided in favor of The Tigre Mining Company, as stated above. Graham and his associates, however, have appealed the case.

### Analysis of Tin-Tungsten Ores.

According to *Zeit. f. angew. Chem.*, XIX, (1906) p. 140, H Angenot has shortened somewhat the tedious analytical method for separating tin and tungsten. Experimenting upon known mixtures of tungstic acid and tin oxide, he followed Bornträger's method except that, instead of fusing the substance with sodium carbonate for 1 hour, he fused it in an iron crucible with sodium peroxide for 15 minutes, and obtained accurate results. The determination of tin was equally satisfactory, and the author now applies his abbreviated method directly to the analysis of tin-tungsten minerals.

*The Engineering Record* (Feb. 10, 1906, p. 145) describes a trolley boat which has been in service during the winter in the intake canal of the Niagara Falls Power Company for keeping the surface free from floating ice. The boat is 25 ft. in length by 10 ft. beam and is operated by a 75-kw. Westinghouse single-phase railway motor, current being delivered to the boat by double trolley wires suspended longitudinally over the canal with over-running trolley and flexible cable. The motor has rheostatic control giving, if necessary, propeller speeds of 100 to 275 r.p.m.

### Timber Land Reservations.

The continued prosperity and expansion of the mining industry in Idaho particularly, and the whole West in general, is seriously menaced by the present Federal and State laws which admit of withdrawing vast areas of rich mineral territory from the investigation of the prospector, hampering and restricting his opportunity for original discovery, says Robert N. Bell, Inspector of Mines of Idaho, in his report for 1905.

The most vicious Federal law is the Timber and Stone Act, which admits of the purchase, for a few hundred dollars, of a tract of timber land (and in Idaho this land is generally mineral land) amounting to 160 acres, and the timber claimants' purpose in acquiring it is generally for the specific purpose of turning it over as quickly as possible at a few hundred dollars' profit, as soon as he acquires title, to some big lumber company. This transfer not only carries with it the right to cut the timber, but also the right to the land and all that underlies it, and has resulted in passing to private ownership hundreds of thousands of acres of mountain territory in Idaho, often rich in mineral possibilities, seriously limiting the prospector's former liberties.

The State selections of vast areas of land are another serious drawback to original investigation. The past Legislatures of the State have done good service to the mining industry in their appropriations for wagon road construction to open up the remoter districts of the State, but this purpose is in a measure defeated by the selection of extensive areas of mineral territory as timber land. A law should be passed, giving the prospector full liberty to enter on the State's holdings, and to explore the same with the privilege of leasing, with ample time for an annual improvement requirement, and of buying any portion of it he may consider valuable for mineral in square blocks of not less than 40 acres, restricting his mineral rights to vertical boundary lines, thus setting a rational example for the Federal Government to follow in the amendment of its abortive apex and extra lateral right law.

The argument that the land is not valuable for mineral because it was open to exploration for years and no valuable mines were found upon it is unsound. There are many orebodies in Idaho, whose highest crests were hundreds of feet under the surface of the ground, often showing little more evidence of their existence than an iron-stained fracture, containing absolutely no commercial ore at the surface, and in some instances requiring years of hard work and apparent blind faith on the part of their discoverers in finding them.

In classifying mineral-land, the miner should be given the benefit of the doubt.

### A Traveling-Belt Screen.

BY J. M. CALLOW.\*

Three distinct operations are involved in the dressing of ores; crushing, sizing and separating. Great improvements have been made in crushing and separating machinery in the last 25 years, but screening has been neglected.

Present practice may be summed up in a few words: That  $2\frac{1}{2}$  mm. is the limit of practical screen sizing with revolving screens under the conditions prevailing in the country; below that, water classification is used. This is the parting of the way and where the troubles begin.

Every concentrating mill in the country uses water classification in some form or another, and every intelligent millman realizes its defects; there is not one of them who would not replace it, if he could only find a worthy substitute. I believe that this has been found in the traveling-belt screen.

The fundamental principle of this machine is a traveling band, or belt, of screen cloth, over which the ore and its carrying water is spread, by means of distributing aprons, or feed soles. This belt of screen cloth passes over head and tail rollers and is caused to travel continuously in a horizontal direction at a speed varying from 15 to 30 ft. per min. according to the nature and quantity of the material to be screened.

The aprons play an important part in the operation of the machine; as the particles, which are of all sorts and sizes, fall from the lip, the coarsest and largest pieces having the greatest trajectory strike the screen at a point far ahead of the smaller ones, and they are there deposited, leaving a space behind free and unincumbered. The pores of the cloth in the rear being uncovered and open, permit the free passage of the fines and water. Simultaneously with this action, the cloth is being moved forward and the deposit of oversize is continuously and unintermittently removed from the separating or screening zone, and the machine continues to perform its function so long as it is kept moving and is supplied with feed.

After leaving the screening zone, the deposit of oversize is carried forward and passes under a shaking spray of clear water, where any remaining trace of slime or of fine adhering particles are washed, and pass through with the water from the spray into the undersize hopper beneath. Continuing on, the oversize, still clinging to the screen cloth, passes in front of a small impinging spray, which is conveniently situated somewhere about the mid-diameter of the front roller; the oversize is there washed off the screen cloth into the oversize hopper below.

It will be seen from the illustration that the machine is in two parts, each half becoming the duplicate of the other; the two belts are independent of one another but operate from a common driving mechanism. The speed of the two belts can be varied by means of the cone pulleys and the driving shafts are arranged so that either side can be thrown in or out by suitable friction clutches adjusted to each driving roller.

This is a convenient arrangement, permitting of one side of the machine being shut down for changing or for the repair of screen cloth, all the feed being turned on the running side for the time being; it is only necessary to speed up the belt sufficiently to carry the increased load.

The rollers revolve on over-hung shafts, so that there are no out-board bearings to prevent the quick renewal of worn out cloths; the new ones are slipped on, after being made endless, over the ends of the rollers.

These screen belts have rubber edges fastened to the screen cloth and on each side of the belt there are sprocket chains to which the edges of the cloth are attached through the medium of the flexible edge piece. At frequent intervals in the chain there are special attachment links provided with knobs or buttons, and on the flexible edges there are correspondingly spaced holes by means of which the screen is buttoned on to the chain. The holes in the rubber edges are reinforced and strengthened by knob eyelets, which prevent the button holes from tearing out if subjected to undue strain at any time.

The rollers have sprocket teeth, which correspond with and drive the chain. These chains are to control any tendency of the cloth to work sideways on the rollers and to keep them running true; also to drive the screen belts, and to relieve them of any of the work of operating the front roller.

To remove an old cloth it is only necessary to unbutton it from the knobs on the chain and withdraw it over the ends of the rollers. This can be done in a few minutes, and the whole operation of taking off the old and putting on a new belt can be accomplished in 20 min.

The shafts which carry the rollers are carried in long hubs or bosses attached to each side of a central casting or girder; to this casting are also attached the undersize hoppers. This casting is hollow and forms, besides a support for the moving and all other parts of the machine, a central gutter or launder into which the combined undersize from each half of the machine discharges.

The machine has high capacity, and handles sizes from 10 to 200 mesh. It can be placed anywhere in a mill where the feed can be delivered to it. There is no shake or bump and the blinding of the screen is insignificant. It is practically

noiseless and absorbs but little power; a one-inch belt will drive it. The cost of screen cloth, which is the only item of ordinary repair, does not exceed 2c. per ton of ore treated, even on the finest meshes.

The conditions in different mills are so variable that it is impossible to give any hard and fast rules or to speak about capacities with any exactness, but enough has already been done with the machine under actual mill conditions to show that for each 12 in. width of screen cloth, at a belt speed of 20 ft. per min. the machine will handle 50—60 tons of feed per 24 hours of 30 mesh; 40—50 tons of 40 mesh; 30—40 tons of 60 mesh; and 25—30 tons of 80 mesh.

This is assuming a "half and half" feed, that is, 50 per cent. of the feed will be retained on the screen mentioned and 50 per cent. pass through.

The spray water required for the shaking spray will vary with the nature of the feed and quantity of oversize, but about 3 to 5 gal. per min. for each ft. width of cloth is sufficient, and for spraying off the oversize from the front roller, about half this quantity will do; in most cases considerably more will have to be added to convey the ore to the separating machines below if fitted with spouts as they usually are.

The water in the feed may be as low as 4:1 and still do good work, and as high as 250 gal. per min. per ft. width of screen when screening on 30 mesh, but it should not exceed 30 gal. per min. for each ft. width of cloth when treating 20 or 30 mesh feed on 80 mesh cloth.

It is therefore advisable in the installation of a series of screens to put at the head of the screen line a "sloughing off" tank, by means of which, in cases where the quantity of water is in excess of what the last screen can conveniently handle, a portion of it may be diverted from the screen line and afterwards join the undersize from the last screen in the series on its way to the slime plant.

The first machine involving this principle was installed by me in the concentrating plant of the Basin Reduction Company of Montana. It consisted of a belt of 30 mesh brass cloth, 36 in. wide, working on 24 in. rollers, spaced 6 ft. centers. It was put in for the purpose of removing coarse pieces of ore, trash, fuse, waste and wood chips from the Wilfley feed; this served the purpose extremely well. The machine handled about 900 gal. of water per min., carrying nearly 200 tons of solid matter per day. The oversize was a varying quantity, depending upon how well the jig separators were run. When the feed was heavy and a separator would stop up, there would sometimes be deposits of as much as  $\frac{1}{2}$  in. of oversize on the screen, and other times nothing but trash, waste and wood chips. There was probably 10 or 15 per cent. of oversize and out of this

\* Consulting engineer, Salt Lake City, Utah

developed my standard machine, which is described in this article.

I installed one of these in Salt Lake City, with an artificial feed and worked out during a period of six months the details of construction, experimenting on different sized cloths up to 200 mesh.

The next machine was installed at the Bunker Hill & Sullivan Mining Company early in September, 1905. It has been running continuously ever since, screening on 80 mesh cloth the product of a 6 ft. Huntington mill, crushing through a 16 mesh

and about 50 of 80 mesh oversize. The feed contains about 4 tons of water for a ton of ore, which is ample to do good work. Good screening could be done with even 3 to 1 water and ore. 75 per cent. of all the lead is contained in the undersize; the oversize makes a 77 per cent. lead product, bringing the recovery up to about 92 per cent.

The first set of screen cloths treated nearly 3,000 tons. We have had some trouble with the side chains wearing, but this was because too cheap a grade of

### The New Allis-Chalmers Machine Shops.

Construction on the extension to the West Allis Works of the Allis-Chalmers Company, Milwaukee, Wis., is being steadily carried on. The total floor space of the new structure will be 1,513,000 sq.ft. Orders have been placed for 19,000 bbl. of portland cement, 785,000 ft. of roof sheathing, and 850,000 ft. of yellow pine and white oak. The scaffolding alone will aggregate 10,800 pieces. Over three and a half acres of wire glass will be used in skylights and windows, while the weight of new equipment will aggregate 3080 tons.

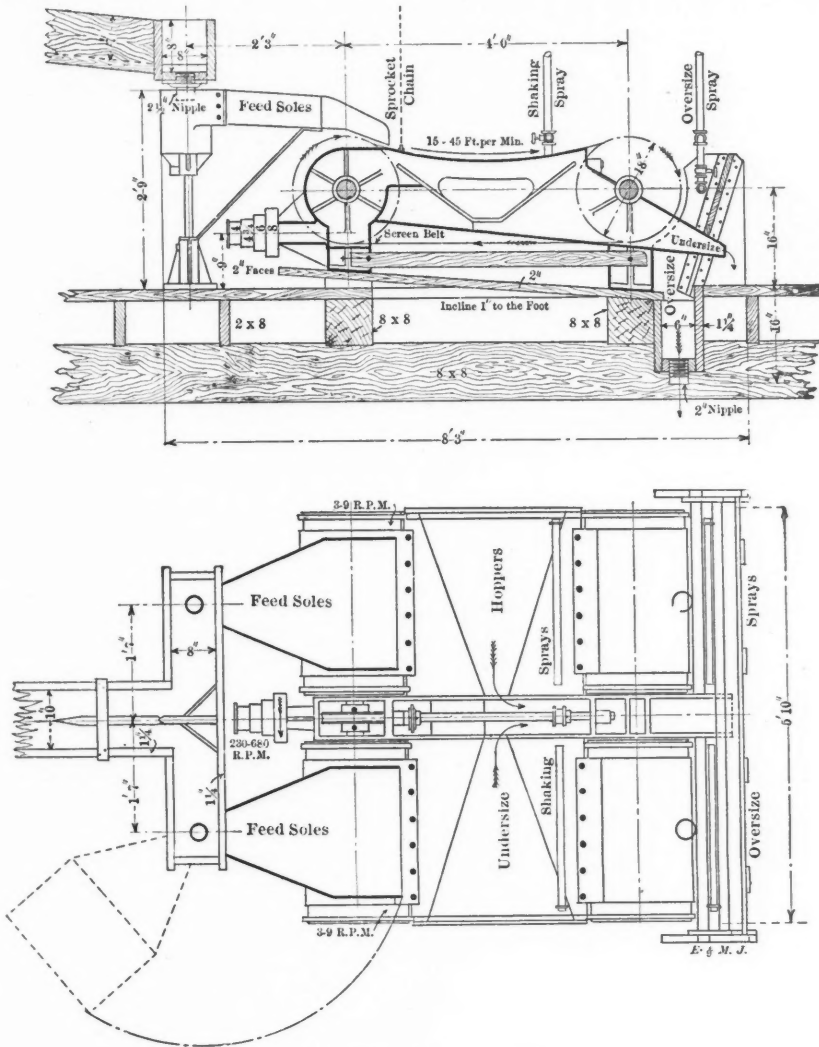
Forty-two motor-driven machine tools designed for use with high-speed steels, have been ordered. The combined weight of these machines, without motors, is about 2,140 tons. About 75 Allis-Chalmers-Bullock motors of various sizes, aggregating a total of 1,200 h.p., will be employed to drive these. Fourteen of the new tools are vertical boring and turning-mills, from 8 to 16 ft. capacity. There are five standard shaft-lathes, and two crank-shaft lathes, with swings of from 60 to 125 in. and 30 ft. between centers; eight planers of various sizes, all of the spiral-gear type; a 260-ton armature press, several drilling and boring machines, slotters, and miscellaneous appliances.

In addition to the order for machine tools, 34 electric traveling cranes were ordered at the same time, of Pawling & Harnischfeger, in sizes ranging from 2½ ton wall jib-crane up to a 60-ton crane with 10-ton auxiliary hoist, for the new foundry. The combined weights of the cranes ordered is approximately 940 tons.

A new transportation problem was recently presented in the form of a huge engine bed-plate, weighing approximately 80 tons and forming part of the great blowing engine purchased some time ago for the Carnegie Steel Company's plant at Sharon, Pa. The weight of this casting, as well as the growing demand for cars of greater capacity suitable for carrying heavy parts, induced the company to design a special car for the purpose.

In order to provide for the needs of the new works, orders have been placed for two 16-wheel flat cars with a capacity of 100 tons each, to be built in accordance with the practice in the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad Company. They will be 41 ft. in length, with bolsters not less than six feet from the ends and will be built low, in order to furnish the necessary clearance. They are made of open-hearth steel and were expected to be ready for use at the end of February.

The possibility of zinc mining in northern New Hampshire is now attracting considerable attention.



CALLOW TRAVELLING-BELT SCREEN.

slot-screen. The feed is the regular Bunker Hill ore, that is not high enough grade to be called first class and yet too high grade for a regular mill feed.

Laboratory experiments showed that if this ore could be screened on 80 mesh after crushing to 60, the undersize will run 45 per cent. lead and that a 75 per cent. lead concentrate could be made by tabling the oversize; this makes a first class shipping product by the simple operations of crushing, a single screening, and one tabling. These experiments have been fully borne out in practice. The machine is handling at the rate of 100 tons per day making 50 tons of 80 mesh undersize

chain was used; it was not sufficiently grit proof.

The Hecla Mining Company, a near neighbor of the Bunker Hill, has ordered two of these machines, intending to replace water classification entirely by means of them, screening down to 80 mesh.

Heavy creeps and movements are frequently experienced in the mines of the Cœur d'Alenes. Conditions of this kind had to be taken care of in the Snow-storm, Hercules, Morning and Bunker Hill mines last year. The motion is usually slow and gives ample warning.

### Theoretical Aspects of Lead-Ore Roasting.\*

BY C. GUILLEMAIN.

It is well known that the process of roasting lead ores in reverberatory furnaces proceeds in various ways according to the composition of the ore in question. Thus in roasting a sulphide lead ore rich in silica, one of the reactions is:  $PbS + 3O = PbO + SO_2$ . But this reaction is incomplete, for the gases which pass on in the furnace are rich in  $SO_2$  and in  $SO_3$ . And so it is found that whatever lead oxide is formed passes over almost immediately into lead sulphate, according to the reaction:  $PbO + SO_2 + O = PbSO_4$ . This reaction is the chief one which takes place. Whether the silicious gangue serves as a catalyzer for the sulphur dioxide, or whether it serves merely to keep the galena open to the action of the gases, the end result of the roast is usually the formation of lead sulphate according to the above reaction.

In the case of an ore rich in galena, a slow roast is essential, for it is desired to have the following reaction take place during the latter part of the roast:  $PbS + 3PbSO_4 = 4PbO + 4SO_2$ . Now if the heating were too rapid, not enough lead sulphate would be found to react with the unaltered galena. The quick roasting of a rich ore would result in the early sintering of the charge, and sintering prevents the further formation of lead sulphate. Whether this sintering (which takes place so easily and which is so harmful in the latter part of the process) is due to the low melting point of the lead sulphide, whether the heat evolved by the reaction,  $PbS + 3O = PbO + SO_2$ , is sufficient to melt the lead sulphide, or whether other thermochemical effects (notably the preliminary sulphatizing of the lead sulphide) come into play, must for the present be undecided. Suffice it to say that the sintering of the charge works against a good roast.

In the Tarnowitz process a definite amount of lead sulphide is transferred into lead sulphate by a preliminary roast. The sulphate then reacts with the unaltered lead sulphide, and metallic lead is set free, thus:  $PbS + PbSO_4 = 2Pb + 2SO_2$ .

But when a very little of the sulphide has been transformed into sulphate, and when there is so little of the latter present that but a small amount of lead sulphide could be reduced to metallic lead, the mass of ore begins to sinter and grow pasty. Very little lead could be formed were it not for the addition of crushed lime to the charge just before the sintering begins. This lime breaks up the charge and cools it, prevents any sinter-

ing, and allows the continued formation of lead sulphate.

It can scarcely be held that the lime has any chemical effect in forming lead sulphate, or in forming a hypothetical compound of lead and calcium. Even if such theories were tenable from a physico-chemical point of view, they would be lessened in importance by the fact that other substances, such as purple ore or puddle cinder, act just as well as the lime.

There are now to be mentioned several new processes of lead-ore roasting whose operations fall so far outside the common ideas on the subject, that their investigation is full of interest. For a long time the attempt had been made to produce lead directly by blowing air through lead sulphide in a manner analogous to the production of bessemer steel or the converting of copper matte. In the case of the lead sulphide, the oxidation of the sulphur was to furnish the heat necessary to carry on the process.

After many attempts along this line, Antonin Germot has perfected a method, wherein by blowing air through molten galena, metallic lead is obtained. About 60 per cent. of a previously melted charge of galena is sublimed as lead sulphide, and the rest remains behind as metallic lead. The disadvantages of the process are the difficulties of collecting all of the sublimate and of working it up. Moreover, it is impossible as yet to secure two products one of which is silver-free and the other silver-bearing. The silver values are in both the metallic lead and in the sublimed lead sulphide.

While the process just described answers for pure galena, it fails with ores which contain about 10 per cent. of gangue. In the case of such ores, they form a non-homogeneous mass when melted, and the blast penetrates the charge with difficulty. If the pressure is increased the air forces itself out through tubes and canals which it makes for itself, and the charge freezes around these passages.

Messrs. Huntington and Heberlein have gone a little farther. Although they are unable to obtain metallic lead directly, they prepare the ore satisfactorily for smelting in the blast furnace, after their roasting is completed. The inventors found that if lead sulphide is mixed with crushed lime, heated with access of air, and then charged into a converter and blown, the sulphur is completely removed in the form of sulphur dioxide. The charge, being divided by the lime, remains open uniformly to the passage of air, and sinters only when the sulphur is eliminated.

The inventors announce, as the theory of their process, that at 700 deg. C. the lime forms a dioxide of calcium ( $CaO_2$ ) which at 500 deg. C. breaks down into lime ( $CaO$ ) and nascent oxygen. This nascent oxygen oxidizes the lead sul-

phide to lead sulphate according to the reaction:  $PbS + 4O = PbSO_4$ . Furthermore it is claimed that the heat evolved by this last reaction is large enough to start and keep in operation a second reaction, namely;  $PbS + PbSO_4 = 2PbO + 2SO_2$ . The theory, as just mentioned, cannot be accepted, and some of the reasons leading to its rejection will be given.

It is well established that the simple heating of lime with access of air will not result in further oxidation of the calcium. The dioxide of calcium cannot be formed even by heating lime to incandescence in an atmosphere of oxygen, nor by fusing lime with potassium chlorate. Moreover, calcium stands very near barium in the periodic system. And as the dioxide of barium is formed at a low temperature and breaks up on continued heating, it seems absurd to suppose that the dioxide of calcium would act in exactly the opposite manner. Moreover, a consideration of the thermo-chemical effects will disclose more inconsistencies in the ideas of the inventors. The breaking up of  $CaO_2$  into  $CaO$  and  $O$  is accompanied by the evolution of 12 cal. The reaction of the oxygen (thus supposed to be liberated) upon the lead sulphide is strongly exothermic, giving up 195.4 cal. So much heat is produced by these two reactions, that if the ideas of the inventors were true, the further breaking up of the calcium dioxide would stop, as the whole charge would be above 500 deg. C. It appears, then, that the explanations suggested by Messrs. Huntington and Heberlein are untrue.

In the usual roasting process, as carried out in reverberatory furnaces, it is well established that the gangue, and whatever other substances are added to the ore, prevent mechanical locking up of charge particles since they stop sintering. It is not at all improbable that in the new roasting process, the chief, if not the only part played by the lime, is the same as that played by the gangue in reverberatory-furnace roasting. A few observations leading to this belief will be given.

It is known that other substances will answer just as well as lime in this new roasting process. Such substances are manganese and iron oxides. Not only these two substances, but in fact any substance which answers the purpose of diminishing the local strong evolution of heat, due to the reaction,  $PbS + 3O = PbO + SO_2$ , serves just as well as the lime. This fact is proved by exhaustive experiments in which mixtures of lead sulphide on the one hand, and quartz, crushed lead slags, iron slags, crushed iron ores, crushed copper slags, etc., on the other hand, were used for blowing. All these substances are such that any chemical action, analogous to the splitting up of  $CaO_2$ , or the formation of plumbates as suggested by Dr. Borchers,

\*Abstracted from *Metallurgie*, II, 18, Sept. 22, 1905, p. 433.

cannot be imagined. The time is not yet ripe, without more experiments on the subject, to assert conclusively that there is no acceleration of the process due to the formation of plumbates through the agency of lime. But the facts thus far secured point out that such reactions are, at least, not of much importance.

Theoretical considerations point out that it ought to be possible to avoid the injurious local increase of temperature during the progress of this new roasting process, without having to add any substance whatever. To explain: The first reaction taking place in the roasting is  $PbS + 3O = PbO + SO_2 + 99.8$  cal. Now the heat thus liberated may be successfully dispersed if there is, in simultaneous progress, the endothermic reaction:  $PbS + 3PbSO_4 = 4PbO + 4SO_2 - 187$  cal. Hence if there could be obtained a mixture of lead sulphide and of lead sulphate in the proportions demanded by the above reaction, then such a mixture ought to be blown successfully to lead oxide without the addition of any other substance. Such a process has, in fact, been carried out. The original galena is heated until the required amount of lead sulphate has been formed. Then the mixture of lead sulphide and of lead sulphate is transferred to a converter and blown successfully without the addition of any other substance.

The adaptability of an ore to the process just mentioned depends on the cost of the preliminary roast and the thoroughness with which it must be done. As is known, when lead sulphide is heated with access of air, it is very easy to form sintered incrustations of lead sulphate. If these incrustations are not broken up, or if their formation is not prevented by diligent rabbling, the further access of air to the mass is prevented and the oxidation of the charge stops. If ores with such incrustations are placed in the converter without being crushed, they remain unaltered by the blowing. If the incrustations are too numerous the converting becomes a failure.

It has been found that the adoption of mechanical roasting furnaces prevents this. Such furnaces appear to stop the frequent failures of the blowing which are due to the lack of care on the part of the workmen during the preliminary roasting. Moreover, in such mechanical furnaces a more intimate mixture of the sulphide with the sulphate is obtained, and the degree of the sulphatizing roast is more easily controlled.

As a summary of the facts connected with this new blowing process, it may be stated that the best method of working can be determined upon and adopted if one has in mind the fact that the amount of substance (lime) to be added is dependent on: 1, The amount of sulphur present; 2, the forms of oxidation of this sulphur; 3, the amount of gangue in the ore; 4, the specific heats of the

gangue and of the substance added; 5, the degree of the preparatory roasting and heating.

For example, with concentrates which run high in sulphur, there is required either a large amount of additional material, or a long preliminary roast. The specific heat of the added material must be high, and the heat evolved by the oxidation of the sulphur in the preliminary roast must be dispersed. Oftentimes it is necessary to cool the charge partially with water before blowing. On the other hand, if the ore runs low in sulphur, the preliminary roast must be short, and the temperature necessary for starting the blowing reactions must be secured by heating the charge out of contact with air. Not only must no flux be added, but oftentimes some other sulphides must be supplied in order that the blowing may be carried out at all.

The opportunity for the acquisition of more knowledge on this subject is very great. It lies in the direction of seeing whether or not the strong local evolution of heat cannot be reduced by blowing with gases poor in oxygen rather than with air. Mixtures of filtered flue gases and of air can be made in almost any proportion, and such mixtures would have a marked effect upon the possibility of regulating the progress of the oxidation of the various ores and ore-mixtures which are met with in practice.

#### The Westinghouse Variable Speed D. C. Motor, Type SA.

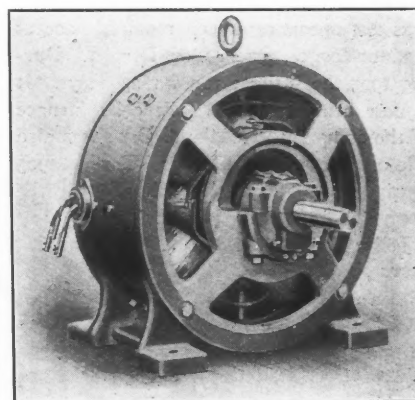
In many classes of work a wide speed variation is required and to meet the demands of such service the Westinghouse Electric and Manufacturing Company has developed a line of direct-current motors having a speed range of four to one on a single voltage. This variation is obtained by field control and the new motors are similar mechanically and electrically to the Westinghouse type S motors, except for the addition of auxiliary poles and coils. These are introduced in order to control the field during the variation of field strength necessary to obtain so wide a range of speed.

The construction is simple, cast-steel poles with machine-formed coils being placed midway between the main poles and securely bolted to the frame; this introduces no complications, nor does it make the removal of the main poles and field coils difficult. An auxiliary pole and coil can be taken out, without disturbing the main field winding, by simply disconnecting the coil connections, withdrawing the bolts which hold the pole to the frame, and sliding the pole and coil out parallel to the shaft.

The auxiliary field winding is connected in series with the armature and produces a magnetizing effect which is proportional to the armature current. The coils are placed as close to the armature surface

as mechanical considerations will permit and their turns are concentrated at that point. This arrangement applies the corrective influence of the auxiliary winding directly at the points where the distorting effect of the armature current is strongest. The arrangement is much more effective than the distribution of the ampere turns along the length of the auxiliary poles. The auxiliary magnetic field acts in opposition to the armature reaction. The resultant field is made up of three components—that due to the shunt winding, that due to armature reaction, and that due to the auxiliary winding. The field distortion usually produced by armature reaction is overcome and the shape of the magnetic field at the point of commutation is maintained as formed by the main poles; good commutation is made possible over a wide range of speed.

These motors are shunt wound, having a definite speed for each point of the controller; this speed is nearly constant for all loads. Heavy overloads may be mo-



WESTINGHOUSE MOTOR.

mentarily developed without injurious sparking. The motors are reversible without danger and without readjustment of the brushes; and, as the armature and auxiliary windings are connected permanently in series, it is only necessary to change the external armature connections to reverse the directions of rotation.

These motors develop their full rated output throughout their entire range of speed. They will carry full rated load at any speed within their range for six hours with a temperature rise not exceeding 40 deg. C. in armature and field, and not exceeding 45 deg. C. on the commutator, as measured by a thermometer. An overload of 25 per cent. may be carried for one hour without injurious sparking.

The air hammer hand drills weigh about 17 lb. each, irrespective of make, and consume about 25 cu.ft. of free air per min. They should be operated at about 80 to 90 lb. pressure.

From coal, at Leamington, Eng., about 28 lb. of ammonium sulphate is obtained per ton; and from 1 to 4 lb. of ammonium sulphocyanate. The recovery varies.

### Canadian Blast Furnaces.

The following notes on Canadian furnaces are reported by the American Iron and Steel Association:

Of the four furnaces of the Dominion Iron and Steel Company, of Sydney, Nova Scotia, three were in blast on Dec. 31. The company is holding its idle furnace in reserve and will blow it in when any of the furnaces which are now active blow out for repairs.

The Londonderry Iron and Mining Company, of Londonderry, N. S., has dismantled furnace B. The stack was built in 1875-6 and was 62x18 ft. It has been idle for several years. Furnace A ran for 293 days in 1905 and was active on Dec. 31. Foundry iron only was made.

The Nova Scotia Steel and Iron Company has abandoned its Ferrona furnace at Ferrona, N. S. It was 65x15 ft., was blown in in 1892 and was last active in June, 1904. It will probably be dismantled.

The Canada Iron Furnace Company was not operating its charcoal furnace at Radnor forges, Quebec, on Dec. 31. During 1905 the furnace ran for 236 days. It is now being re-lined. The coke furnace of the company at Midland, Ont., was also idle on Dec. 31 for re-lining. During 1905 it ran for 345 days. It will probably be ready for blast early in March.

John McDougall & Co., of Montreal, operated Grantham furnace at Drummondville, Quebec, for 48 days during 1905 and their St. Francis furnace at the same place for 285 days. Grantham was idle on Dec. 31, but St. Francis was active. Charcoal pig iron only is made.

The Algoma Steel Company of Sault Ste. Marie, Ont., had No. 1 and No. 2 furnaces in blast on Dec. 31. Furnace No. 1 ran for 290 days during 1905 and No. 2 was in blast during the entire year. No. 1 used charcoal alone, charcoal and coke mixed, and coke alone for fuel. At the close of 1905 it was using coke alone and this fuel will probably be used during the first half of 1906. Furnace No. 2 used coke only during the whole of 1905. No work was done in 1905 on the two furnaces for which ground was broken in 1901, but upon which work was subsequently suspended. Nor is it likely that work will be resumed upon these furnaces during 1906.

The charcoal furnace of the Deseronto Iron Company, at Deseronto, Ont., was out of blast on Dec. 31, but ran for 348 days during 1905. Work was resumed on Jan. 18.

During 1905 the Northern Iron and Steel Company did no work whatever upon the furnace at Collingwood, Ont., which it acquired in September, 1904. Nor is it likely that work will be resumed during 1906.

The Atikokan Iron Company, of Port Arthur, Ont., is pushing work on the coke furnace for which it broke ground a short

time ago and now expects to have the stack completed and ready for operation by Aug. 1.

Eugene Haanel, Superintendent of Mines of the Dominion of Canada, states that the experimental furnace which the Canadian Government erected at Sault Ste. Marie last year for the manufacture of pig iron by electricity was in operation for about 15 days during January, 1906, and that about 36 tons of pig iron were made. The furnace was not operated during 1905. The experiments are being made by Dr. Heroult, of La Praz, France, under the supervision of Dr. Haanel.

### Mining at Broken Hill.

The Broken Hill Proprietary produced 5,007,698 oz. silver and 66,462 tons lead in 1905. The total number of men employed at Broken Hill at the close of 1905 was 7717. This is the highest number in the history of the field. In 1900—the boom year—it was 7010. Each of the mines along the line of lode is employing more men than three months ago. The figures for the individual mines are: Proprietary, 3036; Block 10, 662; Central, 995; South, 902; South Blocks, 18; Block 14, 170; British, 594; Junction, 157; Junction North, 219; North, 380; others, 385. In addition the Proprietary gives employment to 1361 men at Port Pirie and 68 at the Iron Knob, 62 at Point Turton, and 75 at the Bellambi coke works. At Cockle Creek the Sulphide Corporation finds employment for between 400 and 500 men. This brings the total directly dependent upon Broken Hill mines during 1905 up to over 9500.

