The Engineering and Mining Journal

VOL. LXXXI. NEW YORK, APRIL 7, 1906. NO. 14.

Published Weekly at
505 PEARL STREET, NEW YORK
London Office: Bucklersbury, London E. C., 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, 33 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.

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* 12,000 *copies are printed. None sent regularly free. No back numbers beyond current year.*

The New Oxide of Aluminum.

BY CHAS. S. PALMER.

The statement in the last paragraph on p. 505 of the JOURNAL (March 17, 1906) relative to an analysis of supposed alumina as giving "over 100 per cent." seems to have attracted some attention, and many hasty readers, without waiting to read the paragraph through, seem to have jumped to the conclusion that the editors must have allowed a statement of the impossible to appear.

As a matter of fact, not only is this particular statement true (the figures obtained were really somewhat over 102 per cent.), but it was this seeming paradox which guided the chemist in his successful search for the new oxide. The gain in weight from the proportions implied in Al_3O_4, to those in Al_2O_3 (in which form aluminum is invariably determined and weighed), involves the principle, which is by no means new in the history of chemistry.

The classic illustration in this line is probably the conservative analysis by Plattner of the mineral pollux, in the forties. Plattner's figures showed a total of about 92 per cent. He obtained these results, but no explanation was offered of the anomaly, till in the sixties, when spectrum analysis discovered the new alkali metal caesium. Pollux contains over 30 per cent. of caesium, which has an atomic weight of 132.9; but Plattner, knowing nothing of caesium, had faithfully figured it as sodium (atomic weight, 23), with the deficit as noted. The sturdy fidelity of Plattner to his actual results not only vindicated his conscientious work, but marks it as a typical case of the significance of reaching the approximate 100 per cent. of conventional technique.

Thus the common coal analysis gives over 100 per cent., the iron (existing in the coal as FeS_2) being converted into Fe_2O_3 in the ash, and weighed as such, thus figuring oxygen into the coal which does not exist there. In a careful coal analysis correction is always made for this.

The case offered by Professor Richards is an excellent illustration of discovery coming from seeming inconsistency; but it is only the natural experience of chemical analysis.

Recovery of Water from Coal Washing.

BY F. W. PARSONS.*

It has been the custom for some years past to run washed coal through a cylindrical screen having fine meshes, and then pump the water and slack coal, or sludge as it is called, up into a tank at the top of the washery, just over the washed coal bins. The sludge is there allowed to settle, the water is run off into the fresh-water tank lower down, while the slack coal is dropped from the sludge tank into the bins. This requires an expenditure of much power and can be avoided by separating the water from the waste rock and slack coal on the ground floor.

The washed coal, after leaving the jigs and going through a disintegrator, is run into a long revolving cylindrical screen, with perforations. The fine coal and water goes through the screen, and instead of being pumped to the sludge bins before mentioned, goes into the fourth partition of a settling tank.

This tank is 30 ft. long, 9 ft. wide and 6 ft. deep; the bin is so hoppered that everything will run into a revolving 12-in. screw in the bottom. This screw is 29 ft. long, and the 3-in. shaft on which it revolves passes through a water-tight stuffing box and is operated by a bevel-gear arrangement.

The settling tank has three partitions, which fit down within one inch of the screw circumference and have several ½-in. holes drilled about two feet from the top. There are four compartments in the tank. The sludge is dropped in the last compartment, the screw revolves and carries all settlement to its end and there drops it into a boot where an inclined bucket elevator carries it to the washed-coal bin above.

*Chief Engineer, Victor Fuel Company, Denver, Colo.

The elevator has 30x12-in. buckets and travels not more than 30-ft. per min. This enables all the water to drain out and back into the settling tank. All of the disturbance occurs in the fourth partition of the tank; practically no coal works back to the first compartment where the pump is connected to raise the clear water to the fresh-water tank above.

A similar arrangement can be made to separate water from waste rock, or instead of a 30-ft. settling tank, one can be built 60 ft. in length with two screws, each revolving toward its end. The sludge is dropped into one end, and the waste rock into the other, the clear water being pumped from the middle partition of the tank.

The advantages of these systems are: 1. Dryer coal in the waste-coal bin, and consequently, better service at the ovens. This is due to the use of larger meshes in the revolvng screen, for the pump has not to handle all that goes through. 2. There is a saving of about 50 per cent. in power, for neither the coal nor the water has to be raised so high. 3. Practically no water is lost. 4. A smaller pump can be used.

The cost of installation is hardly any more than that of the older method. The settling tank can be placed on top or set in the ground. It is made of 3x12-in. lumber; part of it is lined with iron; in the remainder the boards are so beveled where they join that a wedge and caulking can be driven in to make it watertight.

Such a tank will contain about 6000 ft. of lumber, and the iron, calking, and all, will cost about $165. The 12-in. screw on a 3-in. pipe and the conveyor for 75-ft. center, with all driving machinery excepting the motor, will cost about $1050. A centrifugal pump will cost about $90. This equipment will handle the waste, water, and sludge from 400 to 500 tons of coal in 8 hours. Each ton of coal requires a ton of water.

J. K. H. Inglis, in an exhaustive paper read before the Society of Chemical Industry, Feb. 5, 1906, on the loss of niter in the chamber process of sulphuric-acid manufacture, summarized his results as follows: (1) Only very small quantities of nitrogen peroxide and trioxide are reduced to nitrous oxide in the sulphuric acid chambers. (2) About 50 per cent. of the total loss of niter takes place owing to incomplete absorption of the nitrogen trioxide and peroxide in the Gay-Lussac tower.

Great Lakes Coal Company.

BY JOHN LEGGETT PULTZ.*

The Great Lakes Coal Company's mines are located at Kaylor, in the northeast portion of Armstrong county, Pennsylvania, about 40 miles northeast of Pittsburg. The company owns a standard gage railroad 18 miles in length, known as the Western Allegheny, connecting at Queen Junction with the Pittsburg, Bessemer & Lake Erie Railroad, which is essentially an ore road. The branch is well constructed and admirably equipped to take care of a large tonnage. The prolongation of this road to New Castle, at present under construction, is progressing with such rapidity as to warrant the assertion that the line of 46 miles from Kaylor to New Castle will be in operation by early spring.

KAYLOR TIPPLE.

Practically the entire production of the mines is shipped at present over the Pittsburg, Bessemer & Lake Erie and connecting lines to points on the Great Lakes. Upon completion of the New Castle extension of the Western Allegheny, the Great Lakes Coal Company will be a strong competitor in the Mahoning Valley. By a contract with the Pittsburg, Bessemer & Lake Erie Railroad, extending over a term of years, the coal company is given favorable freight rates and is assured of an abundant car supply.

The company owns 25,000 acres, the greater portion of which is underlaid with coal. There are three workable seams on the property, viz.: the Lower Kittanning, the Upper Kittanning and the Upper Freeport. The intervals between these seams range from 90 to 125 ft., the Upper Kittanning being about midway between the upper and lower seams. The Upper Freeport and the Lower Kittanning seams are worked on a large scale.

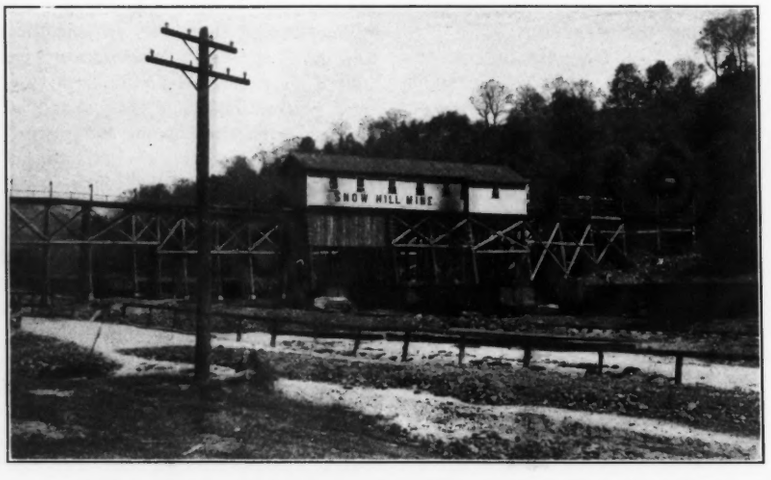
The operation consists of five mines located for about a mile on both sides of a narrow valley, along which runs the Western Allegheny Railroad. Of these five mines, the Kaylor, Snow Hill and Pine Run openings are on the Lower Kittanning, while the Reese and Barnhart are on the Upper Freeport seam. All the mines are drift except Kaylor, which is opened by a slope. At the Reese mine, owing to the high elevation of the coal above the river, it has been necessary to construct a gravity plane equipped with barneys which deliver the coal to the valley below. The position of the Barnhart mine has made it possible to run a spur of the Western Allegheny up a small tributary giving the distance required by the elevation of the tipple with respect to a favorable grade.

Comparing the Upper Freeport and Lower Kittanning seams with respect to mining, the former seam has a more treacherous roof, and it has therefore been found best to turn the rooms narrow, and Harrison machines are used in this coal. The bottom is taken up to give the required hight in the entries, as the roof holds better when undisturbed. These conditions are not characteristic of the Lower Kittanning. In the mines on this seam, wide rooms and chain machines are practical.

At the Kaylor mine the coal lies about 40 ft. below the stream; a rock slope has therefore been driven on a 15 per cent. gradient to strike the coal at a distance of 600 ft. The mouth of the slope is in the hillside at an elevation above the valley floor sufficient for the necessary tipple hight. A few hundred yards down stream from this point the Lower Kittanning rises above water, so that the Snow Hill and Pine Run mines are opened by drifts. The last named mine is at present in the construction stage. The Snow Hill and Pine Run mines are tributary to one tipple. The approach from each pit mouth is by trestle across the valley.

As the general method of development and working the coal is similar in all the mines, a brief description of the mode of attacking the coal at the Snow Hill will be sufficient.

The coal has been opened by a main-drift entry one-fourth on the face, from which run two face entries 1300 ft. apart and connected by parallel butt headings every 420 ft. The face headings are driven 5x10 ft. The butt headings are usually of the same dimensions, but they are first driven 18 ft. wide, posts set every 10 ft. and 8 ft. from the rib, and the rock is gobbed to one side. There are breakthroughs every 125 ft. unless the butt headings are driven from opposite directions to meet. Face-entry pillars are 22 ft. and butt-heading pillars 20 ft. A pillar 100 ft. in width is left between the face entry and the first room off the butt headings; this causes the roof to break should there be any subsidence, and so insures protection against creeps in the main haulage roads.



SNOW HILL TIPPLE.

Rooms are turned in both directions with 41-ft. centers where the rib is drawn. If the roof is strong, as is generally the case with the heavy sandstone cover over this seam, double rooms are driven with

*Mining Engineer, 25 Broad St., New York.

necks 8 ft. wide by 21 ft. in length, at which point the full width of the room, from 40 to 50 ft., is taken. The room pillars are 24 ft. As the room advances, three or four rows of posts are set in the the middle and the dirt is gobbed between them. Twelve feet of the ribs on both sides is brought back by pick.

A modification of this method consists in running the track along the middle of the rooms and to post and gob on both sides for half the length of the room, and then to take the ribs for the remaining distance.

REESE TIPPLE.

The second method gives 10 per cent. more machine coal in the butts, while the present way insures the recovery of the entire pillars against only half in the first mentioned plan. The roof must not be allowed to settle, as there is only a clearance of 3 in. above the armature pin on the chain machines. In the first method the roof is held by coal stumps on either side track, while in the second method the road is 20 ft. from the stumps and is therefore not as well supported. The roof is a massive sandstone and is apt to cause trouble unless carefully timbered.

There are seven Morgan-Gardner chain machines in use in this mine; four of these are "Low D'S" with self-propelling trucks, and three are "Standard D'S." Each machine is capable of cutting 70 tons to the shift of 10 hours. They are all 5-ft. machines and give results as good as the larger style capable of undercutting six feet. The reason for this is that it is practically impossible to shoot down with one firing a block of this coal undercut for a distance greater than from four to five feet.

Ventilation is accomplished at Kaylor and Snow Hill, by 5x15-ft. and 4x 13½-ft. Capell fans. At the former mine a 220-h.p. Russell engine drives the fan; at Barnhart a direct-connected Pollock fan is employed. Electric haulage is used in all the mines. The voltage is 250. The Baldwin 13-ton electric locomotives are capable of hauling 30-car trips, the capacity of the pit wagons being 2500 lb. At Kaylor a Westinghouse-Baldwin gathering locomotive is in service. Forty-pound rail is laid in the main headings. Both electric and air pumps are in service under ground. The former type is represented by Stillwell & Bierce triplex horizontal plungers with 9-h.p. motors and vertical plunger pumps of the same make operated by 7½-h.p. motors. Rotary pumps with 6-in. suction and 5-in. discharge, direct connected to 10-h.p. motors are also in use. The vertical type of plunger pump seems best adapted to conditions met with in low coal. It is lighter, takes up less room, can be more easily moved and costs less than the horizontal pump. The electric pumps in use in these mines have given efficient service over a period of two years.

There are two power plants; one situated at Kaylor and one at the Barnhart mine. The former is the larger and furnishes power to Snow Hill and Kaylor, while the Barnhart plant supplies Snow Hill besides itself. The Kaylor power station consists of four 150-h.p. boilers, two 220-h.p. Russell engines, two 150-kw. generators, one Norwalk compressor and one boiler-feed pump of the Stillwell-Smith-Vaile type. The Barnhart power station has one 220-h.p. Taylor engine, one Morgan-Gardner 150-kw. generator, one Norwalk compressor, one Ingersoll compressor and two 150-h.p. boilers.

The Great Lakes Coal Company is one of the largest coal producers in the bituminous fields of Pennsylvania working the Kittanning and Freeport seams. Its mines are capable of producing over 3000 tons per day, but the output will be raised to 4000 tons when the fifth mine is further advanced in development. The large acreage held by the company will make it possible to increase the output as desired, by opening up new mines.

BARNHART TIPPLE.

Hudson Bay Minerals.

William Beech has returned to Winnipeg after an extended prospecting trip on the shores of Hudson Bay and reports important discoveries of minerals. Within a few miles of Fort Churchill there are valuable plumbago deposits. Mica abounds in some of the rocky districts, where both the white and brown varieties are found. Six miles from Fort Churchill Mr. Beech found iron ore on the shores of the bay, samples of which he procured for analysis. He is the first man to stake out a mining claim on Hudson Bay and register it with the Dominion Government, having located deposits of mica, iron and plumbago. The Hudson Bay factor showed him samples of gold which had been brought in from time to time by Eskimos and explorers, and he learned that copper abounds in the vicinity of Chesterfield Inlet, where it is chopped out of the rock in large chunks by the natives. Others are prospecting in the same region. Mr. Beech returned part of the way on snowshoes and the remainder of his journey was by a Hudson Bay Company dog train. He will return and prosecute further researches when navigation opens.

The Mickley Conveyor.*

BY J. W. BATEY.

At the Prudhoe colliery of the Mickley Coal Company, Ltd., the output is chiefly derived from the Brockwell Seam, which varies from 19 to about 28 in. in thickness. Immediately above the coal is a bed of shale, about 12 in. thick, containing a considerable number of shells; next occurs a bed of fine blue metal, from 5 to 6 feet thick; and this is overlain by a bed of post, of considerable thickness. The thill is a coarse fire-clay, containing iron-nodules.

There being no power at bank to work coal-cutters or mechanically driven conveyors, a simple form of conveyor[1] has been introduced, to carry the coals along the face. This conveyor and its accessories are not costly; it is entirely worked by manual labor; and, since its introduction, the cost of working the coal has been considerably reduced.

The conveyor, *A*, is a long shallow tub (Fig. 1 and 2). The box, made of thin sheet iron, is 7 ft. long at the top tapering down to 6½ ft. long at the bottom, and 2 ft. 8 in. wide; the depth at the back is 11 in., and the side next to the coal-face is 7 in. deep, thus affording the hewer more height between the top of the tub and the roof when filling coals into the tub.[2] The axles are placed at each end of the tub, the wheels are 6 in. in diameter, and the gauge of the conveyor-road is 2 ft. 10 in. The bottom of the conveyor is fitted with two sliding doors, which are drawn out when it is to be emptied. The height of the front side of the conveyor from the rail is 10½ in.

The road upon which the conveyor runs backward and forward along the face is made of ordinary bridge-rails, laid upon iron sleepers, 3 in. wide and $\frac{5}{16}$ in. thick. The ends of the sleepers are turned up to grip the outside of the rails, and a small iron clasp is attached on the inside, with a bolt and nut, to keep the rails in position. The rails, *B* (Fig. 1 and 2), are laid along the whole length of the face, and span the bottom-canch, *C*, which has been taken up in the main road, so as to allow the ordinary coal-tub to run underneath the rails. The conveyor is run over the coal-tub, the sliding doors are withdrawn in turn, and the coals fall directly into the tub.

The conveyor is run to and fro, along the face, by means of an endless galvanized wire rope, ¼ in. in diameter, fastened to each end of it. The rope is turned one and a half times round the driving-wheel, and has a single turn on the return-wheel. The driving-wheel, *D*, is an ordinary pulley-wheel, 18 in. in diameter, with a groove, 1½ in. wide. The spindle which carries the driving-wheel is fixed to the frame or standard of an ordinary stone-boring machine, and is set, between the conveyor-rails, on the far side of the tub-way. A handle, about 12 in. long, is fixed to one of the spokes of the driving-wheel, and is worked by a strong lad. The return-wheel, *E*, 10 in. in diameter, is fixed to a drill-standard, and is set at the top-end of the face in the same way as the driving-wheel (Fig. 1 and 2).

The Mickley conveyor has been used in a district which had been worked on the longwall system, with a face 300 ft. long, with 10 gateways each 30 ft. wide, and 10 workmen per shift (Fig. 3 and 4). Height was made in the main road or winning gateway, *A*, by taking up a bottom-canch, 4 ft. thick and 5 ft. wide, and in the other gateways the bottom-canch was taken up 2½ ft. thick and 5 ft. wide. Cross-headings, *B* and *C*, were driven at intervals of about 150 ft.; and a putting-station or flat, *D*, was made, between alternate headings, in the winning-place. The coals were brought from the face to the flat by hand-putters, and from the flat to the engine-plane-landing by ponies.

This longwall-face is now being worked by two conveyors: the driving-wheel of No. 1 conveyor being placed in the winning gateway, and that of No. 2 conveyor midway between the winning gateway and the return-airway (Fig. 5 and 6). As this longwall is being driven by the side of an old goaf, height is made in a place, *E*, driven near the goaf-edge, in continuation of the tenth gateway, by taking up a thin canch. This place is used as a return-airway and as a second road out of the face.

The winning places, *A* and *B*, for each conveyor, are driven 24 ft. wide, and about 9 ft. in front of the face traversed by the conveyor. A bottom-canch is taken up 4 ft. thick and 10 ft. wide, close to the left-hand side. The right-hand side of each place is closely packed to within 3 ft. of the face; the left-hand side is also packed, but the wall has to be kept back, so as to allow room for the men to work and for the passage of the conveyor. The bottom-stone being taken up in front of the conveyor-face, there is room for one tub to stand in front of the tub that is being filled from the conveyor, and the man working in the winning place can fill into this tub direct. Two roads are laid up to the face, and ponies bring in the empty tubs and take out the full ones. There is ample room for the stand of the driving-wheel, and for the lad to work the conveyor (Fig. 1 and 2).

The rails are laid along the face for the conveyor, about 2 ft. from the coal, and this leaves sufficient room for the setting of the necessary timber. On the goaf-side of the rails, the roof is supported by two rows of chocks made of soft wood, 20 in. long, 5 in. wide and 2½ in. thick, set on a few inches of dirt. These chocks are set, alternately, 8 ft. apart, with props between them. When the rails are moved forward, as the face advances, another row of chocks is put in, and the back row is drawn out. Where it is necessary, crowntrees are put across the conveyor-way. The face of each conveyor advances about 3½ ft. per day, and the way is shifted forward on alternate nights.

Three men do all the work in connection with the shifting forward of the two conveyors: they shift the way, fix the wheelstands, put on the rope, set new chocks and draw all back chocks and props in a shift of 8 hours, and these men are kept regularly employed in attending to two conveyors.

Since these conveyors were started, the width of the face has been increased from 300 to 360 ft., making 156 ft. of face for each conveyor and 24 ft. for each winning place; and 12 men are now working, in place of 10 men per shift.

The best output from 360 ft. of face, with one boy employed at No. 1 conveyor and two boys at No. 2 conveyor, has been 983 tons in one fortnight. The coal works much better, and the output has increased from 2.73 to 4.75 tons per man per shift.

The men in each face where the conveyors are used divide their earnings equally: this has considerably facilitated the work, and little time is taken up in filling the conveyor, as two men fill into it at the same time. The men prefer this method of working, for the coal has not to be cast as in ordinary gateways, the tub being stopped just where it is required. The arrangement has been in use for several months, and five conveyors are working at the present time.

Under the ordinary conditions of longwall working, the putting, stone-work and shift-work cost 1s. 2d. per ton, including 16¼%; under the new method of working with the conveyor, the stone-work, shift-work, chock-drawing and conveying cost about 6d. per ton, including 16¼%.

When a floor, wall or other weight rests directly on the chord of a truss, the chord ought to be so proportioned that the sum of the strains per sq. in. on the outer fiber, resulting from direct compression or tension, and three-fourths of the maximum bending moment (the chord being considered as a beam of one panel length, supported at the ends) does not exceed the specified limiting strains in tension or compression. The bending moments at panel points should be assumed, for this calculation, equal to that in the center, but in opposite direction. If the load is one that produces impact, the usual allowance should be made, in addition.

Roof trusses should be braced in pairs in the plane of the chords, either top or bottom, and better, both.

---

* A paper read at a meeting of the North of England Institute of Mining and Mechanical Engineers, at Newcastle-upon-Tyne, 1905.

[1] British patent, 1904, No. 16576, Sidney Bates.

[2] The dimensions of the conveyor should vary according to the size of the ordinary coal-tub, and should be made so that each load the conveyor brings from the working-face will just fill a tub.

FIG. 1.—PLAN OF THE WORKING-FACE OF THE NEW METHOD OF LONGWALL-WORKING WITH THE MICKLEY CONVEYOR.

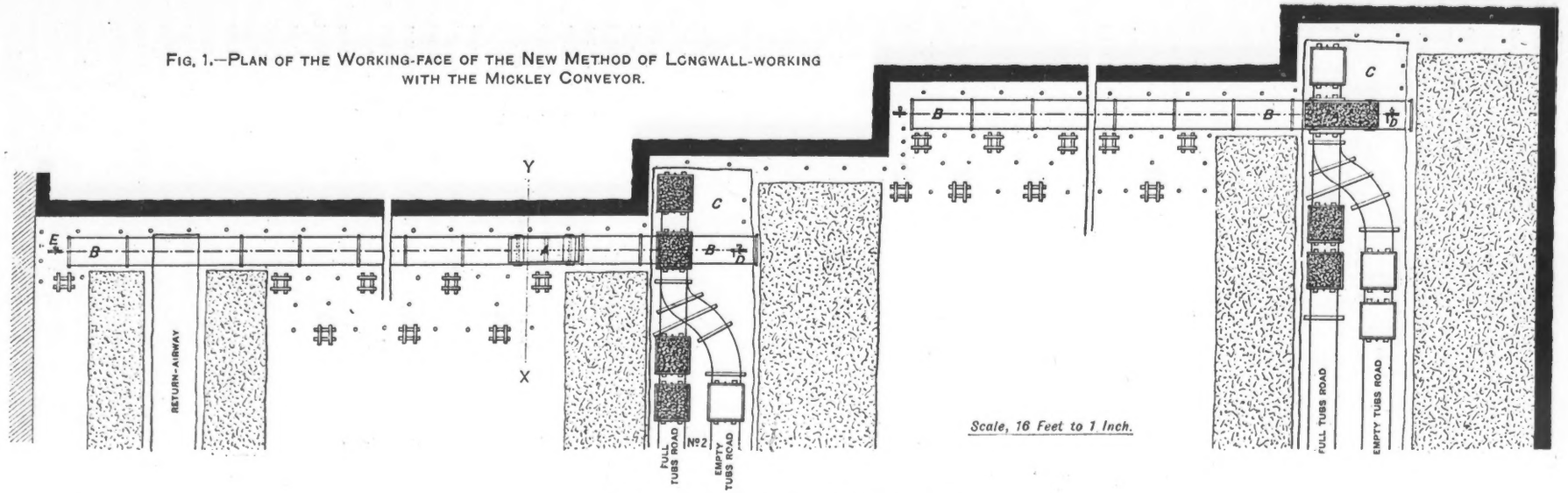


FIG. 2.—SECTION THROUGH THE WORKING-FACE.

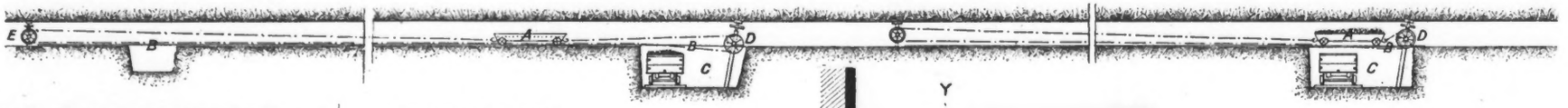


FIG. 3.—PLAN OF THE ORDINARY METHOD OF LONGWALL-WORKING.

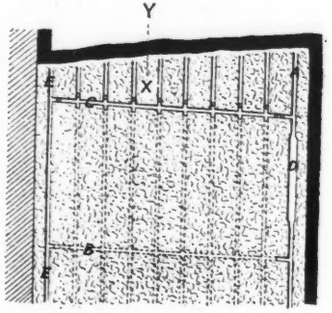
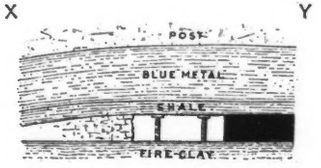


FIG. 4.—CROSS-SECTION THROUGH THE WORKING-FACE ON THE LINE XY OF FIG. 3.



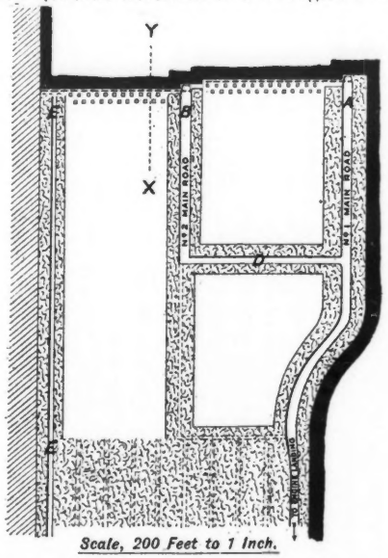
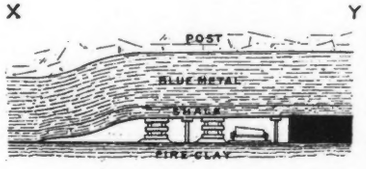


FIG. 5.—PLAN OF THE NEW METHOD OF LONGWALL-WORKING WITH THE MICKLEY CONVEYOR.

FIG. 6.—CROSS-SECTION THROUGH THE WORKING-FACE ON THE LINE XY OF FIG. 5.



The Quincy Mine Assay Office.

BY C. W. MACDOUGALL.*

This paper describes the methods in detail of determining the percentage of copper in waste sands; the No. 2 mineral from the hydraulic classifiers and the Wilfley finisher tables; and the No. 3 mineral or slime from the Quincy mills at Mason, Mich; also the percentage of copper in the waste slag from the Quincy mineral smelter at the Quincy smelting works at Ripley, Mich.

METHODS OF SAMPLING THE WASTE SANDS.

Jig Samples—A galvanized iron trough (about 3 in. wide, 2 in. deep, and a trifle longer than the discharge lip of the jig launder) is placed under the discharge lip so that a sample representing an entire cross-section of the discharge for a certain length of time is taken.

Wilfly Finisher Tables—A trough similar to the one described above but larger, is used to obtain the samples of waste sand from the Wilfley tables. The trough is placed under the tailings portion of the table, and a complete cross-section of the stream of waste material is taken from each set of the various machines four times each shift.

Combining the Samples—The samples from one set of machines (say the roughing jig for each separate head are combined into one large sample and thoroughly mixed; a portion, weighing about three lb. is placed in a galvanized iron can, 3 in. in diameter and 4½ in. deep. All the samples for the machines are treated in the same manner.

Samples from the Waste Sand Launders—A pipe is suspended over the launder in such a way that the free end may be lowered to the bottom of the launder and also may be swung freely from side to side.

When the sample is to be taken, a bucket is suspended under the fixed end of the pipe. The free end of the pipe is then lowered, and swung from side to side so as to pass over all portions of the stream of sand and water flowing through the launders.

This stream of sand and water has momentum enough to carry a stream of sand and water up through the pipe and into the bucket. When the bucket is full it is put one side until all of the fine sand and practically all of the mud have settled; the water is then decanted off. When all the samples have been taken from that launder, they are mixed in the same manner as the samples from the machines, and are placed in a can similar to the cans used for the machine samples

Finally when all the samples from the machines and launders have been taken, combined and placed in cans, the cans are put in boxes that hold 12 cans each, and are shipped to the assay office, via The Q. and T. L. railroad. The total number of samples taken each shift at the mills is 232.

MINERAL SAMPLES.

The mineral samples assayed are samples from the hydraulic classifiers (known as No. 2 hydraulic), from the Wilfley finisher tables and the finisher jigs (known as No. 2 Wilfley); and from the Wilfley slime table (known as No. 3 mineral or slime copper). The samples are all taken in the same manner. When the finished product is removed from the machine, it is loaded directly into small mineral cars, each grade being kept separate. When the car is full it is sampled by boring out a small quantity of the mineral with a rounded spatula, similar to a button tester. This process is repeated at several points in the car, in each case the borer being driven diagonally through the entire depth of mineral in the car. The several samples of that particular grade from that mill are mixed and put in a sample can, the same as the waste sands. The number of samples received at the Assay Office each day is: Waste sands, 58; concentrates, 6; total 64.

TREATMENT AT THE ASSAY OFFICE.

The samples received from the roughing jigs, the finisher jigs and the tables are known as "Machine Samples," and are treated as follows: Each sample is dumped from the small can, in which it is received, upon a sheet of glass (16 in. x 19 in x ⅛ in.) and thoroughly mixed with an iron spatula; it is then collected into a square and quartered. Two opposite quarters are returned to the can, while the remaining quarters are mixed again. This process is continued three times, or until about 50 grams of the original sample remains on the glass. The "discard" has been returned to the can each time. When this process is complete the can and contents are set to one side for further use in case of need.

The retained sample is then scraped onto a "pie tin" (7-in. diameter and 1-in. deep) and placed in a "dryer" to be thoroughly dried. The dryer consists of a sheet-iron box with hinged front, and contains four lengths of 1-in. pipe, 3 ft. long through which live steam at about 20 lbs. pressure is continually passing. When the sample is thoroughly dry (which takes about one and one half hours) it is allowed to cool; it is then weighed and placed in a sample bottle, a certain weight being taken each time for reasons to be stated later.

Launder Samples.—The samples received from the main launders and separate head launders are sampled and dried in the same manner as the machine samples; but in this case about 125 grams of the original sample received, is retained.

Method of Combination—The samples are combined into what are termed "runs." A run usually consists of the samples received for one week, though the number of samples making up the run really depends on the total number of working days in the month. As it is desirable not to have the final sample weigh over 200 grams, a run usually consists of the samples received for six days, 30 grams of the daily sample being taken.

Each day after the sample is dried it is thoroughly mixed by rolling on a piece of white oil-cloth; 30 grams are weighed out and placed in a large-mouth 6-oz. bottle. The next day a sample of 30 grams from the same source is added to the first sample in the bottle The process is continued until the run is complete, care being taken to keep from mixing, the samples from different sources.

When the combination from that particular run is complete, the sample is ground in a Weatherhead crusher, either by hand or by mechanical power, until it will all pass through a 60-mesh sieve. The ground sample is then returned to the bottle and put one side for the chemical treatment. All the machine samples are treated in the same manner.

Launder Samples.—It is desirable in this case to make very short runs so that any excessive loss of copper in the tailings may be noted at once and stopped. For this reason a run usually consists of the combination of two days' samples. After drying the sample, it is thoroughly mixed in the same manner as the machine sample, and 100 grams are retained. This is placed in a bottle, and a 100 gram sample for the next day from that particular source is also placed in the bottle. The whole 200-gram sample is then ground in the same way as the machine samples, and put to one side for the chemical treatment. Table 3 shows the dates of the samples combined during June 1905.

Chemical Treatment.—The chemical treatment of all the waste sands, both from the machines and launders, is the same, and as follows: The ground sample is dumped on a sheet of oil cloth about a foot square, and thoroughly mixed by rolling. It is then spread in a thin layer over the cloth. From this layer, small quantities are taken at numerous points until a sample weighing 5 grams has been obtained. This 5-gram sample is placed in a No. 2 beaker (capacity about 200 c.c) and slightly moistened with water;5 c.c. of conc. nitric acid is then added. After the action ceases the bulk of the solution is increased to about 60 c.c. with water. It is then boiled on a sand bath over a Dangler gasolene lamp until all the nitric oxide ("red fume") has been expelled. The solution is then cooled by placing the beaker in a wooden trough through

*Assist. mining engineer, Quincy mine, Hancock, Mich.

which water is running. When the solution is cold, 5 c.c. of conc. sulphuric acid is added, and the solution diluted to about 200 c.c. It is then placed on the electrolytic apparatus and electrolyzed.