According to *The Mining Journal* there is considerable dissatisfaction at Broken Hill at the action of the South Australian Government in increasing the railway rates for the carriage of ore from the border to Port Pirie, the excuse being that the increased values of metals justified the augmented rates. It is admitted that it was the Broken Hill trade which kept the South Australian railways together, and also that the increasing traffic is swelling the railway revenue; but the State wants more money to spend, hence the rise. Local opinion is voiced by a leading mine manager, who says that the freight on ore should not be based on the price of metals. Either it is worth so much to carry ore to port, or it is not.

### Improved McDougall Furnaces.

Frank E. Marcy, of Chicago, Ill., has patented (U. S. No. 802,007, Oct. 17, 1905) an improvement in ore-roasting furnaces having superimposed hearths, as in the McDougall type. In order to avoid the necessity of shutting down at times, to clean off the accretions or "barrings" on the roof of the upper hearth, he provides

means to keep the dust from rising to the hearth-dome when there is a discharge to the lower hearth. This is accomplished by providing each of the rabble-arms with an extended plate or surface coming over the discharge opening. The accretions will then tend to form on these rabble-plates, from which they can be removed through the furnace doors without closing down.

August R. Meyer, of Kansas City, Mo., has patented (U. S. No. 804,751, Nov. 14, 1905) an improved roasting furnace, and assigned the same to the United Zinc and Chemical Company. In a type of heating or drying furnace having a series of superimposed hearths, he provides a central hollow shaft, having hollow arms extending over the hearths, and through this shaft and arms he circulates cooling air, preferably moistened by water flowing down the inner surface of the hollow shaft. Inside the hollow shaft is a central rod for supporting horizontal partitions for dividing the arms and shaft sections.

Henry Howard, of Brookline, Mass., has patented (U. S. No. 804,227, Nov. 14, 1905) an improved roasting or desulphurizing furnace. He uses an upright tubular air-shaft, extending through the top arch, and employs means for introducing hot air from the shaft into the charging chamber. The waste heat of the furnace is used to dry the incoming material, which is placed in a chamber on top of the furnace, and stirred and dried before being fed into the furnace proper. There is also a device for feeding positively the dried material through a duct near the bottom of the chamber to the interior of the furnace.

### Removal of Iron From Water.

*The Engineering Record* (Feb. 17, 1906, p. 191) states that iron removal is accomplished at the Richmond, Mo., waterworks by means of a plant designed by Wynkoop Kiersted, of Kansas City. Water is raised by low-pressure pumps from wells to the top of a frame carrying four horizontal sieves in a thin spray, becoming fully aerated in this way, and is collected in a circular basin 17 ft. in diameter, from which it passes to an annular reservoir encircling the first. This has a width of 16 ft. 6 in. and is surrounded in turn by another annular basin of the same width. Part of this is partitioned off and filled with sand and gravel, so as to serve as a sand filter, while the remainder is used as a clear-water basin. The entire structure is built of reinforced concrete, Iola portland cement being used.

More fatal and serious accidents result from the careless handling of nitro-glycerin blasting compounds than from any other single cause in Idaho.



# THE ENGINEERING AND MINING JOURNAL

## Contents.

	PAGE
Editorials:	
Notes .....	473
Milling at the Osceola .....	473
Zinc Industry in Belgium .....	473
The Quincy mine.....	474
Tin Mining in the United States....	474
The Smelter Smoke Question.....	475
Ancient History and Modern Invest- ments .....	457
White Portland Cement .....	458
Pig-Iron Production in Canada.....	458
Patience in Speculation.....	458
*National Mining Company's Mines, <i>Editorial Correspondence</i> .....	459
Tin Prospects in Victoria .....	461
*Holsting Methods at Butte, <i>A. H. Wethey</i> .....	463
Electrolytic Tin Refining .....	466
The Seizure of El Tigre Mine.....	467
Analysis of Tin-Tungsten Ores.....	467
Timber Land Reservations .....	467
*A Traveling-Belt Screen. <i>J. M. Cullow</i> ..	468
The New Allis-Chalmers Machine Shops Theoretical Aspects of Lead-Ore Roast- ing .....	469
*The Westinghouse Variable Speed D. C. Motor, Type SA.....	471
Canadian Blast Furnaces .....	472
Mining at Broken Hill .....	472
Improved McDougall Furnaces.....	472
Removal of Iron from Water.....	472
Gold Dredging in Northern California..	481
Distillation of Gold .....	481
Metallics .....	476
Colliery Notes .....	477
Correspondence and Discussion:	
Underground Surveying, <i>Floyd L. Burr</i> .....	477
Opposition to Gold Dredging, <i>N. B. Crane</i> .....	478
New Publications .....	478
Professional Papers .....	479
Abstracts of Official Reports:	
Quincy Mining Company .....	480
Adventure Consolidated Copper Com- pany .....	480
Osceola Consolidated Mining Company	480
Patents .....	481
Personals .....	482
Obituary .....	482
Societies and Technical Schools.....	482
Trade Catalogs .....	483
Industrials .....	483
Construction News .....	483
Special Correspondence:	
Butte .....	485
Bisbee .....	485
Goldfield, Nev. ....	484
San Francisco .....	484
Salt Lake City .....	486
Denver .....	486
Johannesburg, Transvaal .....	490
Leadville .....	487
Cripple Creek .....	487
Platteville, Wis. ....	488
Scranton .....	489
Joplin, Mo. ....	488
Paradise, Ariz. ....	485
Duluth .....	487
Indianapolis .....	489
Toronto, Can. ....	489
Mexico .....	489
London .....	490
General Mining News .....	491
Foreign Mining News .....	495
Markets .....	500

\*Illustrated.

THE APPROXIMATE QUANTITY of natural gas produced in 1904, at a pressure of 4 oz. to the square inch, was 256,645,000,000 cu ft., or 6,159,840 tons of 2,000 lb. If the density remained the same throughout, it would fill a pipe that would encircle the globe at the equator and whose diameter would be slightly greater than 50 ft.

DESPITE THE UNPRECEDENTED drought of early winter, the average rainfall at most points in the mountains of California has thus far been as usual, owing to late rains. There is now plenty of water for every purpose, but the snow is melting so fast in the high Sierras that some alarm is felt over the water supply for next summer. Much more snow is needed. Freight teams are now hauling in loads to mountain points, which have never before witnessed such scenes in February.

THE REPORT OF Robert M. Bell, State Inspector of Mines for Idaho, is always one of the first of the State reports to reach us, and is one of the best. His report for 1905 was the first official report for that year, so far as we are aware. Such promptness is highly commendable. The report is a thorough and instructive review of mining conditions in Idaho and contains many suggestions which may profitably be considered.

### Milling at the Osceola.

We have frequently referred to the very low cost of ore dressing which has been attained in the mill of the Osceola Consolidated Mining Company. The report of the company for 1905 shows a further decrease, the average cost per ton of rock stamped having been only 16.95c., as against 18.12c. in 1904. These extraordinary figures were attained on the treatment of about 1,000,000 tons of rock per annum. The quantity stamped in 1905 was practically an even million of tons; the quantity in 1904 was 1,095,520 tons.

These are remarkably low figures. They are very nearly the best on record, if not actually the best. They would be remarkable even as a performance for crushing the ore, not to speak of the rest of the process, all of the ore passing through the mill having been crushed to go through a ¼-in. to 3/16-in. round hole. A change was made during the year in the standard of crushing, 3/16 in. being substituted for ¼ in. This change, together with other

improvements in the mill, increased its capacity over 25,000 tons per working month.

It is indicated in the report of Mr. Haire, the general manager of the company, that a further decrease in the cost of milling is to be expected in 1906, and we have no doubt that these expectations will be realized, in view of the high degree of efficiency to which this mill has already been brought, and the exceptional skill with which it is managed. A better showing would indeed have been made in 1905 if the mines had not been prevented by certain strikes and accidents from furnishing the mill with the full quota of rock.

### The Zinc Industry in Belgium.

The zinc industry in Belgium is almost entirely concentrated in the Province of Liège, but there are a few works in the Provinces of Anvers (Antwerp), Namur and Limbourg. The spelter production of Belgium is, after that of Germany, the most important of Europe. The statistics for 1904, which is the last year for which official figures are available, are instructive as to the present condition of the smelting industry, especially in showing to how great an extent the Belgium smelters are dependent upon imported ore.

The spelter production in 1904 amounted to 139,847 metric tons, of which 125,570 was produced in the Province of Liège. The Belgium ore consumed in this production amounted to only 3050 tons, which was less than one per cent. of the total consumption; 304,320 tons of ore was imported. The following table shows the sources of ore supply during three years, in metric tons:

Country.	1902.	1903.	1904
Italy and Sardinia .....	74,740	71,674	66,538
France.....	25,522	27,268	32,288
Sweden and Norway ....	19,333	24,888	24,867
Germany .....	22,365	13,252	12,016
Spain and Portugal.....	52,993	66,566	74,762
Algeria and Tunis.....	26,511	32,595	37,483
Greece .....	361	1,486	4,896
Australia .....	5,288	1,114	18,274
Eng'and .....	9,017	9,140	6,447
America .....	26,227	31,133	21,806
Turkey .....	569	789	496
Elsewhere.....	2,146	4,416	4,448
<b>Totals.....</b>	<b>265,012</b>	<b>£83,880</b>	<b>304,320</b>
Belgium .....	5,750	5,355	3,050
<b>Grand totals .....</b>	<b>270,762</b>	<b>289,235</b>	<b>307,370</b>

The entire importation of ore is made through the port of Antwerp, whence the ore is transported to the smelting works by the canals, of which an extensive system ramifies through this part of Belgium. Comparatively cheap transporta-

tion is thus enjoyed. In some cases the ore goes directly to the smelting works; in other cases it is interrupted in transit for roasting at sulphuric acid works, the burnt ore being thence forwarded to the smelteries. Thus, all the sulphide ore received by the Vieille Montagne Company is roasted at Baelen-Wezel on the Campine canal. The manufacture of sulphuric acid in Belgium is an important industry, the output in 1903 having amounted to 310,000 metric tons of 60 deg. Beaumé, a large proportion of which was derived from blende roasting. The only other source of sulphur employed in Belgium is pyrites, the cinder from which is usually sold as purple ore at a price of 8 to 9 francs per metric ton.

The sheet-zinc rolling mills in 1904 produced 41,492 tons of material, the average value of which was 592.31 francs per ton, which may be compared with the average value of 552.17 francs per ton for spelter. This shows an average differential of only 40.14 francs, or about \$8 per ton, which is quite different from what exists in the United States. Zinc oxide is made at only one works, the output of which in 1904 was 8500 tons, all of which is produced by the combustion of spelter.

#### The Quincy Mine.

The report of the Quincy Mining Company is of special interest, inasmuch as it represents a general summary of the receipts and expenditures of the company from its organization to December 31, 1905. These data are of especial value, because the Quincy is one of the oldest of the Lake companies (work having been done by it previous to 1856), since which time it has been a large producer, and its figures enable some deduction to be made as to the ultimate cost and profits in mining. The charging up of cost of plant and dead work, from year to year, is a matter of book-keeping and managerial opinion, as to which there is considerable difference. In the long run, however, there is no question as to where or how they should be charged. They constitute a portion of the cost of mining, just as do the costs of stoping, hoisting and other current expenses, which are allotted per ton of ore.

Up to December 31, 1905, the Quincy Mining Company had received for its products the sum of \$52,487,136.40, this rep-

resenting the production of 356,283,149 pounds of copper, together with a small output of silver, which is not stated in the report. Disregarding some comparatively small preliminary expenses, these being chiefly on the location previous to 1856 and on the Quincy vein (not now worked) in 1858, the total cost of production has been \$5,041,885.08 for real estate and plant; and \$32,915,150.36 for actual mining and smelting, marketing copper and administration. The total cost of production may be assumed, therefore, as \$37,957,035, leaving a net operating profit of \$14,530,101. This is about 28 per cent. of the gross production of the company.

There are comparatively few mining companies which report such data, wherefore it is difficult to make extensive comparisons. The Quincy figures compare favorably with the reports of such other large companies as are available.

The Broken Hill Proprietary Company, in the 20 years of its productiveness up to May 31, 1905, made an output aggregating \$130,290,491 out of which the dividends paid amounted to nearly 30 per cent. The Homestake Mining Company, of South Dakota, up to February, 1905, had produced about \$75,400,000, out of which dividends amounting to \$22,000,000, or approximately 30 per cent had been paid. It is to be remarked that both the Quincy and the Homestake mine ore that is comparatively low in grade; the property of the Broken Hill Proprietary Company comprises one of the greatest ore deposits that has heretofore been known in the world. It is a striking coincidence that these three important mines, of long record, should show an ultimate profit of so nearly the same figures.

We have no doubt that if similar figures could be obtained for mines of the first order, it would appear that a profit of 30 per cent. is rather above the average than below it, although it is well known that the ratio has been considerably exceeded in some very rich mines, like the Ontario, of Park City, Utah, which out of a gross production of about \$36,000,000, has given a profit of nearly 42 per cent. On the other hand, some successful mines show a good deal less. The Wallaroo & Moonta mines of South Australia have furnished up to date, a profit amounting to a little less than 15 per cent. out of a gross production of about \$60,000,000.

The Quincy is one of the best operated

mines at Lake Superior, and its management is to be complimented upon the full information which it communicates to its stockholders in the annual reports. We regret, however, that the figures are not given in such a way as will enable separation to be made between the costs of mining and milling, these data being of much technical value. On the basis of rock hoisted in 1905, the amount of which was 1,168,519 tons, the total running expenses at the mine (exclusive of taxes) came to \$1.47 per ton. Making a reasonable allowance for the milling expense, this indicates a comparatively low cost for mining, considering the depth and the conditions under which the mine is operated in its lowest levels.

#### Tin Mining in the United States.

Tin is known to exist in several parts of the United States, and at various times efforts have been made to exploit the deposits. This has been done in Virginia, the Carolinas, South Dakota and California. So far, however, all the attempts have been failures, some of them disastrous failures, involving the loss of much money. It has come to be the general opinion, therefore, that the United States has no important tin resources, and never will be a producer of tin. We should be unwilling, however, to indorse such as the final dictum. There are certainly some tin prospects in the United States which have been pronounced promising by experienced engineers, whose honesty is above question.

Tin ore is usually of low grade. There are a few lode mines in various parts of the world which may be considered rich, as for example the Mount Bischoff (of Tasmania), which has paid large dividends from ore yielding one per cent. tin, but many mines are worked successfully on a much lower average yield.

The indications point to the Black Hills of South Dakota as the most promising region of the United States for tin production. There is no question whatever that tin exists there in considerable quantity, and over a wide area. Some of the mineralizations are also extensive in size. The mineralization is, however, irregular; and few, if any, of the mines have been developed sufficiently to prove the probable yield of the ore in actual mining. The mineralization is such that determination of the probable grade of

the ore by mine sampling is almost impossible. The conditions are somewhat analogous to those which exist in the copper mines of Lake Superior and the lead mines of southwestern Missouri, where the actual grade of the ore can be reliably determined only by actual mining and milling. The same condition appears to exist at the tin prospects at Irish Creek, Rockbridge county, Virginia.

It is probable that ore yielding 10 lb. of metallic tin per ton can be produced in South Dakota. This would indicate a value of \$3.60 per ton of ore at the present high price for the metal, and a value of \$2.38 per ton at the average price for the last 10 years. If tin should fall again to the level reached during the nineties (the average price at New York in 1896 having been 13.29c. per lb.) the exploitation of a mine yielding only 10 lb. per ton would be doubtful, but in view of the present situation in tin production, a much higher level of prices is reasonably to be expected. This is leading to the exploitation of low-grade tin ore in various parts of the world, especially in Tasmania, where careful management enables the Anchor mine to be operated successfully on a yield of only 5 lb. of tin per ton. The success of some of these enterprises, together with the success in treating the low-grade ores of other metals, as for example the disseminated copper ore of Utah, should direct attention to the low-grade tin ore of South Dakota.

Attention is in fact being directed to that ore at the present time, but the efforts are feeble and apparently not well advised. It is folly to contemplate operations on a small scale. Success in such kind of mining is dependent upon approaching the problem in a broad way, involving large initial expenditure of capital, with a view to opening a mine to enable it to produce a large tonnage of ore, at least 1000 tons daily, and to provide the necessary milling capacity. The preliminary expenditure of a million dollars would be a moderate estimate.

The concentration of the low-grade tin ore of the Black Hills formerly gave much trouble because of the association of the cassiterite with the mica of the country rock, the latter being a coarse greisen. It is probable that modern methods of ore concentration would succeed in overcoming this difficulty. We hope that some effort will be made to test

thoroughly the possibility of tin production in the Black Hills.

### The Smelter Smoke Question.

The U. S. Circuit Court of Appeals has reversed the decision of the U. S. Circuit Court in the case of the United States against the Mountain Copper Company of Shasta county, California, thus dissolving the injunction against the company and permitting it again to operate its plant. The injunction was originally issued prohibiting the smelter of the corporation from being operated on the ground that the fumes and smoke damaged the timber holdings of the Government in that section of the country surrounding Keswick. The opinion reversing the Circuit Court was rendered by Judges Ross and Gilbert. Judge Hawley filed a dissenting opinion.

The copper company maintained in its defense before Judge Morrow of the U. S. Circuit Court, that the land, which the Government claimed was being ruined, was unfit for cultivation; that it was covered by scrub timber and brush; that the company, if prevented from smelting its copper ore in the manner employed, would be compelled to shut down its plant, which represents an investment of \$6,000,000, and thereby would cease to give employment to 1000 men. This contention was in a measure upheld by Judges Ross and Gilbert, who said in their opinion:

"It is quite true that it is a maxim of the law that every one must so use his own property as not to interfere with that of another. But where one cannot use his own property at all without injuriously affecting the property of another, then the sound discretion of the court of equity, that it appealed to, to abate the nuisance, is invoked, and should be wisely exercised. We have, then, the ownership in the complainant of a little over 4000 acres within the damaged zone, mountainous in character, with little or no soil, practically worthless for agriculture or horticulture, upon which most of the trees and undergrowth have been killed by the fumes generated by the appellant company (for which it is, of course, liable for damages for whatever they may have been worth), and upon which but little more vegetation of any

kind remains susceptible of destruction.

"In view of these facts—about which there seems to be no question upon the record—can it be doubted that the maximum injury that can result to the lands of the complainant embraced by the bill is but a mere trifle in comparison to the loss inflicted by the injunction in question upon the appellant company and those dependent upon and benefited by it? And such being the case, would it be a wise exercise of the sound discretion we are called upon to exercise, to sustain such injunction? We are of the opinion it would not."

Judge Hawley, in his dissenting opinion, took a view exactly opposite to that expressed by his associates. The burden of his decision is expressed in the following sentence:

"The innocent are not to suffer either in their property or comfort for the promotion of another's interest or profit."

He held that the value of the company's plant, the profits to be made from it, and the loss entailed by the shutting down of the plant, are no defense for injury to another's property. He concluded as follows:

"This court has no power under the laws of California to decree that appellant can condemn the lands of appellee for its individual use by paying a just compensation, and this court is not possessed of any authority to compel appellee to sell its lands to appellant. Nor has the appellant pointed out in what manner the Government could, if it wishes to accept appellant's offer, dispose of the lands without additional legislation by Congress."

While waiting for this decision, the smelting plant at Keswick has been practically closed down. Indeed, the company has meantime constructed a new plant at Bulls' Head Point on the shore of Suisun bay, an extension of San Francisco bay above Carquinez Straits. The decision of the court is important, however, not only in enabling the company to resume smelting at Keswick, if at any time it sees fit to do so, but also in establishing the law in such a way as to prevent similar injunctions against other companies which are now, or may hereafter, cause damage in an analogous manner. This decision, moreover, will do much to reduce the consideration of the smoke nuisance everywhere to a basis of fairness.

### Metallics.

Cast aluminum has an ultimate tensile strength of from 15,000 to 25,000 lb. per sq. in.; wrought aluminum, from 22,000 to 30,000 lbs.

The older the dynamite the more dangerous it becomes, being the more likely to burn without exploding, and more likely to involve missed holes, and the consequent danger of repriming.

Platinum silver, as used for jewelry, is composed of two parts of silver and one part of platinum. It is easily worked and is susceptible of a high polish. Much of the ring and other mounting that masquerades as platinum is made of this alloy.

The rock-drill test which took place on the City & Suburban mine, Transvaal, and is frequently referred to, was in no way indicative of the capabilities of the different types of machines, or of their utility in the hard practical daily discharge of their duties underground.

The speed of a direct current electric motor depends on the number of armature conductors and the field strength. The armature must run at a speed such that the counter electromotive force generated will equal the applied voltage minus the drop in the motor.

Many of the accidents caused by fall of rock are from barring down small blocks. Three of the fatal accidents from this cause in the Cœur d'Alenes, in 1905, were due to falls of ground that in no case exceeded half a ton in weight, and with due precaution might have been prevented.

In any sieve or mesh, given equality of aperture diameter to that of the wire, the area of discharge is always one-fourth of the square of the unit of measurement. That is to say that, whatever the number of holes in the linear inch, only one-fourth of the square inch is available for discharge where these conditions obtain.

Anyone who has to do with screens, either in the mill or assay office, will find a micrometer gage, and what may be called a screen tester, very useful tools. The number of apertures per inch and the diameters of wires are sometimes quite different to the description of the screening furnished by the seller, and the foregoing appliances enable these points to be accurately determined. A difference of even a thousandth of an inch in the diameter of the wire makes a considerable variation in the percentage of screen area available for discharge.

The power developed by an electric motor is proportional to the product of the torque and the speed. The relation may be illustrated as a cable wound on a drum and used to hoist a load without the use of intermediate pulleys; the tension in the cable corresponds to the torque. Torque is a "static" function, a source of potential energy. If the load is

stationary, the torque may be the same but no power is developed. With a given torque, power is proportioned to the speed, and at a given speed, power is proportional to torque.

Experiments made by Swain and Bauschinger demonstrate that neat cement when set and hardened in air, contracts. This applies to all brands of high grade portland cement, and this contraction increases with age up to a certain period. The same authorities state that a mortar made of one part portland cement and three parts sand, hardened in air, shows contraction, but less in proportion than the neat cement. Concrete that has been mixed very wet does not appear to contract so much as that produced by dry mixture.

The requisites of a good non-conducting material for boilers, etc., are porosity, durability and lightness; it is the material containing the largest number of air cells or dead air spaces that gives the most efficient results. A covering that is fairly durable on low temperature work may be useless on high. There should be nothing in the material which can attack the metal to which it is applied. Sulphur, which is found in some coverings, is injurious. The materials which give the most satisfactory results are light in color; they radiate less heat than a dark colored material.

In rock drilling, rifling can be caused in various ways. Often by a tooth being broken out of the ratchet, by a pawl-stem being broken, by a bent drill, or by the operator not watching carefully the starting of his hole, the drill "runs away," bringing the steel in contact with the sides of the hole, causing the machine to labor, impeding the rotary movement and naturally causing rifling. This in many instances can be remedied by moving the machine to the line of the hole, and running it on a short stroke until it has gained the length of the stroke below the lowest point of rifling.

There is little use for the drill-man who sets his machine to nick away on a short stroke, trying to pitch a hole on an angled surface. The first thing a miner will do is to scrutinize his face and ascertain his chances of pitching. If unfavorable, he will rig in such a way as to give him the best chance to cut "collars" for these pitches; then setting his machine to its work, he has a clear run for the rest of his shift. Such a man on a cross-bar in a crosscut, where two men were running a machine each on the same bar, has been known to come out at the end of his eight hours two or three holes ahead of his partner, who practiced the "short stroke" nicking business to pitch his holes in a bad place.

The tractive effort required to propel a car at uniform speed on straight level track is only that necessary to overcome the train resistance at that speed. This is a variable quantity and is difficult to

determine. It is dependent upon the weight, size and shape of car; speed, condition of track, and of rolling stock. Train resistance has three component parts, namely, journal friction, rolling friction and wind resistance. The first is practically independent of speed, and rolling friction is inversely proportional to speed. Wind resistance is proportional to some power of the speed as yet undetermined, though it is often taken that the wind resistance increases as the cube of the speed. The train resistance is often taken as having a constant value of 20 lb. per ton.

The total number of men employed in mining of Idaho is approximately 6000; about half of these are in the Cœur d'Alenes. The total number of fatal mine accidents reported during 1905 was 20, or about 3.33 per 1000 men employed, as compared with 10 fatalities during 1904, and 20 during 1903, for about the same number of employees. The causes of the fatal accidents in 1905 were as follows: Explosion of blasting compounds, 5; fall of rock, 5; falling down chutes, 3; moving cage, 2; contact with trolley wires, 2; moving car, 1; caving ground "placer mine," 1; gasoline tank explosion, 1; total, 20. With one exception, where two men lost their lives together in a fall of ground, they were all single individual accidents, 14 out of the 20 being in the Cœur d'Alene. They were mostly due to reckless personal risk rather than to any unusual surrounding dangerous condition.

There are several devices for thawing dynamite, usually in the form of water-jacketed vessels surrounding a chamber with adjustable drawers or shelves, for which the water should be heated to a temperature no greater than the hand can comfortably bear. Where the manufactured article is not available, a fairly safe thawer can be made, suitable for softening 20 to 40 cartridges, by building a solid oblong box of two or three-inch lumber with a close-fitting lid and adjustable shelves. The box should be deep enough to take in an ordinary 5-gal. coal-oil can in the center, and long enough for two tiers of loose wooden shelves, resting on cleats, at each end. Then, if covered with a tight-fitting lid and banked around with dirt, it will hold the cartridges in good condition for several hours. It should be placed in a cellar at the surface, away from other buildings, if possible, or in some out of the way cross-cut. The water should never be heated by candle snuffs in the same receptacle containing the powder, as this is a dangerous practice. Any thawing device of whatever kind should be cleansed and kept free from glycerin saturation, as the latter renders wood, cloth, paper or earth on which it can drip, dangerously susceptible to explosion by either heat or concussion.

### Colliery Notes.

In laying out new workings precaution should be taken to leave ample coal pillars surrounding the shaft or flanking the slope. The size of the pillars is determined by the depth of shaft or overlying cover of slope.

The differences in the height of gas caps in testing lamps is due to differences in the heat (and height) of the testing flame, and the size and shape of the burner. A dull background also assists in increasing the flame and cap heights.

All air-stoppings should be substantially built of stone or bricks and plastered to render them perfectly airtight. When good clay is available, a good air-stopping can be made by building double brick walls and filling the space between them with tamped clay.

Dolomitic concretions are often found in some of the Westphalian coal seams. They are petrifications of the coal-forming vegetation, and are geologically useful in distinguishing the various seams, as certain seams possess them in abundance while others of different geological ages are devoid of them.

In determining the size of coal pillars to prevent squeezing, the depth of cover, width of working place, nature of coal, roof and bottom, as well as the inclination and thickness of the seam, and the method of working, have all to be taken into consideration. Experience gained in neighboring collieries will also be of value.

Chemical analyses of coal samples will not throw much light on the behavior of the coal on distillation on a large scale. It has been found that coals from different localities having a similar chemical composition, behave very differently during distillation. The only way to estimate this property accurately is by actual experiments in fairly large retorts.

The sensitiveness of safety lamps can be considerably increased by reducing the luminosity of the illuminating flame. Copper chloride dissolved in alcohol, in order to color the flame, has proved effective, but it cannot be practically employed on account of its corrosive action on the lamp fittings. Ethylene chloride has been found to give more satisfactory results.

Accidents from gas explosions in collieries can be largely avoided by maintaining an efficient ventilating current and by proper attention to air-splitting and coursing. Notwithstanding the large amount of evidence showing the necessity of these precautions, the rapidly increasing number of accidents from explosions shows that in a large proportion of coal mines the ventilation is defective.

Impurities in coal like slate, bone, spar and fireclay increase the amount of ash and decrease the calorific value of the coal. They also cause excessive clinker-

ing and obstruct the furnace grates. Iron pyrite when present in coal often destroys the grate bars. The removal of a large amount of incombustible matter from the coal reduces the quantity of ash, consequently it is generally advisable to wash coals of poor quality.

A platinum wire which is heated by the lamp flame, is now employed in several valuable testing lamps for collieries in order to assist the eye in detecting a low percentage of fire damp. In the Ashworth lamp a thin platinum wire coil is placed either in or over the wick flame. In the Beard & Mackie lamp there is a series of platinum wires strung between two standards at fixed distances apart. This arrangement enables the reading to be rapidly and easily done, as the highest wire to glow gives the percentage of fire damp present in the air. The chief defects in these indicators arise from the deposition of soot on the platinum, which obscures the reactions.

Heat lost from a pipe covering in mine workings is proportionate to the area of the outside of the covering. A non-conducting covering of one inch in thickness will nearly double the diameter of a 2-inch pipe, but will add very little to a 20-inch pipe. The loss is consequently different for pipes of various diameters. The effect of the covering will be more pronounced as the diameter decreases. A 2-inch pipe loses 718 units of heat per sq. ft. per hour, while a 4-inch pipe loses only 664 units. The loss of heat with the best types of non-conducting coverings may be calculated at half a thermal unit per foot area per degree of temperature difference. This points to the necessity of keeping the compressed air pressure mains in coal mines as large in diameter as possible.

The separation of coal from its impurities is done by taking advantage of the difference in specific gravity between the coal and foreign matters associated with it. When equal-size pieces of coal and a heavier material are thrown into a tank containing water, the heavier matters sink more rapidly than the coal and forms a bed on the bottom of the tank, while the coal rests on top, thus affording a rough separation of the two. This principle is practically employed in various ways, but chiefly by means of jiggling machines, which consist of a large water tank, in one side of which is a partitioned space fitted with a movable piston. The downward movement of the piston forces the water upward through a perforated bottom in the other portion of the tank. The mixture of coal and impurities is fed slowly and regularly into the perforated bottom, and is raised by the upward force of the water during the downward stroke of the piston. A series of scrapers collect the coal that remains suspended a longer time in the water, and drag it up an inclined trough.

### Correspondence and Discussion.

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.

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

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

#### Underground Surveying.

Sir—The correspondence column of the JOURNAL (Jan. 20, 1906, p. 144) contains a letter from Nimmo Boush criticising my paper on the "string method" for rough surveys underground. I think a discussion of the general subject of rough surveys would be very valuable to the readers of the JOURNAL and I hope that Mr. Boush's letter may be taken as the beginning of such a discussion. I would suggest that engineers give their ideas not only on the "string method," but also tell of their own practice for various sorts of rough surveys above and below ground. It seems to me that there can be little question as to the necessity for occasional rough surveys.

Referring to what Mr Boush says about the time taken for the application of the string method, there is no doubt in my mind as to the superiority of the string work. I have made surveys in rises using the base board for the support of the transit and even when the places were dry and free from smoke, the time consumed was five or six times that by the use of a string.

I know of very few situations where the string could not be used and the transit could. Seeming exceptions are those where the angle between strings approaches 180 deg. or where one or both strings are very steep—say 80 deg. above or below the horizon. The first can be overcome by stretching an auxiliary string and thus measuring the angle in two portions the sum of which is equal to the large angle desired. The second case is not quite so easy to get around, but even that can be overcome usually by a little ingenuity.

He mentions work with cords on the surface. It should be borne in mind that on the surface there is usually too much wind to admit of good results. I seldom have any difficulty in measuring to the intersection of the strings even at wide angles or to get at all three sides of the triangle for measurement. I have not found many places where the shortest side of the triangle could not be made at least 5 ft. and would suggest for such occasional situations, as well as where unusual accuracy is required, that two or more combinations of measurements be made by moving the riders to somewhat different positions on the strings. The average result should be good.

Now the matter of accuracy. That is naturally and properly the first consideration and probably doubt on this point exists in the minds of many. Unfortunately the JOURNAL abbreviated my paper and left out some essential portions. In answer to Mr. Boush I append a tabular record of a test on seven angles which I measured by the "string method" under the usual conditions underground. The same angles were measured with the transit and the errors computed on the basis of the transit work. These were not picked cases but were taken in succession and none were culled out. They were taken carefully but hurriedly and only one set of measurements made for each. The vertical angles were measured, as described, by the straight-edge of a Brunton pocket mine transit. By taking greater care and by repetition greater refinement could probably have been attained.

The errors were respectively:—25 min., + 15 min., + 16 min., + 27 min., + 07 min., + 44 min., and + 09 min., or an average of 20 min., a maximum of 44 min., and a total net error of + 1 deg. 33 min. for the seven angles. I would call attention to the fact that in all seven cases the shortest side of the triangle of measurements was between 4 and 6 ft.

In explanation of the record of tests *a*, *b* and *c* are the three measurements between riders and vertex. *A* and *B* are the vertical angles of the strings. *C* is the angle between the strings. *D* is the horizontal projection of *C*. The computation of the value of *D* comes from the spherical trigonometric formula

$$\cos \frac{D}{2} = \sqrt{\frac{\sin s \cdot \sin (s - C)}{\cos A \cdot \cos B}}$$

in which

$$s = \frac{1}{2} [C + (90^\circ - A) + (90^\circ - B)]$$

taking into account the algebraic signs of *A* and *B*.

Field Notes.	1.	2.	3.	4.
c	9.925	5.020	12.390	8.245
a	4.035	5.755	5.750	4.490
b	6.980	6.990	7.015	5.135
A	0°	0°	-41°15'	-41°25'
B	+37°50'	+38°15'	+38°15'	+42°15'

Results.				
Graphical.				
C	126°58'	45°08'	152°11'	118°03'
D	139°47'	25°58'	142°52'	92°42'
Computation.				
C	126°29'	45°07'	151°38'	117°44'
D	138°50'	26°01'	143°02'	92°08'
Transit Check Work.				
D	139°15'	25°	142°46'	91°41'
A	0°	+38°25'	+38°25'	42°31'
B	+38°25'	0°	-41°20'	-41°20'
Inherent Error.	- 0°25'	+ 0°15'	+ 0°16'	+ 0°27'

Field Notes.	5.	6.	7.
C	9.070	8.920	10.560
a	4.505	5.150	4.325
b	5.135	4.480	7.475
A	-47°45'	+42°15'	-47°48'
B	+42°15'	-35°15'	0°

Results.			
Graphical.			
C	140°31'		
D	122°55'		
Computation.			
C	140°18'	135°37'	124°50'
D	122°54'	123°18'	148°15'
Transit Check Work.			
D	122°47'	122°34'	148°06'
A	+ 42°31'	+ 42°31'	0°
B	- 47°42'	- 35°02'	- 47°42'
Inherent Error.	+ 0°07'	+ 0°44'	+ 0°09'

From what Mr. Boush says about the elasticity of the cord, I wonder if he understood the manner of procedure. The string (a strong brown wrapping twine) is stretched from one station to another covering the whole traverse, the stations being marked by nails. The surveyor then starts at the first one and at proper distances from the vertex, ties onto the string short pieces of thin copper wire (riders) to mark these points on the string while the three measurements are taken, a matter of two or three minutes only. These riders are then removed and thrown away. The surveyor then goes to the next vertex and repeats the performance. Now I fail to see how the elasticity of the cord cuts any figure. There is of course a very slight sag in the string, but I have found that its effect is infinitesimal. I cannot see the aptness of his reference to the metallic tape, but think that he understood that the rider and its distance was fixed in the office before going underground instead of being placed after the string was stretched and when ready for the measurements.

I should be glad to have Mr. Boush write again, as I appreciate honest criticism. I should also be glad to have him explain the triangles referred to in his closing sentence.

FLOYD L. BURR.

Vulcan, Mich., Jan. 27, 1906.

*Opposition to Gold Dredging.*

Sir—Referring to the editorial that was published in your issue of December 30, I beg to say that the quotation credited to me, which you took as the text, was entirely false. The fact is that the land surrounding that which I own is virtually worthless for agricultural or horticultural purposes, in its present condition, and up to the advent of the gold dredges was without value. There is not, nor has there been, a dredger in operation nearer than a mile from my land, which is well known to everyone in this locality. In justice to myself I request that you will make a correction in the JOURNAL.

N. B. CRANE.

Oroville, Cal., Feb. 8, 1906.

[We regret to have misquoted Mr. Crane, the fault being due to one of our correspondents, who sent us a clipping from a California newspaper, which we took as the text of the editorial referred to. This does not, however, alter in any way

the opinions as to the general status of the problem which we then took occasion to express.—Editor.]

**New Publications.**

"Electric Power Transmission." By Louis Bell. Pp. 721; illustrated. 6x9 in.; cloth; \$4 net. New York, 1906: McGraw Publishing Co.

"Electric Railway Accounting." By W. B. Brockway. Pp. 84. 6x8 in.; cloth; \$1.25 net. New York, 1906; McGraw Publishing Co.

"Standard Telephone Wiring." By James F. Fairman. Pp. 91+xvi; illustrated. 5x7 in.; leather; \$1 net. New York, 1906: McGraw Publishing Co.

"Wiring Handbook." By Cecil P. Poole. Pp. 85; illustrated. 5x8 in.; leather; with table inserts; \$1 net. New York, 1906: McGraw Publishing Co.

"Practical Electric Railway Handbook." By Albert B. Herrick. Pp. 460; illustrated. 5x7 in.; leather; \$3 net. New York, 1906: McGraw Publishing Co.

"Revised Map of the Southeastern part of Cahaba Coal Field with Columnar Section." By Eugene Allen Smith, State geologist. 22x27 in.; \$0.75. University of Alabama, Tuscaloosa, Ala., 1905: A. Hoen & Co.

"The World's Desires." By Edgar A. Ashcroft. Pp. 440. 6x9 in.; cloth; \$3. London: Kegan Paul, Trench, Trubner & Co. Ltd. Chicago: The Open Court Publishing Co. Ltd. 1905.

"Traverse Tables." By Richard L. Gurden. Pp. 270, 10x14 in.; cloth, \$7.50. London, 1904: Charles Griffin & Co., Ltd. New York: D. Van Nostrand Co.

This monument to the author's industry gives traverses to four places of decimals; the tables are calculated to single minutes and to hundreds in distance.

"The United Otto System of By-Product Coke Ovens." By the United Coke and Gas Co., New York. Pp. 146; illustrated. 9x12 in.; cloth. New York, 1906: A. W. Erickson Advertising Agency.

"Jaarboek van het Mijnwesen in Nederlandsch Oest-Indie." Pp. 289-iv.; illustrated. 7x10 in. paper. Batavia, 1905. Landsdrukkerij.

"The Nature of Ore Deposits." By Richard Beck, professor of geology and economic geology, Freiberg Mining Academy. Translated and revised by Walter Harvey Weed, geologist U. S. Geological Survey. Pp. Vol. I, 340-XIV; Vol. II, 341-669, with index; illustrated with 272 figures and a map. 6x9 in.; cloth, \$8. New York, 1905: THE ENGINEERING AND MINING JOURNAL.

In translating and placing at the command of English-speaking readers Prof. Richard Beck's "Lehre von den Erzlager-

staetten," Mr. Weed has done a notable service. The value of it to the American mining fraternity is increased by the additional notes (contributed by the translator himself) upon North American localities. The work is presented in clear and well-written English, and the book is certain to be studied by all who desire to acquire modern knowledge and conceptions of the formation, associations and alterations of ores.

In preparing the original, Professor Beck attacked the subject with admirable preparation. Succeeding the lamented Stelzner in the historic chair at Freiberg, he found at hand a rich collection of illustrative material and an inheritance of theoretical results in good scientific form dating back over a century. Not only is the vein system of the Freiberg region complicated and instructive, but it has also been extensively developed and carefully studied by generations of acute observers. Professor Beck brought to his work the qualifications of petrographer, mineralogist and experienced geologist. His work is therefore thorough and authoritative.

The book is planned in its larger framework on much the same lines as was von Groddeck's work in 1879, which bears almost the same title. That is, in the large classification, ore deposits are regarded with respect to the wall rocks, as:

1. Those original and contemporaneous with the wall-rock—the *syngenetic* in the phraseology used by Beck.

2. Those subsequently introduced into the wall-rock, or the *epigenetic*.

3. Detrital deposits.

The same terms, syngenetic and epigenetic, appear also in the posthumous work of Professor Stelzner, issued under the editorship of Dr. Bergeat; and we may conclude that they have become current in German usage. Under the syngenetic we find discussed: Magmatic segregations and bedded ore deposits; under the epigenetic, mineral veins and epigenetic ore deposits in stratified rocks, exclusive of veins; finally the detrital deposits complete the series.

These larger groups are then subdivided into types, first upon larger and more comprehensive characters, then upon smaller ones, until individual cases are reached.

Under veins, for example, in the narrow sense of the term, 22 different kinds are described; based first on the leading metal; and, second, on the mineralogical associations afforded by ore and gangue. In the same way, under the other heads a similar line of treatment is followed, until we find the ore deposits of the world grouped so far as possible according to their mineralogical characters. As a result there is afforded a comprehensive picture of the range of phenomena embraced under the subject.

Nevertheless one cannot but question sometimes if, in so widely applying the distinctions and characters which have at-

tained such prominence in the work of earlier observers in the limited Saxon region, too great stress is not laid upon the fortuitous associations of minerals; and whether they should not be regarded as interesting coincidences when we view the world at large rather than as involving any very profound relationships. The advantage in emphasizing associations, however, lies in the fact that they lead the student to group like with like, and to note the occasional recurrence of similar aggregates in new and remote localities. Being now set forth in English, they will at least make familiar to a wide circle the classic Saxon types.

The discussion of the structural features leading to the production of the epigenetic deposits is thorough and excellent, as is also the treatment of the method of introduction of the materials. Yet it seems to the reviewer that it would have been better not to interrupt this general discussion at page 193 with the catalog of the vein types and their detailed descriptions for 168 pages, but to have continued with the general discussion, which is introduced again on page 361 and continues for 71 pages further. A reader loses the thread of the discourse and is much better able to understand the particular descriptions after a perusal of the entire theoretical treatment. He will therefore find it advantageous to skip from p. 193 to p. 361; to read the seventy-one pages and then go back to p. 193.

The illustrations have often suffered in the reproduction in the American print and the reason for this is not apparent. They are fine and clear in the German original and could be easily photo-engraved. In reproduction in English they, no less than the text, ought to experience translation, whereas the German words for drift, vein, fault, etc., may convey but little significance to one unacquainted with the original. The round writing lettering which appears in the German original is not to be compared for clearness with such plain type as can be readily used in the wax process. If we select Fig. 117 on p. 162, for example, after protracted study a reader may be in ignorance of its significance. Several typographical errors will doubtless be eliminated in later editions, including an occasional tendency to omit the capital initial of a German common noun when bodily transferred from the original.

J. F. KEMP.

#### Professional Papers.

*Sulphuric Acid*, Contact process, History of. F. Winteler. *Zts. f. angew. Chem.* Feb. 9, 1906. Pp. 237-238.

*Black Copper*, Treatment of speissy. G. Kroupa. *Oest. Zts.*, Feb. 10, 1906. Pp. 73-75; Feb. 17, Pp. 84-87.

*Copper-Matte Roasting*, and utilization of the waste gases therefrom for the manufacture of sulphuric acid by the contact process, at Guayacan, Chile. A. Gmeh-

ling. *Oest Zts.*, Feb. 10, 1906, Pp. 69-73; Feb. 17, Pp. 88-90.

*Gold*, Assaying. L. Schneider. *Oest. Zts.*, Feb. 17, 1906. Pp. 81-84.

*Chemical Industry of Belgium*. Present condition of. B. Simmersbach. *Chem. Ind.* Feb. 15, 1906, Pp. 88-95. Continued in the next.

*Kalgurli Gold mine*, Ore-reduction plant and process of reduction. R. Allen. *Monthly Journal of Chamber of Mines of Western Australia*, Dec. 31, 1905. Pp. 875-883.

*Zinc Dust*, Spontaneous ignition of. P. Spier. *Oest Zts.*, Jan. 20, 1906. Pp. 39-41.

*Colliery Rescue Work*, Respiration Apparatus for. M. Bamberger and F. Bock. *Gluckauf*, Nov. 25, 1905; Abridged and translated in *Coll. Guard.*, Feb. 2 and 9, 1906.

*Mineral Properties*, The Valuation of. T. A. O'Donahue. *Coll. Guard.*, Feb. 9, 1906. P. 271.

*Gases from Blast Furnaces*, The Commercial Utilisation of. Gerald Hooghwinkel, before the Cleveland Institution of Engineers, Jan. 29, 1906. Abstracted in *Iron and coal Trades Rev.*, Feb. 9, 1906.

*Fuel Briquetting in America*, Notes on. Clarence M. Barber. *Jour. Assoc. Eng. Soc.*, Jan. 1906. Pp. 19-27.

*By-Products*, Present Practice of Saving, in Coking in Belgium. B. Simmersbach. *Zeit. f. B.-H.-u. S.-wesen* LIII, 1905. Pp. 569-574.

*Copper and Sulphur*, E. Heyn and O. Bauer. *Metallurgie*, Feb. 8, 1906. Pp. 73-86; illustrated.

*Coal-Cutting*, Mechanical, Report of the Committee on, Part II, "Heading Machines". *Trans. N. of Eng. Inst. Min. and Mech. Eng.*, Nov. 1905. Pp. 43-109.

*Arsenic*, the Estimation of Minute Quantities of. H. B. Bishop. *Journ. Am. Chem. Soc.* Feb., 1906. Pp. 178-185.

*Argillaceous Limestone*, Co-operative Analysis of an. W. F. Hillebrand, Chas. B. Dudley, Clifford Richardson and H. N. Stokes. *Jour. Am. Chem. Soc.* Feb., 1906. Pp. 223-239.

*Accumulators*, Use of, in Connection with Gas Motors in Electric Plants. R. Goetze. *Centralblatt f. Accumulatoren*, Feb., 1906. Pp. 25-27.

*Feed Water*, Behavior of Chemically Purified, and Steam Boiler Corrosion. H. Frischer. *Chem Zeitung*, Feb. 14, 1906. Pp. 125-127.

*Engines*, The Steam Consumption of Reciprocating. T. Stevens and H. M. Hobart. *Elec. World*, Feb. 17, 1906. Pp. 369-371; illustrated.

*Nitrates*, Electrolytic Production of, from the Atmosphere. Silvanus P. Thompson. *Elec. (London)*, Feb. 9, 1906. Pp. 666-670; illustrated.

**Abstracts of Official Reports.**

*Quincy Mining Company.*

The report of this Michigan copper mine covers the year 1905 and records an increase of nearly 500,000 lb. over the output of the previous year.

Development during 1905 comprised 681 ft. of shaft, 17,827 ft. of drifts, 2696 ft. of crosscuts, 857 ft. of winzes, besides rises and other dead work for pockets and chutes. Stopping in the copper rock took 63,560 fathoms and provided 116,280 tons more than during 1904. Some good ground has been opened, but other parts of the mine showed a decline in quality.

Mining operations for the past two years may be itemized thus:

	1904.	1905.
Average force employed.....	1,605	1,714
Average number of miners...	592	643
Monthly earnings of contract miners.....	\$62.40	\$65.10
Pounds of mineral per fathom	457	433
Pounds refined copper per fathom.....	307	277
Total tons ore mined.....	1,070,131	1,222,257
Total tons ore hoisted.....	1,061,810	1,168,519
Total tons ore stamped.....	1,018,873	1,135,162
Pounds mineral from mill.....	23,703,155	26,506,368
Pounds mineral from rock houses.....	3,468,083	2,917,080
Pounds refined copper.....	18,343,160	18,827,557
Cost of producing 1 lb. copper	10.33c	10.86c
Selling price of 1 lb. copper..	13.33c	15.83c

Electric locomotives are now used to haul ore from No. 4 to No. 2 shaft, where it is hoisted, and from No. 8 to No. 6 shaft; No. 4 shaft and equipment will ultimately be abandoned. The 49th level is to be equipped throughout with electric traction.

The earnings and expenses of the company during 1905, in totals, and in cents per pound of fine copper were:

	Total.	Per Lb.
Sales of copper.....	\$2,981,121	15.83c.
Interest and real estate.....	29,286	.....
<b>Total receipts.....</b>	<b>\$3,010,407</b>	<b>15.99c.</b>
Mining expenses.....	\$1,715,419	9.11c.
Taxes in Michigan.....	51,406	0.27
Smelting, transportation, etc.	139,098	0.74
Construction.....	138,733	0.74
<b>Total expenses.....</b>	<b>\$2,044,656</b>	<b>10.86c.</b>
Income for the year.....	\$ 965,751	5.13c.
Balance brought forward.....	946,841	
Available for dividends.....	\$1,912,592	
Dividends paid in 1905.....	600,000	
Carried forward.....	\$1,312,592	

Reconstruction at No. 8 shaft is making good progress; engine and boiler-houses are nearly complete and the 140-ft. concrete stack will soon be finished. No. 6 compressor plant has been enlarged to 10,000 cu.ft. capacity; the total compressed air capacity is now 20,000 cu.ft., and 85 per cent. of this amount is now being consumed by drills, hoists and pumps.

Stamp mills Nos. 1 and 2 treated 378 tons of ore per day more than they did during 1904. One head at No. 2 mill was reinforced by a pair of Nordberg rolls to crush the oversize, and its output was thereby increased by 100 tons per day. The one Nordberg steeple compound stamp has not fulfilled expectations as to efficiency.

At the smelter a hoist for elevating slag, so as to give additional dumping

space, and a new 150-h.p. boiler, were installed; also a belt conveyor for more rapid charging of No. 5 furnace. During the year 2,288,382 lb. more of Quincy mineral and 4,991,358 lb. more of custom mineral was treated than during 1904.

The next dividend, one of \$5 per share, or \$500,000, has been declared payable Feb. 26, 1906. Up to this one, 74 dividends, totalling \$15,220,000, have been paid since the beginning of operations.

*Adventure Consolidated Copper Company.*

Development during 1905 comprised 407 ft. of shafts, 4115 ft. of drifts, mainly on the Knowlton lode, 848 ft. of crosscuts and 128 ft. of winzes. Stopping amounted to 8700 cubic fathoms, mostly from the Knowlton lode; the Butler lode contributed 800 fathoms. Shaft No. 3 is now to a depth of 1079 ft. and has been enlarged to three compartments to the 9th level. Drifting to the west of this shaft has developed nothing of promise and work in this direction has been gradually discontinued; results to the east have been more encouraging. Shaft No. 4, 2400 ft. east of No. 3 and on the Knowlton lode, was begun in September, 1905, and reached 179 ft. by the end of the year. The first level will be at 200 ft. This is a 3-compartment shaft and is being worked with equipment already on hand.

In the mill, foundations and floors have been renewed. The Huntington mills are not satisfactory, and the substitution of other re-grinding machinery is recommended.

The mine yielded 2,700,354 lb. of mineral containing 1,606,208 lb. of fine copper which was sold (at average of 15.72c.) for \$252,572. Mining, taxes, smelting and construction, including the new shaft, cost \$341,223 (21.24c. per lb.) showing a loss on the year's work of \$88,651. At the beginning of the year, \$86,556 was on hand; \$50,000 was paid in as an installment on the stock, and interest, and stock premiums amounted to \$5848, showing a balance of \$53,754 on hand at the end of the year.

*Osceola Consolidated Mining Company.*

The report for 1905 shows a diminution of 1,500,000 lb. from the output of 1904, which is explained by loss of time during which workmen were on strike. During the year the former relative productivities of the Osceola and the Kearsarge lodes were reversed, the Osceola now being the larger contributor.

The following developments were made during the year:

	Shafts.	Drifts.
Osceola.....	276 ft.	6,594 ft.
North Kearsarge.....	532 "	10,986 "
South Kearsarge.....	756 "	6,697 "

The total advance was 25,855 ft., all but 56 ft. of which was in the amygdaloid.

The results of mining during the past two years may be compared thus:

	1904.	1905.
Tons ore mined.....	1,128,376	1,128,376
Tons ore stamped.....	1,095,520	1,007,200
Pounds mineral obtained....	27,457,497	24,854,391
Percentage copper in mineral	74.56	76.20
Pounds of copper per ton of ore stamped.....	18.7	18.8
Pounds copper yielded.....	20,472,429	18,938,965
Cost per pound for mining...	8.04c.	8.32c.
Cost per lb. for construction.	0.65	1.10
Cost per lb. for smelting, etc.	1.27	1.26
<b>Total cost per pound copper,</b>	<b>9.96c.</b>	<b>10.68c.</b>
Cost mining per ton ore stamped,	\$1.32	\$1.39
Cost stamping " " " "	.18	.17
<b>Total cost " " " "</b>	<b>\$1.50</b>	<b>\$1.56</b>

The Osceola branch continues to show an improved grade of ore, and large blocks are developed and ready for stoping. The main compressor power for the mine will soon be centered at No. 6 shaft on the Osceola, where a modern 50-drill plant will be erected.

The South Kearsarge ore continues of good grade. The worn-out hoist has been replaced.

North Kearsarge is losing its former richness; the "disturbed area" continues to be exposed on all the new levels and a large amount of exploration is necessary to find its limits. In spite of its leanness the ore taken from this lode has yielded a profit. The inclined hoist-way in No. 1 shaft is being repaired and strengthened with concrete stringers. This shaft was driven for a long distance through abandoned stopes.

During the year the mill was improved by the replacing of simple by compound stamps, and the addition of regrinding and concentrating machinery. The present equipment consists of six compound stamps, each assisted by a set of 16x36-in. rolls and their concentrating apparatus, all ore being crushed to pass a 3/16-in. round hole, instead of a 1/4-in. hole, as before. These improvements have increased the mill's capacity by 25,000 tons per month and have reduced the cost per ton for stamping. To supply more water a Nordberg 40,000,000-gal. pump is being added to the old equipment.

The profit and loss account for the year stands as follows:

Sales of copper (@ 15 54c).....	\$2,942,239
Other income.....	19,132
<b>Total receipts.....</b>	<b>\$2,961,371</b>
Mining and milling.....	\$1,575,691
Smelting, transportation, etc.....	239,429
Construction.....	207,503
<b>Total expenses.....</b>	<b>\$2,022,625</b>
Profit for the year.....	\$ 938,746
Balance brought forward.....	505,929
Available for dividends.....	\$1,444,675
Dividends paid out of 1905 earnings.....	576,900
Balance carried forward.....	\$ 867,775

The last semi-annual dividend, \$4 per share, was the largest ever paid by this company. Since its incorporation \$5,208,800 has been distributed.

Nitro-glycerin is the principal explosive element in all the ordinary forms of dynamite, giart powder, blasting gelatin, etc. It is mixed with various absorbent materials and chemicals to make it stable and reasonably safe to handle.



**Gold Dredging in Northern California.**

In the northern part of California the counties of Siskiyou and Trinity have been great producers of the precious metal. Flowing through these counties are two rivers draining a country rich in gold, these being the Trinity and the Klamath, with their numerous branches. These rivers unite in Humboldt county, near Hoopa Indian reservation, and along both banks of the Klamath river below the reservation mining operations have heretofore been impossible. No title could be obtained, as the reservations extend to the mouth of the Klamath, where it empties into the Pacific Ocean, in Del Norte county, just north of the Humboldt county line, and about 75 miles north of Eureka. A few years ago, however, the lower Klamath was thrown open to settlement extending a distance of about 22 miles from the mouth. About a year ago some experienced mining men of northern California, following the rivers through Siskiyou and Trinity counties, prospected the numerous bars of gravel along the river banks, finding everywhere that the gravel contained gold, decided that there existed a profitable field for dredging. They organized a mining company known as the Klamath River Dredge Mining and Development Company. Work was then systematically commenced for acquiring title to all the available mining lands along the Klamath river from the ocean to a distance of 22 miles up the stream where the Indian reservation commences. There are no wagon roads, and for miles not even trails, and the country is inhabited by Indians only, hence the work of locating was slow and laborious, but at last title to a total of about 2200 acres of dredging ground was obtained, comprising everything which could be called a gravel bar, in addition to which about 3000 acres of other dredging land is controlled. Thus far no dredges have been installed, the work having been confined to prospecting operations.

**Distillation of Gold.**

According to H. Moissan (*Comptes rend.*, 1905, CXL1, 977-983), gold can be easily distilled in the electric furnace, with an arrangement of apparatus similar to that used by him in distilling copper. It boils at a higher temperature than copper and condenses on the cold tube in filament masses and microscopic crystals, which have all the characteristics of ordinary gold in fine division. In alloys of gold and copper, or gold and tin, the copper or tin distils before the gold. In distilling gold-tin alloys, a finely divided mixture of stannic oxide, lime and gold is obtained, having the color and properties of purple of Cassius. Similar deposits of varying tint can be obtained by sub-

stituting for lime other oxides (silica, zirconia, magnesia or alumina).

**Patents Relating to Mining and Metallurgy.****UNITED STATES.**

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

Week ended Feb. 27, 1906.

- 813,442. GAS-RELIEF VALVE FOR BLAST-FURNACES.—Engene L. Messier, Pittsburg, Pa.
- 813,457. GRIP FOR ROPES AND THE LIKE.—George W. Seebach, New York, N. Y.
- 813,473. CONVEYER-CHUTE.—Freeman R. Willson, Jr., Worthington, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio.
- 813,474. CONVEYER.—Freeman R. Willson, Jr., Worthington, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio.
- 813,483. ANNEALING OR MALLEABLEIZING OVEN.—William L. Casaday and August Bergman, South Bend, Ind.
- 813,484. STONE-SAW.—Joshua D. Clevenger, San Francisco, Cal., assignor of one-half to Archibald H. MacNutt, San Francisco, Cal.
- 813,490. CEMENT-KILN.—Thomas A. Edison, Llewellyn Park, N. J.
- 813,508. MINING-MACHINE.—Edwin R. Merrill, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio.
- 813,527. CLAM-SHELL BUCKET.—John C. Slocum, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio.
- 813,528. CLAM-SHELL BUCKET.—John C. Slocum, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio.
- 813,532. PROCESS FOR THE ELECTROLYTIC PRODUCTION OF METALS OF THE EARTHLY ALKALIES.—Carl Suter and Berthold Redlich, Ratibor, Germany.
- 813,540. REINFORCED CONCRETE CONSTRUCTION.—Charles H. Black, Pettysville, Ind.
- 813,548. BUILDING CONSTRUCTION.—George F. Fisher, North Tonawanda, N. Y.
- 813,566. EXCAVATOR.—William R. Martin, Idaho Falls, Idaho.
- 813,572. MOLDING APPARATUS.—Willis H. McDowell, Auburn, Ind.
- 813,573.—MACHINE FOR MANUFACTURING CONCRETE BUILDING-BLOCKS.—Willis H. McDowell, Auburn, Ind.
- 813,600. GAS-PRODUCER.—Edward N. Trump, Syracuse, N. Y.
- 813,605. METHOD OF FORMING MOLDS FOR CASTING PURPOSES.—Joseph G. Weyer, Providence, R. I.
- 813,620. PROCESS OF EXTRACTING GOLD, SILVER, ETC.—Joseph A. Comer, Los Angeles, Cal.
- 813,627. CEMENT-BURNING PROCESS AND APPARATUS THEREFOR.—Byron E. Eldred, Brookline, Mass., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York.
- 813,628. PROCESS OF OPERATING GAS-PRODUCERS.—Byron E. Eldred, Bronxville, N. Y., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York.
- 813,629. GAS-PRODUCER.—Carleton Ellis, New York, N. Y., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York.
- 813,630. HEAT-REGENERATOR FOR CEMENT-KILNS.—Carleton Ellis, New York, N. Y., assignor to Combustion Utilities Company, New York, N. Y., a Corporation of New York.
- 813,657. BRIQUET-MACHINE.—Howard E. Marsh, Los Angeles, Cal., assignor of one-half to William P. Wagly, Los Angeles, Cal.
- 813,658. CRUCIBLE-SHAKER.—William S. Mather, Newark, N. J.
- 813,671. APPARATUS FOR ANALYSIS OF GASES.—Alfred Sahlatter and Ludwig Leutsch, Budapest, Austria-Hungary.

- 813,675. GLASS-CASTING APPARATUS.—James R. Speer, Pittsburg, and Henry A. Otto, Allegheny, Pa., assignors, by mesne assignments, to the Mississippi Wire Glass Company, Jersey City, N. J., a Corporation of New Jersey.
- 813,763. SIFTER.—Adrienna O. Atkinson, Louisville, Ky., assignor of one-half to Grace Jurt, Alexandria, Ind.
- 813,780. AMALGAMATOR.—David Draper and George A. Hay, Johannesburg, Transvaal.
- 813,785. APPARATUS FOR THE PREPARATION OF METALLIC OXIDES.—Laurent Fink-Huguenot, Paris, France.
- 813,794. APPARATUS FOR FORMING SHEET AND PLATE GLASS.—Harry J. Hays, Pittsburg, Pa., assignor to Edward F. Hays, trustee, Pittsburg, Pa.
- 813,824. SMELTING AND REFINING PROCESS.—Enos C. Pollard, Seattle, Wash.
- 813,825. SMELTING AND REFINING APPARATUS.—Enos C. Pollard, Seattle, Wash.
- 813,828. ROCK-DRILL.—Edward A. Rix, San Francisco, Cal.
- 813,841. METHOD OF TREATING CEMENT AND CEMENT CONSTRUCTION.—Maximilian Toch, New York, N. Y., assignor of one-half to Henry M. Toch, New York, N. Y.
- 813,903. GRINDING-MILL.—Povi T. Lindhard, New York, N. Y.
- 813,965. PRODUCTION OF CEMENT.—Bernhard Grau, Kratzweck, near Stettin, Germany.

**GREAT BRITAIN.**

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

Week Ended Feb. 10, 1906.

- 27,852 of 1904. BRIQUETTING MACHINE. T. B. Wilcox, New York. An improved briquetting machine for binding small coal into briquettes.
- 677 of 1905. COUPLING FOR MINE CAGES. T. C. Morgan, Aberdare. Improved couplings for mine cars for the purpose of preventing the couplings becoming undone.
- 3191 of 1905. CONVERTING NICKEL, COBALT, OR COPPER.—J. Savelberg, Papenburg, Germany. For the purpose of forming a sulphur-containing smelter charge of oxide ores of nickel, cobalt or copper, mixing the oxide ores with sulphur flux and fuel and heating in a converter. The resulting mass on cooling is broken up into pieces that are suitable for smelting and are more coherent than if the constituents had been briquetted together.
- 7154 of 1905. RECOVERY OF TIN. L. Parry Huddersfield. In order to extract tin from tin slags, mixing them with oxide of iron and lead slags, and smelting, so producing an alloy of tin and lead containing 20 per cent. of tin.
- 8183 of 1905. IGNITER FOR SAFETY LAMPS. F. Kay & W. Walker Barnsley. Improved method of electrically igniting miners' safety oil lamps.
- 10,793 of 1905. ELECTRIC MINE SIGNAL. L. B. Woodworth, Johannesburg. Improved electric bell, apparatus for signaling in mines.
- 11,886 of 1905. BRIQUETTING MACHINE. T. B. Wilcox, New York. Improvements in the inventors machinery for briquetting fine coal.
- 15,367 of 1905. BRIQUETTING PROCESS. T. C. King, New York. In briquetting spent pyrites for the purpose of using it as an iron ore, using a binding material such as pitch, and heating the briquette in such a way that the sulphur in the pyrites shall form a volatile compound with the binding material and be thus eliminated from the briquette.
- 17,844 and 17,844 A. of 1905. AGGLUTINATING FINE ORES. L. Weiss, Budapest. Forming fine ores into solid pieces by damping with lime water and introducing into an atmosphere of compressed carbonic acid gas.
- 25,177 of 1905. JIG. Humboldt Engineering Works, Cologne. In jigs, providing an adjustable mesh, so that at first only the fine particles pass through, and afterward, when the larger sizes have accumulated, the hole in the mesh is increased so as to discharge some of the larger pieces.

### Personal.

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

E. H. Teats is in New York and can be found at the Waldorf-Astoria.

T. G. Madgwick has returned to London from Baku, Russia.

Mr. Sickles is with the Tennessee Copper Company, Copperhill, Tenn.

A. A. Tallmadge, of the Blaisdell Company, New York, is now in Mexico.

Walter M. Brodie is at Guanajuato, Mexico, on professional business.

B. B. Lawrence expects to return to New York from Cuba in a few days.

Theodore J. Hoover has taken up his residence at Aguascalientes, Mexico.

Chas. d'Autremont has left Bisbee, Ariz., for a visit to Hermosillo, Mexico.

J. H. Hindry has been appointed manager of the Velardeña smelter in Mexico.

Sir Archibald Geikie has been appointed president of the Geological Society, London.