The cone on which the copper is deposited is a sheet of platinum, 3in. long and 2 in. wide, suspended from a platinum wire of No. 14 gage. The weight of the entire cone is about 15 grams. The anode is a piece of platinum wire, No. 17 gage, bent in the form of a spiral; it weighs about 6 grams. The cones and spirals are connected in series, with 'crowfoot" cells also connected in series. The cones and spirals are connected in parallel with each other.

After the copper has been deposited electrolytically, the cone is removed from the solution, washed, dried and weighed.

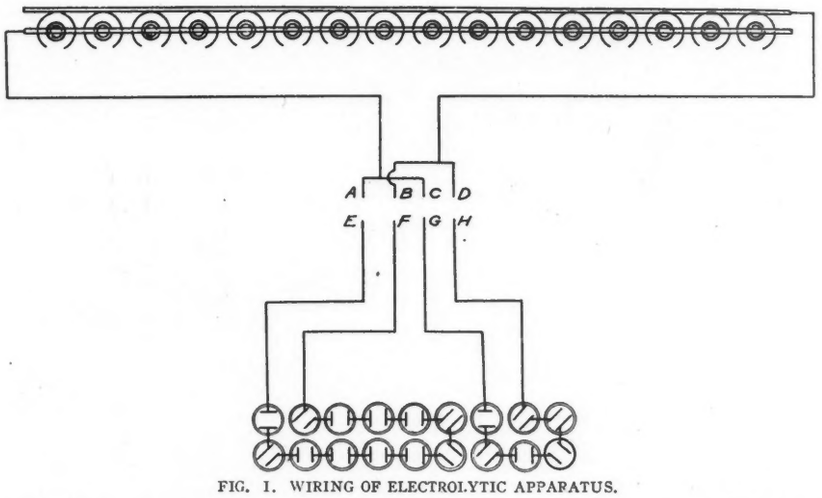


FIG. 1. WIRING OF ELECTROLYTIC APPARATUS.

After subtracting the weight of the cone, from the weight of the cone with the copper coating, the percentage of copper is calculated as follows:

Weight of sample taken (5 grams): 100=weight of copper obtained: per cent copper, or (weight of copper obtained) x 20=per cent. copper in sample.

The electrolysis of the solution is complete in 14 hours, and requires a current of 0.25 amperes with an e. m. f. of about 1 volt. At this office there are sixteen cones and spirals, requiring eighteen crowfoot cells. At times it is necessary to electrolyze less than 16 solutions. In this case, all of the 18 cells would give entirely too great a current, and the copper would be precipitated in a spongy form which can not be weighed. To overcome this difficulty the cells have been connected to the main lead wires in such a manner that either 6 or 12 cells may be used when that number is all that is required to accomplish the desired results.

In the process of operation, as shown in Fig. 1, the connections are as follows: When all sixteen solutions are being electrolyzed, connect *A* to *E*, *F* to *G*, and *D* to *H*, by means of switches at these points. In this way all the cells are thrown into series with the main leads. In case only 12 cells are required, connect *A* to *E*, *B to F*, and bridge *G* to *H*, by means of the switches. When only six cells are required, connect *C* to *G*, and *D* to *H*, bridging *E* to *F*.

When the crowfoot cell is not in use, it loses strength and requires two to three hours to regain the normal maximum efficiency, thus making it necessary to leave the cones in the solutions that much longer and causing considerable loss of time. Therefore, it has been found advisable to short-circuit the cells after the cones have been removed. To accomplish this short circuiting, connect *E* to *F*, and *G* to *H*, by means of the switches.

(*To be Continued*).

Lime-Sand Brick.

According to R. Seldis (*Zeit. f. angew. Chem.*, 1906, XIX, 181-183, and *Journal*, Society of Chemical Industry, Feb. 28, 1906) for the preparation and mixing of the materials three methods are used—the quicklime, the slaked lime, and the heating process. In the first, the moisture of the sand effects the slaking of the lime; in the second, the lime is slaked to the dry hydrated condition, ground to a powder and mixed with the proper amount of sand; and in the third, weighed amounts of ground quicklime and dry sand are mixed together for 22 to 25 minutes in a closed vessel, to which steam and water are admitted to slake the lime. After any of these processes the materials are taken to the press, and from it the objects are removed to a wagon, which is pushed into the hardening chamber and exposed to a steam pressure of eight atmospheres for eight or ten hours.

Two hypotheses have been advanced to explain the process of hardening in this chamber. The one assumes that in the production of the pressed ware each grain of sand must become coated with a thin skin of lime, and that a cementation takes place in the hardening chamber. The second assumes that the hollow spaces between the individual grains of sand are filled with lime, which then effects the cementation. From his own experiments Seldis considers the following to be the explanation of the process: At the usual pressure and temperature prevailing in the hardening chamber, a portion of the silicic acid goes over to the gelatinous or colloidal condition. The hydrated lime present in the object reacts with this silicic acid, with a simultaneous union with water, and forms a calcium hydrosilicate, $CaH_2SiO_4 2H_2O$, which causes the hardness of the brick.

This theory explains why bricks cannot be made with either a very small or a very large addition of lime, and why the amount of lime required is dependent upon the quantity of soluble silicic acid contained in the sand, and further why the best bricks are obtained when the calcium hydroxide and the free silicic acid are in molecular proportions. The fact that bricks cannot be made from pure quartz-sand and lime is because the silica in such a form will not combine with the lime at the oven temperature. Feldspar sand is used most for the manufacture; it contains 5 to 7 per cent. of soluble silicic acid, and this, with a lime averaging 85 per cent. of calcium oxide, corresponds to 4 to 5 cwt. of lime to 2½ cu.m. of sand, a ratio used in practice.

The theory also shows that if a hard water containing much lime is used, this will not become chemically combined in the hardening process. It also explains why, when the heating process already referred to is employed, it is necessary to pass the pressed objects at once to the hardening chamber, to avoid interruption of the chemical reaction, which begins in the heating process. Variations in the steam pressure of the hardening chamber should be avoided, and for this purpose a registering pressure gage is recommended.

The Kirby Oil Process.

E. B. Kirby has patented (U. S., 809,959, Jan. 16, 1906) an oil flotation process, wherein the pulverized mineral is mixed with a considerable quantity of water and with a substance immiscible with, but lighter than, water, e. g., a solution of bitumen in kerosene, which, in presence of water, will adhere to some of the mineral particles but not to others. The mass is violently agitated and then allowed to settle, whereby the particles which have become coated with the bitumen solution rise to the surface, this separation being assisted by gentle agitation and by blowing in a current of a gas. The layer of floating matter is removed, and washed, and the mineral particles are separated by filtration and then heated to recover the light hydrocarbon.

Felling a Large Chimney.

BY DR. ALFRED GRADENWITZ.

At the works of A. Koppel, Ltd., of Bochum, Germany, a large chimney had recently to be felled, as a junction track was to be reconstructed. The preparatory work consisted in withdrawing part of the masonry from the base and replacing it by wood struts on the eastern side between the railway dam and the junction track, where the chimney was to drop. The masonry in the base was withdrawn stepwise and replaced by wood struts, while large amounts of readily combustible matter, especially straw, were heaped up within the base.

Fig. 2 shows how, the combustible matter being lighted, the chimney is turning slowly eastward, breaking into three parts on its way down, as shown in Fig. 3. In Fig. 4 is shown the débris of the turned-over chimney.

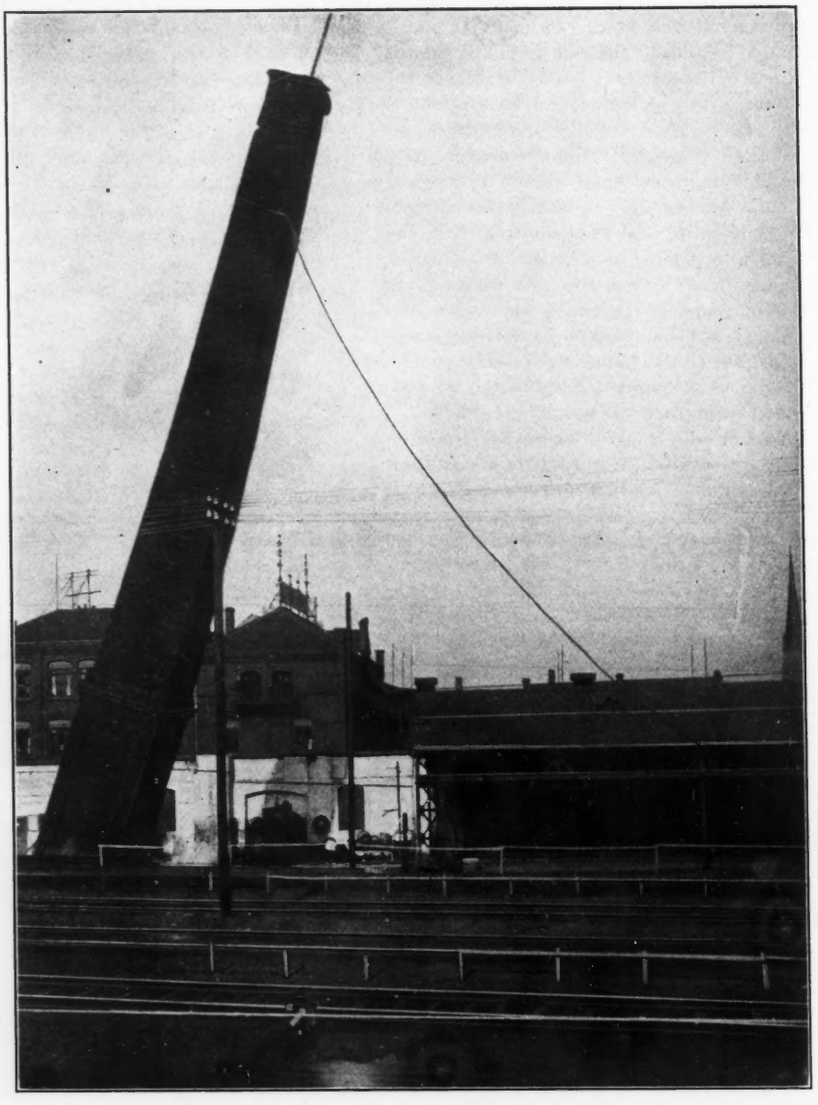


FIG. 2. THE CHIMNEY FALLING.

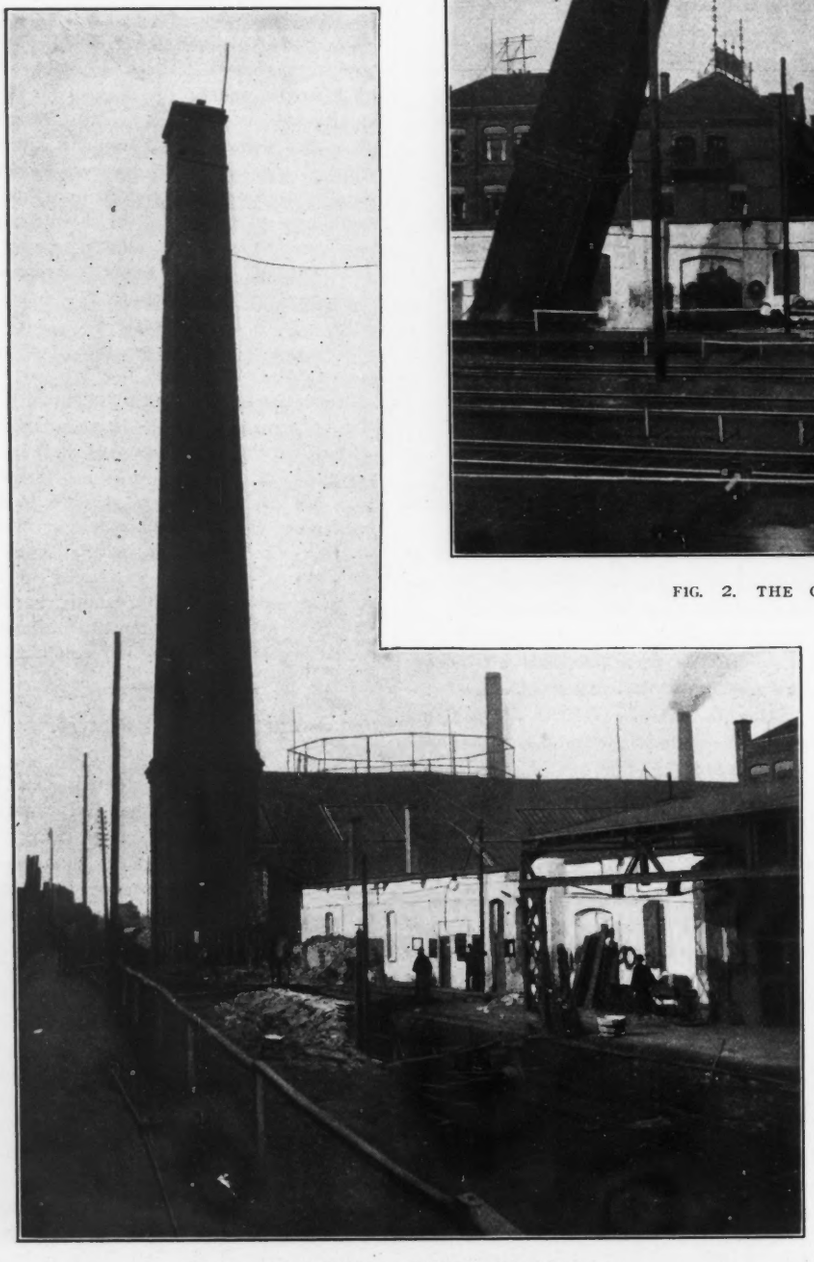


FIG. I THE CHIMNEY PREPARED FOR FELLING.

The work was performed without any disturbance or irregularity, and lasted somewhat less than two seconds from the instant the chimney began turning over. The chimney dropped accurately in the direction calculated.

Alaska may soon become an important copper producer. Copper is found in large low-grade deposits over a wide area. An important copper-bearing area is situated around the head waters of the Tanana, White and Copper rivers, which will shortly be opened up by railroads. At present a railroad is being built to connect Valdez and Dawson. It will cross the Copper river at a point about 100 miles above its tidewater terminus at Valdez. This copper region includes portions of the Chugatch, Wrangell and Alaskan mountain ranges, which all rise from the valley of the Copper river.

Electric Smelting Experiments at Sault Ste. Marie.

Dr. Eugene Haanel, Dominion superintendent of mines, was entertained by the Canadian Club, of Toronto, March 12, and gave an address on electric smelting which contained some interesting details with regard to the experiments at Sault Ste. Marie not previously published. He stated that the furnace specially designed for the occasion by Dr. Héroult was of 250-h.p. capacity, having the upper half lined with fire-brick and the lower half with carbon. The latter received the electric current, which, by a transformer furnished by the Westinghouse company, was transformed from 2200 to 40 volts, the tension required. The electrodes, 5 ft. long and 16 in. square, were brought from Germany. The special points which the experiments were held to determine were:

Can magnetite be successfully smelted?

Can iron ore with considerable sulphur content be made into pig iron of marketable value?

Can charcoal be substituted for coke, which must be imported?

And, lastly, what is the amount of electric energy required per ton of pig iron produced?

Experiments on Canadian iron ores began in earnest in the middle of February and lasted night and day until March 5, during which period 150 casts were made, yielding 55 tons of pig iron. All the iron used was magnetite, except in one experiment, and taken from various Canadian mines. The sulphur content was high, except in the Wilbur magnetite, which was low in sulphur.

It was found that magnetite could be smelted as readily as hematite, and analysis of the pig iron produced showed that sulphur could be passed into the slag, the iron containing only a few thousandths of 1 per cent. of sulphur. The experiments had demonstrated that the best of pig iron could be produced from ores containing as high as 1 per cent. of sulphur. The blast furnaces would not usually handle an ore containing 0.1 per cent. of sulphur, and therefore required ores only obtainable at a high figure. A pig iron equal in value and lower in sulphur content than that produced at the Algoma Steel Works from ore costing $4.50 per ton, could be made by the electric process from the sulphurous ores which could now be bought for $1.25.

A reduction had been made in the cost of the electrodes per ton of pig-iron production which, in the French experiments, amounted to 77c. and in the Sault Ste. Marie demonstrations to 30c. The cost of electric energy produced from natural water powers, which abounded in the neighborhood of many iron-ore deposits, was estimated at from $4.50 to $6 per h.p. per year.