P. G. Lidner, has returned to New York from a professional visit to British Guiana.

J. W. Evans, formerly of Deseronto, Canada, has opened an office in Cobalt, Ontario.

W. H. Goodchild is on his way to England after fulfilling a professional engagement in Borneo.

F. L. Bosqui recently visited the Tonopah goldfields, where he has important interests.

R. B. Higbee, has returned to St. Paul, Minnesota, from a visit to the Tonopah goldfield.

J. H. Crittendon has been appointed to the management of the Rising Sun mine, Broken Hill, N. S. W.

Wm. A. Paine, of Boston, who has copper interests in Arizona, is visiting Bisbee and Globe.

President Lewis A. Riley, of the Lehigh Coal and Navigation Company, Scranton, Penn., has been re-elected.

John Watt has left San Francisco for New Zealand, with a view of investigating methods of gold dredging.

H. L. Webster, mining engineer, left Abonemassi, West Africa, Feb. 28, for a short stay at his home in Ireland.

H. Kilburn Scott, who has spent several months inspecting mining properties in Brazil, has returned to England.

Robert C. Gemmel has been appointed general superintendent of the properties of the Utah Copper Company in Utah.

Thos. F. Cole is visiting Bisbee, Ariz., and proposes to spend a short vacation in California during the next few weeks.

F. R. Burnham, who was prominent as a scout during the Boer war, is now in

charge of mining operations in Sonora, Mexico.

Hudson H. Nicholson returned to Denver last week, from a professional trip in Mexico, where he has been for three months.

Sir William Crookes has been elected a corresponding member of the physical section of the Academy of Science, Paris, in succession to the late M. Bichat.

R. J. Grant and H. A. Shipman have established themselves as consulting mining engineers at 415 Mining Exchange building, Denver, Colorado.

Mr. Thorley, superintendent of the Lithgow coal mines, New South Wales, has returned to Lithgow from an extended visit to England.

General Manager D. C. Jackling, of the Utah Copper Company, has returned to Salt Lake from New York, after attending the annual stockholders' meeting.

Prof. Wyndham Dunstan has been elected president of the chemical section of the British Association, which will open a session at York, England, on August 1 next.

Patrick Clark, of Spokane, Wash., who has been in the East on mining business during the last two months, is now in Butte, where some of his mines are located.

W. D. Munro, of Houghton, Mich., has left New York for Norway via London. He expects to visit Spitzbergen in the coming summer and will not return to America until next fall.

P. S. Souders, formerly in charge of the tool room of the Burroughs Adding Machine Company, has accepted a similar position with the Barber-Colman Company, Rockford, Illinois.

J. Parke Channing, of New York, spent several days in Butte, Mont., recently, examining the Amazon group of mines for Adolph Lewisohn of New York, who holds a lease and bond on the property.

Dr. Nelson P. Hulst, well known in the mining world, is in Duluth, where he delivered a talk to one of the clubs of the city on "The Metals in Human Progress." Dr. Hulst now makes his winter home at Milwaukee and spends the summers at Duluth.

Walter H. Wyley and a corps of mining engineers are examining the Utah copper properties at Bingham, in accordance with the request of Samuel Newhouse, before determining the matter of putting the Boston Consolidated in the proposed Bingham merger.

### Obituary.

M. E. Smith, who had been prominent in mining and smelting matters, during the past thirty years, in Colorado, died in Denver suddenly a few days ago, aged 65 years. As far back as 1879 he was superintendent of the La Plata smelter at Leadville.

Franklin Brooks, partner in the firm of Eugene Munsell & Co., of 218 Water street, died at his home in Elizabeth, N. J., March 5. He had just returned from Hot Springs, N. C., where he went to obtain relief from rheumatism. He was born 51 years ago in San Francisco. His father was interested in a mica mine in North Carolina, and the son spent several years there and became an expert on mica. He associated himself with his cousin, Eugene Munsell. He was vice-president of the Mica Insulator Company and director in two mica mines in North Carolina. He was also interested in mica properties in India and visited the mines there two years ago. The firm of which he was a member is one of the most important in the mica industry of this country.

Samuel Pierpont Langley died Feb. 27, at Aiken, S. C., where he had gone for his health. He was born at Roxbury, near Boston, in 1834. He early showed a keen interest in astronomy, but though he afterward received honorary degrees from various great universities he had no college education. After being graduated from a high school he hesitated for several years between the professions of civil engineering and architecture. On his return from a two years' trip abroad in 1865 he was appointed an assistant at the Harvard Observatory, a position which he soon gave up for that of assistant professor of mathematics at the Naval Academy at Annapolis. His work in enlarging the Annapolis observatory led to his appointment as director of the Allegheny observatory at the Western University of Pennsylvania. This was in 1867, and he remained director for 20 years. During this period he introduced many reforms and improvements. On his arrival the observatory was suffering from a lack of sufficient income. This he remedied through the profits derived from his system of railway time service, an idea that has since been generally adopted. In 1870 he began his studies in solar physics, a field in which he became a recognized authority. He was appointed secretary of the Smithsonian Institution in 1887. The value of his work at the Institution is well known. Professor Langley received the degree of LL. D. from Harvard, Yale, Princeton, Wisconsin and Michigan. Oxford made him a D. C. L. and Cambridge a D. Sc. He was a member of the French Institute, a fellow of the Royal Astronomical Society of London, a trustee of the Carnegie Institute, and a member of the National Academy of Science, and other learned societies. He was elected president of the American Association for the Advancement of Science in 1886. The following year he received the gold and silver medals of the American Academy of Arts and Science and the Rumford Medal of the Royal Society of England. He was a prolific writer on scientific subjects.

### Societies and Technical Schools.

*Lehigh University*—In addition to the two well-established courses in mining leading to the degrees of engineer of mines and metallurgical engineer, the recent extensive development of electro-metallurgy has induced the faculty to establish a course in electro-metallurgy. This course in its main outline is similar to the course in metallurgical engineering, but differs from it by omitting assaying, geology and certain studies in civil and mechanical engineering. The time thus gained is devoted to electrical engineering, electrolysis and practice in the electrical and electro-metallurgical laboratories. There are thus two courses of 4 years each offered in the Department of Metallurgy—one in metallurgical engineering leading to the degree of Metallurgical Engineer, and the other in electro-metallurgy leading to the degree of Electro-Metallurgist (El. Met.). Prof. Joseph W. Richards directs the Department of Metallurgy.

### Trade Catalogs.

Receipt is acknowledged of the following catalogs recently issued:

Northern Electrical Mfg. Co., Madison, Wis. Booklet No. 39, Northern Variable Speed Motors.

The Sandy Belting Co., Baltimore, Md., Price List and Telegraphic Code. Pp. 2, paper, 3 by 6 in.

The Brown Hoisting Machinery Co., Cleveland, O. Ferroinclave. Pp. 32; illustrated; paper, 6 by 9 in. 1906.

Bury Compressor Co., Erie, Pa. Bulletin No. 30, Air Compressors. Pp. 18; illustrated; paper, 6 by 9 in.

B. F. Sturtevant Co., Hyde Park, Mass. Bulletin No. 125. Vertical Engines. Pp. 7; illustrated; paper, 7 by 9 in.

The A. Leitz Co., 614-18 Commercial St., San Francisco, Cal. Solar Ephemeris. Pp. 13; paper, 3 by 5½ in. 1906.

Scully Steel & Iron Co., Chicago, Ill. Stock List. Pp. 144, illustrated; indexed, paper, 4½ by 7 in. January and February, 1906.

Merton Furnace Co., Lombard Building, 17 Queen St., Melbourne. Merton Patent Furnaces. Pp. 18; illustrated; paper, 6 by 9 in.

Allis-Chalmers Co., Milwaukee, Wis. Bulletin No. 1408, Tremain Steam Stamp, Pp. 48; illustrated; paper, 8½ by 10½ in. November, 1905.

Wm. Hoskins & Co., 81 Clark St., Chicago, Ill. Hoskins' Patent Hydro-Carbon Blow Pipe and Furnace. Pp. 24; illustrated; paper, 3½ by 6 in.

Sprague Electric Co., 527-531 West 34th St., New York. Bulletin No. 224, Type D Direct Current Motors. Pp. 15, illus-

ry equipment, for the Great Western Gold Company, Shasta county, California; one matte tramway, with settling bowls, special electric hoists, 16 self-dumping slag trucks and five 35-ft. screw-dump slag trucks for the Compania Minera Fundidora y Afinadora, Monterey, Mexico.

C. W. Hunt Co., West New Brighton, Staten Island, N. Y. Catalog No. 0511. Hunt "Industrial" Railway. Pp. 63; illustrated; paper, 7 by 9½ in.

Westinghouse Electric & Mfg. Co., Pittsburg, Penn. Circular No. 1126. Type C Transformers. Pp. 7; illustrated; paper, 7 by 10 in. December, 1905.

### Industrials.

The Lindahl Manufacturing Company, of Denver, made large shipments of its patented miners' candlesticks during the past few days to Salt Lake City, Sacramento and New Orleans, the last shipment being destined for Nicaragua.

The ore-testing plant of the Colorado Iron Works Company in Denver, Colo., is kept busy making tests on ores from various parts of the world. The plant has excellent facilities for testing by concentration, amalgamation and cyanide, with a chemical laboratory for assays and other determinations.

The Empire Electric Power and Irrigation Company, of Empire, Colo., will install under a head of 560 feet a Pelton wheel of 1000 h.p. capacity, direct connected to a 450-r.p.m. generator. The exciter will be mounted on the end of the alternator shaft. Power will be transmitted to the mines in the vicinity of the Empire, Colorado.

The American Bridge Company has closed a contract with the American Steel and Wire Company for the construction of 10 steel barges in use in Pittsburg harbor and in hauling coal from the mines along the Monongahela river to the company's plants at Rankin and Shoenberger mills. This order proves that the 10 barges built for this company last year have been satisfactory.

The H. K. Porter Company, builder of mine locomotives and other light locomotives, has purchased 40 acres of land at Economy, on the Ohio river, about 12 miles west of Pittsburg, and will move the Pittsburg plant to the tract. The land was purchased at about \$2,500 an acre. The locomotive works have been located in Pittsburg since 1869. The move will be made because of the lack of space in Pittsburg for extensions. Work will be begun on the building of the foundry plant next month and new buildings will be erected rapidly for each department. The latest ideas in shop practice will be adopted.

The Colorado Iron Works Company, of Denver, Colo., recently received and is filling the following orders: Four sets of 48x24-in. belted rolls and two sets of 48x24-in. geared rolls for the American Smelters' Security Company; a 42x120-in. copper matte furnace for the Utah Smelting Company, Ogden, Utah; a 42x150-in. copper matte furnace with acces-

### Construction News.

*Cardinal, Colorado*—Manager Lake, of the Boulder County property at Cardinal, Colo., announces that a 50-stamp mill is to be erected for the treatment of the company's ores.

*Mud River, Kentucky*—The Mud River Coal Company, just organized, intends to buy pumps, hoists and other mining machinery. S. W. McComb, Nashville, Tenn., is manager.

*Boulder, Colorado*—J. R. Furlong, of Boulder, Colo., associated with Illinois and Oklahoma people in the ownership of the Roy group at Furlong station, is reported to be preparing to install a cyanide mill this spring.

*Eldora, Colorado*—Superintendent Davidson, of the Lincoln Mining and Investment Company, of Eldora, Colo., has received instructions from St. Louis, Mo., to arrange for the erection of a powerhouse and the installation of an air plant.

*Empire, Colorado*—It is reported that the Marshall & Russel Gold Mining, Milling and Tunnel Company will build a large concentrating mill to treat its own ores, in the near future. J. F. Bridge, Empire, Colo., is superintendent.

*Idaho Springs, Colorado*—The Stanley Mines Company has recently taken up several claims in the Trail Creek and Coral districts near Idaho Springs, and, it is reported, is going to build a mill with concentration methods at an early date.

*Good Springs, Nevada*—Joseph Dederich, of Salt Lake City, Utah, has been awarded the contract to construct a smelter for the Good Springs Smelting and Development Company, at Good Springs, Nevada. The plant will treat the lead, silver and gold ores of the Good Springs district.

*Georgetown, Colorado*—Manager Smith of the Democrat Mountain Mining and Tunnel Company, of Georgetown, announces that they will erect a mill to treat the low-grade ores of the Beecher and Boston lodes.

The Sisters Power and Electric Company, with J. J. White, Georgetown Colo., as manager, has taken up a reservoir site near Georgetown, and proposes to build an electric plant of between 250 and 500 h.p. to operate the American Sisters mines and a concentrating mill which is to be built at the portal of tunnel No. 1.

**Special Correspondence.****San Francisco.** Feb. 28.

On the 19th the second payment of a 10 per cent. dividend was made to the creditors of the Copper King, Ltd., of Fresno county. Similar instalments will be paid during the year. The prospects of this copper mine are said to be excellent and extensive operations are under way for developing its resources. The roads at present are in poor condition and little shipping of ore has been going on, but ore is being mined and laid aside for shipment when the transportation facilities improve. During the slack shipping time the management is busy on repairs, and has a large force of men engaged in opening up new sections of the vein.

In this connection it may be stated that a matter of some interest to those who deal with English mining companies in this country, has just been decided by the English Court of Appeals. The Copper King, Limited, was organized as a mining company under the English corporation laws, with registered offices in London and with capital fully subscribed and fully paid up. Under its charter the corporation had authority to acquire mining property in the United States. The company carried on business in Fresno county, California, and purchased machinery from the Risdon Iron Works at San Francisco, the bill amounting to about \$40,000. The bill was never paid. The company went into liquidation in London, and the Risdon people brought suit against Sir Christopher Furness, one of the largest shareholders of the defunct company, to charge him with liability for this unpaid bill. The question raised was new and interesting. The California statute which makes stockholders liable for debts of the company, made Sir Christopher liable; the company had asked to do business in California and had impliedly at least agreed to conform to the California laws. The English court, held, however, that the company was limited in its corporate capacity and anyone doing business with it should be compelled to inquire into its birthplace capacity; at least, when sued at the place of its birth the laws of England would limit its liability.

At its smelter site four miles south of Kennett, the Balaklala Copper Company is about to erect a hotel to accommodate 200 men. The 9th of next month is the date set for the commencement of the work of the construction of a 1000-ton smelter. The Southern Pacific engineer is now surveying the mile spur that will connect the smelter grounds with the main line. The pipe-line that is to convey water from Cottonwood creek to the new town of Balaklala is almost completed.

The supervisors of Butte county have

decided that in oiling the roads they have pursued a mistaken policy. It is now proposed to establish a county macadam rock plant at Oroville, where some 30 gold dredgers have been making immense piles of boulders with their stackers. The boulders and coarse gravel thrown up by the dredgers can be had free of cost. It is believed that the labor for the plant can be performed by the convicts of the county jail. A plant large enough for the purpose would require the laying of considerable track and the purchase of cars for removing the rock to the railway. It is calculated by some of the supervisors that when the electric road is completed, rock can be delivered to the districts of the county at a less price than any one of them can secure by establishing individual crushing plants. A tentative plan is to supply county road districts with crushed rock at cost and sell it to the various incorporated cities of the county at a reasonable profit.

The District Court of Appeals affirmed the judgment of the Superior Court of Siskiyou county in the case of Mary A. Hayden against the Consolidated Mining and Dredging Company. The plaintiff was awarded \$5000 damages arising out of the construction of a dam across a stream running parallel with the plaintiff's ditch. The water from the stream entered the ditch and washed away about a mile of it. The defendant company appealed from the decision on the ground of error in the Court's instruction to the jury.

The Champion Mines and Home Gold Mining Company will have their legal fight in Nevada county, where the mines are located, after all. Judge Sewell, of the Superior Court of the City and County of San Francisco, has rendered a decision upon the motion of the Home Company, granting a change of venue to Nevada county in the case commenced in San Francisco by the Champion Company against the Home Company. The motion was made upon the ground of the convenience of witnesses, as it was stated in the affidavits that were filed in support of the motion that many of the witnesses on the part of the Home Company would be from Nevada City and vicinity and it would be a hardship to compel all these witnesses to go to San Francisco to testify. The Champion Company on the other hand filed affidavits alleging that many of their witnesses would be from San Francisco and urged the court not to transfer the case.

There is now pending in the Superior Court of Nevada county two cases commenced by the Home Company against the Champion Company covering practically the same ground as is involved in the suits instituted by the Champion Company in San Francisco. These cases, involving as they do the title to the

ledges owned by both of the big companies, are the most important ever tried in the Superior Court of Nevada county. Technical points of mining law are involved, and the decision in these cases may establish important precedents in the future.

**Goldfield, Nev.** March 1.

The Red Top Mining Company has leased for one year the entire plant of the American Milling and Water Company. The plant is complete in every detail and was designed to work as a custom mill on the ores of this district. The mill is provided with a 40x40-ft. sampling floor covered with steel plates. Upon this floor the ore is unloaded from the mine wagons. It is then run through a Dodge crusher and elevated to the bins. From there it is fed into a battery of Nissen stamps, which effect the crushing. After passing over apron plates the pulp is led to three Frue vanners, which separate the concentrates. The pulp from the vanners runs into a series of classifiers, which separate the sand from the slime. The sand is direct-filled into the vats by means of Butters distributors, while the overflowing slime is raised, with its excess of water, from the sump into which it flows into a long V-shaped settling box. In this settling box the slime is settled and thickened to be drawn off into the slime tanks for agitation, while the clear overflowing water is led to the batteries to be used over again. It is the intention of Mr. Taylor, the manager of the Red Top Company, to have the mill started at once. E. J. Sweetland will act as mill superintendent.

The work of installing an electric hoist on the January is now finished. The machinery is working smoothly, and although no trouble is anticipated, the former hoist will be retained in case of necessity. The company is soon to install an electric pump, which will complete the present installation. The output of the mine has been somewhat restricted in the past on account of the limited capacity of the old hoist; now that this difficulty is obviated, the lower levels will be worked more extensively than ever.

The experimental mill at the Jumbo mine, which has been under construction for some time, is now nearing completion. The plant will consist of two Nissen stamps, two Frue vanners and a cyanide plant. The plant is so built that additional stamps may be added at any time.

The Kinkead mill has made several short experimental runs and the mill is now ready for the regular treatment of ores. A shipment of Kendall ore has been made to the mill for treatment.

Capt. A. H. Mayne and Herbert Cook are prospecting and developing two ledges at their lease on block No. 8, on the north end of the Kendall claim. A shaft is being sunk on each of the leads, and at the same time surface prospecting is in progress.

The Florence mine recently made an-

other shipment of high-grade ore to the sample of the Western Ore Purchasing Company at Miller's siding. A sampler is soon to be erected on the Florence property for the sampling of ores from the adjacent leases. Work on the foundation is now in progress.

N. W. La Lime and associates, who recently secured a lease on the Black Bear claim of the Atlanta Company, intend to commence at once to develop their block. A gasolene hoist is to be installed at the old shaft, and sinking commenced at once to a depth of 200 feet.

The plant of the Nevada-Goldfield Reduction Company, better known as the Frank mill, is now in operation. A short run has been made on January ore, which was already in the bins, and a shipment of Red Top ore has been made to the mill.

News comes from Silver Peak that a 10-stamp mill is to be erected on the holdings of the O'Meara-Lynch syndicate. M. J. and T. J. Lynch are now in San Francisco with the object of purchasing the plant and incorporating a company for the further development of their mines. The corporation is to be known as the Silver Peak-Valencia Gold Mining Company, and its possessions will include eleven claims adjoining the Drinkwater mine.

#### Bisbee. March 1.

Reference has been made to the probability of the combination of American and Saginaw development companies here. Official statement was sent to the stockholders of the two companies this week. The American will be reorganized with a capital stock of 100,000 shares of \$10 each, which is double the present issue, and the new stock will go to the Saginaw Company for its property. The Saginaw Company receives its 50,000 shares indorsed as \$3 paid, though its stockholders have actually paid in \$5.60 per share, or \$280,000, up to date. The American shareholders have paid in \$2 per share and are now called for \$1 additional, which will give a fund of \$120,000 in the treasury of the consolidated company, for only about \$30,000 has ever been paid out. It will also give it the 912-ft. shaft of the Saginaw, fully equipped. The consolidated company will have a larger territory than Calumet & Pittsburg, and nearly all of it is known to be within the mineralized belt of the Warren district. The line of contact, so far as at present determined, runs across Saginaw ground, and the pitch of contact between lime and porphyry is to the north, as has been proved in the adjoining properties of Junction and Denn, so that it is quite probable that at some distance beneath the surface the entire Saginaw ground may be in possible mineral bearing formation. Junction has already proved the contact to be rich in copper. Since the early days of the Minnesota people in Bisbee the theoretical location of the contact line, between the mineral-bearing lime and the adjoining porphyry, has been materially

changed. Then it was supposed to run southeast across Calumet & Pittsburg ground and to cut off the claims now forming the Junction from any possible mineralization. Careful consideration by H. B. Hovland, of Duluth, and others, led to the idea that this contact might trend more to the east, and more directly coincide with the break forming Mule Pass gulch. This led to the organization of Junction and later to that of Denn. Work on these two properties, first by diamond drill and later by shafts, has proved the theories of Hovland and others to be correct. This has extended the area of the district materially and has coincided with what the present writer stated in the JOURNAL a year ago last August, that "the future developments of the Warren district lay more toward the east and south-east than in any other direction."

The Calumet & Arizona declared a quarterly dividend of \$2.50 per share, payable March 20, making a total to date of \$3,900,000 and accumulated surplus to the same date of \$3,100,000. The company's first smelter blew in Nov. 15, 1902. February production will be less than that of January, but more than the intended average; some stopes of rich ore opened to make an unauthorized record in January are still unmined and must either be timbered and left or taken out. As the policy of the company is not to leave much open ahead of mining, these will be taken out as fast as convenient, and may add to the average for several months.

Shattuck is now delivering ore to the Copper Queen smelter at Douglas and is therefore the fifth producer in the camp. It will make small shipments till its hoist, now on the way here, is set up and in operation, which will be, say, 90 days. Three crews have been started at levels in the shaft, cutting it up, and this work will take a short time. Contracts have been let for a tramway from the shaft to the nearest sidetrack. The company has adjourned its annual meeting till April 17 and may take up the question of a smelter at that time.

Wolverine & Arizona is in 2100 ft. with its 500-ft. drift and the breast is looking very well, in broken lime, showing the effect of solutions. It is still a few feet from the Czar fault, where the management hope for mineral.

Hoatson shaft of the Calumet & Pittsburg is now 1065 ft. deep and is going to water before stopping. In the meantime a plat will be cut at 1050 ft. and drifts started off there.

The Old Mammoth mine, near Tucson, is to be reopened by its English owners.

Old Dominion is to reopen its Continental claims, from which a considerable tonnage of sulphides has been produced in times past.

#### Paradise, Ariz. March 1.

At the Savage Gold and Copper Company work continues steadily. They are

now working about 20 men, and will increase this to 25 and 30 as soon as they can be obtained. This property now has the main tunnel in about 400 ft. with stoping ground above of an average of about 300 ft. In the winze, 200 ft. from entry and 100 ft. deep, they are drifting both east and west. In the west shaft, 3000 ft. from the tunnel, work continues on the same ledge and is exposing the same class of ore.

At the Cochise Consolidated Copper Company work continues, and they now have ground opened that will keep their concentrator in operation for more than a year. The concentrator should go into commission in March.

At the Scanlon property on Horace mountain, work continues in the crosscut tunnel.

At the Doran Gallegher group, under bond to Davis & Alexander, work is being pushed.

The Chiricahua Development Company continues work with the usual force, under the management of Fred W. Hoar. A diamond drill is now being used for the exploration of the property.

At the Manhattan Development Company work continues in the Smith tunnel. It is reported, but not confirmed by the management that the high-grade ore has been cut. An additional force of men has been put to work at another point.

S. S. Badger expects to begin work during the coming month on a group of claims he controls on the lower mineral belt.

At the Duluth & Chiricahua Development Company work continues in sinking the shaft. Crosscutting will begin shortly at the 200 ft. level from this shaft.

At the King of Lead the tunnel is now in about 450 ft., and stringers of ore have appeared. On this property, an incline winze was sunk to a depth of about 40 ft. and at the 30-ft. a fault was encountered that threw the ledge from its regular dip of about 20 deg. from the perpendicular, to nearly horizontal, so that the tunnel is some 100 ft. under the ore; but the tunnel will be continued until the fault is passed, and this will be done before up-raising is started.

#### Butte. March 3.

The trouble experienced by the Boston & Montana early in the winter in shipping its ore to Great Falls has been overcome by a better supply of railroad cars. The company is now shipping 3500 tons a day to that point and is making periodical shipments to the Washoe. The new shaft on the Leonard will not be finished for some time, for it is the intention to sink it 1400 ft., 200 deeper than the present one. All other sub-companies of Amalgamated are maintaining their customary output of ore, with the exception of the Colorado or Trenton, the principal producer of which, the Gagnon, is closed down on account of

needed repairs in the shaft. The work will not be complete until early in April.

North Butte is mining about 1000 tons of ore a day and expects to increase this quantity as soon as its new hoisting engine is ready for work, which will be at least six weeks or two months. Manager Carson is dividing his time between North Butte and United Copper, and since taking hold of the latter has increased the output of ore. He has shut off all leases in the Rarus mine.

Raven and Reins Copper continue the development of their properties. Last week the former encountered a character of ore new in that property, being rich in bornite and copper glance. The company thinks it will cut its main veins at a depth of 1500 ft. in Snoozer ground inside of 10 days. Reins has its shaft down 1110 ft. and is now sinking on the last 100. The cutting of a station at the 1200 and installation of heavy pumps there will be followed by the driving of a crosscut for the veins, which it is thought are not far from the line of shaft.

The Cable Lease Mining Company, which has been operating the old Cable gold mine and adjoining claims 50 miles west of Butte, has given way to the Cable Consolidated Mining Company, organized under the laws of Maine recently with a capitalization of \$2,500,000, shares of a par value of \$1 each. Organization was effected by George I. Whitney and associates, of Pittsburg. Mr. Whitney will turn the Cable Lease property over to the new company with \$150,000 in cash. F. W. Bacorn, of Butte, is president of the new company; H. H. Robinson, of Pittsburg, is secretary, and Stanbury Sutton, of the same place, is treasurer.

Butte Copper Exploration is making rapid headway in unwatering the old workings on the Six O'clock group of copper claims. It expects to touch bottom in 10 days and begin sinking to the 1000-ft. level at once. Butte & London is still driving through wash. Its shaft is 60 ft. deep.

#### Salt Lake City. March 1.

The Eagle & Blue Bell Mining Company, controlled by the Bingham Consolidated Mining & Smelting Company, has established a transfer office in Boston. E. L. White, of Boston, has succeeded Duncan McVichie, of Salt Lake, as president.

The management of the Newhouse Mines and Smelters Corporation has announced that the mill will be supplied with ore from the portion of the Cactus property where the steam shovel is operating, in about three weeks.

Disappointed in not finding ore where it was expected, in the east drift of the 1500 level of the Lower Mammoth mine in the Tintic district, the directors were obliged to levy another assessment of 5c. a share to meet the pressure of a \$17,000 indebtedness. Shipments of ore from the south cross-cut of the 1500-ft. level contin-

ue, but the returns only a little more than meet operating expenses.

The owners of the Buekhorn mine at Ophir have received another payment on the purchase price of that property.

At the meeting of shareholders of the Consolidated Jefferson Gold & Copper Company, operating at the mouth of Little Cottonwood cañon, near Salt Lake City, a proposition to borrow \$250,000 for further development was rejected. As much as \$150,000 has already been expended, resulting in the opening of quite a large body of low-grade ore; while some high-grade values have been found. Nicholas Schmittroth resigned as president and manager and W. E. Neiman, of Omaha, was chosen as his successor.

The Mammoth, Grand Central, Victoria and Carisa mines in the Tintic district have been examined by a corps of engineers. Rumors have been thick, but the most accepted theory is that the examinations have been made for the interests promoting the American Copper Company. The Bingham Consolidated mines, also the Silver King at Park City, are now being examined, presumably for the same people. It is believed these mines are wanted to insure many years' supply of desirable silicious ores. Walter Fitch, former manager of the United States Mining Company, is in the field for the prospective purchasers.

The Consolidated Mercur directors have posted the first quarterly dividend for the year for payment on March 26. The amount is \$25,000. With this, the company will have paid \$1.13 a share, or \$1,130,000, including the dividends paid by the Mercur and Golden Gate mines, before consolidation, \$3,310,313.

The Rio Grande Western Railroad Company will soon let contracts for the construction of another line into Bingham cañon. The line will go up Carr Fork cañon. The road is a necessity because of the rapid increase in tonnage soon to come from the mines.

The Sacramento Gold Mining Company, of Mercur, shipped 480 flasks of quicksilver to New York during the past week.

The Centennial group of claims in Bingham, located in Markham gulch, has been bonded to Peter Porter and associates, of Salt Lake. It will be consolidated with the Montezuma property now being developed.

The case of John and Ellen Strickley against the Highland Boy Gold Mining Company, tried in the Federal court at Salt Lake and appealed to the United States Supreme Court, has been decided in favor of the mining company by the latter tribunal, which confirmed the judgment of the lower court. The action grew out of the condemnation of a right of way across the property of the plaintiff for an aerial tramway.

Salt Lake banks reported ore and bul-

lion settlements last week to the amount of \$495,800.

The Crescent Peak Gold Mining Company has been organized in Salt Lake to operate in the Searchlight, Nevada, district. Among the promoters are Judge William H. King and John W. Burton, of Salt Lake.

The stockholders of the Eureka Hill Mining Company, operating at Eureka, Utah, have re-elected the old board of directors. Moylan C. Fox is president; Judge Robert Harkness, vice president; George W. Riter, secretary. All are of Salt Lake. The mine is being worked principally by leasers.

The stockholders of the Wabash Mining Company at Park City authorized the capital stock of the company increased from 300,000 shares of the par value of \$1, to 400,000 shares of the par value of \$5. The new issue and the 50,000 shares in the treasury at the time of the change are to be sold for development and improvement purposes and made non-assessable.

The metal output of the Daly West mine at Park City, Utah, in 1905, was sold for \$1,234,457; the production being: 1,798,628 oz. silver; 1,225,331 lb. of copper; 16,772,978 lb. of lead; 9,926,517 lb. of zinc and 1,397 oz. of gold. The metal came from 16,537 (dry) tons of crude ore, 15,994 tons of concentrate, 2,017 tons of crude ore from the 1,400 level and 419 tons of mill crude.

The financial statement presented to the stockholders of the company at the annual meeting held in Denver showed the treasury to have contained on Dec. 31, a balance of \$411,886. Aside from the sum total received from ore sales, there came in from other sources \$2701 making the receipts of the year aggregate \$1,237,139. The disbursements, including \$432,000 paid out in dividends, footed up to \$1,234,458. With one exception, the outgoing directors were re-elected, the new member being F. J. Haggenbarth, of Salt Lake, who succeeds Albert Watts, of Boston. Ernest Bamberger, of Salt Lake, was re-elected general manager.

#### Denver. March 1.

The Supreme Court of Idaho has granted the leaders of the Western Federation of Miners, who are at present in the penitentiary at Boise City, charged with the murder of Governor Steunenberg, a writ of habeas corpus and the hearing on the same is expected to take place today. Their attorneys claim that the statute referring to extradition was violated by their summary removal from Colorado to Idaho.

James McParland, who has charge of the western division of the Pinkerton detective agency, has left for Boise in order to testify before the grand jury, which is investigating the case at present. The confession of Harry Orchard comprises

more than a hundred pages in type. It is stated on good authority that the detectives have secured the key to the cipher which was used by the Western Federation in its correspondence by letter or wire and have thereby been able to secure a large amount of damaging evidence, to be used at the trials. Governor Gooding has withdrawn the offer of \$5000 reward by the State and the only reward at present offered is that of \$1000 for the information leading to the arrest of J. L. Simpkins, who has not yet been located.

Indictments under the conspiracy statutes have been returned by the grand jury at Pueblo, after a session of three weeks, against certain officials of the Colorado Fuel and Iron Company and the Colorado Supply Company, charging them with violation of the scrip law. The defendants are charged with violating the provisions of the law which secures the employees payment in money. In the report of the grand jury it is demanded that the attorney general shall at once begin proceedings under the anti-trust law for the forfeiture of the charters of that company and of the American Smelting and Refining Company.

A. W. Grant, clerk of the District Court at Cripple Creek, has been appointed receiver of the Cripple Creek Homestake Mining and Reduction Company, which about three years ago, built a large cyanide plant on Globe hill. The appointments of the plant were first class, but the average grade of the ore mined was too low to make it a paying proposition.

During the week ending Feb. 21 nearly 1500 tons of ore were shipped to the Argo smelter from Black-Hawk, showing that Gilpin county is keeping up its reputation. The mild winter which northern Colorado has enjoyed and the small amount of snow in the mountains have permitted mining operations to be continued right along. In the southwestern part of the State the case has been different, and considerable trouble has been experienced there on account of the deep snow.

Another electric-power proposition is being developed in Gore Cañon, which will not interfere with the building of the Moffat road and the power generated will supply the mines in that vicinity and the small towns in Middle Park.

Daniel Guggenheim, chairman of the board of directors of the American Smelting and Refining Company, is expected here this week on his annual inspection tour of the properties of the company.

#### Leadville. March 3.

The Yak tunnel has installed a system of telephones underground to connect with all of the different departments on the outside, also with the main offices in Leadville and Denver. There are 26 dif-

ferent telephones, with switchboards and two private trunk lines connected with the main lines of the Colorado Telephone Company which now makes it possible for the superintendent when underground to call up the general manager in Denver and notify him of the work that is being done.

Recent development in the Cloud City has placed it at the head of the list as a manganese ore shipper, and the property is now in a position to ship 100 tons daily of a high grade. The company is operating two shafts, the Cloud City and the Home Extension, 600 and 650 ft. deep respectively; a drift 1125 ft. long connects the two shafts, and in this drift three distinct shoots of manganese ore were encountered. While this ore is being sent to the steel works at Pueblo, prospecting for the large body of lead-silicious ore, opened in the Coronado, is being vigorously pushed.

Six years ago the Land Office made a ruling that all patented claims had to be patented from section tie lines; several years previous to this ruling the Emma-Nevada, adjoining the London mine, Mosquito range, had secured a patent. When the claims were platted according to the ruling it was found that an error had been made in the Emma-Nevada survey of 1000 ft.; the London people, desirous of securing more territory, surveyed over the Emma-Nevada to cover the error and secured a receiver's receipt on the Silver Monument claim. The owners of the Emma-Nevada entered protest, and were awarded a decision by the commissioner of the Land Office; this was appealed, and taken to the Secretary of the Interior, who during the week upheld the ruling of the commissioner on the ground that the original stakes of the Emma-Nevada survey were found in position on the ground and tied to mountain peaks according to the original law.

James W. Newell has been appointed receiver of the Dolly B. mine, Big Evans, to succeed Charles L. Hill. The property is considered one of the best in that section of the camp, and before the unfortunate litigation was commenced that closed the mine, large quantities of high-grade ore were shipped. The mine is well equipped, and if there is a chance of starting the property up the new receiver will do it, as the help of the Dolly B. in controlling the water situation in that section of the camp would be the means of starting up other properties.

The work of getting the Pawnolas shaft in condition is nearly completed. Prospecting will be carried on from the lower levels of the shaft to catch the ore channel recently opened in the Mammoth shaft, Big Evans.

Drifting north from the bottom of the Silent Friend shaft, head of South Evans, has resulted in the opening of a good body of high-grade ore; to work the

strike economically the shaft will have to be sunk another 100 feet.

The Dome shaft, Rock hill, has been sunk 100 ft., and is now 450 ft. deep; drifting has been started in different directions to catch the ore-shoots that are known to exist in this section of the hill. At the lower part of the hill the Prindle shaft has entered the lime at a depth of 600 ft.; the Thompson shaft is still in the lake bedding at 520 feet.

Fair progress is being made in the sinking of the Tuscon shaft, and with the assistance of heavy pumps at the lower station the water is under control. It is very probable that when the Tuscon shaft reaches the required depth, a number of the adjacent mines will start up, as no water will hinder operations as the Tuscon shaft has drained the hill.

#### Cripple Creek. March 1.

The recent issue of the Portland report for the year 1905 shows that company to be in excellent shape. The production for the year amounted to 100,986 tons of ore of the gross value of \$2,373,600, or an average of \$23.60 per ton. Also 8246 tons of dump ore of the gross value of \$48,433, or \$5.84 per ton was shipped, making the total production \$2,422,033. The net profits of the company for the year were \$547,723 from the mine, \$314,279 from the mill and \$19,273 from all other sources, making the total net profits \$881,275. The report shows that the total gross production of the mine from April 1, 1894, to the end of last year to be \$23,102,328 and the net tons to be 671,496. During this time dividends to the amount of \$6,457,080 have been paid. During the year the company was reorganized under the laws of the State of Wyoming. Heretofore it has been an Iowa company.

The Forest Queen has been shipping steadily a fair grade of ore, which has been taken from the bottom level.

The work of clearing away the debris of the Little Giant mill in Pony gulch has commenced and the rebuilding is expected to begin soon. This mill was recently destroyed by fire just as it was completed, before it had been used.

Interest seems to be reviving again as far as the drainage tunnel is concerned, and considerable money has been subscribed.

Lessees on the Old Gold are shipping considerable ore of good grade.

The leasing company on the South Burns has resumed sinking, having repaired damages.

#### Duluth. March 5.

Ed. A. Parmalee, who has been in charge of the Republic Iron and Steel Company's Mesabi range mines, has resigned. He will spend some time at his old home at Iron Mountain and has no plans for the future. Mr. Parmalee has been very fortunate in business matters

while on the Mesabi range and will probably take a long rest.

W. A. Watson, formerly in charge of the Antoine Ore Company's mines on the Menominee, will go to Bovey, Minn., where he will take a responsible position under J. C. Greenway, superintendent of the Coleraine district for the Oliver Iron Mining Company. The Oliver Company will carry on a great work at this point the coming season and will be mining from no less than four shafts as well as from a large open pit at the Holman property.

The Katonka Iron Company has been formed in Philadelphia to take over what its prospectus claims is a most valuable iron property. The ground lies in town 33, Dickinson county, and the prospectus claims there are 5,000,000 tons of good bessemer ore in the land. Half a dozen mining companies have explored the land, but none of them have ever succeeded in finding enough ore to make a mine, and the new Katonka Company has done little, if any, additional exploration. The company estimates a profit of \$100,000 per annum on a product of 100,000 tons.

The Marquette & Southeastern road, a Cleveland Cliffs concern, is to build to that company's new Austin mine. The Cleveland Cliffs roads—Marquette & Southeastern, Lake Superior & Ishpeming, and the Munising Railway—now have a mileage of about 160 miles, extending from the heart of the Marquette range to Lake Superior at several points, and into the hardwood timber belts of several rich counties. Tributary to the roads the company owns an enormous acreage of timber lands, and it is now starting the scientific forestation of these lands, with a view to making the timber crop permanent. It was eight years ago that the Cleveland Cliffs Iron Company, unable to secure from the South Shore a reduction from 40 to 25c. for the haul of ore the 15 miles from Ishpeming to Marquette, built the Ishpeming line and branched out in the career it is now following. It has become far more than a mining company, important as that may be. It has mines and lands upon three great Lake Superior ranges; the largest charcoal furnaces in the United States; great chemical works, where it treats the pyroligneous acids of its carbonizing retorts; railroads and a constantly growing fleet of steel ships; millions of acres of land, partly forested, partly for settlement; tracts at lower lake points, where it is proposed to ultimately erect steel mills, etc., and many minor interests of the most varied nature, and in some cases of the most altruistic character.

#### Platteville, Wis. March 1.

The exceedingly mild weather has enabled prospectors to push the work of drilling. Reports of new strikes are continuously coming in. The latest comes from the Pigeon Black Jack Mining Company

near Lancaster. Ten of the business men of that place have been drilling for some time three miles southwest of the Lancaster camp. In the third drill hole, at the depth of 40 ft., a vein of lead and at 75 ft. a 5-ft. vein of zinc ore, underlying a 2-in. vein of sulphur, were found. Among those interested are Tom Orton, Howard Rose and Al Webber.

Mining men from the copper and iron district in the northern part of this State and Michigan are paying considerable attention to the Platteville fields. This camp was recently visited by a delegation from Marquette.

The Big Patch Mining Company struck rich lead and zinc ore in the three drill holes.

The unleased property lying between the Empire, Enterprise and Grant County mines was secured by Mr. Johnson of this place. As soon as it was known that he was forming a drilling company shares were applied for.

Ground for foundations was broken this week for seven new plants. The warm weather thawed the ground to such an extent that work went very easily. It has been the custom heretofore to secure leases in 80- to 1000-acre tracts. The owners of property in some localities are now confining operators to smaller lots, thus compelling them to work and not hold the leased land for speculative purposes.

Ten mining men from Platteville and Stoughton have incorporated the Midway Mining Company. The mine is located on the property adjoining the Baxter, in the Cuba City camp. Three drill holes show exactly the same formation as at the Baxter. The Midway parties are sinking a shaft and have ordered machinery for a complete pumping and hoisting outfit. It is their intention to contract for a concentrating plant at once. The company is capitalized for \$80,000.

La Follette management is pushing the development work so as to have the property ready for a mill early in the coming summer.

The Ollie Belle mine, near the Sally Waters at New Diggings camp, owned by the New Jersey Zinc Company, has been developed to the point where the management is convinced that the property is ready for a concentrating plant. A contract has been let to the Galena Iron Works.

It is reported that the Preston Point Zinc Company, at British Hollow camp, will begin active operations at once. A vein of zinc and lead has been recently encountered. This, in addition to the former developments, promises to put the mine well up. It is expected the contract for same will be let next week. The owners are local and Minneapolis men. M. D. Hoff, from Colorado, is at the head.

The annual report of the Platteville Lead and Zinc Company shows that there

was paid to the stockholders during the year 1905 about 290 per cent., in addition to some \$60,000 paid out for permanent buildings, real-estate and improvements.

The United Mining Company reports one of the biggest strikes of the week on one of its leases, just west of Montfort. It is rumored that the company is to take over the Eberly mine and mill and install a roaster and magnetic separating plant.

Rogers & Rogers, promoters from Chicago, have secured a large amount of mining land in the vicinity of Galena camp. It is reported that they are being backed by Philadelphia and New York investors. The property secured by them produces a considerable amount of lead above the water level.

The Russell Mining Company, which is operating quite extensively throughout the district, reports a good strike of lead ore on one of its leases in the Galena camp. The ore is of a disseminated nature, some 18 ft. thick.

#### Joplin, Mo. March 3.

The Union Ores Company, of this city, has been incorporated with a capital stock of \$50,000, fully paid up and non-assessable, chartered for a term of 50 years. The object of the company is to mine and mill ores and buy and sell properties.

A very promising lead discovery has been made by Wiles & McNeal on their lease of the Edgar county land, two miles north of Chitwood. About 20,000 lb. of chunk lead has been taken out in a few days' work, with only two men in the ground.

Jones & Co., who recently secured a lease on the old Rabbit Foot mine on the Granby Mining & Smelting Company's land in Leadville Hollow, are opening up what promises to be a rich run of zinc ore. The ore was found in the old workings at a depth of 80 feet.

Ritter & Co., who have been prospecting on the Montgomery land northwest of this city, have encountered a rich run of zinc ore and expect to make 10 or 12 tons of ore per week hereafter.

Earl Brothers, of Carterville, have sold their mine, located east of the Carterville foundry, to Dreidle & Co., of St. Louis. The consideration is placed at \$6000. The same parties also purchased the old Blue Wing mill and are moving it to the mine, over which the dirt will be handled.

A Webb City company composed of Allen Hardy, Jr., Geo. Hardy, Herman Jones, Ed. Allen and others are opening up some new prospects in the Webb City district. They have a 20-acre lease on the Ragan land and a 10-acre lease on the McClellan land adjoining. Shafts have been sunk and rich ore encountered on both leases.

Corbin & Co., who recently secured a lease on the Johnson land west of Joplin



and commenced prospecting by drilling have just completed the second hole and discovered a 10-ft lead of ore at the 105-ft. level. A run of zinc ore was found at the 144-ft. level.

A rich discovery of zinc ore has been made on the Tolbert land, north of this city. This land is north of the Cox land, which is just now producing much ore.

#### Indianapolis. March 5.

The annual meeting of the Indiana Operators' Association has been called for March 13 in Terre Haute. It has been the custom to meet a few days after the Indiana United Mine Workers assemble, to proceed with the joint conference, but this year there will be no joint conference unless the strike situation should be changed. The Miners' State Convention is called for March 6. The *United Mine Workers Journal*, the official publication of the miners' union, urges moderation, but at the same time insists that justice demands the restoration of the 1903 scale, basing its argument on the assertion that never did the country enjoy a greater prosperity and never was the consumption of coal so great. In this connection, the *Journal* points out for the benefit of the public, that when the miners accepted the 5.55 per cent. reduction two years ago the public did not get its coal a cent cheaper.

Vice-President Fairbanks has laid before the U. S. Senate the report of the United States Geological Survey on the coal tests at the St. Louis Exposition. This is the report that Senator Hemenway of Indiana called for because it shows that Indiana produces a high grade of steam producing coal. Accompanying the report is a request for an appropriation of \$350,000 with which to continue the tests. The Senate ordered 5000 copies of the report printed for general circulation.

#### Scranton March 6.

The strike at the Jermyn collieries in Old Forge is as far from being settled as ever. Last week the owners discharged the inside foreman and other officials are to be removed. The mine workers have also decided to withdraw the engineers, firemen and pump-runners, if the company does not take action to relieve the situation immediately. The men offered to return to work at the old rate of wages until the dispute could be settled, but this the company would not agree to. Afterward the men offered to submit the points in dispute to Hon. W. L. Connell, chairman of the conciliation board, and President T. D. Nicholls of the United Mine Workers, and this likewise was refused. Finally the men asked the company to revoke the order reducing the wages of the 40 men, and this was declined. There are 1400 men and boys idle, with no prospect of any settlement being arrived at. It has been the most unfortunate strike in the anthracite region since the conciliation board was established.

According to the annual reports of the mine inspectors the number of fatalities caused by falls of roof and coal are increasing year after year, and considerable discussion has been provoked by the disclosures made in the reports published last week. In Lackawanna county, for example, the fatalities due to falls were 65 per cent. Not many years ago great surprise was expressed when in one or two districts the percentage reached 50, but in the Second Anthracite district last year 78 per cent. of the fatalities were caused by falls. The same complaint is heard throughout the region and the matter is being generally taken up by the press. The demand is being vigorously made that at the coming session of the State Legislature steps be taken to revise the mining laws in a thorough manner. There is no doubt but that many of the fatalities caused by falls are due to the carelessness of the miner, while in many places they are attributable to the scarcity of foremen. The chief of the Bureau of Mines will take up the question with the representatives elected from the mining districts.

Tons of coal are now being taken out of the old Greenwood mine in Tamaqua, in which a fire has raged since 1857 and which was recently extinguished by the Lehigh Coal and Navigation Company after a large expenditure. The coal, however, will not burn. Although pretty in appearance, it is practically worthless, having lost all its burning properties. For 50 years the coal has been subjected to intense heat from the fire which raged close to it. This was expected by the company even when it spent a fortune to extinguish the fire. The coal underneath the seam in which the fire raged will, it is believed, be unimpaired, and the thickness of the seams and richness of the coal will abundantly recoup the company for the outlay.

Notices have been posted at the collieries controlled by the Pennsylvania Railroad Company that hereafter, until further notice, all collieries will be worked full time on Saturdays.

Work has been completed upon the foundations of the new engine-houses at No. 10 colliery of the Lehigh and Wilkes-Barre Coal Company.

The Hazleton board of assessors has decided finally to assess the coal-lands of the Lehigh Valley Coal Company at the rate of \$500 per acre. The company will appeal and will ask that the amount be reduced to \$250.

#### Toronto, Canada. March 6.

The Ontario Legislature opened Feb. 15. As was anticipated, the Lieutenant-Governor's address promised important legislation on mining. The details have not yet been announced, but it is understood that the head of the present Bureau of Mines will be constituted a Deputy Minister, thus raising the bureau from the position of a merely subordinate branch of the public service. The position will be

filled by T. W. Gibson, who has been director of the bureau for over five years and has displayed great efficiency in the work. As deputy minister he will have fuller control of matters and be responsible only to the minister at the head of the department.

W. G. Trethewey, of Toronto, and John McMartin, of Cornwall, promoters of the Cobalt Mining Company, have arranged to establish a refinery in Hamilton, Ont., for treating silver-cobalt ore. They have secured the property in that city belonging to the Hoepfner Refining Works and bought five acres additional, and will proceed with the work of construction at once. It is proposed to refine the ore by a process used in Germany.

The Ontario Government has received a cablegram from London announcing that the Rothschild's experiments in smelting cobalt ores were turning out well. Advance payments have been made of £100 per ton on each of the 20 tons of ore forwarded for the tests.

Engineer Davy, of the Transcontinental Railway Survey staff, has reported to headquarters at Ottawa that indications of gold, silver, copper, iron pyrites and lignite have been discovered at Spurt lake in the Lake Abitibi district. The Standard Oil Company has agents prospecting in that area and are said to have found a valuable silver proposition.

The Crow's Nest Coal Company held its annual meeting in Toronto, Feb. 9. It is proposed to increase the present capital of \$3,500,000 to \$14,000,000 by the exchange of each present \$100 share of stock for \$100 in 5 per cent. bonds and three shares of common stock of par value of \$100.

The annual meeting of the International Portland Cement Company was held at Ottawa, Feb. 6. Sir Sandford Fleming presided. The report of J. S. Irvin, managing director, stated that the first five months' operation of the plant, ending Nov. 30, 1905, showed net earnings of 8 per cent. on the total capital. As the result of the installation of improved machinery it was expected that the output would be increased to 2000 bbl. a day. They would have 140,000 bbl. for spring delivery and be ready to take early spring orders.

The Imperial Plaster Company of Toronto contemplates reopening the plaster mines near Cayuga and will probably erect a mill in that town for grinding the plaster, instead of doing the grinding at the mines.

#### Mexico. March 1

The object of A. F. Holden's trip to Pachuca, mentioned in my letter in the *JOURNAL* of Feb. 10, is made manifest this week by the public statement that the majority of the stock of the Real del Monte mine has been bought by the United States Mining Company, and the new directors will consist of A. F. Holden, W. H. Coolidge, E. A. Clark and Pablo Martinez del Rio. Señor del Rio will act as

managing director at present, with M. B. Spaulding the local manager and T. H. France the consulting engineer, with headquarters in Mexico City. This mine is one of the richest of Pachuca's famous old properties, and whether it will be used as a basis on which to start the smelting business the United States Mining Company is so anxious to establish in the Republic cannot be said, though it is stated that \$1,500,000 gold will be spent in development work, mill and new equipment. The examination of the property was made by Geo. Schroeter, T. H. France and Geo. Kennedy.

It is stated that \$2,000,000 gold has been offered to Lawrence F. Bedford and associates who form the company owning the Garduña mine, near the Placeres de Oro, where Wm. Niven is preparing to put in immense dredges for treating the river sands, in the State of Guerrero. The Garduña is one of the old properties of the district, but during the time of the present owners, a comparatively few years, has produced something like \$1,500,000 Mexican, with only a 16-stamp mill, followed by lixiviation and cyanide. It is believed the deal will go through.

Near the Balsas station of the Cueruavaca station of the Mexican Central in Guerrero H. O. Robinson has bought the Santa Lucia of T. F. Place and Robt. Wilson, of Bangor, Maine, and will develop on a large scale, putting in a spur or a cable between the railroad and the mines. J. S. Moser and associates from Chicago are preparing to put in an electric railroad from Balsas station to Chilpancingo, a distance of 40 km. (25 miles), which, because of engineering difficulties, will cost over \$300,000 gold, will open up a splendid mining territory, besides reaching close to the holdings of Mitchell's La Dicha Copper Company near Acapulco. A large party, consisting of John A. Cassidy, of Washington; Leo Benoist, of St. Louis; Geo. A. Fitch, of Los Angeles, and others, has just left Mexico City with Walter R. Hensley for a visit to La Dicha properties.

In Sonora F. M. Foster is preparing to start work on the Todos Santos, an old property south of Nacozari, and will build a small smelter on the Yaqui river, 2 miles distant. And the Ohio-Mexico Mining Company, with John Henderson as general manager, will build a 60-ton smelter at Caborca, 70 miles west of the Santa Ana station of the Sonora Railroad; they also contemplate building a small railroad of their own 70 miles to the coast. At Guaymas, New York capitalists are to have a 250-ton smelter completed before the end of the present year. If done it will be a great boon to that section of Sonora, as it is some 600 miles to the nearest smelter, which prevents the working of many properties.

The enthusiasts for Guanajuato are losing their heads over the proposed merger deal and there are those who say that

\$75,000,000 Mexican will be involved. The deal includes 10 or 12 mines, among which are most of the old bonanzas; about the same number of mills, six of them being new stamp mills with cyanide plants; and possibly a smelter. This is no doubt exaggerated as to the amount; but certain it is that a large consolidation is on and will most probably be carried through. In the meantime the new work and additions, previously mentioned in these letters, at the Guanajuato Reduction and Mines, the Guanajuato Consolidated Mining and Milling Company, El Cubo Mining and Milling Company and others, continue. In La Luz section of the camp Al. J. Adams has organized the Guanajuato Gold Mines Company and is offering the stock for sale to raise money for development work and to pay for a new 100-stamp mill and complete set of machinery, hoists, pumps, etc., that have been already ordered. The mines controlled by this company have been worked by the sons of Mr. Adams in a haphazard way for several years, but without particular results. One of the sons, Lawrence P. Adams, is manager of the new company. Whether the results will be the same as before, and why Mr. Adams is selling such a good thing to the public it is difficult to say.

London. March 1.

The attention of investors in mining shares has been drawn to the Champion Reef Gold Mining Company, of India, which finds itself in the unaccustomed (for it) position of having to combat with poor zones of ore. The mines in the Kolar goldfield have repeatedly had to go through this ordeal. The Mysore mine had this experience at a very early period of its history, but quickly recovered. On the other hand, the Coromandel has spent many years in the doldrums. Ooregum and Nundydroog passed successfully through the trying time at about the middle of their present career. The case of Champion Reef is not immediately acute, for the known ore reserves will last over two years. It is deemed advisable, however, owing to the drop in the values of ore now being developed, to curtail the output, and the amount sent to the mills has been reduced from 15,000 to 12,000 tons a month. For the present, the shareholders must possess their soul's impatience and hope for the best.

While writing of Indian mines, it is of interest to note that John Taylor & Sons are embarking on the exploration of another goldfield in India, situated near the village of Ramagiri in the Anantapur district of Madras. It is situated nine miles from the South Mahratta railway, at a point 102 miles north of Bangalore. The whole district is honeycombed with old workings that must have been abandoned in almost prehistoric days, and in this way the district resembles the Kolar very closely. The gold is found in quartz

veins of irregular shape occurring in chloritic and argillaceous schists. The dip is from 70 to 80 deg. from the horizon, and this, with other facts, points to the likelihood of the veins continuing in depth. A sum of at least £10,000 is to be spent on prospecting, and driving levels and shafts in various places. A company called the Anantapur Gold-Field, Ltd., has been formed, with a capital of £30,000, of which the whole is being offered for subscription. The money thus subscribed will be available for working capital, there being no inflation of capital in the shape of vendors' shares. The shares in the company should be very attractive to those who hope to get in early into the new field.

A few weeks ago I gave some details of the Um Garavart mine in Upper Egypt, operated by the Nile Valley Company, and I mentioned that the mine was a comparatively low-grade one—11 to 14 dwt. per ton—with phenomenally rich patches here and there. At the time I wrote, negotiations were on hand for the placing of £48,000 more shares and 15,000 had been sold. All of a sudden a panic struck the market, and the remainder were quite unsalable. It will be remembered that originally the option on these £48,000 shares was held by J. B. Robinson, the Rand magnate, but as he backed out of the bargain, negotiations had to be made elsewhere. The inability of the directors to place the shares has led to the necessity of raising further funds by reconstruction, and what is practically an assessment of 4s per £1 is being made. The mine has now a battery of 10 stamps running, and it is hoped to erect another 10 stamps by means of the money forthcoming at the reconstruction. During December the recovery in the mill was 14.57 oz. per ton, and the tailings assayed 2.2 dwt. With a capital of £250,000 it will be hard work earning a decent dividend out of the mine, and it was always somewhat of a mystery that the shares should stand high in the market. All last year they stood at about £1 10s. or 50 per cent. premium. Why they should drop down to 6s., their present quotation, in this sudden way, is not quite clear, though of course it is much nearer their real value than the inflated price hitherto ruling.

Johannesburg. Feb. 14.

During 1906 one or two producing mines will drop off the list, the principal mine being the Bonanza. This property has only enough ore left to run its 55-stamp mill a few months longer. Two of the deep-level-mines, however, are increasing their plants to such an extent that the falling out of the Bonanza will not be noticed. The Robinson Deep and Langlaagte Deep are each adding 100 stamps to their mills. With its 300-stamp battery and tube mills, the Robinson Deep will easily be the premier mine.

## CALIFORNIA.

## AMADOR COUNTY.

*Oncida Mining Company*—This company at Jackson, E. Hampton, superintendent, has laid off part of its force, but keeps some men sinking in the endeavor to find better rock.

*Bunker Hill*—At this mine, Amador City, a large orebody has been encountered. E. H. Harrington is now superintendent in place of C. R. Downs.

*South Spring Hill*—It is expected that this old mine, idle for several years, will now resume operations under supervision of J. R. Tregloan.

## CALAVERAS COUNTY.

*Easy Bird*—From this old mine at Mokelumne Hill rock running \$28 per ton is being taken from the point of the recent strike.

*Boston*—In the work of unwatering this mine at Mokelumne Hill the 800 level has been reached. As soon as the water is all out work will be resumed by an Eastern company.

## EL DORADO COUNTY.

*Vician*—Development work on this mine near Greenwood has been commenced by Wilkins & Tolman, formerly of the Darling mine.

*Mount Pleasant*—The old shaft of this mine at Grizzly Flat is being unwatered before sinking 200 ft. further to the 1000-ft. level.

*Bonded*—W. P. Carpenter and son have bonded this gravel mine near Smith Flat to Colorado men, who have placed J. Swansborough in charge of the necessary development work.

## INYO COUNTY.

*Great Western Ore Purchasing and Reduction Company*—This company is operating the old mines at Cerro Gordo. A smelting furnace has been erected at Swansea, which will be blown in about April 1. Its estimated capacity is 150 tons of ore per day. There is a great resumption of mining all through this section of California, and many important strikes are said to have been made.

## MADERA COUNTY.

*Enterprise*—This old mine at Grub gulch has been sold by Todd & Sully to San Jose men, and work will shortly be resumed.

## MARIPOSA COUNTY.

*Hornitos*—At this place more mines are now being worked than has been the case for years. Near by there are eight mines employing from five to 20 miners each. The Exchequer Company is advertising for miners, and it is understood will soon put up a mill in which custom rock will be crushed.

*Copper*—The copper mine at old Coppertown, near Hornitos, is working three shifts and will sink 500 ft. to develop the property.

## MONO COUNTY.

There has been a sweeping change in the control and management of the Standard Consolidated Mining Company of Bodie. The Eastern interests, headed by N. Westheimer, carried the annual election held last week in San Francisco by a vote of 89,351 shares out of a total representation of 171,673 shares. The new directors are N. Westheimer, A. C. Lassen (editor of the *Daily Financial News* of New York), J. B. Topf, Sol. Scheeline, C. J. Bandmann, W. H. Metson and A. Herman. N. Westheimer has been elected president and Sol Scheeline vice-president.

## NEVADA COUNTY.

*Cyanide plant*—R. D. Jackson has for a year past been operating a cyanide plant below the Empire mine at Grass Valley, and is increasing its capacity by 40 tons daily.

*New York-Grass Valley Mining Company*—It is announced that sufficient money has been raised to pay off the indebtedness on this property at Grass Valley, and also pay for the new cyanide plant and additions to the mill.

*Central Consolidated Mining Company*. The building to house the slime plant and store sulphurets is completed. The electric hoist is soon to be installed at the end of the tunnel, 900 ft. in. As soon as the water is pumped out the hoist will be set in operation. Twenty stamps of the mill are steadily dropping.

## PLUMAS COUNTY.

*Ward Creek*—This mine, Genesee, recently closed up for a short period, has resumed operations. It is expected that a full force of men will soon be put at work.

*Glazier*—It is expected that this mine, near Genesee, will soon be transferred to the company now having it under bond.

## SAN DIEGO COUNTY.

*Iron Locations*—Some 28 claims covering about 4000 acres of land supposed to contain rich iron-ore deposits have been filed with the recorder of San Bernardino county. The locators are Lyman Stewart, J. S. Torrance, F. A. Galbreath, S. T. Merrill, W. R. Slate, Giles Kellogg and C. E. Tredell.

*Cleveland & Pittsburg Mining Company*—This company, near Escondido, is now successfully working the tailings from the mill by the cyanide process.

## SHASTA COUNTY.

*Sugar Loaf*—This copper mine near Balakalala, owned by Grotefend, Filius and King, is now being opened and developed.

*Black Oak*—W. G. Van Matre has bonded from T. Z. Blakeman this mine at French Gulch on the basis of \$30,000. A new tunnel to strike the pay shoot is to be run.

## SISKIYOU COUNTY.

*Fernandez*—This hydraulic mine at Cherry Creek has commenced operations for the season with a light supply of water.

*Big Slide*—The Iowa company which has bought this gravel property at the mouth of Deadwood is receiving its machinery, the intention being to raise the water from the creek by centrifugal pumps and use it in piping, avoiding the construction of long ditches for a distant water supply.

*Graham Consolidated Mining and Development Company*—This company has begun work on the Wood Rat claim on the Klamath river, opposite Garvey Bar. Elevators are to be installed.

## COLORADO.

## CLEAR CREEK COUNTY.

*Sterling Mines and Tunnel Company*—This company has given a mortgage to the Scranton Trust Company, trustee, on the Beaver group of 28 lode claims to cover a bond issue of \$200,000. It is reported that the company will erect a concentrating mill at the portal of its main tunnel. Office is in Idaho Springs.

*Pearce Gold Mining Company*—Denver and New York people have purchased the Morris and 89'er claims in Russell district from Mrs. J. B. Sutton, the consideration being \$3600, and are going to do heavier work. Frank Hardy, Central City, Colo., is superintendent.

*Dandy Jim*—A three years' lease and bond in sum of \$30,000 has been given by D. C. Officer and others to J. S. Fragelius of Rollinsville, Colo., together with associates, on this group in Moon gulch.

*Fifty Gold Mines Corporation*—Articles of incorporation having been filed showing capital stock of \$3,000,000 to operate the Gregory-Bobtail, Fisk, Cook and other consolidated property in the Gregory district. Manager O. B. Thompson, Black Hawk, is now on a business visit to the East.

*Chase*—A shipment by leasers in the 400-ft. level of this property in Chase gulch, brought high values in gold and silver. St. Louis people are owners and J. A. Gilmour, Central City, Colo., is manager.

*London*—This group of seven claims in Twelve Mile section was sold this week to D. R. Patterson, of Denver, whose address is now Apex, Colo., and who will install a gasolene plant at an early date.

*Pleasant Valley Mining Company*—This company operating in the Pleasant Valley district received a carload of Leyner drills and machinery during the past week. R. L. Martin, Central City, Colo., is manager.

## SAN MIGUEL COUNTY.

*Menona Mining and Milling Company*—John B. and John P. Olson, of Telluride, who leased the group of mines and 30-stamp mill of this company in Savage basin, five miles from Telluride, in the month of December, have finished cleaning out the workings and re-timbering them where necessary, and the mines are in excellent shape for production. From now until the snow melts sufficiently to provide an adequate water supply for the mill, the force will be engaged in blocking out mineral, adding to the large areas already in sight. The mill has a capacity of 100 tons daily. The Columbia-Menona group has not been worked for about eight years, and it is regarded as one of the most desirable low-grade concentrating propositions in the country. The ore carries gold, silver and lead, and the vein is large.

*Ophir Consolidated Mining Company*—F. E. Trumble and H. H. Hutton, of Ames, have secured a lease on part of the workings of the Silver Bell mine, a property comprised in this company's group of seventy-odd claims, located at Ophir Loop, 16 miles from Telluride, and are negotiating for the whole of the property. The Silver Bell has always carried a large streak of high-grade shipping ore, and the lessees are sending out carloads at regular intervals to smelters. After a sufficient quantity of low-grade ore has accumulated, it is said the operators will endeavor to make arrangements with the company for the treatment of the product at the Ophir Consolidated 50-stamp mill, connected with the mine by a wire-rope tramway. The company is not doing any work on the group at present. J. O. Buckley, of Milwaukee, Wis., is Eastern manager.