The experiments made in smelting roasted and briquetted nickeliferous pyrrhotite carrying 1.6 per cent. of sulphur, had proved so successful that the Lake Superior Corporation desired to acquire the plant from the Government for the commercial production of ferro-nickel pig. They had succeeded in turning out a ferro-nickel pig containing 4.50 per cent. of nickel and virtually free from sulphur.

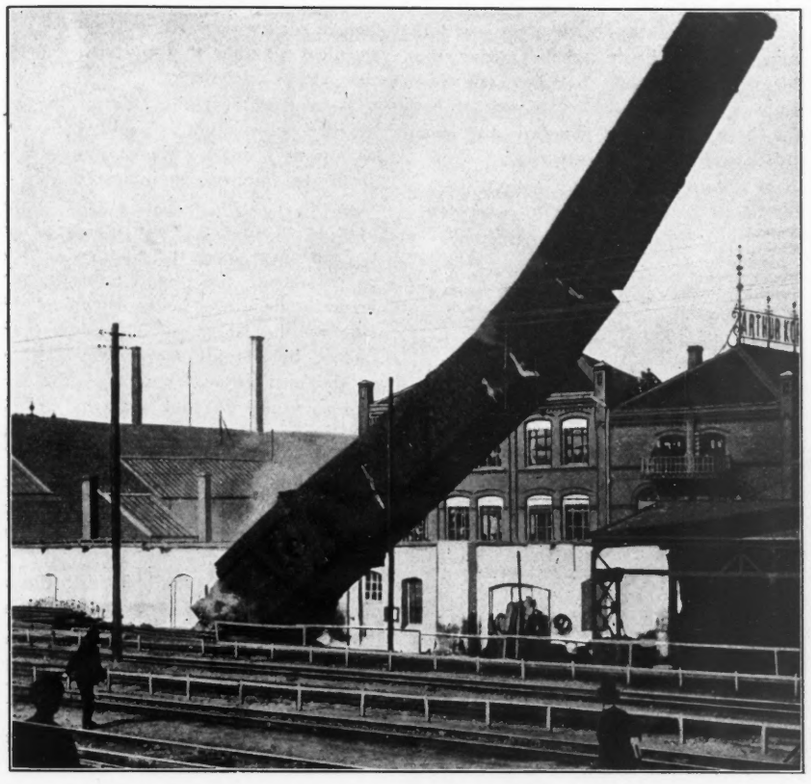


FIG. 3. THE CHIMNEY FALLING.

FIG. 4. THE CHIMNEY FELLED.

Coal Mining in the Indian Territory.

BY W. R. CRANE.*

The productive coal beds of the Indian Territory, so far developed, lie in the northern and northern central portions of the Territory, extending from South McAlister on the west, to Howe on the east, and terminating some 45 to 50 miles to the eastward in Arkansas. From South McAlister and vicinity, reaching southward almost to the Texas line, is an extension or spur of this field, the whole being a southern extension of the western-interior region. The principal mining centers in this extreme southern district of the Indian Territory are Coalgate, Lehigh and Midway.

Coal mining in the Indian Territory is by no means an easy proposition; owing to the more or less disturbed condition of the coal and associated strata, one must contend with faults and folds, weak roof, considerable water and much gas. However, with modern methods and equipment, together with careful management, supervision and inspection, the production is as large or larger than that of any other district of equal area and similar product; and further, the casualties resulting from fall of roof, explosions and other accidents are remarkably few, considering the existing conditions; and the southern field is, in most particulars, no exception to prevailing conditions.

The coal ranges from 3 ft. 6 in. to 5 ft. 6 in. in thickness. It is, however, fairly uniform in thickness and quality. A section of No. 5 shaft at Coalgate, is as follows: Shale, in lenticular masses, 1 ft. to 3 ft.; sulphur rock, shale and pyrite, ½ in. to 1 ft. 6 in.; bony coal, 2 in. to 6 in.; sulphur rock, shale and pyrite, ½ in. to 4 in.; coal, 3 ft. 6 in. to 5 ft. 6 in.: bituminous shale (black jack), 4 in. to 8 in.; fire clay, several feet. Small partings (¼ to ½ in.) of pyrite and gypsum occur occasionally in the coal.

The sulphur rock is extremely hard, and is often left either alone or with the bony coal as a roof, making an excellent top. The bony coal is hard, dull in color, is shiny on fracture and breaks like cannel coal. The main stratum (3 ft. 6 in. to 5 ft. 6 in.) is an excellent quality of bituminous coal, being much harder than the bituminous coals to the north, as in Kansas and Missouri. Analyses of both the bony coal and that of the main stratum are given herewith:

	Bony. Per Cent.	Main Stratum Per. Cent
Moisture	2.86	2.15
Volatile and combustible matter	36.80	42.10
Fixed carbon	45.13	38.18
Sulphur	2.20	3.50
Ash	13.01	14.07

The bituminous shale bottom, commonly called "black-jack," is hard, brittle and shelly, and tends to mix with the coal when loading the former into the cars at the face; but owing to its extreme brittleness, its separation is readily accomplished, as is noted later on.

FIG. 1 CLOSING A DANGEROUS ROOM.

Rolls are of frequent occurrence, cutting into, and even pinching out the coal altogether; they usually come in from below, rarely from above. Faults are occasionally encountered near the outcrop, and are therefore confined almost entirely to the slope mines (those opened by slopes). Displacements of 6 to 18 ft. are not uncommon. The strike of the faults is roughly N.E and S.W., being practically parallel with the line of outcrop or the strike of the coal (they often bifurcate). Many of them are reverse faults, the coal on that side of the fault opposite the outcrop being higher.

The dip of the strata is 5 to 17 deg., the direction being rather irregular, as is the case further to the north. The cleavage is quite pronounced, ranging from 12 to 18, and often 20 in. apart; the direction varies largely with the dip and strike of the coal.

Mining Methods—The mines in this field are opened both by slopes and shafts; slopes are, however, preferred when such a method of development is possible, and form the common method of procedure where the properties include or are adjacent to the outcrop; otherwise shafts are employed. Most of the mines are, in reality, operated as slope mines, regardless whether the surface connections are slopes or shafts.

As a rule, near the outcrops the pitch of the coal stratum is slight, being often as low as 5 deg.; while at some distance from the outcrop, as indicated above, it may reach 17 or 18 deg., averaging probably 15 to 16 deg. When a property is opened by a slope, the slope is as nearly as possible in the direction of the pitch, levels or headings, being driven to either side as the slope is extended. When opened by a shaft, a gangway is driven in the coal from the foot of the shaft, and as nearly parallel with the strike of the coal stratum as is possible. From this gangway slopes are driven both up and down the pitch, from which in turn are run the room entries or headings. It is then evident that the mines are operated as slope mines; although the coal may, in some cases, be hoisted to the surface through vertical shafts. The shaft mines at Coalgate are about 600 ft. in depth.

The methods employed are single- and double-entry room and pillar mining. The former is the older, and probably more widely employed than the latter, the so-called dip-and-rise working. In the single-entry system (that commonly employed throughout the Territory), two entries, the room- and back-entry or air-way, are driven; from the former the rooms are run, either directly up the pitch or at some angle with it, while no rooms are turned off from the back-entry, the main purpose of which is to serve as a means of facilitating ventilation. In the double-entry system, rooms are turned off from both entries, to the rise and to the dip, in which case each serves the same purpose, that is, as haulage-ways and ventilation passages, the arrangement being identical with that known as double-entry, as employed in practically flat seams.

In both single- and double-entry systems, the rooms are 100 to 125 ft. long, 20 to 22 ft. wide, with 34 to 35 ft. centers. Owing to the necessity of protecting the entries and air-ways, the distance between the sets of entries turned off to either side of the slopes is greater than the length of the rooms; the distance, center to center, of two consecutive sets of entries is 150 to 175 ft. Slopes are 8 to 10 ft. wide, while the entries are usually driven 8 ft. wide and 5½ ft. high. The necks of rooms range from 6 to 8 or 10 ft. in width. Pillars between main horizontal gangways and air-ways are 50 ft. wide, between slopes, and air

*Assistant professor of mining, School of Mines, Columbia University, New York.

ways 15 ft.; also between room-ways or room-ways and air-ways, 15 ft. Only one air-way is driven parallel with the main gangway, which is on the down-pitch side. It is customary to drive two air-ways, one on either side of the slopes and parallel with them, although occasionally only one is employed.

The system of dip-mining, as outlined, is rendered possible only on account of the dryness of the mines. The coal strata, in the northern Indian Territory fields have been so highly tipped, folded and faulted, that water finds easy ingress into any part of the mines; then too, most of the mines are opened by slopes, which in itself is a good reason for wetness.

Coal was formerly, and is largely at the present time, mined by pick work, and shot from the solid. Within the past year a number of the mines in the neighborhood of Coalgate, especially the Coalgate Coal Company's mines, have been equipped with Sullivan electric longwall chain-cutters, each machine being provided with a self-propelling truck. It is estimated that from 60 to 64 per cent. of the coal is won from the breasts; 2 per cent. more is obtained in robbing pillars; thus about two-thirds of the coal is extracted.

Underground Handling and Haulage—When rooms are turned off at back entries, as when the double-entry system is employed, the coal mined in the dip-rooms has to be hauled up the pitch to the entry above; while the reverse is true when the rooms are driven to the rise. With moderate pitches (which are obtained by running the rooms at an angle with the pitch) usually only one mule is employed in hauling the loaded cars, one by one, out of the dip-rooms; with steeper inclinations, trail-teams of two or more mules may have to be employed. This is seldom done, however, unless the pitch equals or exceeds 10 deg.; yet rough and irregular track or pitches as low as 5 to 6 deg. may require it.

Several of the mines at Coalgate are being equipped with gathering locomotives, which are employed in rooms driven both to the dip and to the rise. In the the rooms driven to the rise, the cars are hauled up the pitch to the face and lowered to the entry again by an electric locomotive provided with a drum upon which winds a rope. The rope extends from the drum up to the face of the room (where it passes over a sheave firmly supported at that point), thence down to the entry where connection is made with the car. Empty cars are thus transferred to the working face of the rooms, while loaded cars are in turn transferred from the face to the entry, from which point they are collected and hauled away. Cars are handled in the rooms driven to the dip by a gathering locomotive, similar to that employed in the rooms driven to the rise; but in this case the empty cars are lowered into the rooms, and the loaded ones hauled out, the locomotive being stationed in the back-entry at the mouth of the room. It is then evident that the systems of handling coal in the rooms is, in the former case, a gravity-plane; in the latter, an engine-plane; the winding appliances being the same in both cases.

After collecting a sufficient number of cars (from one or several rooms) to make up a train or trip (usually 5 or 6 cars), they are hauled by the gathering locomotive to the partings on the entries next the slopes from which place they are hoisted, in trips of 5 to 8 cars, up the slopes to the surface or to the foot of the shafts, if vertical shafts are employed. Haulage on the slopes is usually done by an engine located at the head of the slope, or by the endless- or tail-rope systems. The partings are provided with double tracks, usually 13 ft. wide, and are made long enough to accommodate at least two trips of cars. Formerly mule haulage and occasionally rope haulage, tail- or endless-rope, were employed on the main gangways that connect directly with the shafts. The capacity of the mine cars is 1500 to 1800 lb., being purposely made light to facilitate handling on varying grades.

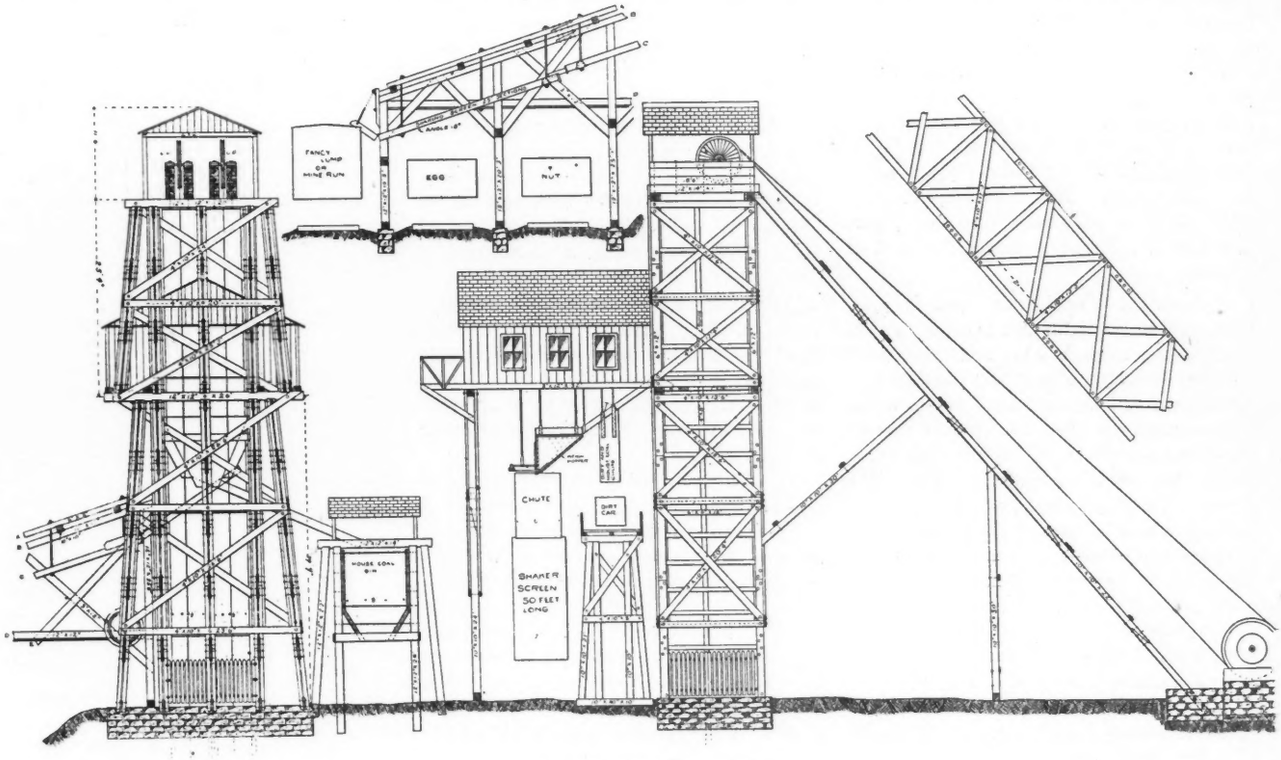


FIG. 2. COALGATE TIPPLE.

Mine Drainage—The mines are, as a rule, remarkably dry, yet it is customary to install mine pumps which are usually placed at the foot of the shafts (when shafts are employed), or at points on the line of the slopes or entries that are found to be most desirable. The Worthington, Snow, Gardner and Cameron makes of pumps are largely used. Occasionally tank cars are employed, and are especially applicable when (for some reason, such as faulting) water enters an isolated portion of the mine; and, to prevent its spreading, it is collected and hauled to the surface.

Mine Support—The support of the roof is comparatively easy where the sulphur rock occurs; but where it is wanting, the

roof is usually weak and exceedingly difficult to properly maintain. Then, too, the disintegration of the pyrite is continually loosening and weakening the pillars.

The main gangways are usually timbered with ¾ sets, while the slopes rarely have more than ½ sets (cap and one post), although caps needled into the walls are probably more widely used. Lagging is employed in all cases to supplement the various forms of sets, being used especially above the caps, where 4-in. round poles are placed and wedged up against the roof.

Oak is the kind of timber in most general use for all forms of timbering, and is seldom used other than in the round. The bark is usually left on, which is a great mistake, as is evidenced by the ravages of the borers; this is so marked that often within a year's time, the timbers are supports in appearance only.

In case of failure of the shoulders of coal that support the caps (when needled in), it is customary to set either a full-length post or cut out the broken part of the pillar, until a firm footing is obtained, and then set a short prop, which is seldom more than 18 to 24 in. long. The size and position of the coal pillars have been referred to under the head of mining.

Ventilation—Considerable gas is present, and naked lights are used, as a rule, only in the haulage ways and other parts of the workings where the ventilation is good; safety lamps are used in the workings driven to the rise, unless breakthroughs are provided, making connection with the back-ways above. The davy lamp is largely employed by the fire bosses, who examine the rooms before the miners are allowed to enter; if gas is found to be present in considerable quantities, a board or timber is placed across the mouth of the room upon which, or on the walls, is written with chalk the date, and a warning to keep out (Fig. 1).

The exhaust system of ventilation is that commonly employed. Small quick-running fans, such as the Sullivan make, also large fans of the Guibal type, are largely used. The former are 6 ft. diam. by 4 ft. width of blades, and run at a speed of 300 r.p.m.; while the latter are 12 to 16 and 18 ft. in diam., from 4 to 6 ft. wide, and are run at 65 to 75 r.p.m.

The slopes are the down-casts, and the air-ways paralleling them are up-casts, which connect with the fan shafts, set some distance back from the slope mouth by passages. The air-way on the opposite side of the slope shaft has its connecting passage either under or over the slope; an air-bridge over the slope is probably more common, owing to the slight inclination of the slopes near the surface. In the double-entry mining, the air currents entering the slopes pass downward and reach the rooms by way of the lower or back-ways; passing through these rooms close to the working-face, they cross to the upper set of rooms through back-throughs in entry pillars, and after sweeping the face of these (which are connected with one another by breakthroughs similar to those below) they enter the air-way running parallel with the slopes, and thence to the surface through the fans. In single-entry mining, the air currents enter the rooms by way of the upper room entries; then after passing from one room to another through openings in the room pillars, they enter the back-ways and reach the surface through the main air-ways running parallel with the slopes.

The distribution of the ventilating currents to the breasts is varied somewhat in each mine, the exact method being immaterial, provided that sufficient air is furnished.

Preparation of Coal—Four grades are usually produced by the mines of this field; namely, lump, egg, nut, and slack or house coal. Double balanced screens are used; the upper section of the screen has bars spaced 1¼ in., the product of which is nut; the lower section has bars spaced 2½ to 3 in. and makes egg size; while that which passes both sections of screens is fancy lump. By the use of veils, placed on screens, mine-run can be obtained.

As already stated, the bituminous shale lying directly beneath the coal, being hard and brittle, mixes readily with the coal, and is therefore difficult to keep separate in shovelings; the value of the coal may be materially affected by the presence of this shale.

The coal is loaded into cars, hoisted and dumped onto a grizzly (bars spaced ⅞ to 1 in.); the oversize goes to balanced screens, the undersize to a trommel, which has two sections of wire screens with holes ¼ and ¾ in., respectively. All undersize from the trommel goes to the waste bank, and all oversize to coal bin. The bituminous shale being very brittle, breaks up readily in the trommel; the greater part being undersize, goes through the screen, thus effecting a fair separation.

Coal is paid for in the Coalgate portion of the district as mine-run; it is estimated that 25 per cent. is waste. Therefore if 72c. (the present price) is paid per ton, mine-run at the actual cost of mining will be close to 90c. per ton finished coal. At Lehigh, coal is paid for on a screened-coal basis.

Surface Equipment—The method of preparing the coal for market has already been described; this gives an idea of the necessary arrangements for the tipples. A typical form of tipple for this district is shown in Fig. 2 (for the plans of which I am indebted to the Coalgate Coal Company). The construction of this tipple is rather unique, being a built-up form; but it is substantial and looks well. The labor as well as the timber costs are probably greater than for a similar construction consisting of single pieces. Further, the tipple is an angle instead of a straight-line construction, the latter being more used. The location is largely responsible for the arrangement noted.

Although many of the mines in this district were idle for several months during the past summer, yet the time was not wholly lost, as in many cases new equipment was installed and the resumption of operations was under much more advantageous conditions, which are making themselves felt in increased production and facility of working at a material reduction in cost; it can be said with confidence, that the outlook for the coal industry of the Indian Territory has never been brighter.

Coal Mining in the Indian Territory.

The report of William Cameron, United States Mine Inspector, for the fiscal year ending June 30, 1905, shows a decrease of 349,096 tons in output when compared with that of the previous fiscal year. No particular reason for the decrease can be pointed out, other than that petroleum is generally supplanting coal for railroad and manufacturing power in the region in which Indian Territory coal is consumed. Statistics of the coal industry for the past two years compare as follows:

	1903-04.	1904-05.
Mines in operation	117	109
Coal produced, tons	3,320,057	2,970,961
Value of coal production	$6,375,453	$5,398,589
Value per ton, run-of-mine	$1.923	$1.818
Coke ovens in blast	286	186
Coke produced, tons	50,210	41,193
Men and boys, under ground	7,194	6,575
Men and boys, above ground	1,066	1,062
Fatal accidents	30	44
Non-fatal accidents	69	70
Lives lost per 1000 employees	3.6	5.9

During the year 1904-05 there were 22 workings abandoned and 14 new mines were opened; the abandoned ones were nearly all small workings, while the new openings are mostly substantial producers, so that the total productive capacity of Indian Territory is about double the amount of last year's output. In past years mining has been confined to the limits of the Choctaw Nation; under more recent developments the Creek and Cherokee nations are increasing in importance.

The increased number of accidents is due mainly to an explosion, cause unknown, at the Wilburton mine, in which 13 men were killed. The most serious cause of mining accidents in general was the fall of mine cars, an event to which steeply-pitching workings are particularly liable. Gas explosions were the next most prolific source of accident and were attributable, in almost every instance, to recklessness in shot-firing.

During the last quarter of 1905 the Mount Lyell Company, of Tasmania, produced 2323 tons of blister copper, containing 2294 tons of copper, 163,360 oz. silver, and 6446 oz. gold, of the aggregate value of £232,244.

The New Railroad for the West Coast of Mexico.

BY E. A. H. TAYS.*

A concession for a railroad from Guaymas, Sonora, to Guadalajara, Jalisco, has been granted the Southern Pacific Railroad Company, and recently this was ratified by the Federal Congress. This road will be the last link in the north-and-south systems of Mexican railways, north of the City of Mexico; it should have been built 20 years ago; it offers greater inducements as an investment than any of the other north-and-south lines in that country.

The concession makes Guadalajara one of the terminals; but as the Mexican Central has built to that city and has this branch well advanced toward the Pacific Coast, it is probable that it will now finish it to the Port of San Blas without delay, in which case the natural terminus of the new line will be the city of Tepic, or some convenient point near it.

So far this line is spoken of as "the railroad from Guaymas to Tepic"; but the logical name for this road would be "The Sonora, Sinaloa & Tepic railroad."

Twenty-five years ago the Sonora railroad was built from Nogales to Guaymas, across over 200 miles of desert country, and stopping at the entrance to a sparsely settled region, but a country of great resources. Why the Sonora road was not continued down the coast is a mystery.

In 1888 and 1889, a company (formed under the Huller concession, and called the Sonora, Sinaloa & Chihuahua Railroad Company) made surveys as far south as the Fuerte river; but before any construction was done the company "broke."

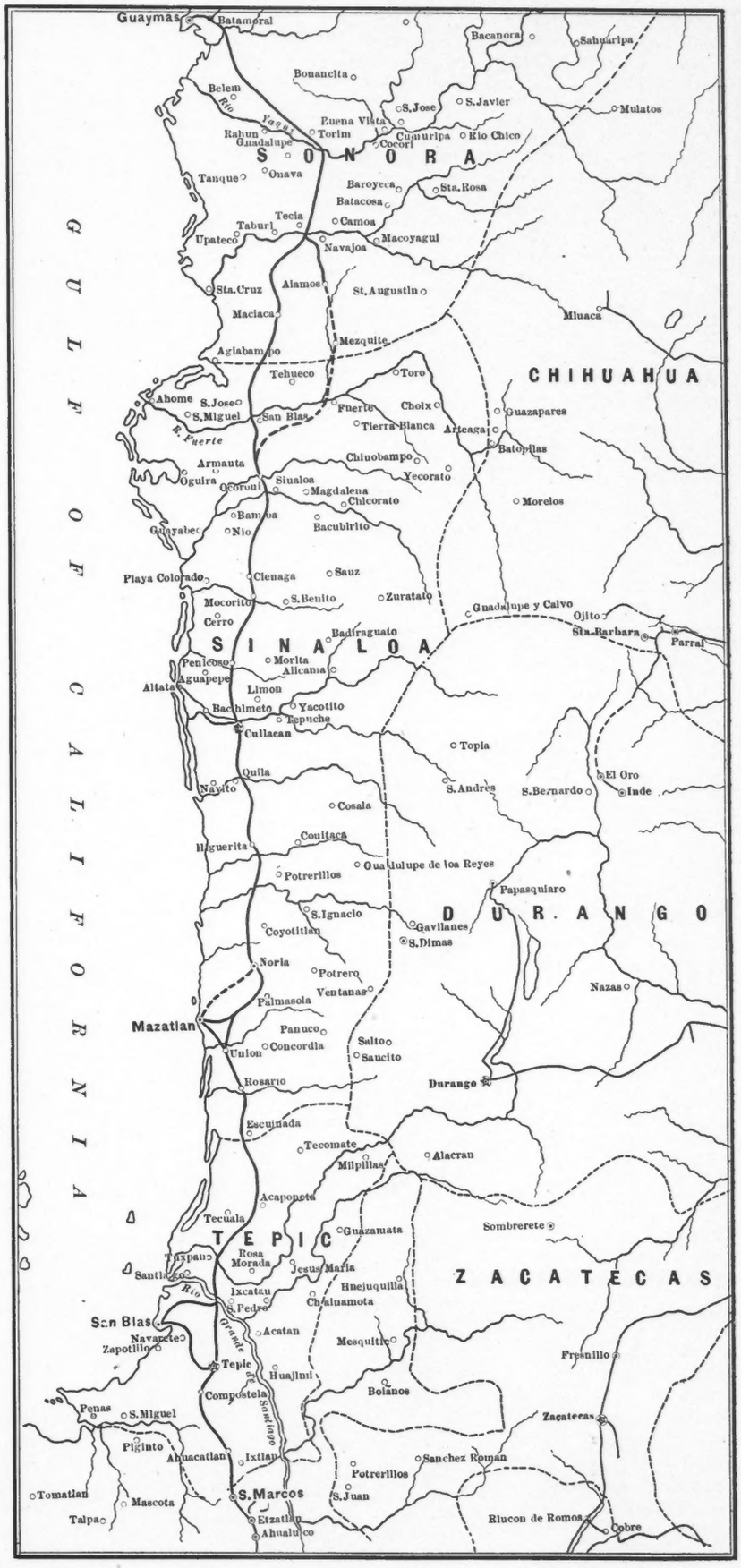
The present concession could not have fallen into better hands, as the Southern Pacific has taken hold with its customary energy and ample funds; survey parties are now in the field along the entire length of the proposed line.

The whole country to be traversed is essentially an agricultural, cattle and mining country; all the large towns will be supply points for one or more mining districts back in the mountains; while Guaymas, Topolobampo and Mazatlan will supply the whole country.

The total distance of line to be built will be over 600 miles. This country has now about 500,000 population, but is capable of supporting 25 millions with ease.

From a point on the Sonora road, between Guaymas and Balmoral, the new road will run nearly east 60 miles to Torin, a large town, and the military headquarters on the right bank of the Yaqui river.

En route it will touch several ranches,



MAP OF WEST COAST OF MEXICO.

*Mining engineer, Fuerte, Sinaloa, Mexico.

and the military forts of La Guacima and Pitahaya.

The country traversed is the typical coast country; excepting one or two estuaries, there will be no streams to cross. The rise to Torin will hardly exceed 200 ft. in the 60 miles.

From Torin the line will probably follow up the bank of the Yaqui river, about four miles to Chunampaco, a military post on the left bank of the river. At this place the river narrows, affording an excellent location for a bridge. From this crossing a line can be laid about S. 20 deg. E. to the Mayo river on a tangent for 53 miles, and over virtually a level country. This tangent would hit the Mayo river at a little Indian town called Cohuirimpo, a place where there is the only good crossing to be found for miles. At Cohuirimpo a town would spring up, unless the important town Navojoa, five miles up the river, should prove strong enough to kill it.

From this point probably the line will split—the main line continuing southeast between the coast and the Alamos range of mountains, and a branch running to Alamos, 50 miles via Navojoa and Las Lomas.

The Mayo river station would be the distributing point for the important mining town of Alamos, and would supply a large section of the mountain mining towns, such as Chinipas, San Augustin, Baroyeca, and even Jesus Maria, besides many new camps that would spring up; for the country to the east of the proposed line, up the Yaqui and Mayo rivers, is a well-mineralized section.

Should the importance of Alamos force the main line through that point, it would naturally seek its outlet via Fuerte, striking the coast country again about Ocoroni (this line is dotted on the map). To take this route would mean grades three times as steep, 200 per cent. more curvature, and nearly three times more for cost of construction; and this for the entire distance of 160 miles.

The line from Cohuirimpo to Alamos would be 50 miles long; and in that distance the rise would be nearly 1200 ft., 6 per cent. of which would be made in the last 20 miles. From Alamos to Fuerte, 65 miles, the drop is 900 ft. over a rolling, broken, foot-hill country. From Fuerte out to open country again, at Ocoroni, would be 45 miles more through rather a rough region, unless the line ran down the river to San Blas. In view of these difficulties it is probable that a branch will be built to Alamos and the main line be continued down the comparatively level coast country.

The region between Guaymas and the Yaqui river is a ranch country. The soil is of good quality, but water is lacking. Up and down the Yaqui river from Torin are thousands of acres of prime land, much of which can be irrigated, especially on the south side of the river from Cocorit to the coast. One large ditch has already been taken from the river above Cocorit, and there is room for more. This country is destined to be a good wheat, corn and fruit country. The land on the Mayo river is good for farming, and the section around Navojoa and down the river will posper under irrigation.

Leaving the Mayo river, should the railroad follow the line of least resistance, it will keep its southeasterly course, running across a rolling, brush-covered country (nowhere exceeding 400 ft. above sea level) to the Fuerte river, 90 miles. It will run close to the small ranch town of Masiaca, passing within five miles of the port of Agiabampo; thence, via the ranches of Carrigo and Metate, it will cross the Fuerte river just below the ranch of San Blas, where it will also cross the Kansas City, Mexico & Orient Railroad, the new line from the port of Topolobampo across the Sierras, which has a track laid beyond Fuerte. This crossing of the river is one of only two good ones to be found between Fuerte and the mouth of the river, a distance of 75 miles. The other is at San Miguel, 25 miles below San Blas. The elevation at the Fuerte river is about 120 ft. above the sea.

The Fuerte, above San Blas, to above the town of Fuerte, runs between low ranges of isolated foot hills of volcanic origin, the valley varying from one to three miles wide. The hills stop just below San Blas, on the south side of the river; a level stretch of fertile land extends southwest to the bay of Topolobampo, 30 miles away; and down the river for 45 miles westward.

The Fuerte river is the largest of all the rivers crossing the State of Sinaloa; it takes its source beyond the summit of the Sierra Madre, cutting well into the central plateau, which, in reality, is the continental divide. This river never goes dry; at San Blas is a stream varying from 2 ft. deep by 250 ft. wide, with a speed of 1½ miles per hour at the extreme low stage, to a mile wide, 25 ft. deep and flowing from 7 to 10 miles per hour during floods.

The crossing at the Fuerte, wherever made, should be the supply point for a large mining region, which would start at the station itself, as the Fuerte district has mineral ledges almost from the coast to its east boundary. From the start the present camps of Lluvia de Oro, Batopilas, Urique, Guazaparez, Morelos and the mining country around Choix would become tributary to the road. From the Fuerte river the line will run southeast to the Ocoroni arroyo, about 36 miles, over a rolling but not a difficult country, used for cattle raising entirely.

The line will cross the Ocoroni somewhere below the town of this name, and continue on 20 miles farther to the Sinaloa river, which it will cross about two miles below the town of Sinaloa. This crossing will be the supply point for the mining camps of Bacubirito, San José de Gracia, Calabacillas, San Juan and many others that will spring up within a very few years after the line is finished. The agricultural resources of the Sinaloa are promising.

From Sinaloa the line will continue southeast, its general course, for 44 miles to or near Mocorito, passing through a ranch country (cattle) all the way. Mocorito will be the supply point for a large mining section, including the camps of Palmarito, Guadalupe y Calvo, Basonopa, and the Badiraguato district. Agriculture in this district will be limited, due to lack of water, although there is much good land.

From Mocorito the line will run to Culiacan. The distance is 60 miles, and en route the road will run near Pericos, the great mescal liquor and fiber section of the State. Culiacan is a clean, live town of about 12,000 inhabitants; it is destined to be the most flourinshing town in the state of Sinola. It should be the supply point for a large mining section; the present camps of Copalquin, San Fernando, San Andres de la Sierra, Canelas, Sianori and Topia being tributary to it.

The country south of Culiacan, along the line of the railroad is rolling, often hilly, but not mountainous; the elevation never going over 400 ft. above sea level. The work will nowhere be excessively heavy; the curvature will be light, 6 deg. perhaps, and the grades should not exceed 0.6 per cent.