*Smuggler-Union Mining Company*—Bulkeley Wells, of Telluride, general manager of this company, has granted a lease on the Caruthers lode to I. E. Brown, Joe Bellino and Grant Snyder, of Telluride, who have a force of men at work vigorously prosecuting development. The Caruthers vein runs into the noted Smuggler-Union vein, and is being worked from the Sheridan cross-cut, a property of the Smuggler company. There is a streak of ore from 8 to 9 in. wide that carries high values in gold and silver. A contract has been let to Harry E. Scott for driving the tunnel 100 ft. on the vein, and 10 men have been put to work by him. The bore will be continued until a large dike about 3000 ft. distant is encountered, where it is expected a deposit of mineral will be found. The Smuggler-Union mines continue to be operated by some half a dozen sets of leasers whose ore is treated at the Smuggler mills at the head of the valley, at the village of Pandora. These mills have a capacity of from 450 to 550 tons daily and they are running full capacity most of the time.

## KENTUCKY.

## MUHLENBERG COUNTY.

*Mud River Coal Company*—This company has been organized to operate coal mines in the Mud river district. The main office will be in Nashville, Tenn., where most of the incorporators reside. S. W. McComb is president and general manager.

## MICHIGAN.

*Consolidated Coal Company*—This company has been incorporated, with \$5,000,000 capital stock, to take over a number of coal-mining companies in Michigan. The properties merged are: Saginaw Coal Company, Pere Marquette Coal Company, Shiawassee Coal Company, Barnard Coal Company, Central Coal Company, Wolverine Coal Company, Uncle Henry Coal Company, Standard Mining Company, Cass River Coal Company, Riverside Coal Company, Northern Coal and Transportation Company, Chappell & Fordney Company. The office of the new company will be in the Eddy building at Saginaw. The total capacity of the mines controlled is about 1,200,000 tons annually and the company will sink shafts for more mines. The officers of the company are: President, Walter E. Eddy; vice-president, Harry T. Wickes; secretary-treasurer, G. L. Humphrey. Of the mines owned by the 12 companies nine are located in Saginaw county and three in Bay county.

## MINNESOTA.

## IRON—MESABI RANGE.

The Oliver Iron Mining Company is exploring with a number of crews close to Virginia and has four drills on the old Norman mine, which has been idle a number of years. These drills are to test the orebody on the lines of recent work by the Oliver Company, in order that the precise character of the entire body may be known before any work is done in opening the mine. With this work done as the company now does it the deposit can be opened completely and accurately and all the ore saved in the most economical manner. The Norman lies east of the big open cut of the Oliver and Ohio mines, and the understanding is that the company may strip the Norman and give a through cut that will permit trains to run direct over the ore of all three mines. The Oliver Company's holdings about Virginia have not been fully appreciated and they are very large. They include the Oliver, Ohio, Lone Jack, Norman, Moose, Shaw, Great Western, Great Northern, Auburn, Rouchelleau, Minnewas, Sauntry, McEwan, Alpena and Higgins. Several of these are fee mines and therefore not liable to be opened for many years; but most are leases that will be mined heavily before long.

A small deposit of ore has been found just north of the Mahoning, in the southwest of the southwest of section 35, where Capt. Harry Roberts has been exploring.

He has sold the product to an Eastern furnace company and will mine it out at once. It is astonishing how close the north line of the Mahoning forties and the north line of the ore deposit in that neighborhood coincide, but there are a few spots where the ore gets outside of Mahoning lines.

A shaft will be sunk on the new Brunt mine of the Rhodes Mining Company at once. This property is a medium body of fair ore in the northeast quarter of section 10-58-18, east of the Iroquois and south of the Wacoutah. This latter is also to be developed, while the Iroquois is a shipper of some importance. The Brunt will be an underground property. The Wacoutah is getting started in its stripping and will make a small shipment this year. In that immediate neighborhood the Great Northern road is exploring the lands of the old Champion Iron Company, one of the few early-day Mesabi companies whose capital stock is low. It was formed in the days when nothing less than \$3,000,000 was considered big enough to mention, but its capital is just 1 per cent. of that. The Great Northern is also exploring some other lands in the same vicinity.

The Empire mine, which belongs to J. T. Jones, of Iron Mountain, is to resume soon and machinery is now going in. The mine will produce 30,000 tons this year and will crush its ore, which is a hard, dry silicious lean bessemer. The small test shaft is being enlarged to three compartments, two skipways and a ladder-road; and a small hoist is now in place there.

## MISSISSIPPI.

## LEFLORE COUNTY.

*Oil City Oil Company*—This company has been organized at Greenwood by G. A. Wilson, S. F. Jones, R. W. Baird and others. A contract has been let to drill a well on the Woodward place, 10 miles from Greenwood.

## MISSOURI.

## ST. FRANCOIS COUNTY.

*Bonne Terre*—The new shaft at the north end of the town is to be equipped with a five-stage centrifugal pump, electrically driven. It will have a total lift of about 500 feet.

*Central*—Plans are being made to unwater this old mine, and to erect a large modern mill.

*Federal*—Messrs Daniel and Solomon Guggenheim are making their annual spring inspection of this mine, and of their other properties in the district.

*Herculeum*—The exterior matte settling basin system is now in use on the large furnace of the St. Joe smelter. The slag, after the matte has settled out in the fore-basin, is carried off to the slag-dump in large pots or cars, headed by an electric locomotive, and dumped in a molten condition. This is giving cleaner

slags than the old small-pot system, and is also a considerable saving in labor.

*Leadwood*—This is the name of the new town at the Hoffman shaft of the St. Joe Lead Company. It was formerly known as Owl Creek. A new shaft, No. 14, is being sunk; it is 10x20 ft. Furnaces will be built, to roast the concentrate from the new 1000-ton mill.

*Madison Lead Company*—A large compressor is being erected at the Catherine mine, in order to replace the electric drills with air drills. The company is also considering the erection of a large mill at the mine, to take the place of the present small mill on the St. Francois river.

*North American*—A new shaft is being sunk on this mine, at Fredericktown, in order to increase the output. A three-stage centrifugal pump, electrically driven, has been installed at No. 1 shaft. It has about 300 ft. lift, and replaces three steam pumps.

#### NEW JERSEY.

##### WARREN COUNTY.

*Hudson Iron Company*—This company, which owns Hudson furnace at Secaucus, N. J., has lately bought the old iron-ore property at Beatyestown, south of Hackettstown, and is preparing to work it on a large scale. The mine was worked at one time, but has been closed some 20 years. The property bought by the company covers 75 acres of land, and mining is on the open-pit plan. The ore is a limonite running from 45 to 52 per cent. in metallic iron. It is expected that active mining operations will be under way soon and the output will be 100 tons a day. The company has contracted for an ore-washing outfit, which is now being installed by Earle C. Bacon, New York. A 50-h.p. 10x12-in. double-cylinder friction drum winding engine is provided, and by means of an automatic self-dumping skip, with wire rope and sheaves, ore is hoisted from the pit over an incline to the washer building. The ore is delivered automatically into a large hopper located at the end of the building and is dumped over grizzly bars. The larger pieces are put through a Farrel crusher and the ore that drops through the bars goes to a bin and trough, from which it is conveyed by water to an ore washer. Here the ore is cleaned of clay and dirt and is delivered direct on cars. The capacity of the washing plant is 150 tons a day.

#### NEW YORK.

##### ORANGE COUNTY.

*Forest of Dean Mine*—This old mine, near Fort Montgomery on the Hudson river, is now nearly in shape to ship ore. By April regular shipments will be made to Hudson furnace, at Secaucus, N. J. It is operated by the Hudson Iron Company.

#### OHIO.

*Columbus and Hocking Coal and Iron Company*—This company has arranged for an issue of \$500,000 new 6 per cent. preferred stock and \$1,000,000 in 6 per cent. bonds. The new capital is to be used for the purchase of additional coal lands and to provide plant for utilizing the large deposits of fire-clay and other clay owned in Ohio.

#### OREGON.

##### BAKER COUNTY.

*Sumpter Smelter*—The successful operation of the Sumpter smelter during the past year has perhaps done more than any other one thing to aid the mining prospects of eastern Oregon. Manager Fred D. Fuller reports that they now have their bins full of ores from every section of eastern Oregon and western Idaho, and as they own a limestone quarry near Sumpter, the matter of fluxes is easily solved. The ores coming now from the Seven Devils, Idaho, district, and from the Snake River, Oregon, camps, contain sufficient quantities of iron and copper, which mixed with the Quartzburg, Elkhorn and Bourne gold and copper ores, make a combination for successful smelting. The matte produced by the smelter carries 45 to 50 per cent. copper and all the gold and silver values of the various ores. The smelter is paying cash for ores, and refines its product in Tacoma. Fifty-six men are employed in the work on double shifts. The necessary coke is shipped from Fairfax, Washington.

*Copperopolis*—The Copperopolis mine in the Quartzburg camp, 60 miles southwest of Baker City, owned by a syndicate at the head of which is M. A. Butler, of Portland, has struck some rich ore and is continuing its shipments of concentrates to the Sumpter smelter. Mr. Butler is increasing the reduction plant to a capacity of 125 ton. Under the management of Edward I. Field, the property has been in steady operation for 14 months. Seventy-five men are at work on day and night shifts.

#### SOUTH DAKOTA.

##### LAWRENCE COUNTY.

*Homestake South Extension*—This company is located on the trend of the Homestake vein with the shaft 2000 ft. southeast from the Ellison hoist. It owns 50 acres of patented ground and has a bond on 30 acres more. A double-compartment shaft has just been sunk to a depth of over 100 ft. At the 150-ft. or 200-ft. level drifts will be run westward to catch the Homestake vein. The company is capitalized at \$1,500,000, and the greater part of the stock is held in Brooklyn. There is sufficient capital on hand to do all the development work.

*Puritan*—The two weeks' run at the new mill has been so far satisfactory. About 150 tons of ore averaging \$4 a ton have been put through daily. This ore, which is quartzite, runs high in silver.

*Branch Mint*—A force of men has been put to work at the Hoodoo shaft to unwater and clean up the workings. The Hoodoo tunnel will be continued for ventilating purposes and also for development. At the 500-ft. level of the Union Hill shaft some extensive bodies of porphyritic ore have been opened up.

*Western Coal and Chemical Company*—This company was organized nine months ago, and the vice-president and general manager is Paul Dankwardt. The company plans to open up the coal-fields of northeastern Wyoming, to build a smelter and coke ovens at Spearfish, to supply the town of Sundance with light and to manufacture sodium cyanide. Spearfish has been chosen as the place for the smelter because it lies midway between the coal-fields at Sundance and the mines of the Hills. The company is endeavoring to induce the Burlington railroad to extend its line to the coal-fields.

##### PENNINGTON COUNTY.

*Black Tom*—The 10-stamp mill on this property is running at half its capacity, and the entire number of stamps will be dropping in a few days. This property lies on Skull Gulch near the old Queen Bee, and has three veins of ore each of which shows good value. The mill has been in operation less than 30 days, but so far the run has been satisfactory.

*Mercedes*—A steam hoist has been ordered and will be installed as soon as possible. The shaft, which is now down 120 ft., will be continued to the 300-ft. level. A 9-ft. ledge of ore averages throughout \$4.60, and is largely free milling. The company is pumping out the mine for the purpose of pushing development work.

#### TENNESSEE.

##### CUMBERLAND COUNTY.

*Southern Contracting and Development Company*—This company has bought a large tract of land near Crossville and is preparing to open coal mines. Lucius H. Wilson, of New York, is general manager.

#### UTAH.

##### BEAVER COUNTY.

*Harrington & Hickory*—Superintendent Ingols, of Milford, reports steady improvement in this property. He expects to do considerable shipping this year. The mine is one of the properties owned by the Majestic Copper Company.

*Frisco Contact*—Crosscutting to an extension of the Horn Silver ledge from the 500-ft. level of the shaft continues favorably. The crosscut has been run for 70 feet.

*Horn Silver*—Another attempt is to be made to operate the zinc plant on this

property. Shipments of high-grade zinc ore are being made to the Kansas smelters.

#### JUAB COUNTY.

*Brooklyn Consolidated*—This mine is on the shipping list.

*Uncle Sam Consolidated*—A strike of considerable importance has been made in a winze sunk from the 500 level.

*Grand Central*—The work of re-timbering the shaft of this property down to the 700 level is progressing.

*Tintic Ore Shipments*—A total of 173 carloads were sent to the smelters last week, the shippers and amount sent out by each being: Ridge & Valley, 7; Gemini, 16; Centennial Eureka, 51; Bullion Beck, 9; Brooklyn, 3; Dragon Iron, 15; Beck Tunnel, 7; Uncle Sam Con., 5; Eagle and Blue Bell, 6; Swansea, 4; Eureka Hill, 15; Yankee Con., 2; Ajax, 5; May Day, 1; Black Jack, 4; Lower Mammoth, 2; Mammoth, 14; Victor, 1; Uncle Sam Concentrate, 2.

*Mammoth*—A special meeting of stockholders has been called to consider the matter of re-incorporating under Nevada laws, and changing the capital stock to 1,000,000 shares of the par value of \$1 each. The meeting is to be held March 31.

*Tetro*—The new working shaft is down 300 feet and is to be continued to 500 ft. depth when cross-cutting to known orebodies will commence.

#### MORGAN COUNTY.

*Carbonate Hill*—A raise from the lower tunnel has tapped an extensive shoot of high-grade silver-lead ore. Samples assayed showed values of 69 per cent. lead, and 8 oz. silver. This property will be quite a heavy shipper this year. M. A. Dougherty, of Salt Lake, is manager.

#### SUMMIT COUNTY.

*Columbus*—This company, operating at Park City, has let another contract to extend the tunnel 300 ft. It is now in 500 ft., or a little over.

*Silver King Consolidated*—The sinking of the shaft at this property is progressing, and indications in the bottom indicate the near approach to an ore body, the ground being highly mineralized.

*Little Bell*—In addition to the development of a high-grade body of lead ore on the 700 level, a fine showing has been disclosed in the 115-foot upraise.

*Odin*—High-grade silver-lead ore has been encountered at a point 400 feet in from the mouth of the tunnel.

*Park City Shipments*—Park city mines produced last week: Daly Judge, crude ore and concentrate, 1,148,000 pounds; zinc middlings, 286,000 pounds; Daly West, 1,150,000 pounds of crude ore and concentrate; Silver King, 1,230,180 pounds of crude ore and concentrate; Keith Kearns, 128,000 pounds of crude ore and

concentrate; Jupiter, 30,000 pounds of crude ore.

*St. Louis-Magnolia*—The new shaft being sunk on this property is down 100 feet and has encountered some good ore.

#### TOOELE COUNTY.

*Consolidated Mercur*—Nine hundred tons of ore daily was treated in this company's mill during January.

*Overland*—Connections have been made with the orebody in the new working shaft. The management expects to be ready to start the mill again in the near future.

*Honerine*—Connections are about to be made with the mine workings and drain tunnel. The mill will go into commission in April.

*Black Diamond*—Regular shipments are being made from this Stockton property and the mine is considerably more than paying expenses.

### VIRGINIA.

#### FAUQUIER COUNTY.

*Appalachian Conduit Company*—This company obtained good results from drilling at Broad Run, particulars of which will be given out later. The company has removed its drill to Casnova and is now boring for coal. Charles Cadmus, manager of the North Virginia Exploration Company, is chief engineer of this company.

*North Virginia Exploration Company*—Work has been suspended for two weeks, pending the decision of the Southern Railway as to the removal of the Broad Run station. It has been decided to make no change. The company has resumed work on Nos. 1 and 2 shafts and will begin sinking on No. 3 a new shaft.

### WASHINGTON.

#### FERRY COUNTY.

*Pearl Consolidated*—The northeast drift on the 190-ft. level is in 140 ft., and shows great improvement with streaks of ore, rich in sulphides, next the footwall. The crosscut south of the shaft also shows similar streaks in the floor. The compressor plant lately installed is being used to great advantage in making more rapid headway, and also in economy in working the mine. Ore shipments are being made to the Granby smelter from 300 to 400 tons of second-class material on the lower tunnel dump. About 20 men are employed in and about the mine.

*Quilp*—Ore is being stoped on the upper levels and shipped at the rate of a carload a day to the Sullivan Group Smelting Company, at Marysville, B. C. Other parts of the mine are being cleaned up for renewed operation.

*Mountain Lion Mill*—The concentrates from a test of ore from the Mountain Lion mine 600-ft. level are being cleaned up. About 6 tons of concentrates from

tests of ore from the Pearl Consolidated, Quilp and Ben Hur mines have been shipped to the Granby smelter. The tests are intended to show whether the tailings will pay to cyanide after amalgamating and concentrating. It is impossible to get close information on results at present.

*Oversight*—A new crosscut will be started soon to intersect the vein 100 ft. from No. 1 crosscut. The tests are being made on the efficacy of power drills of different manufacture, to ascertain which will make the greatest headway in different kinds of ground encountered, with a view of changing the drills to suit the rock.

*Shamrock Group*—Trowbridge brothers have sunk 40 ft. on the footwall, and have 5 ft. in width of ore that averages \$19 a ton in copper, gold and a little silver.

*Ben Hur*—The value of the ore on the 320-ft. level is reported to be continually increasing. The ore goes to the Trail, B. C., smelter.

*Gold King*—Negotiations are afoot for the transfer of the stock of the Gold King Mining Company to D. F. Anderson, of Rosalia, Wash. The Gold King group of claims adjoins the Belcher mine, of which company Mr. Anderson is president.

#### OKANOGAN COUNTY.

*Phil Sheridan*—The ore stope is being lengthened, and new ground on the Phil Sheridan vein is being opened. The returns from 39,908 lb. dry ore, treated at the Granby smelter, show a gross return of \$109. The railway freight charge was \$41, and the treatment \$110, leaving a net sum of \$943. That amount covers the wagon haulage and mining expenses. The low-grade ore on the dump remains as a net asset, showing that the mine can be worked at a profit.

*Ruby*—At this mine, near Nighthawk, the flow of water from the hanging wall near the face of the north drift, on the lower tunnel level, is so strong that work has been temporarily suspended until steps can be taken for care of the water, by cutting the drainage ditch deeper. The south drift is in 50 ft., the last 20 ft. having been driven on a rich streak of ore, 20 in. in width, with quartz 5 ft. in width following along between it and the hanging wall. An upraise, 5x7 ft. in the clear, is up 55 ft., with separate compartments for a manway, ore-chute and handling mine timbers.

*Rainbow Group*—This was sold at sheriff's sale to satisfy labor liens. It has produced some of the best ore on Palmer mountain and one of the first mills erected in the district was placed on it; but, not answering the metallurgical requirements, it was removed to the Caribou mine, at Camp McKinney, B. C. The purchasers are J. J. Bennett, John Woodward and

F. Harris, of Loomis. The new owners have started work on the claims.

#### WEST VIRGINIA.

##### FAYETTE COUNTY.

*New River Smokeless Coal Company*—C. J. Wittenberg and others, of New York, have bought a controlling interest in this company. At the annual meeting R. S. Spilman, of Charleston, and W. N. Jasper were elected president and secretary, respectively. The company is operating seven mines, producing an annual output of about 700,000 tons, for which the New River Consolidated Coal and Coke Company of Thurmond has been general sales agent.

##### MORGAN COUNTY.

A tract of 400 acres of land near Sir John's Run, which is said to contain a deposit of nearly pure silica, suitable for glass making, has been sold to S. F. Shelly, of Berkeley, W. Va. He proposes to mine the sand.

#### Foreign Mining News.

##### CANADA.

Dr. Eugene Haanel, superintendent of mines of the Dominion of Canada, has wired Hon. Frank Oliver, Minister of the Interior at Ottawa, that the experiments at Sault Ste. Marie in the electric treatment of iron ores are proving wholly successful. Dr. Haanel's message is in the following terms: "Successful demonstration in all points, stated in my memorandum on electric smelting of Canadian iron ores requiring investigation. Output greater than figure adopted by Harbord in report of commission. Successful smelting of magnetite and desulphurization of pig. Successful substitution of charcoal and therefore of peat coke for coke. Consumption of electrode insignificant. Production of nickel pig of fine quality from roasted pyrrhotite. Forty tons of pig have so far been produced. Process admits of immediate commercial application. Experiments will be completed in about two weeks."

Dr. Haanel has associated with him Dr. Héroult, the electric smelting expert from La Praz, France. The steel process of Dr. Héroult is in actual operation in La Praz (France), in St. Michel (Savoy), in Kortfors (Sweden) and in Remscheid (Germany).

##### YUKON TERRITORY.

The Yukon Consolidated Gold Fields, a corporation in which the Guggenheim Exploration Company is largely interested, has placed an order with the Pelton Company, San Francisco, for two complete Pelton units operating under a head of 650 ft.; each wheel being direct-connected to a 600-kw. 450-r.p.m. generator, provided with an overload capacity of 1200 h.p. each. The power will be transmitted electrically and used in connection with dredging work on the Yukon river.

##### PIUTE COUNTY.

*Sevier Consolidated Mill*—This new plant is in commission and working on 100 tons a day for the present. The power-plant, water system and mill represent an investment of about \$250,000.

*Annie Laurie Mill*—This plant has undergone repairs and is in commission again.

##### SUMMIT COUNTY.

*Mt. Masonic*—Development of this property is progressing, with good indications of ore in the tunnel.

*Silver King Consolidated*—The shaft has cut through a mineralized fissure for about 50 ft. and is being continued on to the underlying quartzite, where important developments are looked for. The shaft is double-compartment.

#### CANADA.

##### ONTARIO.

The Martha mica mine, situated on lot 13, range 6, in the township of North Burgess, about 10 miles from Perth, has recently been examined by a Montreal expert on behalf of English capitalists and is reported to have been taken over by them. This property was originally owned by the Lake Girard Mica Syndicate, which controlled some 2000 acres of mica lands early in the nineties, but went subsequently into liquidation. The workings consist of a number of excavations in a mica vein for over a length of about 300 ft. The width of the mica varies between 4 and 8 ft. and the quality is reported to be excellent, fetching a high price on the market. About 20 men are at present employed, but the working staff will be increased considerably by the new owners in the next spring.

The Roberts mica mine, on lot 18, range 6, township of Loughboro, about 9 miles from Sydenham, has opened up two vein-like deposits, one of which, on the contact with the gneiss formation, is followed by a shaft 100 ft. deep. The temporary plant will be replaced by adequate machinery, and as soon as this is done the property will be worked on a larger scale.

#### CENTRAL AMERICA.

##### NICARAGUA.

Mining in the Piz Piz district is active, and work is in progress on a number of properties.

*Bonanza*—This mine is producing 200 tons daily of good grade free-milling ore, all the ore coming from open cuts. Eight Huntington mills reduce the ore. A large slimes plant is being added to the present cyanide plant. Jos. Lapierre, owner and manager, is now at the mine after a trip to New York.

*Concordia Mine*—Milling operations are stopped for this month, while the track from the mine is made broader gage. Large two-ton cars are at the mine; this will facilitate handling the ore.

*El Detino*—The small mill recently purchased is being erected here. The mine continues to show specimen ore.

*La Constantia*—This mine is running 10 stamps steadily on good ore. Large additions to the plant are being planned. N. J. Martin is manager.

*La Mars*—Manager S. Sherick has just returned from the United States and the Huntington mills are running steadily on rich surface ores.

*Lone Star*—Mr. Norman MacGinnis, principal owner, is now at the mine. In the mill 20 stamps are running by water power. The large cyanide plant is also in successful operation. New discoveries have lately added a large amount of ore to the reserves. The electric plant is now running steadily.

*Siempre Viva*—The large electric power plant is in partial operation. The cyanide plant is nearing completion. In the mill 20 stamps are being run by water power on first-class ore. Manager R. B. Stanford is employing a large force of men, developing the large holdings of this company.

#### AUSTRALIA.

##### QUEENSLAND.

The Minister for Mines, Queensland, in a recent review of the State mining industry during 1905, stated that the total value of all minerals won was greater than the value in the previous year. The outlook for 1906 is unusually promising. There will be a further advance in the production of copper and tin. In a few months the Mount Morgan mine will begin to produce copper, and this must materially add to the value of the output, as very extensive machinery has been provided. If the O. K. Co. carries out its intention to build a railway, their output will also largely increase. Then the latest news from the Chillagoe Co. is of a very encouraging nature. The prospecting carried on by diamond drill boring shows that considerable bodies of available ore exist at a depth, and it is not improbable that at least two smelters may be kept in constant operation during the coming year. Some activity is being shown on the Stanthorpe, Kangaroo Hills, and Herberton tinfields. At Cloncurry the approach of the railway will give a stimulus to mining, and the commencement of the Lawn Hills and Etheridge railways will show effects later.

In the Central coal district progress appears to be slow, still the interest in the coal there is by no means dead. The recent visit of a representative of the Admiralty shows that they are still anxious to procure a coal superior to anything hitherto discovered in the southern hemisphere, and that they have hopes of

the Central district. It is to be hoped that the final test will prove that the Dawson-Mackenzie coal comes up to the requirements. In other respects the coal industry shows little change. Some interest has been aroused by the Orient Steamship Co. taking bunker coal for trials, and an outlet may be secured by this means. In the southern part of the State competition is keen owing to the number of collieries opened by the loop line in the Ipswich district.

The quantities of gems secured in 1905 were not quite so large as in 1904. The opal diggers have been handicapped by want of water. On the Anakie field the easily-got supply of gems is becoming exhausted.

### Coal Trade Review.

NEW YORK, Mar. 7.

#### ANTHRACITE.

The only interesting features in the hard-coal market are the conferences and negotiations in regard to the threatened strike. The operators have received the demands of the Union and are in session for considering them; when they have reached a conclusion, the double committee of miners and operators will be convened to come to an agreement.

Following the decision of some of the soft-coal operators to yield to the Union demands under compulsion from the steel and other industries with whom they are bound by contract, it is intimated that these will in turn compel the Union to urge their demands upon the anthracite operators, but this is unconfirmed. In the meantime the anthracite mines are working under pressure and large stocks are being stored. Coal of all sizes in New York is in abundant supply, and prices remain as follows: \$4.75 for broken and \$5 for domestic sizes. Steam sizes: \$3 for pea; \$2.25@2.50 for buckwheat; \$1.45@1.50 for rice and \$1.30@1.35 for barley f.o.b. New York harbor shipping points.

#### BITUMINOUS.

An active demand is general in the Atlantic seaboard soft-coal trade, which good weather has permitted to be well supplied. Coal is arriving at tidewater in abundance, and is absorbed readily; most consumers are calling for prompt shipments and in the case of specialties are offering additional prices for promptness. The markets are generally strong except in New York.

The contract season is proceeding quietly, but producers are not so anxious to take business, except in certain quarters, as in previous years. Figures are about on the level of last year's business, except for some specialties which are getting 5 to 10c more. A feature of the trade is the present advance of ocean freights. Shippers at several of the lower ports bid up the prices 20c. per ton above what they were a few weeks ago, and

owners are trying to maintain this advance, thus far with success. The advance is partly justified by the ice which vessels meet in coming north but, on the other hand, the early approach of spring will induce many vessels to come out of winter quarters.

Trade in the far East is brisk; demand is heavy and coal is absorbed promptly. The Sound is ordering heavy shipments and it is taking all that offers. New York harbor is consuming large quantities but the supply is sufficient to keep prices down; fair grades sell at around \$2.60 f.o.b. New York harbor shipping points.

All-rail trade is active and a good demand exists at well sustained prices. Transportation is excellent and car supply varies from medium to poor. The coastwise market shows a fair supply of boats. Rates from Baltimore, Norfolk, Newport News and Philadelphia to Boston, Salem and Portland, range around \$t and discharge. Days for loading and discharging are demanded, but in default of this, the association bill of lading is accepted.

#### COAL TRAFFIC NOTES.

The total coal and coke traffic originating on all lines of the Pennsylvania railroad east of Pittsburg and Erie for the year to Feb. 24, was as follows, in short tons:

	1905.	1906.	Changes.
Anthracite.....	590,899	784,303	I. 193,404
Bituminous.....	3,910,286	5,597,045	I. 1,686,759
Coke.....	1,490,666	1,920,719	I. 430,053
Total.....	5,991,851	8,302,067	I. 2,310,216

The large shipments of bituminous coal this year are to be noted.

Shipments of Broad Top coal for the week ending March 3 were 22,483 tons; for the year to March 3 they were 189,096 tons.

#### Birmingham. March 5.

The coal trade in Alabama is still brisk. There is a good demand with a strong output, though the time of the year has arrived when a falling off is usually felt. The indications are that there will be a steady operation at the Alabama coal mines during the entire year. An apprehension that a strike would occur in the bituminous and anthracite fields in the North and West caused some inquiry to be made in this district as to capacities and some business was offered but nothing was placed.

Another "windy shot" caused a dust explosion in an Alabama mine during the past week and as a result ten men are dead and eleven injured. The accident happened in the Mine No. 2 of the Little Cahaba Coal Company at Piper, Bibb county. Governor W. D. Jelks came to Birmingham, and after a conference with the state mine inspector, ordered a thorough investigation of the accident. Just a year and two weeks ago a "windy shot" caused a dust explosion in the

Virginia City mines in this State and 111 men were killed. The state mine inspector is not criticized by the Governor for these serious accidents but efforts are to be made to get better mining laws at the next session of the legislature.

The railroads in Alabama are now giving good service in handling the product of the coal mines. There are not so many complaints as to car shortage. The prices are holding up well.

Coke is still in good demand with a fair price being received.

#### Chicago. March 6.

The coal market is dull under the influence of mild weather and the feeling by consumers of coal that there will be no strike at the mines. Railroads that have been buying heavily have almost stopped giving large orders and manufacturers likewise are refraining from storing coal. In consequence prices are weakening, especially of western coals. Anthracite is hopelessly dull, and is not likely to revive this month unless a strike seems certain, the usual discounts for spring buying being expected next month.

Run-of-mine from Illinois and Indiana mines is selling for steam purposes at \$1.80@2.10; steam lump brings \$2@2.20 and screenings—the most active and strongest of the sizes—ranges from \$1.40 @ \$1.70. There is very little demand for domestic sizes in western coals.

Hocking shares in the depression, the supply having been restricted because of railroad sales which are falling off, causing greater supplies and a lessening demand. The price of Hocking is \$3.15@3.40, with the tendency to lower figures.

Smokeless is also in comparatively small demand; lump and egg are said to have been sacrificed on sales of the week, bringing 25c@50c less than the standard quotation of \$4.05. Run-of-mine smokeless brings \$3.15. Shipments of this coal are not excessive.

Youghiogeny is in very light demand outside of contract shipments. Three-quarter brings \$2.90.

With all weather signs pointing to an early spring, there is every evidence now that the usual spring quietness has begun that will last into summer unless checked by a strike or some other extraordinary agency. The mildness of the winter has operated to make consumers of large and small amounts optimistic about supplies and it seems probable that smaller spring and summer stores will be laid in than were stored last year.

#### Cleveland. March 6.

Consumers of coal have begun to store fuel in anticipation of a strike. Purchases in addition to regular requirements have increased 50 per cent on the average during the past week and the demand has been so strong that a shortage of cars has



resulted. Mine operators have refused to anticipate shipments on contracts, insisting that coal for storage purposes be purchased at the ruling market price, which shows a considerable advance over the recent contract quotation. Mine-run coal of the steam quality has been selling during the week at \$1.10 at the mines either in the Ohio or the Pennsylvania district, with higher figures anticipated. In addition to the short supply of cars mine operators have had difficulty in keeping their mines in operation on account of the independent attitude of labor, which takes the stand that any large production would facilitate the storage of coal, which would be unfriendly to the strike cause. The short supply of coal has increased the demand for slack also and the price has risen, until both Ohio and Pennsylvania products are selling at \$1 at the mines.

The demand for coke has increased materially and is now stronger than it has been for some time, with the best grades of 72-hour foundry coke selling for \$3 to \$3.25 at the oven and the best grades of furnace coke selling for \$2.40 to \$2.60 at the oven.

Charters are being made now for the movement of coal up the lakes during the coming season and they show a reduction of 5 cents a ton from last year's figures. This puts the rate to the head of the lakes at 25c and the rate to Lake Michigan, principally Milwaukee, at 35c. The situation is not unusually strong therefore.

**Pittsburg** March 6.

**Coal**—There is a division of opinion among the operators here over the probability of a settlement of the mining rate for another year without a strike. A meeting of representatives from the four States embraced in the inter-state agreement was held in the board room of the Pittsburg Coal Company last week to consider the request of President Roosevelt that another effort be made to avert a strike. It was decided in deference to the request to call a general meeting of operators of Pennsylvania, Ohio, Indiana and Illinois to be held in Indianapolis on March 19. It is expected that fully 500 bituminous coal operators will attend. Separate meetings of operators in the four States are to be held this week to consider the situation. The independent operators in this district are bitterly opposed to making any concession whatever to the miners. Some operators favor a strike, believing it will result in establishing more profitable prices and put them in a position to pay the rate demanded by the miners. Prices continue about the same on a basis of \$1 to \$1.10 a ton for run-of-mine coal. The river mines and most of the railroad mines are in full operation and a large tonnage of coal is being accumulated along the Monongahela river. It is believed there will

be a supply for the mills along the river for probably two months but it is almost impossible for the inland mills to store any coal. The miners in this district are preparing for the special national convention of the United Mine Workers to be held at Indianapolis on March 15.