From Culiacan the line will run to Mazatlan, 130 miles, passing no town of any size; and although the region is fertile, scarcity of water accounts for the sparse settlement. The principal industry along the coast is cattle raising. At 25 miles from Culiacan the line will cross the San Lorenzo river, near the small town of Quila. Forty miles farther southeast, the line will cross the Elota river, probably below the town of Elota. This place should make a good supply point for the important mining camp of Guadalupe de los Reyes and others that will spring up in the districts of Cosala and San Ignacio.

About 10 miles southeast of Elota, the line will cross the Piaxtla river at, or near Piaxtla ranch. About 25 miles farther southeast it will cross the Quelite river, near the small town of that name. Quelite will, in time, become an important supply point for the mining region 100 miles to the east that will become active when the road is completed.

From Quelite the line will run nearly due south, 30 miles to Mazatlan. On the accompanying sketch map the line is drawn through La Noria; but this place will be left 10 miles to the east.

It is hardly probable that the line will run into the town of Mazatlan itself, on account of the estuaries, but it will come within two to five miles of it.

Mazatlan is the largest and most im-

portant place on the Coast. It has about 20,000 inhabitants, and is the supply port for the entire West Coast, between latitude 22 and 29 deg., and for 200 miles inland.

This railroad will be of great benefit to the port; but the lack of a good bay, which no reasonable amount of money can remedy, will limit its size and importance. The nearer the road runs to the present town, the greater the benefit. From Mazatlan the line will run about due east for 15 miles, to Villa Union, where it will cross the Mazatlan river; from this place it will again take its southeasterly course to the Rosario river, 20 miles farther on, crossing this at, or below, the important mining town of Rosario. This place should develop into a flourishing business center, as it has a large undeveloped mining section back of it.

Ten miles southeast of Rosario the line will pass the small town of Escuinapa; and 25 miles farther southeast the boundary line between Sinaloa and the territory of Tepic. The boundary is a small river emptying into the Teacapan bay; the railroad will cross this stream near the small town of Concepcion.

From Concepcion the line will continue southeast for 35 miles to the Mesquital river, a small stream it will cross near the town of Tuxpan. From Tuxpan the line will run nearly south to the Santiago river, a distance of 20 miles. This large stream will be crossed near Santiago, perhaps above the town.

The line from Mazatlan to the Santiago river will traverse practically the coast line, never getting over 30 miles from it, nor over 200 ft. above the sea level. This section, although capable of agricultural development, will remain dormant in that line for many years, due to the scarcity of water. However, its mineral resources compare favorably with most parts of the Coast; mining camps will spring up in many directions to the east.

From the crossing of the Santiago river it is probable a branch will be built to the port of San Blas, a distance of about 30 miles, over a low level country. From the river, the main line will continue its general southeasterly course for about 30 miles to, or near to, the large and important town of Tepic, the capital of the Territory of that name. As Tepic is about 1000 ft. above sea level, from the Santiago river south, heavy grades and more costly construction work will be the order. As already stated, it is probable that Tepic will be the terminus of the road, especially should the Mexican Central continues its line from San Marcos, its present terminal, northwest to San Blas, via Tepic.

Should the terms of the concession demand the construction of the road to Guadalajara, it would have to follow about the line of the Mexican Central; it will be almost impossible to follow up the Santiago river, due to the wild and broken nature of the country for 50 miles up its course, the river running in a deep cañon for many miles.

Following the natural line, the road will take a southeasterly course for about 70 miles to San Marco, through a rolling mountainous country; and from San Marco it will run on a general easterly course, for about 70 miles more, to Guadalajara.

Although the road will run through a mountain country, climbing 6000 ft. in 140 miles, the agricultural and mineral resources of the district are good.

Active work has begun; numerous engineering parties are in the field all along the line; actual construction has started from Guaymas south, and the Rio Yaqui country should, in a few months, be connected with the outside world.

From present operations it looks as though the construction of the road would be pushed from Guaymas south, and from Mazatlan north and south; but should the company care to complete the whole line in the shortest time possible, it could, also, be built both ways from the Fuerte river, and both ways from Culiacan. Material for the Fuerte division would be handled at the Port of Topolobampo and run up to its destination on the Kansas City, Mexico & Orient road; while that for the Culiacan division could be landed at Altata and run up to Culiacan on the railroad connecting those two places.

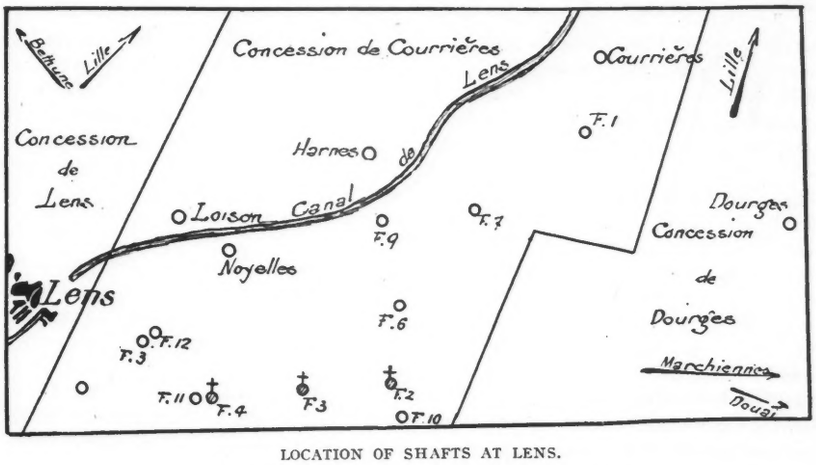
From time immemorial this section of Mexico has lain dormant, due to a lack of transportation. It has had an outlet on the coast side, but that benefits only a limited strip along the coast, and only in a limited way. In the last 20 years business has increased from two steamers to a dozen or more; and the sugar industry alone, in spite of this limited outlet, has jumped from one factory to eight.

For passenger traffic, a stage line runs from Guadalajara to Guaymas, a journey over which is a nightmare in the memory of the man who travels, and this is the quickest mode of getting *anywhere;* but it only runs from November to July, and up and down the coast. If it is desired to make a trip inland, recourse must be had to the ubiquitous mule.

The Disaster at Lens.

BY MATTHEW VINGOE.

Early on the morning of March 9 a serious explosion occurred in the Courrières colliery, Pas de Calias, France, about two or three hours' journey north from Paris. The mine is situated just outside the town of Lens and is known as the Concession de Courrières. The operations numbered 2, 3, 4 and 11 (shown in the accompanying sketch) were the scene of the trouble. Down these shafts 1800 miners descended on the morning of the disaster,



LOCATION OF SHAFTS AT LENS.

Scenes of the explosion are marked with a cross.

and of this number about 1300 are known to have perished. The exact number will probably never be known.

The Concession de Courrières ranks third in importance among French coal mines, and the loss of 1300 workers, all of them being between the ages of 20 and 40 years, is serious. The accident may make a difference of a million tons in the output of the Lens district this year; and, as France already is a large importer of coal, this difference will probably have to be made up by importation from England and Germany.

Courrières took rank next in importance after the Anzin and Lens collieries. In accordance with the latest practice the entries were made intercommunicative, thus multiplying the means of escape from the mine to the various shafts, and affording the means for a more perfect coursing of the ventilation currents. It is this very fact, however, that accounts for the great number of victims, which, under ordinary circumstances, would not have amounted to more than 20 per cent. of the actual number killed. The mine has been 50 years in operation, and this is the first serious accident that has occurred in it.

The mine has long been noted as containing fire-damp. The coal found is of a soft, friable nature and has a high percentage of volatile matter. The strata overlying the coal seam are very treacherous, and from time to time, owing to the falling in of the roof, pockets are discovered which disengage large quantities of fire-damp. These conditions were well understood at the mine and extra precautions were continually taken in respect to ventilation, and the employment of safety lamps and explosives.

This disaster, it is generally agreed, is in no way directly due to fire-damp. It appears that the following causes contributed to the accident: During Tuesday and Wednesday nights, through the carelessness of a miner, some wood ignited and the fire quickly spread to a coal seam. Barriers of stone were hastily erected to confine the fire. These circumscribed the dangerous district, but the barriers were not duplicated, although prudence might have suggested this course to the engineers. This precautionary work being finished, everything was believed to be safe, as, owing to the good ventilation, no air from the burning material escaped toward the entries where the work was going on. What then happened is probably this: In view of the close confinement of the burning-coal area, the resulting pressure burst the barriers and probably disrupted some of the pockets in the rocks containing fire-damp, or possibly some old working long closed up. This resulted in the disaster. It was undoubtedly a serious error of judgment to have allowed such pressure to accumulate in view of the non-duplication of the barriers.

The mine has a maximum depth not exceeding 1200 ft. and the fire was limited to the Merricourt shaft at a depth of 850 ft. The miners descended between 3 and 4 o'clock in the morning, the accident occurring about three hours later. The rush of air at the mouth of shafts 2, 3 and 4 was tremendous, one man being killed in one shaft, and a horse being lifted high from the ground at the bottom of another shaft. No escape was possible from these shafts, down which no one has since been able to descend. Of the 858 men who descended shaft No. 4, 135 were sent up before the accident, they being unable to work in their particular rooms by reason of the barriers erected to confine the fire area. There is not a single survivor of the remainder.

Only a couple of hundred victims of the Courrières disaster are all that can be at present reached or withdrawn from the ill-fated mine. Their bodies are for the most part unrecognizable, and it is impossible for them to be exposed for identification. All this was, of course, to be expected. It is now admitted that there is not the least chance of any living man being still in the mine.

Throughout France there is great criticism regarding the fact that proper or sufficient means of succor do not, so to speak, exist in any of the French coal-mining fields, and this feeling was accentuated by the arrival of the German coal-mine salvage corps. This corps did yeoman service and rendered signal aid in leading the way during the first descents into the mine. They were somewhat coldly received at first by the authorities, but their home-sending more than made up for any tension at first observable. The members were naturally reserved in expressing their impressions of the French mine, but it is understood that they as a whole consider that the French mine, as compared with German standards, was obsolete in respect to size of rooms and entries, which are small and tortuous. The methods of ventilation were considered below the standard in the leading German collieries, and the means of succor in case of accident were found to be most primitive. It is very likely that these criticisms are justified.

The bad feeling aroused among the miners after the accident was by no means fostered by the men's delegates, who tried hard to keep on good terms with the mine owners. This is now considered impossible, and from dull mutterings and angry meetings the miners are proceeding to organize a general strike, which is considered inevitable. This has four objects: (1) A common base for men's wages by all the companies of the district of 4.80 francs per day; (2) increase of the bonus for work done beyond a fixed output amounting to 45 centimes instead of 30 centimes; (3) more equitable division of wages; (4) means of regulating wages by a sliding scale; (5) minimum wage for a fixed day's work; (6) widows and orphans of men killed in the mines to be kept within the companies' premises (free lodgings are here referred to) as is the custom for men in work.

The strike is rapidly extending, and it is estimated that 1500 men are now out. This is almost a unique case of a big strike following a mining disaster, but it indicates the tendency which such an event can give to general mining affairs in France. In consequence of the strike many large orders for coal have been placed in South Wales, and some orders have gone to Germany.

As regards responsibility for the causes of the accident, at present complete evidence is not obtainable. It is pretty certain, however, that all possible means were not taken to watch the progress of the fire in the mine; and the fact that the fire was hermetically shut up in a proscribed area, without even the precaution of placing a gage to show the pressure within that area, indicates carelessness on the part of the company. The placing of efficient means to control the progress of the fire and to insall means to safeguard such a terrible occurrence as this has proved to be, would, it is stated, have cost only a few thousand francs in supplying proper recording instruments and in suspending mining operations for two days. It is believed the company refused to take this course, fearing the result it would have on the annual dividend. However, the Government report will be made as soon as possible, and we shall learn something definite regarding the technical and immediate causes of the catastrophe.

A Real Referendum.

BY R. W. RAYMOND.

The vote of the miners of Bisbee, Arizona, to which editorial allusion was made in the JOURNAL of March 24, suggests a further comment, not made in that article (which otherwise commands my cordial assent). Namely, what would be the verdict of wage workers in general, as to the tyranny of labor-unions, and especially of that worst of all such organizations since time began—the Western Federation of Miners—if they could vote, as the Bisbee miners did, without intimidation?

It is notorious that the real miners of the anthracite region were overpowered in 1902, and are only too likely to be overpowered again, by the votes of laborers and breaker-boys, admitted for that purpos to the so called "Mine Workers'" Union. It is equally well-known that large numbers of miners, opposed to a strike, abstain from voting, when they expect to be out-voted, for fear of being stigmatized as traitors to the Union. And, finally, everybody knows that when a strike has once been declared, however unwisely and by whatever trick of tactics, large numbers of those who did not approve or desire it, and would have defeated it if they could have done so without incurring vindictive ostracism and persecution, submit under terrorism to the decree which they condemn.

We shall hear a good deal from "labor leaders" about the "referendum" as a panacea for social ills. The vote at Bisbee was a real referendum. How do they like it?

The most important find of alluvial gold in South Australia in late years was that of Teetulpa. The schists and granite around that field and its neighboring goldfields bear auriferous quartz lodes. The alluvial gold is scattered sparingly in areas close to certain lines of lode, and is evidently derived from such lodes. At Teetulpa alluvial gold was largely concentrated in certain gullies, and this fact gave rise to much speculation as to a lead of value being opened in the deeper ground whence such gullies trended. It was speedily found that all such hopes were fallacious; for the yield of gold tapered off to a vanishing point as its sources were left behind at the little belt of quartz lodes.

THE ENGINEERING AND MINING JOURNAL

Contents.

*Illustrated.

Witwatersrand Profits.

The statistics of gold production and dividends paid by companies operating on the Witwatersrand, which are communicated by Mr. Spilsbury, are extremely interesting in their showing of the profits in gold mining on a large scale. Probably there is no other mining district in the world for which the statistics have been kept up from the beginning with so much detail as in the case of the Witwatersrand. These statistics show a total output from 1887 to the end of 1905 amounting to nearly £130,000,000, out of which dividends have been paid to the amount of nearly £33,000,000, or slightly more than 25 per cent. of the gross output. This is certainly a remarkable showing, because although the mines are of exceptional continuity and regularity, the veins are not wide, the ore is not of high grade, and the conditions of working are unfavorable in many respects.

It is to be remarked, moreover, that the dividend percentage is calculated on the basis of total output, which includes the production of some mines which have not paid dividends. If the dividends were referred to the production of only those mines which have paid them, the percentage would be higher. On the other hand, the broad method of financing these companies makes it difficult to determine how much of the outlay for plant has come out of operating profit and how much out of subscriptions of stock and bond holders. However, the statistics of production and dividends are certainly impressive.

The Canadian Geological Survey.

The interregnum in the Geological Survey of Canada, which has existed since the death of Dr. Dawson in 1901, has been ended by the appointment of Albert P. Low as director of the Survey. The new head has grown up with the department now under his charge; he has been connected with it for 24 years, is thoroughly familiar with its work, its traditions and its present condition and its needs. He has won recognition by his own work in various directions, especially by his explorations in Labrador and the Hudson Bay country. His latest contribution is the monograph on the Chibogamoo region in northern Quebec. He has shown that he possesses the executive ability which is now one of the chief requisites in the reorganization and extension of the Survey work which is planned.

Dr. Robert Bell, who is now practically retired, has been for many years prominent in the Survey and has reached an age and acquired a reputation which will enable him to look with satisfaction on the work and the successes of the younger men to whom the direction of the Survey is now entrusted, and who will doubtless maintain the high reputation to which he himself has contributed in the past. Dr. Bell has labored under the disadvantage of holding a temporary position as acting director, which was liable to be terminated at any time; but he has done his best to hold the Survey to its work and to maintain its organization during his tenure of the office, and his services will not be forgotten.

The Anthracite Situation.

In another column we have referred to the coal situation in the West. In the anthracite region the prospects are more doubtful. The mines are not working this week, though the stoppage is called a "suspension," not a strike; and a conference is still in progress, in which, however, neither party seems inclined, up to date, to give way. In this case there is a wide difference from the conditions prevailing in the West. The almost absolute unification of the anthracite companies—though no formal combination exists—and the almost entire absence of competition over a wide field, make the question a direct one between operator and employee. In case of a final rupture, there is no power but the pressure of public opinion which can force either side to make the concessions which will bring about a settlement. In 1903 this pressure was expressed in a way through the President's Strike Commission, and it is quite possible that a similar measure may be needed now.

For the present the situation is not alarming. The opening of spring, following an unusually mild winter, and the accumulation of stocks by the companies will prevent any such pressure for coal as existed at the time of the last strike. A stoppage, even of a month or so, will entail no serious trouble; though a longer cessation of work may give rise to some difficulties. That the present "suspension" may last, at least for several weeks, begins to look probable.

The Prospect for Copper.

The article by Professor Douglas, which is published on a following page, is bound to attract much attention. He shows in a very careful statistical compilation that during the 10 years from 1896 to 1906 the consumption of copper has averaged one ton to 83 tons of pig iron, and he points out that a demand for copper in that ratio to meet the requirements of the trade shows that the stocks of copper must now be very low, and the existing scarcity of copper need not be attributed to artificial manipulation. The method of arriving at this conclusion is ingenious and the result has the further merit of agreement with the evidence of the trade as it is at the present time.

The situation in copper is certainly very strong; probably it was never stronger in the recent history of the metal. We stated at the beginning of the year that there were then no stocks of refined metal in first hands, save an insignificant quantity reserved for certain regular customers, who might find that they had underestimated their requirements. The apparently large stock of copper figuring in the statistics is metal in transit, or in process of refining, which always, inevitably, constitutes a considerable proportion of the production. There was a relaxation in the demand for copper during January and February, but toward the end of February consumers appeared in the market again, and throughout March the demand has been large.

At the present time there is no evidence of any accumulation of stock; on the contrary, refiners are shipping their product as rapidly as they can turn it out. Estimates of production and consumption, which go to show that the supply of copper is exceeding the demand, are misleading. Such estimates are based upon an assumption as to the current consumption of copper, which can never be any more than a guess. Moreover, at the present time there are no reliable statistics as to the current production. There has been undoubtedly a small increase in the production of the older districts during the first quarter of the year, and there will probably be a larger increase during the remainder of the year. A new smelting works, producing blister copper, has just gone into operation in Arizona; the large plant of the American Smelters' Securities Company, at Garfield, Utah, will probably go into operation in the early summer; there is, moreover, likely to be a considerable increase in the production of California during the year. The important enterprises which are likely to add materially to the production of copper, such as the development of the disseminated copper ores of Utah and Nevada, are hardly likely to cut much of a figure in the output of 1906. It is doubtful whether the increase in production that is reasonably to be expected this year will more than equal the normal increase in the demand. The present outlook is for a strong market in copper throughout the present year.

The Western Coal Situation.

The coal situation, now that both the anthracite and bituminous agreements have expired by their own limitations, remains altogether uncertain. No settlement has been reached, either in the East or the West, although the way has been opened for a partial arrangement in the Central bituminous district. Beyond this the future is still doubtful.

The Indianapolis conference broke up on March 31—it cannot be said without results, since an important outcome was the virtual abandonment of the interstate agreement, which has heretofore governed the operations of the mines in the Central competitive district, which covered the country from central Pennsylvania to the Mississippi. On the part of the miners this was an abandonment of the original ground that no settlement would be made which did not cover the whole field. Doubtless it was due to the stand taken by the Pennsylvania operators, who had announced their willingness to compromise. The resolutions adopted by the union authorize the signature of an agreement in any district where the operators are willing to concede the wage-scale of 1903, which involves an advance of 5.55 per cent. on the mining rates of the past two years.

Under these conditions the closing of agreements will depend in part on local considerations; but will also be determined in large part by the competitive situation. It is also the case that during the past year there have been many consolidations and combinations which have already changed materially the position of the coal trade in some of the Western States. The Indiana coal trade, for instance, and that of some of the Illinois districts, have come largely under the control of the railroad interests. Whether this movement has been for the best is a question that cannot be discussed here; but undoubtedly it results in the adoption of a different—perhaps a wider—view of the trade.

The western Pennsylvania operators, with few exceptions, have already signed the district agreement, and most of the mines will be at work in a few days, only a temporary misunderstanding having prevented their continuous operation. The causes of this readiness are found in great part in the iron and steel situation. The larger companies in the Pittsburg district are controlled by the steel companies, or have important contracts with them; and the steel makers cannot just now run the risks involved in a short supply of fuel. Moreover, the Pittsburg men are too near the non-union mines of West Virginia, and there is still a recollection of the way in which the strike of 1897 brought the mines of that State into the competitive market—and brought them to stay. The insistance of the steel companies on a settlement was hardly necessary, though it was effectual.

The strongest opposition to a district settlement at present seems to be in Ohio, where the operators are more independent, and where they have suffered more from the low prices due to excessive competition. Ohio, however, has suffered perhaps more than other districts from the growing importance of West Virginia. The prospects of further displacement of Hocking Valley and other Ohio coals in the Western and Lake markets by the New River and Pocahontas products will probably be a strong element in deciding the operators of the State to concede the settlement. We believe that they will do this after only a slight delay.

The Indiana operators seem determined to stand out; at least this is the official statement of their association, and perhaps the sentiment of many of the smaller operators, who have been doing a business which leaves only a small margin of profit. But it is no secret that there is division in the ranks. The large combinations recently formed and controlled, as we have said, by the railroads, do not want, and will hardly consent to, any long stoppage of production. If they come into the agreement and start up their mines, the smaller operators must follow or go out of business altogether—some of them

permanently. The situation is a grave one for this class of mine-owners, and few of them are in a position to fight.

In Illinois the outcome is more uncertain. The operators had hoped, not only to settle the wage-scale, but to bring up some collateral questions, such as the run-of-mine basis and the shot-firers' wages. In this they have been altogether disappointed and are correspondingly sore. The same commercial considerations which have been already referred to may prevail in this State also, but there is more uncertainty, and the possibility of longer delay and stoppage of mining.

In the Southwestern district the general agreement has been abrogated also, and district settlements are to be the order of the day. In most cases it looks as if these would be made, with more or less delay and friction, according to local conditions.

Upon the whole, therefore, it seems safe to predict that—barring unforeseen difficulties—the stoppage of coal mining in the West will be of short duration; too short to affect business seriously. It is to be noted that the leaders of the union are insisting that agreements made now must be for two years only. This shows that they are not unmindful of the tactical advantages which will result from the fact that the next adjustment of mining scales will come in the year of a Presidential election.

The Courrieres Explosion.

The disaster in the Courrières colliery resulted in the greatest loss of life in a single accident, so far as we are aware, ever recorded in mining annals. According to the latest advices over 1200 men lost their lives in the mine. Previously the accident in the De Beers diamond mine, South Africa, in 1888, held the record with respect to the loss of life. In that accident 500 men perished after breathing the poisonous fumes given off by the burning mine timber. The most disastrous colliery explosions previously experienced in France were those in the Verpilleux colliery in July, 1889, which resulted in a loss of 207 men; and in the Villebœuf colliery in 1890, when 113 men perished.

The Courrières colliery is one of the most important in France. It has an area of 13,484 acres (20 square miles), gives employment to more than 8000 miners, and last year produced 2,370,752 tons of bituminous coal. It was operated by eight shafts, the deepest being about 1200 ft. The mine was known to give off fire-damp, but not in large quantity. In certain districts safety lamps were used exclusively; but in others naked lamps were permitted. As the French law requires careful daily inspection of the workings, the Courrières company employed 10 under-managers, 50 underground inspectors who make daily written reports to the managing engineer, and 50 sub-inspectors, who make daily inspections and report verbally to their immediate superiors. In addition to these managerial inspections the Government mine inspectors make frequent examinations, and the miners elect a number of delegates from among themselves to make an inspection of the workings on their own behalf before each shift goes below to work. As a result of this care the average death rate from accidents in the mine before the recent disaster was only 0.126 per 1000.

The exact cause of the accident will not be known until after the Government inquiry. At present the leading French authorities suggest three theories, viz.: (1) A fire which had been burning for several days and had been walled in, distilled a large volume of coal gas which exploded, after accumulating in a vacant chamber. (2) Gas already existing in the rocks was freed by the caving in of some roof, when the timber was consumed, and exploded; this explosion was carried for some distance along the haulage roads by coal dust. (3) The fire ignited a large quantity of fire-damp in old workings.

The evidence at present available appears to indicate that the fire generated a large quantity of coal gas and carbon monoxide, which escaped into the workings in the vicinity of No. 3 shaft, where it became ignited by a naked light carried by one of the miners. Possibly coal dust assisted in extending the explosive zone.

One serious defect in French mining practice, which ought to be speedily remedied (as doubtless it will be), was emphasized by the accident. It was found that there were no up-to-date life-saving appliances at the mine, or in the district, and there was no well-trained life-saving corps. Ordinary city firemen had to be hurried from Paris to render assistance. Fortunately the Hibernia Coal Company, operating in the Westphalian coal field in Germany, has an efficient life-saving corps of 170 men at its mines; and on hearing of the French accident, Herr Meyer, the chief engineer, immediately assembled the corps and started for Lens with a full equipment of modern appliances. They made the first descent into the mine after the accident and rendered much valuable assistance to the colliery engineers.

The Government commission that will shortly be appointed to investigate the circumstances surrounding the catastrophe, will be required to make an exhaustive report, which should throw much light on several obscure problems in colliery practice; more particularly, perhaps, upon the desirability, under certain circumstances, of ventilating old workings, the action of intercommunicating shafts upon the ventilation, the implied danger from these intercommunicating shafts and entries in case of accident, and their influence in rescue operations after accidents. The fact that the Courrières mine has been worked with an immense annual output for over 40 years, and consequently possesses very extensive abandoned workings, which are liable to accumulate fire-damp; also that there are many shafts and other openings (eight shafts being now in working condition), should enable a flood of light to be thrown on these problems.

After the section of this issue containing the report of the disaster had gone to press, news arrived by cable of the escape of 13 men who had been imprisoned in the mine for 20 days. Their heroism and dramatic reappearance, after all hope had been abandoned, will ever remain one of the noteworthy events in the history of colliery disasters. It is, however, a serious reflection upon the management of the colliery that the rescue work was so early discontinued, when, as it has been proved, there were men still living in the mine. The escape of the thirteen was effected by their own brave efforts; not by any assistance from outside. Unfortunately there appears to be ground for the belief that up to that time there were others alive in the mine, who might have been rescued if the work from the outside had been intelligently and vigorously prosecuted. It is improper to charge incompetence before all the facts are known, as they will undoubtedly be developed in the investigation to follow; but we certainly may draw the conclusion that after any colliery explosion the efforts to rescue men imprisoned inside should not be abandoned until it is morally certain that life must have become extinct.

Metallics.

Old powder is dangerous to handle in many ways and hard to explode. Fresh powder and strong caps should always be demanded.

Palladium has about the same degree of hardness as platinum. It may be easily rolled into sheet, and is usually found in commerce in the shape of thin sheet or foil.

The secret of good quality boiler and pipe coverings lies in the imprisonment of air and the prevention of such air from moving. In some works it is usual to leave small boilers uncovered. This is most expensive neglect. From 25 to 40 per cent. of fuel can be saved by covering. If these boilers are to be used in works where they are likely to receive rough usage, it is advisable to protect the covering with sheet-iron sheathing.

Paul Speier, in a recent article in *Oest., Zeit.*, shows that the spontaneous ignition of zinc dust is out of the question, when the material is properly packed. Wetting of the material is also without danger. Ignition and explosion can only occur in the presence of air. The matter is of some importance, inasmuch as steamship owners sometimes refuse to transport this material, and fire-underwriters have stringent regulations with respect to it.

To heat 700 cu:ft. of free air from 60 deg. to 353 deg. F., when under 65 lb., requires 12,800 B.t.u. per minute. Allowing 50 per cent. as the efficiency of the reheater (a figure which tests of standard types have shown to be fair), we must develop 25,600 B.t.u. in the reheater per minute, which will require about 2 lb. of coal per minute, or about 2900 lb. per 24 hours. These calculations are based on installation at an altitude of 5000 feet.

Slag wool was first manufactured for commercial purposes at the Tees Ironworks, Middlesbrough, under the patent of Charles Wood. Slag wool was at one time used for the covering of boilers and pipes, but since the introduction of steel plates its use has diminished for this purpose, as it is said to cause a pitting on steel plates. Other uses, have, however, been found for it. The weight of a cubic foot of slag wool is not more than 8 lb. even when most tightly packed.

With the ordinary direct-acting underground air pumps the amount of compressed air required to raise a given amount of water is appalling. Owing to the resistance of the water passing through the valves, as well as the large amount of friction developed in direct-acting pumps, it has been found that in order to operate a pump of this type at a normal piston speed of 100 ft. per minute, the indicated horse-power of the air end must be double the useful horse-power of the water end.

A formula that is extensively used for the manufacture of valves and fittings for use in sulphite work consists of the following proportions: Copper, 10lb.; lead, 2 lb.; tin, ¾ lb. and 5 per cent. phosphor tin, ½ lb. The copper should be melted and the lead then added, after that the tin, and the phosphor tin last of all. The mixture should be stirred thoroughly and the pouring should be done at a low heat. Owing to the large amount of lead present, this metal is liable to sweat out if too much heat is used.

Nine aluminum cables carry electric energy across Niagara river from the Canadian side to the American border whence it will be distributed through central and western New York State. The energy is developed by the Ontario Power Transmission Company, Ltd., and is handled in New York by the Niagara, Lockport & Ontario Power Company. Each cable consists of 19 No. 5 wires. The power house is on the Canadian side in the gorge at the foot of Horse-Shoe Falls. The water is carried in an 18-ft. steel flume, concrete covered, from a point a mile above the Falls.

The resistance offered by sand or gravel to the flow of water which is percolating through it is very great. The water is obliged to pass through very small pores, usually capillary in character. The rate of transmission varies greatly with the temperature of the water. For example, a change from 50 deg. to 60 deg. is said to increase the capacity to transmit water, under identical conditions, by about 16 per cent., while a change from the freezing temperature to a temperature of 75 deg. will nearly double the power of a soil to transmit water. These facts have an important bearing upon the capacity of gravels to furnish water to wells or to transmit water in the underflow of a river; the principles involved are also of importance in dealing with the permeability of crushed ore by leaching solutions.

A good scheme for washing blueprints is that seen at the general office of a mining company not long since. The tank in which the prints are washed is vertical, instead of horizontal (as usual), and has at the top, a shade roller about 3 in. diameter. This rests upon a pair of rollers at each end, and turns freely; a perforated pipe is arranged at one side of it, and delivers small streams of water against the face of the blue-print. The latter, preparatory to washing, is pinned together at the ends and the shade-roller inserted; the roller, with the print hanging from it into the tank, is replaced and the water turned on. A quick turn of the roller, together with the streams of water directed against the print, keeps the latter in motion for a sufficient length of time to insure thorough washing.

One of the first air reheaters ever built was designed for use with a rock drill, and consisted of a small chamber attached to and connected with the supply pipe close to the air chest. This chamber was filled with oily waste, which was found to burn freely and add the hot products of combustion to the inflowing compressed air. In the next design, a paraffin lamp was placed in the chamber, and, as before, the products of combustion were taken through the drill along with the compressed air. These experiments, though only carried out on a small scale, were sufficient to demonstrate the advantage of utilizing the heat and gases of combustion; but oil is generally an expensive fuel, and the drill operator, having no interest in reducing the amount of compressed air used by the drill, cannot be induced to bother with separate reheaters attached to each drill.

In the manufacture of hollow-metal ware—especially in jewelry such as bracelets and the like—some method is necessary to prevent the collapsing of the thin walls under the strain of working. The process used is analogous to that of the plumber, who fills a lead pipe with hot sand before bending. The jeweler, instead of sand, uses a cement that is squirted, by means of a ram, into the end of the tubing while in the heated state. As soon as it reaches the other end of the tube, this is pressed together in order that the wax-like cement may completely fill it. When all the engraving or other work upon the article has been completed, the cement is melted out before "coloring" the object. Sometimes the cement is left in, when its weight is not objectionable; or, to give the purchaser the idea that heavier stock has been used; but not as a general thing.

The Edison air reheater consists of two concentric cylinders. In the inner one a coal fire is built, while a portion of the compressed air is passed through the space between the cylinders, and a portion is conducted through the fire. Valves are arranged to regulate the proportion of air passing through the fire. The work is intermittent, as the reheater must be opened and emptied before a fresh supply of fuel can be added. When properly lagged with asbestos, 90 per cent. of the heat units of combustion are imparted to the air as well as all the gases produced by the burning coal. The result is that a horse-power may be added to the compressed air by burning 0.4 lb. of coal. This is far below results obtained in any type of steam or gas engine. Two men are required to operate it, and the temperature to which it will raise the air is uncertain. Sometimes the fire goes out after the reheater is closed; sometimes too much air passes through the fire, and all the ashes are carried along with the air; and sometimes the fire burns so hot that the air is raised to temperatures which make lubrication impossible, even exceeding 1000 degrees Fahrenheit.

Colliery Notes.

In many collieries, especially where safety lamps are used exclusively, and in all mines which are dry and dusty, it is advantageous to fire shots electrically. When this method is carefully carried out, it is undoubtedly safer than the old system of hand firing.

When pillars are robbed in an irregular manner trouble from "creep" is liable to be experienced. Pillars sufficient to prevent creep in the first working are sometimes quite incapable of doing so when the work of extracting has progressed a little.