**Connellsville Coke**—Prices remain about the same as a week ago, furnace coke being quoted at \$2.40@2.50 and foundry at \$3 a ton. It is believed the price of furnace coke can be shaded. The production for the week amounted to 281,661 tons and the shipments to 12,230 c rs distributed as follows: To Pittsburgh and river points, 4425 cars; to points west of Pittsburgh, 6530 cars; to points east of Everson, 1275 cars. This was an increase of 18 cars compared with the previous week. The combined shipments from the Connellsville and Mason-town fields amounted to 354,864 tons.

**San Francisco.** March 1.

The market continues quiet and steady, with larger arrivals of British Columbia coal. Fuel oil is in good supply.

For coast coals, in large lots to dealers, prices are as follows: Wellington, New Wellington and Richmond, \$8; Roslyn, \$7; Seattle and Bryant, \$6.50; Beaver Hill and Coos Bay, \$5.50; White Ash, \$5.52. For Rocky Mountain coals in car lots quotations are: Colorado anthracite, \$14; Castle Gate, Clear Creek, Rock Springs and Sunny Side, \$8.50. Eastern coals are nominal at \$14 for Pennsylvania anthracite and \$13 for Cumberland. For foreign coal quotations are, ex-ship: Welsh anthracite, \$13; cannel, \$8.50; Wallsend and Brymbo, \$7.50 per ton.

**Foreign Coal Trade.**

March 7.

Imports of coal into the United States during the month of January are reported as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1905.	1906.	Changes.
Canada.....	114,743	155,996	I. 41,253
Great Britain.....	8,826	30,041	I. 21,215
Other Europe.....	110	84	D. 26
Japan.....	6,000	4,959	D. 1,041
Australia.....	10,724	22,749	I. 12,025
Other countries.....	37	13	D. 24
<b>Total coal.....</b>	<b>140,440</b>	<b>214,442</b>	<b>I. 74,002</b>
<b>Coke.....</b>	<b>.....</b>	<b>19,651</b>	<b>.....</b>

Coke was not reported separately last year. With the exception of some Nova Scotia coal which comes to Boston, the imports are chiefly on the Pacific Coast. The coke is nearly all from British Columbia; a little comes from Germany. Of the coal imported this year, 3307 tons were classed as anthracite.

Exports of coal and coke in January are reported as follows:

	1905.	1906.	Changes.
Anthracite.....	142,201	164,139	I. 21,938
Bituminous.....	414,978	546,903	I. 131,925
<b>Total coal.....</b>	<b>557,179</b>	<b>711,042</b>	<b>I. 153,863</b>
<b>Coke.....</b>	<b>38,557</b>	<b>62,049</b>	<b>I. 23,492</b>
<b>Total.....</b>	<b>595,736</b>	<b>773,091</b>	<b>I.177,355</b>

The coke exported went chiefly to Mexico, though some was taken by Canadian furnaces. The disposition of the coal was as follows:

	1904.	1905.	Changes.
Canada.....	410,466	494,834	I. 84,368
Mexico.....	67,761	94,009	I. 26,248
Cuba.....	23,602	71,429	I. 47,827
Other W. Indies.....	18,621	31,586	I. 12,965
France.....	95	521	I. 426
Italy.....	503	250	D. 253
Other Europe.....	1,320	4,568	I. 3,248
Other countries.....	34,811	13,845	D. 20,966
<b>Total.....</b>	<b>557,179</b>	<b>711,042</b>	<b>I. 153,863</b>

The coal to other countries goes chiefly to South America. Canada took this year 69.6 per cent. of all the coal shipped. The exports to Canada in detail were:

	1905.	1906.	Changes.
Anthracite.....	140,799	158,384	I. 17,585
Bituminous.....	269,667	336,450	I. 66,783
<b>Total.....</b>	<b>410,466</b>	<b>494,834</b>	<b>84,368</b>

In January, 1905, exports to Canada were hindered by severe weather and railroad delays.

The total production of coal in Belgium in 1905 was 21,844,200 metric tons; a decrease of 917,230 tons, or 4 per cent., as compared with the previous year.

The total coal mined in Great Britain in 1905, from mines coming under the coal mines act, was 236,111,150 long tons. This compares with 232,411,784 tons in 1904, showing an increase of 3,699,366 tons, or 1.6 per cent. A few thousand tons are taken from surface openings coming under the quarries act, but this quantity is too small to change the total materially.

**Iron Trade Review.**

NEW YORK, March 7.

Several conditions contribute to the temporary lull in most lines of new business. The most important is the apprehension of a strike of the coal miners; and though prospects are better for a settlement than they were, this will not be entirely removed until the agreement is finally made. The last week's overturn on Wall Street must also be taken into account, though this is a minor cause. Accounts from Europe are so unfavorable, and the iron trade in England, especially, is not in as good condition as at the opening of the year.

It may be that the top of the boom is passed, but there is no apparent cause for apprehension at the present time. Business already in hand is occupying fully the producing capacity, and will occupy it for some months to come; and there is good reason to believe that buying will revive in a short time. The establishment of a somewhat lower range of prices will do no harm.

It is again reported that the deal by which the Hill iron-ore lands on the Mesabi are to be transferred to the United States Steel Corporation has been concluded, except in a few minor details. It is said that the terms of contract provide that the Steel Corporation shall take a

lease on these properties for 30 years, and shall pay for the first two years, 70 c. per ton for the ore mined and 80c. for the carrying of the ore from the mines to Duluth on Mr. Hill's Great Northern railroad. It is further provided that after two years the price of ore in the ground shall be increased 5c. every two years until at the end of 12 years the price shall be \$1 and stay at that figure for the remaining 18 years of the period. Another important provision is that the Great Northern railroad shall be guaranteed freight amounting to 10,000,000 tons annually during the life of the lease. If mines other than those in the deal furnish the amount, the Steel Corporation will not be required to furnish any, but it must supply whatever is lacking of the stipulated tonnage. The Hill properties have often been referred to heretofore in our columns. A general statement is that they contain at least 300,000,000 tons of merchantable iron ore.

**Exports and Imports**—The exports of iron and steel, including machinery, from the United States in January are valued by the Bureau of Statistics of the Department of Commerce and Labor at £7,818,489 in 1905, and £12,980,736 in 1906; an increase of \$5,162,247, or 66 per cent. The chief items of iron and steel exports were, in long tons:

	1905.	1906.	Changes.
Pig iron.....	10,458	4,787	D. 5,671
Billets, ingots & blooms	8,981	18,814	I. 9,833
Bars.....	5,249	6,799	I. 1,550
Rails.....	12,232	31,634	I. 19,402
Sheets and plates.....	3,784	6,657	I. 2,873
Structural steel.....	3,780	6,580	I. 2,800
Wire.....	8,166	10,555	I. 2,389
Nails and spikes.....	3,297	5,734	I. 2,437

Exports of iron ore were 885 tons in 1905, and 3338 tons in 1906. The ore went chiefly to Canada.

Imports of iron and steel, including machinery, in January are valued by the Bureau of Statistics at \$2,111,058 in 1905, and 2,425,017 in 1906; an increase of \$313,959, or 14.9 per cent. The chief items of these exports were, in long tons:

	1904.	1905.	Changes.
Pig iron.....	8,804	25,657	I. 16,853
Scrap.....	1,370	3,427	I. 2,057
Ingots, blooms, etc.....	1,364	2,446	I. 1,082
Bars.....	1,739	4,592	I. 2,853
Wire-rods.....	1,430	1,658	I. 228
Tin-plates.....	7,909	3,200	D. 4,709

Imports of iron ore in January were 103,242 tons in 1905, and 232,407 tons in 1906; an increase of 129,165 tons. Imports of manganese ores were 31,419 tons in 1905, and 15,027 tons in 1906; a decrease of 16,392 tons this year.

#### Birmingham. March 5.

While the demand for pig iron in the Southern territory is a little quiet there is much strength to the market, and more than one of the iron companies are asking \$14.50 per ton again for their product, No. 2, foundry basis. The shipments are not as active right now as they were during the first two months of the year, but still there is more iron leaving the district than is being manufactured.

The shipments for the next three months at least will be steady, and if an expected improvement in the demand sets in before the beginning of the second quarter of the year the steady traffic will keep up through the balance of the year. The improved condition of quotations is probably the feature of the market for the week. There have been some inquiries received here, and indications are still favorable for a need of a large amount of metal before the end of the year.

The following iron prices are given: No. 1, foundry, \$14.50 to \$15; No. 2, foundry, \$14 to \$14.50; No. 3, foundry, \$13.50 to \$14; No. 4, foundry, \$13 to \$13.50; gray forge, \$12.50 to \$13; No. 1, soft, \$14.50 to \$15; No. 2, soft, \$14 to \$14.50.

Steel market condition is still favorable. The output at the steel plant at Ensley for the month of February, despite the fact that the month was short by two or three days, was satisfactory.

#### Chicago. March 5.

With a cessation of the numerous orders for quick delivery, the pig-iron market has lapsed into something like a dullness, though there are no signs of a weakness that will force down prices indefinitely. The condition of the first week in March is ascribed generally to the fact that melters who need immediate supplies have satisfied their needs at the February prices for Southern—25c. less than the March prices, due to an advance of the rate from \$3.65 to \$3.90. With Southern No. 2 selling at \$14 this makes the Chicago price \$17.90 against \$19 for Northern No. 2.

Northern is scarce on quick deliveries, and with a price of \$1.10 against it in favor of Southern is not actively in demand for quick deliveries. On contract business for the second, third and fourth quarters of the year, Northern and Southern are about equally in demand.

Sales are of light amounts, few orders reaching 1000 tons, on contract business. A few large concerns using pig iron have dropped out of the market for the present, and a general holding off by melters is not improbable. The needs of the melters, however, are so great, and prosperity is so evident in every branch of the iron business that business must be heavy for the year, as leading sales agents for the furnaces see things.

Coke is in good demand, relatively and no excessive supply, though the total volume of sales is not great. Connellsville 72-hour brings \$5.40@5.65.

#### Cleveland. March 6.

**Iron Ore**—The talk in marine quarters is that the wild and contract rates for the transportation of ore are to be broken by the big shippers who are making a concerted effort. The shippers base their action on the known increase in carrying capacity and the prospects of a long

season of navigation. Before tackling the ore rates the shippers tried their hands on the coal rates and brought a reduction. The demand for ore at the furnaces is still heavy and shipments from lake docks to furnace stock piles is steady.

**Pig Iron**—Inquiries for foundry iron have been heavy but they have not as yet developed any new business of importance. The fact is that the inquiries are mostly market tests, consumers trying to get lower prices. A wholesale reduction at this time would stimulate a laggard demand for the product and improve the market. The prices have eased some and while No. 2 is generally quoted at \$17.25 in the Valley it is known that some sales have been made at \$17. The Southern producers have sold some material here at \$14 Birmingham for No. 2. Bessemer and basic are about steady, with prices firm but not strong.

**Finished Material**—The demand for steel has eased materially during the past week or ten days. The strongest situations are in billets and sheets. Billets are in demand on account of the enormous increase in the productive capacity of finished material, and sheets are improved by the building operations. For the first time in a long while both plates and structural shapes are easier and the time does not seem to be far distant when the mills will be asking for specifications. The market has seen one instance during the past week where an order for structural steel brought immediate shipment and where plates are being offered in big lots for delivery within three weeks of the time the order is placed. New orders are already needed in some mills and it is apparent they are not coming in very freely.

#### New York. March 7.

**Pig Iron**—Business has been moderate and chiefly in small lots. There is some inquiry, however, chiefly for second and third quarter iron.

For Northern iron, large lots, we quote: No. 1 X foundry, \$18.25@18.75; No. 2 X, \$17.75@18.25; No. 2 plain, \$17.25@17.75; forge, \$16.75@17.25. For Southern iron on dock prices are: No. 1 foundry, \$18.25@18.50; No. 2, \$17.75@18; No. 3, \$17.25@17.50; No. 4, \$16.25@17; No. 1 soft, \$18.25@18.50; No. 2 soft, \$17.75@18; gray forge, \$16.25@16.50. Basic is still held at \$19 for Virginia, \$18.75 for Alabama and \$18.25 for Northern.

**Plates**—Steel plates are in good demand. Tank plates are nominally 1.745@1.825c.; flange and boiler, 1.845@1.945c.; universal and sheared plates, 1.745@1.845c.; according to width.

**Structural Material**—Prices are nominally unchanged. Beams under 15 in. are 1.845c. for large lots; over 15 in., 1.895c.; angle and channels, 1.845c., tidewater delivery. Jobbers ask a considerable advance on small orders. More new work is reported locally.

**Steel Rails**—No change in standard sections. Light rails are in steady demand, prices ranging from \$26 for 35 lb., up to \$33 for 12-lb. rails. Orders for trolley rails are still in evidence.

**Old Material**—Dealers are not overrun with orders, and are asking for business. No. 1 yard wrought can be had for \$17@ \$18; machinery cast. \$14@14.50; heavy steel melting scrap, \$15.50@16.50. These prices are on cars, Jersey City or other terminal delivery.

**Cast-Iron Pipe**—Prices are steady, the present basis being \$29.75 per net ton for 6-in. pipe in carload lots at tidewater points. The foundries are all busy.

**Bars**—Business is slow, and prices are off. Sales have been made at 1.745@ 1.795c. for common iron bars, and 1.845c. for refined iron. Steel bars are steadier, and hold at 1.745c. tidewater. Store trade is quiet at 2@2.25c. delivered.

#### Philadelphia. March 7.

**Pig Iron**—Some of our pig-iron people take the view that we have reached the high-water mark of demand and prices, and figure it out to their own satisfaction. Comparatively little pig iron is selling at this time, from the well-known fact that nearly all large buyers are out of the market and the smaller buyers are purchasing only what they must. The handlers of foundry iron had a fairly good week in a retail way. Makers of cast-iron pipe booked a few orders at good prices and they say that there is more business of the same nature coming along. Two or three small sales of basic iron were also made for delivery during the early summer and efforts to buy bessemer failed on account of the oversold condition of the furnaces. The rolling mills in eastern and middle Pennsylvania are consuming their customary supply, but very few of them will be in the market for several months to come, as their contracts cover in several instances their requirements up to midsummer. The rumors of declining prices make very little impression upon our people. Quotations are \$19 for No. 1 X foundry, with a slightly higher price of three or four brands. No. 2 X foundry, best brands held at \$18.75; No. 2 plain, sales at \$17.50; No. 2 Southern offers at \$18.50 for best brands. Standard gray forge, best makes, sell at \$17; low phosphorus is quoted nominally at \$26.

**Muckbars**—Mill men are soliciting business at \$29.

**Steel Billets**—Business has been done within a day or two at \$29.50. The market is strong, but the volume of business is below the average.

**Bar Iron**—A slight shading of quotations on a few large orders quietly placed within a few days is not taken as an evidence of weakness in the bar-iron market, but is merely an indication of the fact that certain kinds of scrap iron are a little

lower. There is the usual volume of early March business being done. Premiums are still paid for quick deliveries. Our iron people say that as spring approaches the usual increase in business will strengthen the market. A very active spring is in sight and the bar-mills will have practically all they can do. Best grades of bar iron are 1.83½ in large lots; steel bars 1.73½.

**Pipes and Tubes**—Merchant pipe is very strong and recent orders were booked at the outside prices. Tube work is active and full prices are readily paid. A good deal of new work is being sent to the mills, especially for locomotive requirements.

**Merchant Steel**—In a retail way prices are very firm, but it is rumored that in large orders concessions are being quietly granted. As far as this section is concerned, there is not the slightest evidence of weakness.

**Plate**—Boiler plate shows more activity just now than it has shown any time during the winter. Negotiations are pending between two or three large Eastern consumers and the mills for the placing of large orders that will run through the greater part of the summer. There will be no hitch in the business. Tank is quoted at 1.73½; boiler steel, 1.83½; fire-box steel, 2.32½.

**Structural Material**—More business was submitted during the past week that passed through the sieve. A great deal of shaking is done before orders are finally accepted, owing to the difficulty of making arrangements for satisfactory deliveries. Considerable local work is now ready for submission and the engineers are somewhat exercised over the possibility of not getting their steel on time to push construction along smoothly. Quotations are 1.83½ to 2 cents for beams, angles and channels.

**Steel Rails**—This week's indications are that there will shortly be submitted a good many orders for rails for trolley lines. The mill people engaged in the construction of such rails have had a good deal of correspondence with concerns engaged in trolley-line construction and the substance of it all is that the second quarter of the year will bring out a rather unusual demand for trolley rails. Just what the result will be it is impossible to say this early. The rail makers foresee a very heavy construction of trolley lines this year.

**Scrap**—In some lines the scrap market is weak. The larger users of scrap have been buying right and left and have a good deal of stuff either in their yards or where they can lay their hands on it. Choice railroad scrap has weakened and one or two lots have been bought as low as \$19. Machinery scrap is offered at \$16. wrought-iron scrap at \$15, No. 1 steel scrap \$16 to \$16.50. Old iron rails are quoted at \$23 and steel scrap rails at \$17.

#### Pittsburg. March 6.

The dullness of the pig-iron market continues as to new business, but production and shipments are as heavy as at any time since the opening of the year. It is estimated that production is at the rate of 25,500,000 tons a year, and that the output for 1906 will exceed last year by at least 2,000,000 tons. But few furnaces are idle and very little iron is being stored. One large furnace interest declared today that it would be impossible to buy bessemer iron for shipment this month, and there is but little available for second quarter delivery. A few inquiries have been received for third quarter shipment, but it is not expected that any deal of consequence will be closed for a month or two for extended delivery. Prices appear to be firm, although it is believed for second quarter \$17.50, Valley furnaces, could be done. It is reported that several thousand tons of basic iron were sold last week at a trifle under the regular market of \$17, Valley; but for second quarter it is doubtful if that price could be shaded. The advance of 25c. in the freight rate for iron from Birmingham to this district, making it \$4.60 a ton, went into effect on March 1. This, however, has not changed the quotation on Southern foundry No. 2 and would make the rate on that grade \$13.75, Birmingham. No sales have been made, for even at the low rate Southern foundry is 25c. a ton above the Northern product, delivered in this market. The minimum price of Southern gray forge is \$12.50, Birmingham, equal to \$17.10, Pittsburg, under the new freight rate, and it would take \$16.25, Valley, to equal this price for Pittsburg delivery. It is believed that while the furnaces are quoting \$16.50, Valley, they would meet the Southern price if a good tonnage is offered. This apparent weakness in pig-iron prices is not expected to continue long, as an active buying movement is likely to be started within a month. Conditions in the pig-iron market so far this year are regarded as remarkable. It is estimated that fully 300,000 tons more has been produced than was figured on at the opening of the year, but consumers have used more than they anticipated, and the extra production has been absorbed. The winter has been unusual, there being no delay in shipments on account of cold weather or a shortage of railroad cars, the railroads being able to handle the enormous tonnage offered.

While no new business of any consequence in finished steel lines has been booked, the mills are crowded with specifications on old contracts and will be kept busy in some lines all year if no more orders are received. About the only new business is in structural material and plates, and in these lines premiums are offered in some instances for prompt delivery. Prices are unchanged, it having been decided at the meetings of the beam and plate associations in New York last week to continue quotations for another

month. The American Bridge Company is beginning to feel the effect of the strike ordered by the International Association of Bridge and Structural Iron Workers. Last month it fabricated fully 55,000 tons of material. It has three important contracts in this district, but delayed beginning on them until last week, evidently expecting the strike to be declared off. Work was commenced last week on a bridge across a hollow about seven miles from Pittsburg to connect the Union Railroad of the Carnegie Steel Company with the Wabash Railroad. About 35 non-union structural iron workers were engaged and put to work under the protection of armed guards. The strikers did not offer an open interference, but managed in some way to induce the men to quit work, and operations have been suspended. The company has two bridges to build across hollows at Ben Avon and Emsworth, about five miles west of Pittsburg, for the street railway company and the contract calls for their completion before May 1. The material is on the ground and yesterday a number of deputy sheriffs were sworn in. It is believed an effort is to be made to erect these bridges with non-union men. All the independent erecting concerns are busy and are employing most of the striking employees of the American Company. Demand for all lines of steel products is excellent and for wire nails is unusually heavy for this time of the year. An advance in prices may be ordered some time this month. Steel bars are quiet, but a large tonnage of specifications is still on the books and will keep the mills running steadily for fully four months.

**Pig Iron**—The market is uneventful, buying being extremely light. Quotations practically remain the same as last week and are as follows: Bessemer, \$17.50@17.75; basic, \$17; foundry No. 2, \$17.25, all at Valley furnaces; gray forge, \$17.10@17.35, Pittsburg.

**Steel**—No sale of billets of any consequence has been recorded. Bessemer billets are quoted at \$27 and open hearth at \$28. Merchant steel bars are firm at 1.50c. and plates at 1.60c.

**Sheets**—There is no change in the market. Black sheets are quoted at 2.40c. and galvanized at 3.45c. for No. 28 gage.

**Ferro-manganese**—There is still a scarcity of 80 per cent. ferro and for prompt delivery \$150 a ton can be obtained. Some ferro is offered for delivery, beginning July 1, at \$85.

**Cartagena, Spain. Feb. 17.**

**Iron and Manganiferous Ores**—Messrs. Barrington and Holt report that shipments for the week were four cargoes, 9250 tons, all to Great Britain.

Quotations are unchanged. Ordinary 50 per cent. ore is 7s. 11d.@8s. 3d.; special low phosphorus, 8s. 6d.@8s. 9d.; specular ore, 58 per cent. iron, 11s. 3d.; S. P.

Campanil, 9s. 9d. All prices are f.o.b. shipping port. Manganiferous ores, same terms, range from 11s. for 35 per cent. iron and 12 manganese, up to 17s. 9d. for 20 iron and 20 per cent. manganese.

**Pyrites**—Iron pyrites, 40 per cent. iron and 43 sulphur, are quoted 10s. 3d. per ton, f.o.b. Carthage. Exports were 250 tons to France.

**Dusseldorf, Germany. Feb. 25.**

The Imperial Statistical Office has compiled and issued the figures for imports and exports of all the important metals for the full year. Those for iron were sent in a previous letter.

Imports of quicksilver were 691 metric tons in 1904, and 729 tons in 1905; a gain of 38 tons. The exports, always small, were 43 tons in 1904, and 48 tons in 1905. These are chiefly of imported metal.

Imports and exports of zinc were, in metric tons:

	1904.	1905.	Changes.
Exports.....	65,827	62,323	D. 3,504
Imports.....	24,345	26,841	I. 2,496
Excess, exports.....	41,482	35,482	D. 6,000

Imports of zinc ore increased from 93,515 tons in 1904 to 126,577 tons in 1905; while the exports decreased from 40,488 tons in 1904 to 38,972 tons last year.

Imports and exports of lead were, in metric tons:

	1904.	1905.	Changes.
Imports.....	61,388	78,528	I. 17,140
Exports.....	23,169	32,516	I. 9,346
Excess, imports.....	38,219	46,013	I. 7,794

Imports of lead ore increased from 83,807 tons in 1904 to 92,667 tons in 1905. Exports of ore were insignificant, 1312 tons in 1904, and 1496 tons last year.

The imports and exports of tin are given as below, in metric tons:

	1904.	1905.	Changes.
Imports.....	14,852	13,501	D. 851
Exports.....	2,965	3,287	I. 286
Excess, imports.....	11,887	10,250	D. 1,137

The exports of tin were chiefly re-exports of foreign metal.

The imports and exports of copper were, in metric tons:

	1904.	1905.	Changes.
Imports.....	110,231	102,218	D. 8,013
Exports.....	4,223	5,958	I. 1,735
Excess, imports.....	106,008	96,260	D. 9,748

Copper ore imported was 7949 tons in 1904, and 10,137 tons in 1905. The exports of ore exceeded the imports, being 19,235 tons in 1904, and 28,908 tons last year.

Imports and exports of iron ore for the year were as follows:

	1904.	1905.	Changes.
Imports.....	6,061,127	6,085,196	I. 24,069
Exports.....	3,440,846	3,698,563	I. 257,717
Excess, imp'ts.	2,620,281	2,386,633	D. 233,648

Imports were largely from Spain and Sweden; exports were chiefly minette ores from Luxemburg, which went to France and Belgium.

Slag and slag products are important articles of commerce. The imports were 846,738 tons in 1904, and 888,665 tons in 1905, an increase of 41,927 tons. The ex-

ports were 38,587 tons in 1904, and 28,032 tons in 1905. A considerable part of the imports was basic slag, used in manufacturing fertilizers.

The imports of manganese ore were 255,760 tons in 1904, and 262,311 tons in 1905; an increase of 6,551 tons. Exports were small, 5536 tons in 1904, and 4116 tons last year.

**Heavy Chemicals and Minerals.**

**NEW YORK, March 7.**

Heavy chemicals show little change and retain their general strength. The quotations are shown in the table given herewith; and in particular:

**Nitrate of Soda**—The old combination of the West Coast producers will expire on March 31, 1906. As is well known, uncertainty regarding this worked some irregularity in production and price last year; but arrangements are in progress to readjust the combination. The market is strong and production is steadily growing, involving changing quotations, as given herewith. Total Atlantic deliveries for January and February of 1906 were 59,800 tons.

**Potash Salts**—These products still continue interesting. The issue seems to be a lack of agreement between the main producers and certain independents in Germany.

**Phosphate**—There is no advance as yet this side of the water; but a stiffening market makes higher quotations not improbable.

**PRICES.**

<b>Alkalies.</b>	
Soda ash, per lb.....	0.80@.87½c.
Bicarb soda, per lb.....	1.9@1.5c.
Bleaching powder, per lb.....	1½c.
Soda, caustic, per lb.....	1½@2½c.
Salt cake, per lb.....	.65c.
Sal soda, per lb.....	.@1.4c.
Soda, monohydrate, per lb.....	1½@1¾c.
Potash, caustic, per lb.....	4½@6½c.
" carbonate, 82-85%.....	3½@4½c.
Alum, per lb.....	1.75@1.90c.
Ammonia, aqua, 26 deg., per lb.....	6@5½c.
<b>Acids.</b>	
Boric, crystals.....	per lb. .10
powdered.....	" .10½
Carbonic, liquid gas.....	" .12½
Hydrochloric, nominal, per lb.....	1.1c.
Hydrofluoric, 30%.....	per lb. .08
48%.....	" .05
60%.....	" .11
Nitric acid, 100 lb.....	\$4@4.50
Oxalic acid, com'l, 100 lb.....	\$5.00@5.50
Sulphuric acid, 50°, bulb, ton.....	13.50@14.50
60°, 100 lb. in carboys.....	1.00
60°, bulk, ton.....	18.00@20.00
66°, 100 lb. in carboys.....	1.00@1.25
66°, bulk, ton.....	21.00@23.02
Arsenic, white, per lb.....	6@8c.
Blue Stone (copper sulphate), carload lots, per 100 lb.....	5.90@6.00
Nitrate of soda, 100 lb. 96% : future.....	\$2.17@2.20
Salt peter, per lb.....	spot, \$2.25
Potash, muriate, per cwt.....	4½@5½c.
Potash, kainite, per long ton.....	\$1.90@1.98
Sulphate of ammonia, per 100 lb.....	8.50@9.50
3.10@3.12½	
<b>Sulphur.</b>	
Louisiana (prime) to New York, Boston or Portland.....	ton \$22.12½
To Philadelphia or Baltimore.....	" 22.62½
<b>Tin, bichloride per lb.....</b>	
Crystals, per lb.....	.10½
.22½	
<b>Pyrite.</b>	
Domestic, furnace size.....	Unit 10½@11c.
Fines.....	" 8@8½c.
Imported, lump, At. ports.....	" 11@12c.
" fines ".....	" 10@10½c.
" furnace size.....	" 11@12c.

Pyrite prices are per unit of sulphur. On lump deliveries, a charge of 25c. per ton is made for breaking to furnace size.

Phosphates.	F. O. B.	C. I. F. Gt. Britain or Europe
*Fla., hard rock.....	\$7.75@8.00	\$10.90@12.10
land pebble.....	4.00@4.25	7.95@ 8.65
†Tenn. 78%@80%.....	4.60@4.65	.....
78%.....	4.00@4.25	.....
75%.....	3.65@3.75	.....
68@72%.....	3.25@3.50	.....
‡So. Car. land rock.....	4.00@4.25	.....
river rock.....	3.75@4.00	.....

\*F. o. b. Florida or Georgia ports. †F. o. b. Mt Pleasant. ‡On vessel Ashley River, S. C.

**Metal Market.**

New York, March 7.

**Gold and Silver Exports and Imports.**  
At all United States Ports in January.

Metal.	Exports.	Imports.	Excess.
Gold:			
Jan., 1906..	\$ 5,741,665	\$2,600,971	Exp. \$ 3,140,694
Jan., 1905..	16,828,168	1,895,691	Exp. 14,932,477
Silver:			
Jan., 1906..	7,516,668	4,692,096	Exp. 2,824,572
Jan., 1905..	4,364,745	1,922,202	Exp. 2,442,543

These statements cover the total movement of gold and silver to and from the United States. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

**Gold and Silver Exports and Imports, N. Y.**

For the week ending March 3, and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	\$ 15,000	\$ 64,638	\$1,000,810	\$ 102,330
1906.....	3,023,379	427,504	14,658,679	347,351
1905.....	29,456,196	758,732	6,789,378	344,579
1904.....	1,359,160	1,383,684	8,640,945	116,449

Imports, both gold and silver, for the week were from Mexico, Central and South America. Exports of gold for the week were to Panama; of silver to London.

The statement of the New York banks—including all the banks represented in the clearing house—for the week ending March 3, gives the following totals, comparison being made with the corresponding week of 1905.

	1905.	1906.
Loans and discounts..	\$1,134,425,300	\$1,040,838,760
Deposits.....	1,189,970,000	1,029,545,000
Circulation.....	42,851,300	50,907,000
Specie.....	219,628,400	182,672,800
Legal tenders.....	86,283,800	79,721,200
Total Reserve.....	\$305,882,200	\$262,395,000
Legal requirements....	297,492,500	257,386,250
Surplus reserve.....	\$ 8,389,700	\$ 5,008,750

Changes for the week this year were an increase of \$119,800 in circulation; decreases of \$8,463,100 in loans, \$12,753,700 in deposits, \$2,964,400 in specie, \$341,000 in legal tenders and \$116,975 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world. The amounts are reduced to dollars.

	Gold.	Silver.	Total.
New York.....	.....	.....	\$182,672,800
England.....	\$186,319,420	.....	186,319,420
France.....	575,014,785	\$210,742,656	785,757,441
Germany.....	181,810,000	60,600,000	242,410,000
Spain.....	75,335,500	117,240,000	192,575,500
Netherlands.....	31,941,500	30,501,000	62,442,500
Belgium.....	17,700,000	8,850,000	26,550,000
Italy.....	141,300,000	18,284,000	159,584,000
Russia.....	473,025,000	19,450,000	492,475,000
Austria.....	229,265,000	63,425,000	292,690,000

The returns of the Associated Banks of New York are of date March 3, and the others March 2. The foreign bank statements are from the *Commercial and Financial Chronicle*, of New York. The New York banks do not separate gold and silver in their reports.

The Treasury Department's estimate of the amount and kinds of money in the United States on March 1, is as follows:

	In Treasury.	In Circulation.
Gold coin (inc. bullion in Treasury).....	\$225,790,518	\$ 648,856,052
Gold certificates.....	50,627,550	491,733,319
Silver dollars.....	13,732,099	79,363,766
Silver certificates.....	4,411,037	462,752,963
Subsidiary silver.....	9,787,503	107,381,453
Treasury notes of 1890.....	56,545	7,912,455
U. S. Notes.....	10,594,139	336,066,677
Nat. Bank Notes.....	13,588,277	537,215,618
Total.....	\$328,587,668	\$2,671,302,503

Indian Exchange is steady and the Council bills offered in London were taken at 16.06d. per rupee. The demand for silver from the East continues good.

The withdrawal of the India Government as a buyer of silver has been followed by a sharp decline in the price. This has been accentuated by speculative offerings. The decline has been 1 1/8d., but at 29 1/2d. the market is more steady with price dependent on bazaar and other orders.

**Prices of Foreign Coins.**

	Bid.	Asked.
Mexican dollars.....	\$0.49 1/2	\$0.51 1/2
Peruvian soles and Chilean.....	0.45 1/2	0.47 1/2
Victoria sovereigns.....	4.85 1/2	4.87 1/2
Twenty francs.....	3.87	3.89
Spanish 25 pesetas.....	4.78	4.80

**SILVER AND STERLING EXCHANGE.**

Mar.	Sterling Exchange.	Silver.		Mar.	Sterling Exchange.	Silver.	
		New York, Cents.	London, Pence.			New York, Cents.	London, Pence.
1	4.85 3/4	65 1/2	30 1/2	5	4.85 3/4	64 1/2	29 1/2
2	4.85 3/4	65 1/2	30 1/2	6	4.85 3/4	64 1/2	29 1/2
3	4.85 3/4	64 1/2	30	7	4.85 3/4	64 1/2	29 1/2

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, .925 fine.

**Other Metals.**

**Daily Prices of Metals in New York.**

March.	Copper.			Tin.	Lead.	Spelter.	
	Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.			New York, Cts. per lb.	St. Louis, Cts. per lb.
1	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	79 1/2	36	5.35	6.10 @ 6.15	5.92 1/2 @ 5.97 1/2
2	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	79 1/2	35 1/2	5.35	6.10 @ 6.15	5.92 1/2 @ 5.97 1/2
3	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	79 1/2	35 1/2	5.35	6.10 @ 6.15	5.92 1/2 @ 5.97 1/2
5	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	79 1/2	35 1/2	5.35	6.15 @ 6.25	6.00 @ 6.10
6	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	80	35 1/2	5.35	6.25 @ 6.35	6.10 @ 6.20
7	18 1/2 @ 18 1/2	18 1/2 @ 18 1/2	79 1/2	35 1/2	5.35	6.25 @ 6.35	6.10 @ 6.20

London quotations are per long ton (2,240 lb.) 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 cathodes is usually 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting & Refining Co. for near-by shipments of desilverized lead in 50-ton lots, or larger orders. The quotations in spelter are for ordinary western brands; special brands command a premium.

*Copper*—European as well as domestic buyers continue to show a good deal of interest and have placed large orders. In consequence of this the market was more active and prices advanced gradually, closing at 18 1/2 @ 18 3/4 for Lake, 18 1/4 @ 18 1/2 for electrolytic and 18 @ 18 1/4 for casting copper.

The speculative market in London rules very firm, large transactions being closed at advancing quotations. The market closed at £79 15s. for prompt and £78 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £85 @ £86; best selected, £86 @ £87; strong sheets, £91.

According to their official reports, the average prices received by the following Lake companies for their output in 1905 were: Quincy, 15.83c.; Adventure, 15.73c.; Osceola, 15.54c.

*Copper Exports and Imports*—The exports of copper from the United States during the month of January are reported as follows by the Bureau of Statistics of the Department of Commerce and Labor; the figures given being in long tons, of 2240 lb. each:

To:	1905.	1906.	Changes.
Great Britain.....	2,911	1,409	D. 1,502
Belgium.....	193	277	I. 84
France.....	4,581	2,990	D. 1,591
Italy.....	807	655	D. 152
Germany and Holland.....	7,019	6,924	D. 95
Russia.....	1,469	662	D. 807
Other Europe.....	774	988	I. 214
Canada.....	142	152	I. 10
China.....	502	200	D. 302
Other countries.....	909	22	D. 887
Total metal.....	19,307	14,279	D. 5,028
In ore and matte.....	397	795	I. 398
Total.....	19,704	15,074	D. 4,630

The decrease in the total is 30.6 per cent. The actual quantities of ore and matte were 2319 tons in 1905, and 646 tons in 1906; contents are estimated chiefly on the basis of values.

Imports of copper and copper material for the month are reported as follows; the figures giving the contents of all material in long tons of fine copper:

	Metal.	In ore, etc.	Total.
Mexico.....	3,364	1,412	4,776
Canada.....	1,217	350	1,567
Great Britain.....	700	.....	700
Other countries.....	1,018	455	1,473
Total.....	6,299	2,217	8,516
Net imports.....	6,299	2,217	8,516
Net imports, 1905.....	5,292	169	5,461

The increase in the total this year was 3055 tons, or 56 per cent. The actual tonnage of ores and matte from Mexico this was 10,502; from Canada and Newfound-

land, 2772. The exports exceeded the net imports by 14,243 tons in 1905, and 6558 tons in 1906: a decrease of 7685 tons.

**Tin**—The severe decline which was experienced in the London market, and which brought quotations down from £164 15s., the middle of last week, to £161 15s. the beginning of this week, had the effect of creating a larger inquiry for the metal from domestic consumers.

The market closes firm in London as well as here, the former quotation being £163 2s. 6d. for spot, and £162 15s. for three months, while in this market prices range between 35½c. and 35¾c., depending upon deliveries.

Imports of tin into the United States in January are reported as follows, in long tons of 2240 lb.:

	1905.	1906.	Changes.
Straits.....	1,106	1,376	I. 270
Australia.....	5	5	.....
London.....	1,579	2,769	I. 1,190
Holland.....	21	64	I. 32
Other Europe.....	45	121	I. 76
Other countries.....	3	.....	D. 3
<b>Total.....</b>	<b>2,759</b>	<b>4,324</b>	<b>I. 1,565</b>

The increase this year was large, 56.7 per cent.

**Lead**—There is no change in the quotations, business still remaining very limited.

London is reporting a weaker market, and quoting at the close £15 10s. for Spanish lead and £15 12s. 6d. for English lead.

Imports of lead into the United States in January, with re-exports of foreign metal, are reported as follows, in short tons of 2000 lb. each:

	1905.	1906.	Changes.
Lead, metallic.....	539	1,149	I. 610
Lead in ores and base bullion.....	9,164	8,033	D. 1,131
<b>Total imports.....</b>	<b>9,703</b>	<b>9,182</b>	<b>D. 521</b>
Re-exports.....	3,516	4,159	I. 643
<b>Net imports.....</b>	<b>6,187</b>	<b>5,023</b>	<b>D. 1,164</b>

Of the lead imported this year 7811 tons were from Mexico and 482 tons from Canada. There were 833 tons imported from Europe, an unusual movement. Exports of domestic lead were 17 tons in 1905 and 21 tons in 1906; an increase of 4 tons.

**St. Louis Lead Market**—The John Wahl Commission Company reports on March 3 as follows: Receipts amounted to 51,090 pigs this week, against 63,870 pigs last week; shipments 27,900 pigs this week, against 28,340 pigs last week. No sales reported, yet there were bids daily of \$5.27½, and a steady feeling pervaded the market. Missouri brands were held for more. On March 3, the receipts were 14,375 pigs; shipments, 9310 pigs. Market quiet, but steady, at \$5.27½.

The John Wahl Commission Company, under date March 6, reports by telegraph as follows: Lead quiet but very firm, Missouri brands selling on a basis of 5.27½c.

**Spanish Lead Market**—Messrs. Barrington & Holt report under date of Feb. 10

that silver is 14.50 reales per ounce. Exchange is 30.36 pesetas to £1. Local price for pig lead is 81.25 reales per quintal, equal to £15 3s. 3d. per long ton, f. o. b. Cartagena.

**Spelter**—The market has been firm, considerable business being done at advancing prices. The close is 6.10 to 6.20c. East St. Louis and 6¼@6.35c. New York.

Exports of spelter from the United States in January were 1080 short tons in 1905 and 1171 tons in 1906; an increase of 91 tons. There were 1515 tons of zinc ore exported in January, 1905, but none in 1906. Exports of zinc dross in 1906 were 1514 tons; this article was not reported separately last year.

**St. Louis Spelter Market**—The John Wahl Commission Company on March 3 reports as follows: Receipts, 56,690 slabs this week, against 59,960 slabs last week; shipments, 144,930 slabs this week, against 42,080 last week. Movement light. There was a demand for the metal for spot and for early delivery at an advance, and sales were made yesterday at \$6, but little to be had; while lots for more distant delivery were plentiful, and dull, at \$5.90.

On March 3 the receipts were 4990 slabs; shipments, 6480. Market advancing, nominally, with \$6.15 bid for prompt shipment, which is scarce and in demand.

The John Wahl Commission Company on March 6 reports by telegraph as follows: Spelter strong and advancing. Latest sales here are on basis of 6.10@6.15c., according to brand and delivery.

**Spanish Zinc Ore Market**—Messrs. Barrington & Holt report from Cartagena, Spain, under date of Feb. 17, that prices are nominally unchanged at 95 fr. for calamine, 30 per cent. zinc. The market is dull, with no current business. Shipments for the week were 5390 tons to Antwerp.

**Zinc Sheets**—The price of zinc sheets is \$7.75 per 100 lb. (less discount of 8 per cent.) f. o. b. cars for Lasalle and Peru, in 600-lb. casks, for gages No. 9 and 22, both inclusive, widths from 32 to 60 in., both inclusive, and lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since January 1, 1906, have been as follows: Jan. 6, 1906, \$8; Feb. 5, \$7.75.

**Antimony**—There is no change to be reported.

Imports of antimony into the United States in January were as follows, in pounds:

	1905.	1906.	Changes.
Metal and regulus.....	170,220	898,675	I. 728,455
Antimony ore.....	262,065	82,777	D. 179,288

There was a considerable decrease in ore, but a very large increase in metal and regulus.

**Nickel**—Quotations for large lots, New York, or other parallel delivery, are 40@47c. per lb., according to size and condi-

tion of order. For small quantities, prices range from 48 up to 60c., also according to size of order and deliveries.

Exports of nickel, nickel oxide and nickel matte from the United States in January were 1,269,535 lb. in 1905, and 925,019 lb. in 1906; a decrease of 344,516 lb. Imports of nickel ore and matte were 669 tons in 1905 and 1097 tons in 1906; an increase of 428 tons.

**Platinum**—Prices are still unsettled, the supply being irregular and the demand large. The current price is \$25 per ounce, but changes are likely to occur at any time.

Imports of platinum into the United States in January were 1099 lb. in 1905, and 1400 lb. in 1906; an increase of 301 lb. this year.

**Quicksilver**—The metal is firm and New York prices are still \$41 per flask of 75 lb. for lots of 100 flasks or over, and \$42 for small lots down to 10 flasks. For retail quantities, under 10 flasks, pound prices are charged, which work out to \$43.50@44 per flask. San Francisco prices are firm at \$39.50 for domestic orders and \$38 for export. The London price is £7 7s. 6d. per flask, but jobbers ask £7 10s. for moderate lots.

Exports of quicksilver from the United States in January were 67,929 lb. in 1905, and 82,584 lb. in 1906; an increase of 14,655 lb. this year.

**Minor Metals**—For minor metals and their alloys, wholesale prices are f. o. b. works:

	Per lb.
<b>Aluminum.</b>	
No. 1, 99% ingots.....	35@38c.
No. 2, 90% ingots.....	33@35c.
Rolled sheets.....	44c. up.
Aluminum casting alloys.....	30@38c.
Aluminum-bronze powder.....	90@1.00
<b>Bismuth.....</b>	<b>\$2.10</b>
Cadmium, f. o. b. Hamburg.....	77c.
Chromium, pure (N. Y.).....	50c.
Copper, red oxide.....	50c.
Ferro-Molybdenum (50%).....	95c.
Ferro-Titanium (20@25% N. Y.).....	75c.
Ferro-Chrom. (15%).....	12½c.
Ferro-Tungsten (37%).....	29c.
Magnesium, pure (N. Y.).....	\$1.60
Manganese (98@98% N. Y.).....	75c.
Manganese Cu. (30@70% N. Y.).....	40c.
Molybdenum (98@99% N. Y.).....	\$1.75
Tantalum acid (N. Y.) (oz.).....	49c.
Phosphorus, foreign red.....	75c.
Phosphorus, American yellow.....	50c.
Tungsten (best), pound lots.....	90c.

Variations in price are chiefly due to size and conditions of order and deliveries.

**Manganese Alloys**—Prices for these alloys in Germany are given by Paul Speier as below. The prices are for orders of not less than 50 kg. delivered in Bremen, and are as follows, per 100 kilograms:

	Marks.
Manganese copper, No. 1, 30% Mn.....	275
No. 2, 28% Mn.....	180
No. 3, 20 to 25%, with 2 to 4% iron.....	165
Manganese tin, No. 1, 55% Mn., no iron.....	480
No. 2, 56% Mn., some iron.....	280
Manganese nickel, No. 1, free from iron.....	450
No. 2, traces of iron.....	270

Manganese metal is quoted at 3 marks per kg.—38.8c. per lb.—delivered in Bremen. These alloys are made by the Isabellenhütte, in Bonn, Germany, which is represented by Mr. Speier in Breslau as selling agent.

**Wisconsin Ore Market.**

PLATTEVILLE, March 3.

A marked improvement was noticed in the demand for low-grade ore, nearly all being bought up but not loaded. There is a noticeable increase in the bins, but all being sold shows a strong market and the ore at the mines can hardly be called a surplus. Cars for loading are still in big demand.

The price of 60% ore remains about the same, namely \$47. The top price as far as reported was \$53.50.

The Enterprise sold several cars as low as \$47.50.

Certain camps in the district are still unable to load ore owing to a little difficulty with the teamsters which promises to be settled in a few days.

The mines in the southern part of the district around Hazel Green are now in a better position to load than formerly, owing to the opening of the new spur on the C. & N. W. which taps seven of the largest producers in the vicinity of that camp. There is a prospect of a raise in price of 60% ore next week.

Lead is up a bit, one of the old buyers having resumed purchasing again. 80% is quoted at \$38 and \$38.50.

The outlook for production of the district looks exceedingly good. There is a large amount of low-grade ore in the bins at several of the different mills awaiting the completion of their separating plants, also some half dozen mills just ready to turn out ore.

The camps of the Platteville Zinc and Lead district report ore loaded as follows:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville.....	436,840	.....	.....
Buncombe-Hazel Green.....	278,000	51,000	.....
Linden.....	210,410	.....	.....
Mineral Point.....	184,100	.....	.....
Highland.....	118,940	.....	.....
Livingston.....	52,000	.....	.....
Total.....	1,280,290	51,000	.....
Total from Jan. 1.....	13,142,190	607,770	1,857,040

**Missouri Ore Market.**

JOPLIN, March 5.

The highest price paid for zinc was \$51 per ton; the assay basis price ranging from \$48 down to \$44 per ton of 60 per cent. zinc. Average price \$43.44.

Lead ore sold as high as \$73 per ton, the St. Louis Smelting and Refining Company seeming anxious to get a large proportion of the output. Buyers for local smelters are paying premiums for the best grades of ore. Average price \$69.28.

Fine weather resulted in the mines out-putting heavily, and sellers more freely accepted the situation with steadily lowering prices, despite the Treasury Department's ruling that imported ore should pay an ad valorem impost duty of 20 per cent. Producers assert that they expected prices would be temporarily lowered, but expect to reap a future benefit from the tariff.

Following are the shipments of zinc and

lead from the various camps of the district for the week ending March 3.

	Zinc, lb.	Lead, lb.	Value.
Joplin.....	2,510,990	250,980	\$66,480
Cartersville-Webb City..	2,094,630	490,160	64,285
Galena-Empire.....	1,035,820	134,070	26,400
Duenweg.....	689,130	88,210	18,580
Aurora.....	705,900	41,670	14,760
Alba.....	566,130	.....	13,900
Neck City.....	452,120	.....	10,620
Oronogo.....	384,160	12,980	9,365
Granby.....	525,000	30,000	9,000
Spurgeon-Spring City.	473,940	33,690	8,980
Badger.....	286,290	5,750	6,790
Baxter Springs.....	132,770	110,580	6,540
Carthage.....	242,630	.....	5,700
Sherwood.....	142,810	5,930	3,550
Prosperity.....	129,660	16,810	3,305
Springfield.....	122,480	.....	2,790
Playter.....	117,960	7,490	2,620
Central City.....	73,560	.....	1,540
Totals.....	10,636,080	1,228,370	\$274,605

Nine weeks shipment 86,582,030 13,325,750 \$2,437,135  
Zinc value, the week, \$232,145; 9 weeks, \$1,981,225.  
Lead value, the week, 42,460; 9 weeks, 455,910.

The following table shows the average monthly prices of zinc and lead ores in Joplin, by months:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1905.	1906.	Month.	1905.	1906.
January.....	52.00	47.38	January.....	61.50	75.20
February....	52.77	47.37	February....	67.62	72.83
March.....	47.40	.....	March.....	67.20	.....
April.....	42.88	.....	April.....	66.00	.....
May.....	43.31	.....	May.....	68.27	.....
June.....	40.75	.....	June.....	67.89	.....
July.....	43.00	.....	July.....	68.00	.....
August.....	48.83	.....	August.....	68.00	.....
September..	46.75	.....	September..	63.50	.....
October.....	47.60	.....	October.....	63.86	.....
November..	49.55	.....	November..	68.67	.....
December..	49.00	.....	December..	76.25	.....

**Mining Stocks.**

New York. March 7.

The stock market continues uncertain. Early in the week liquidation of stocks was heavy, with a consequent declining movement of values which in some cases reached large figures. Amalgamated Copper declined 4 1/4 points, while Anaconda showed a fall of 16 3/4. At the time of writing it appears that the interests that abetted the decline in copper shares early in the week have accomplished their object, for the time being at least, and improved values may be looked for. United Copper opened today at 63 1/2, as against 59 1/2 for previous quotations.

On the outside market Tennessee Copper rose from 43@44 1/2. Boston Copper was traded in moderately at 27 1/8@27 1/2. Butte Coalition was quoted from 33@34, with very little trading. It is the new Amalgamated-Heinze stock which made its first appearance two weeks ago.

Boston. March 7.

The market for mining shares continued to drag for the better part of the week, until Amalgamated broke wide open, which caused a sharp break throughout the list in this class of securities. This can not be laid to the metal market, but rather to market reasons entirely. The stocks which have been kited, so to speak, are the ones that suffered the most.

On the break, Amalgamated touched \$97.75, against par in New York, rally-

ing later to \$103.37 1/2. The close a week ago was above \$110. North Butte touched \$76.50 on Monday, which was low day, rallying to \$80; a net loss of \$6 for the week. United Copper also followed suit by breaking \$14.75 to \$58, with subsequent recovery, to \$63.37 1/2. Utah Copper fell \$4.25 to \$59.75, with recovery to \$61. United States Smelting fell \$6 to \$51, recovering \$2. Copper Range went of over \$2 to \$79.25, recovering \$1.50. The directors did as was expected; they increased the dividend rate from \$1 to \$1.25 quarterly.

Allouez was also soft, and on light dealings, broke almost \$5 to \$35.25, recovering to \$37 later; while Centennial lost \$2 to \$24.75. The rock contents of both these mines were less for February than for the preceding months. Isle Royale dipped \$2.50 to \$21.50 in sympathy; while Mohawk sank \$3 to \$54.50, the latter recovering \$1.50. Old Dominion went off \$2 to \$44, recovering \$1. If it had not been for the fire, the February output would undoubtedly have been a record-breaker. Osceola slid off \$14 to \$94, but met with buying orders at that figure. The annual report, issued during the week, makes gratifying reading to stockholders. Parrot broke \$4.75 to \$34.75, but recovered \$1.25, while Quincy lost \$9 @ \$85. Wolverine rose \$5 to \$139, which is its record price. This was due to the declaration of an \$8 semi-annual dividend. For 1905 \$11 was paid. Thus far but \$13 has been paid in on this stock. Dividend payments were started in 1898 with a \$1 dividend declaration. Franklin rose \$1.75 to \$20, but eased off from this, while accumulating orders in Granby caused the stock to advance \$1.75 to \$11.50. Nevada Consolidated is up \$1.50 to \$17.12 1/2 on certain negotiations pending. Boston Consolidated is off \$1.25 to \$27.25. The Mass Mining report shows a surplus of \$55,079 above all charges on sales of 2,007,950 lb. of copper. The 1905 product brought 16.43 cents. The curb has been comparatively quiet, with East Butte the particular feature, Mexico Consolidated a Coram proposition, and curb security will soon commence dividend payments at the rate of 50c. quarterly.

Colorado Springs. March 2.

The market in Cripple Creek stocks has been quite strong during the past week, with a fair volume of trading, but with slightly declining prices.

Acacia shows a slight decline, selling for 10. Anaconda has made an advance of about 2c. and sold on today's market for 14 1/4. El Paso is selling for 79 3/4, being about 10c. under market of one week ago. Findley has also made about the same decline, selling today for 74 1/4. Sovereign remains close to its last quotation and some shares were sold for 8 3/4. Isabella is selling for 26 1/2, Vindicator for 93. Work for 7 and Portland for 1.84.

San Francisco. March 1.

The Comstocks remain quiet, with about the usual business, and no special features. Sales were rather small, and fluctuations light.

The Tonopahs lost a little of the boom of last week, but were still strong, with a good buying demand. Here also the fluctuations were not great. So many new stocks are coming into the market that it is hard to keep track of them.

Oil shares continue quiet, with light buying.

Assessments.

Company.	Delinq.	Sal.	Amt.
Andes.....	Mar. 9	Mar. 30	\$0.10
Bullion Con., Cal.....	Mch. 19	.....	0.06
Champion Mines, Cal.....	Mar. 17	.....	0.50
Christmas, Utah.....	Apr. 16	May 5	0.00½
Con. Cal & Virginia.....	Feb. 13	Mar. 6	0.25
Con. Imperial.....	Feb. 14	Mar. 13	0.01
Hale & Norcross.....	Mar. 2	Mar. 27	0.10
Justice.....	Feb. 27	Mar. 19	0.05
New Red Wing, Utah.....	Mch. 17	Apr. 7	0.02
Pioneer, Utah.....	Mch. 15	Apr. 7	0.01
Pinos Altos, N. M.....	Mar. 26	.....	1.00
Providence, Utah.....	Feb. 5	Mar. 12	0.00½
Savage, Nev.....	Mch. 14	Apr. 3	0.10
Wabash, Utah.....	Mch. 15	Apr. 4	0.10

Dividends.

Company.	Payable.	Rate.	Amt.
Am. Smelting & Ref.....	Apr. 16	1.75	875,000
Am. Smelting & Ref. pfd.....	Apr. 2	1.75	875,000
Bunker Hill & Sullivan.....	Mar. 3	0.60	180,000
Calumet & Arizona.....	Mch. 20	2.50	500,000
Calumet & Hecla.....	Mch. 23	15.00	1,500,000
Con. Mercur.....	Mch. 26	0.02½	25,000
Copper Range Con.....	Mar. 31	1.25	.....
Federal Mg. & Sm.....	Mch. 15	4.00	240,000
Federal Mg. & Sm., pfd.....	Mch. 15	1.75	210,000
General Chemical, pfd.....	Apr. 2	1.50	150,000
Iron Silver.....	Apr. 2	0.20	100,000
Parrot Copper.....	Mch. 12	0.50	114,925
Nat. Lead, pfd.....	Mch. 15	1.75	260,820
Standard Oil.....	Mch. 15	15.00	14,550,000
Teztlutlan Copper.....	Apr. 2	2.00	160,000

\*Monthly. †Bi-monthly. ‡Quarterly. §Semi-Annually.

Tonopah Stocks.

(Revised by Weir Bros. & Co., New York.)

	High.	Low.	Last.
Tonopah Mine of Nevada.....	19.00	18.50	18.78½
Tonopah Montana.....	2.95	2.81½	2.93
Tonopah Extension.....	11.50	10.25	11.25
Tonopah Midway.....	2.30	2.25	2.28
Tonopah West End.....	2.85	2.75	2.80
Goldfield Mining Co.....	.75	.73	.75
Jumbo Mining.....	1.60	1.55	1.58
Red Top.....	2.05	2.00	2.05
Sandstorm.....	1.55	1.52	1.55
Montgomery Shoshone.....	5.25	5.00	5.25
Eclipse-Bullfrog.....	.95	.90	.94
Denver-Bullfrog.....	1.52	1.47	1.50

St. Louis.

	High.	Low.
Adams.....	\$ .40	\$ .30
American Nettle.....	.15	.12
Center Creek.....	2.60	2.40
Central Coal & Coke.....	60.00	58.80
" " pfd.....	80.00	79.00
Central Oil.....	60.00	55.00
Columbia.....	2.00	.50
Con. Coal.....	25.00	23.00
Doe Run (old stock).....	400.00	300.00
Granite Bimetallic.....	.30	.17
St. Joe (old stock).....	33.50	31.50

LONDON. (By Cable.)\*

	£	s.	d.
Dolores.....	1	17	6
Stratton's Independence.....	3	7	6
Camp Bird.....	1	8	0
Esperanza.....	4	8	9
Tomboy.....	1	7	6
El Oro.....	1	5	0
Oroville.....	0	19	6
Arizona Copper, pf.....	3	6	6
Arizona Copper, def.....	3	6	3

\*Furnished by C. Schumacher & Co., New York.

STOCK QUOTATIONS.

NEW YORK.		Week Mar. 6.		
Name of Company,	High	Low	Clg.	Sales
Amalgamated.....	110½	100	100½	981,812
Anaconda.....	279½	245½	246½	494,861
Boston Copper.....	28½	27½	27½	13,160
British Col. Copper.....	9	8½	8½	9,850
Federal.....	180	175	175	2-0
Federal Pf.....	106	101	101	4,200
Greene Copper.....	28	27	27½	49,070
Greene Gold.....	5½	3	3	17,500
Homestake.....	82	82	82	.....
Mitchell.....	14½	12	12	22,635
Tennessee Copper.....	44½	42	43	3,050
Union Copper.....	1½	1½	1½	6,185
United Copper.....	73	59	59	137,200
United Copper, Pref.....	110½	105	105	530
Utah Apex.....	6	5½	5½	4,120
Utah Copper.....	33½	31	31½	4,450

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.....	159½	160½	152½	326,210
Am. Smelting & Ref., Pf	123½	121	121	5,650
Col. Fuel & Iron.....	64½	57	57½	161,100
National Lead.....	80	70½	75½	93,150
Pittsburg Coal.....	15½	14½	15	1,600
Pittsburg Coal, pf.....	58½	55	55½	1,000
Republic I. & S.....	30½	26½	26½	15,410
Republic I. & S., Pf	104½	101	101	26,500
Tenn. C. & I.....	150½	146½	146½	3,700
U. S. Red. & Ref.....	26	24	24	1,700
U. S. Red. & Ref., Pf	64	61½	64	1,400
U. S. Steel.....	41½	39½	39½	590,595
U. S. Steel, Pf.....	106½	104½	104½	130,100
Standard Oil.....	687	650	650	159
Bethlehem Steel.....	32	27	27	2,320

BOSTON.

Alouez.....	40½	35	35	3,933
*Amalgamated.....	110½	95½	100½	55,870
Atlantic.....	24½	22	22½	1,660
Bingham.....	44½	35½	35½	22,270
Boston Consolidated.....	28½	26½	27	8,242
Calumet & Hecla.....	695	690	690	183
Centennial.....	26½	24	24½	3,005
Mer-cur.....	69	65	65	200
Copper Range.....	82½	79	79	8,727
Daly-West.....	15½	14½	14½	1,223
Franklin.....	20½	17½	18½	13,007
Granby.....	11½	9½	10½	11,520
Green Con. Copper.....	27½	27	27	16,470
Isle Royale.....	23½	21	21	2,010
†Mass.....	9½	9	9	995
Michigan.....	13½	13	13½	1,055
Mohawk.....	57½	54½	55	988
North Butte.....	85½	74½	74½	25,498
Old Dominion.....	46½	44	44½	5,760
Osceola.....	98	93	93	1,557
Parrot.....	39½	34½	35	2,900
*Quincy.....	93	85	87	721
Rhode Island.....	6	5	5½	1,370
Shannon.....	6½	6½	6½	1,175
Tamarack.....	108	107	107	330
Tecumseh.....	14½	13	13½	2,675
*United Copper, com.....	75	58	59½	75,382
U. S. Smg. & Ref.....	57	51	51½	5,767½
" " pfd.....	44½	43	43½	5,171
Utah.....	64	59½	60	14,457
Winona.....	7½	7	7	379

PHILADELPHIA.

Cambria Steel.....	35½	34½	34½	12,122
Philadelphia Co.....	52½	51	51	3,878
Tonopah.....	19½	19	19	3,950

PITTSBURG.

Crucible Steel.....	15	14½	14½	2,115
Crucible Steel, Pref.....	77½	76	76	1,211
Tonopah Ext.....	12	10½	11	4,620

COLORADO SPRINGS.

Name of Company.	First	High	Low	Clg.
Elkton.....	44½	45	40	40
El Paso.....	85	85	73	73
Isabella.....	27½	27½	25½	27
Portland.....	180	185	180	180
Vindicator.....	93½	94	90	90

SAN FRANCISCO.

Best & Belcher.....	1.15	1.15	1.05	1.05
Bullion.....	.31	.35	.28	.30
Caledonia.....	.45	.48	.35	.45
Confidence.....	.71	.73	.70	.70
Con. Cal. & Va.....	1.35	1.40	1.35	1.35
Gould & Curry.....	.14	.14	.13	.13
Hale & Norcross.....	1.25	1.25	1.15	1.15
Mexican.....	1.20	1.20	1.20	1.20
Occidental Con.....	.90	.90	.90	.90
Ophir.....	5.62½	5.62½	5.37½	5.37½
Savage.....	.46	.46	.42	.42

\* Ex-dividend. † 1st Installment Paid. ‡ 2d Installment Paid.

Monthly Average Prices of Metals.

Month.	SILVER.		LONDON.	
	New York.		1905.	
	1905.	1906.	1905.	1906.
January.....	60.490	65.288	27.930	30.113
February.....	61.023	66.108	28.047	30.464
March.....	58.046	.....	26.794	.....
April.....	56.606	.....	26.108	.....
May.....	57.832	.....	26.664	.....
June.....	58.428	.....	26.910	.....
July.....	58.915	.....	27.163	.....
August.....	60.259	.....	27.822	.....
September.....	61.995	.....	28.528	.....
October.....	62.034	.....	28.637	.....
November.....	63.849	.....	29.493	.....
December.....	64.850	.....	29.877	.....
Year.....	60.352	.....	27.839	.....

The New York prices are in cents per fine ounce; the London quotation is in pence per standard ounce, .925 fine.

COPPER.

Month.	NEW YORK.				LONDON.	
	Electrolytic.		Lake.		1905.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.....	15.008	18.310	15.128	18.416	68.202	78.896
Feb.....	15.011	17.869	15.136	18.116	67.963	78.147
March.....	15.125	.....	15.250	.....	67.174	.....
April.....	14.920	.....	15.045	.....	68.017	.....
May.....	14.627	.....	14.820	.....	64.875	.....
June.....	14.673	.....	14.813	.....	65.881	.....
July.....	14.888	.....	15.005	.....	66.887	.....
Aug.....	15.664	.....	15.725	.....	69.830	.....
Sept.....	15.965	.....	15.978	.....	69.667	.....
Oct.....	16.279	.....	16.332	.....	71.406	.....
Nov.....	16.599	.....	16.758	.....	74.727	.....
Dec.....	18.328	.....	18.398	.....	78.993	.....
Year.....	15.590	.....	15.699	.....	69.465	.....

New York prices are in cents per pound. Electrolytic quotations are for cakes, ingots or wire bars. The London prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.....	29.325	36.390	July.....	31.760	.....
Feb.....	29.262	36.403	August.....	32.866	.....
March.....	29.523	.....	Sept.....	32.095	.....
April.....	30.525	.....	Oct.....	32.481	.....
May.....	30.049	.....	Nov.....	33.443	.....
June.....	30.329	.....	Dec.....	35.838	.....
			Av. year.	31.358	.....

Prices are in cents per pound.

LEAD IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.....	4.552	5.600	July.....	4.524	.....
Feb.....	4.450	5.464	Aug.....	4.665	.....
March.....	4.470	.....	Sept.....	4.850	.....
April.....	4.500	.....	Oct.....	4.850	.....
May.....	4.500	.....	Nov.....	5.200	.....
June.....	4.500	.....	Dec.....	5.422	.....
			Av. year.	4.707	.....

Prices are in cents per pound. The London average for January, 1906, was £ 16.850 per long ton; February, £ 16.031.

SPELTER.

Month.	New York.		St. Louis.		London.	
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.....	6.190	6.487	6.032	6.337	25.062	28.225
Feb.....	6.139	6.075	5.989	5.924	24.594	25.844
Mar.....	6.067	.....	5.917	.....	23.825	.....
April.....	5.817	.....	5.667	.....	23.813	.....
May.....	5.434	.....	5.284	.....	23.594	.....
June.....	5.190	.....	5.040	.....	23.575	.....
July.....	5.394	.....	5.247	.....	23.938	.....
Aug.....	5.706	.....	5.556	.....	24.875</	