When coal undergoes washing and is put into the larry wet, it is found that the chute from larry to funnel head of oven should not be under 50 deg. if the coal is to run quickly and freely into the ovens. The end of the larry chute should not narrow too quickly, else the coal will clog.

Electric motors with a self-winding reel for carrying their feeder cable with them, and gathering from the face of rooms are becoming popular. One of these motors has been known to replace seven mules and seven drivers, and to pull 280 cars in eight hours. They can be made to stand only 30 in. over all above the rail, and will ascend a 9 per cent. grade.

In a large mine where part of the workings are distant from the surface openings, and the fan has an unusually long pull, it is found beneficial to install a "booster" fan in one of the remote air courses which gives the air a new start This fan should be 6 or 8 ft. in diameter, and cannot be run at more than 200 r.p.m. without drawing large quantities of dust.

Circular shafts are preferable to rectangular shafts: (1) when the ground requires reinforcing beyond what is economically possible in rectangular timbering; (2) where the ground is so wet that steel tubbing is necessary; and (3) where timber is expensive in comparison with masonry or concrete. Otherwise rectangular shafts possess advantages over circular shafts.

It appears probable that explosions of gas in coal mines have periods of frequency. It is during these periods that miners should take every precaution to insure safety. During such periods extra care and vigilance are needed in detecting and diluting gas, and every practicable means should be adopted to reduce to a minimum the tendency toward an explosive condition of the mine air.

Mules continually wear holes in the track over which they travel; this is especially true in wet entries and necessitates constant repairing or the injuring of the mules. A large central coal company reduced the number of mules in one of its mines from 124 to 52 by substituting electric haulage, and has not only increased its output 500 tons per day, but also, it is claimed, is getting out cheaper coal.

The ventilation of a colliery shaft while sinking is in progress is often done by compressive ventilation. The air is forced into the shaft by a powerful blower or fan, the object being to get as strong a current of air into the shaft to displace the heavy fumes from the explosives as soon after blasting as possible. In order to carry the air directly to the bottom of the shaft, wrought-iron pipe 2 ft. in diameter is used, excepting the last length or so, which is formed of heavy canvas.

It is becoming more and more evident that mule haulage is not only too expensive but also is a detriment to large output. Mules cost from $125 to $250, according to quality and location. One company using 200 mules has averaged a loss of 48 per year, or four per month. A large Western coal company, using 900 mules, killed 174 in 12 months. Counting the cost of hay and grain, and adding the loss from accidents shows mule haulage to be much more expensive than mechanical haulage by either electric motors or compressed air.

Gas is held in coal seams both mechanically as occluded gas, and chemically in bituminous matter, the extent and volume in either case being dependent on the nature of the coal. The South Wales hard coal has been found to hold mechanically 5000 cu.ft. of gas per ton, measured at ordinary temperature and pressure. The occluded gases were found to be compressed to 200 atmospheres, practically representing a pressure of 3000 lb. per sq.in. These great volumes and pressures are in part balanced and controlled by the absorptive power of the coal.

It is common to hear coal men say that an entry is in a fault when the coal has thinned down and gradually disappeared. A fault is a sudden break of the coal seam, the vein disappearing entirely up or down the line of fracture often telling which way to look for it. Before a fault is reached the coal generally becomes mixed with rock and clay, while a nearby squeeze is often indicated by a thicker seam before the coal disappears. These squeezes are entirely different from faults. The coal when found again is generally on the same level as when lost and they should not be classified as faults.

Disk coal-cutting machines are useful in running entries and rooms in narrow seams. At a colliery in Scotland, a disk machine has been successfully employed in this work for several years in a 2 ft. seam. This machine cuts a face 150 ft. in width, eight times a week of five working days. The cut is 3 ft. deep, and, consequently, the advance is 24 ft. per week. The actual time occupied in making the cut is about three hours. The undercut coal can be broken down and loaded, and the face cleaned and prepared for starting another cut within 24 hours. Operation expenses are 60 per cent. lower than under the old hand system. Other mines in the same field obtained good results from employing chain heading machines.

The coke residue found on the timber and floor of the workings after a coal-dust explosion in a colliery, bears evidence of the voluminous and rapid distillation that occurs. The coke is only visibly deposited under special conditions. Any prominent obstruction to which the soft pasty coal can adhere may retain a deposit. Where distillation is arrested, the gases may retreat, on account of the attenuated condition of the air behind, and impelled by air of normal tension in front carrying fine coal-dust in suspension. If the floors of the haulage ways could be examined immediately after such an explosion, and before the fine dust disturbed by the violent air movements settles, a fine coating of coke-dust would be found covering them.

When there is a heavy cover and a bad roof over a coal seam, and especially if the coal is of such a character that it will break up by simply undercutting, and without the use of powder, it is best to work such a property by the panel system, 25 rooms to the panel, driven only from the cross entry and not from its air course. No room should be broken into the air course ahead, but should be stopped in time to leave a 75- or 100-ft. pillar. The first room in the panel should be separated from the main entry by at least a 100-ft. pillar, and the last room in the panel should likewise have a pillar separating it from the parallel entry. Each room should have a neck 30 ft. long and 8 ft. wide. In this way the whole panel is enclosed within a barrier pillar, and as soon as the last room is driven to its limit the pillars can be brought back and the panel worked out, without injury to the haulways, by the time the rooms in the next panel ahead have been developed. The size of pillars, of course, depends on the weight of cover. One mine having poor roof and 700 ft. of sandstone above, required a barrier pillar of 200 ft. around each panel. This mine has now found it profitable to go still further and adopt a method of working where they develop all the narrow work or entries to the limits of the property, and come back with both pillars and rooms at the same time, taking up the steel and saving what few timbers have been used. This system of course entails greater first cost and a longer wait for returns; still it is a question whether or not the getting of increased tonnage per acre does not justify it. The panel system is easy of ventilation and a heavy fall of roof, or other obstruction, will not impair the air current in the whole mine. Likewise an explosion is more likely to be confined to a local area.

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 shoud be addressed to the Editor.

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

Profits in Mining.

Sir—In your editorial of March 10 to the the records of the Quincy Mining Company and the Broken Hill Proprietary Company are extremely interesting as showing the real amount of profit obtained from these mines over long periods of time.

I think it may be of interest to your readers to supplement these figures with some of the statistics of the profits made in the Witwatersrand mines from 1887 until 1905, a copy of which is communicated herewith. These figures are authentic, being compiled from the records of the different companies. It is interesting to note the gradually diminishing values per ton of the ore treated as greater depths are being reached. The cost of extraction per ton is not being lowered in anything like the same proportion, and the profit per ton appears to have been reduced very nearly one half since the resumption of work in 1901.

WITWATERSRAND STATISTICS.

Period.	No. of mines working.	Issued nominal capital of crushing mines.	Gold output.	Average number of stamps dropping.	Tons crushed.	Yield per ton.	Cost per ton.	Profit per ton.[e]	Dividends declared during period.
From 1887 till war.			£72,913,549		34,549,506	42s. 2.5d.			£18,375,028
Boer working.			1,700,000[b]		?				Nil.
1901	12		1,003,267		412,006	48s. 8.4d.[f]	24s. 10d.[f]	23s. 11.8d.[f]	415,812
1902	44		6,974,195		3,410,826	40s. 10.7d.[f]	25s. 4.2d.[f]	16s. 7.5d.[f]	2,032,374
1903	56	£25,816,030	11,844,942[a]	3975	6,002,788	39s. 5.6d.	24s. 9.5d.	14s. 8.2d.	3,345,499
1904	62	29,994,408	15,462,186	5128	8,120,215	38s. 0.1d.	24s. 3.7d.	13s. 9.3d.	3,882,044
1905		33,700,000	19,950,000[g]	6930[g]	11,160,422	35s. 6d.	23s. 8.8d.[e]	12s. 6.1d.[e]	4,861,380
			£129,848,139		63,655,673				£32,912,137

[a] £650,000 did not tank for dividend. [b] Estimated. [g] Approximately. [d] At Dec. 1, 1905. [e] Up to Sept. 30. During the first quarter the cost per ton was 24s. 4.5d., and profit per ton was 12s. 4.1d.; second quarter, cost per ton was 23s 9.8d., and profit per ton 12s. 2.8d.; third quarter cost per ton was 23s., and profit per ton was 12s. 11.5d. [c] Gold tax not allowed for. [f] These figures do not exactly agree, as some companies did not give complete figures.

On the other hand, the actual ratio of profits to capital invested (which is after all the main thing) appears to have been not only maintained but somewhat increased; this has evidently been the result of the enormous increase in treatment capacity, the number of stamps at work last year being practically double those of two years previous.

In view of the present agitation in England, over the latest situation of the Rand, these figures showing a gradual reduction in the profit per ton would seem to indicate that any action of the Government which would lead to hampering the mine operators in obtaining cheap labor might result very quickly in wiping out the present margin of profit.

E. GYBBON SPILSBURY.

New York, March 21, 1906.

Guanajuato Amalgamated Gold Mines Company.

Sir—In your issue of March 10 your correspondent in Mexico makes a statement regarding this company which I wish you would rectify, as it is incorrect. In connection with the La Luz section of Guanajuato he speaks of the properties of this company, and says that the mines controlled by us "have been worked by the sons of Mr. Adams in a haphazard way for several years."

Your correspondent is evidently mistaken. The properties controlled by this company were not acquired until last June, and work was not actually begun until last August, prior to which time neither Mr Adams nor his sons, nor this company, ever had anything to do with them. The records of the Mining Office at Guanajuato will confirm this.

GEORGE KARSCH, Secretary.

New York, March 28, 1906.

Coal Traffic on the Lakes.

Coal for the entire section about the upper lakes and the Northwest comes from Pennsylvania, West Virginia, Ohio, Indiana and Illinois. The extent to which this business is handled by water depends upon the desire of the railroads for the traffic, as expressed in attractive rates. Fully nine-tenths of the anthracite lake shipments are handled through Buffalo, the only other port of any importance being Erie. Lake Erie ports handle bituminous coal, about three-fifths being shipped from the three ports of Ashtabula, Cleveland and Toledo. Because of competition for return cargo, coal is taken by Lake Superior ore boats at little, if anything, above the cost of carriage, while fair rates may be charged on coal to Chicago and Milwaukee, to which fewer boats go. For example, the average hard-coal rate for 1904 from Buffalo to Chicago was 43.4c. per ton, to Duluth 33.9c., the distance being practically the same. The soft-coal rate from Ohio ports to Milwaukee in 1904 (none is sent to Chicago) was 47.4c. per ton, to Duluth 37.1 cents.

Mining is the art of digging minerals and ores out of the earth at the minimum of cost and with the maximum of profit.

Arkansas Coal.

The coal of the Carboniferous coal field of Arkansas is of a higher grade than any mined west of the Mississippi. Practically the whole of the Arkansas coal product—2,009,451 short tons in 1904—comes from this field. About one-half this product is classed as semi-anthracite, which burns with a short, hot, smokeless flame, similar to that of anthracite. Unlike anthracite, however, this coal is easily broken up, and in mining and handling makes a large amount (about 30 per cent.) of slack or fine coal, the greater part of which is wasted or sold at prices below the cost of production. The entire product is consumed at present by Kansas City packers.

Tests of this coal made at the experiment station maintained by the United States Geological Survey at the Louisiana Purchase Exposition in St. Louis show that it has much greater prospective value, for it was briquetted with great success. So high-grade is it that briquetting would pay, according to the U. S. Geological Survey, even if the process cost as much as $1 a ton. Carload lots of briquets made from this coal were tested last year with excellent results in locomotives of the Missouri Pacific Coal Company. Tests made this year are even more favorable. They show that this fuel, which is practically smokeless, is an excellent substitute for anthracite, and is adapted for both steaming and domestic use.

Coal Traffic on the Ohio.

On the Ohio alone, among the rivers, does there seem to have been any increase in traffic in recent years, and that is confined almost entirely to coal. The coal sent down the Ohio from Pennsylvania and West Virginia is mainly destined for Cincinnati and other Ohio river points, but a large amount traverses the entire 2200 miles to New Orleans. Fleets of coal barges in tow carrying 10,000 to 15,000 tons are made up at Pittsburg, and when the stage of water is favorable are brought down to Louisville, where they are made up into fleets of from 35,000 to 40,000 tons, destined for New Orleans. The barges are made of wood. The strongest of them, after discharging their cargo, are towed back to the mines for reloading; but 70 per cent. of them are constructed as cheaply as possible and are sold for rough lumber in or near New Orleans. This cheap method of transport makes possible a rate of $1 per ton for the distance of 2200 miles, or less than half a mill per ton mile, a rate that is superior to railroad competition.

Prussia in 1905 produced 112,999,716 tons of stove coal and 44,237,200 tons of brown coal.

The Rockwood Mine Water-Car.

The danger existing in coal mines from the presence of dust has come to be well recognized in present practice, and several means have been devised to minimize the danger of explosions from this source, which have previously been referred to in the JOURNAL. A new device is the Rockwood car, which has lately been introduced by S. B. Stine & Son, Osceola Mills, Penn.

This car consists of a steel tank mounted on a platform; as usually constructed it holds about 300 gal. Inside the tank, where it is out of the way, is a horizontal force pump arranged with a system of levers and a countershaft so that it can be operated by a detachable hand lever from the outside of the tank. There is also connection with an eccentric which is secured to the rear axle of the car; when the car moves the pump makes one complete stroke for each revolution of the wheel. The pump has a double suction and discharge, each controlled by valves.

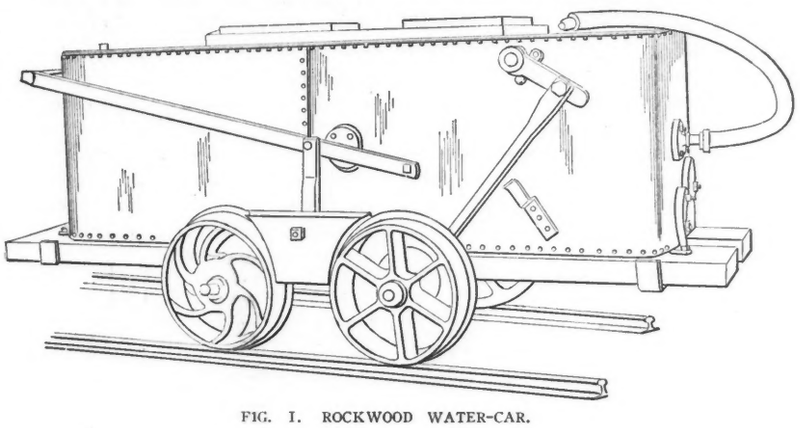


FIG. 1. ROCKWOOD WATER-CAR.

The car is shown in Figs. 1 and 2. It is filled from a sump or other supply by an arrangement of the valves. The hand lever is then used, thus pumping water from the outside and discharging into the car. The valves are then reversed and the hand lever detached and the eccentric shaft connected. The pump then takes water from the tank and discharges it in a continuous stream from the spray nozzle which is used in conjunction with a hose of suitable length. The pump meanwhile is being operated by the wheels of the car while in motion. As the nozzle is in the hands of the operator the water can be directed where most needed, washing off both sides and roof as well as wetting the bottom. Since the pump will throw a spray from 30 to 50 ft. it will reach into gob piles or cover wide rooms.

While the car is generally operated in motion at a speed corresponding to the ordinary walk of a mule, thus utilizing the traction power of the wheels, a stream can be thrown when it is at a standstill by the use of the hand lever, which may be desirable in case of fire, or at the face of rooms.

The car is in use at a number of collieries in the Tennessee coal fields, where it is said to be giving satisfaction.

Escape of Miners at Lens.

The disaster at Lens had a startling sequence on March 30, when 13 miners, who had been entombed for 20 days, were taken out of shaft No. 2, alive. The appearance of the imprisoned men caused stupefaction. A gang of salvagers had just completed their night's work, when they were startled to see a group of miners, terribly haggard and exhausted and with eyes sunken, appear from a remote part of the workings near shaft No. 2. The strongest of the party stated that they had broken out of a distant entry where they had been entombed since the disaster of March 10. The rescued men were taken up the shaft, but were unable to see, the daylight dazzling them.

One of the survivors states that for the first eight days the party ate the bark off the timbering of the mine. Later they found the body of a horse, which they cut up and ate with hay. Furthermore he said "After the explosion I groped my way about, stumbling over bodies and seeking refuge from the gases. I found some comrades sheltered in a remote niche. We ate earth and bark for eight days and then these provisions gave out. We continued to grope among the bodies, seeking for an outlet from our prison, but were forced back time and time again. We found some hay, which we ate, and two days afterward we found a dead horse, which we cut up and ate with the hay and bark. We suffered most from want of water. Finally we became desperate and separated into three parties and communicated with each other by shouts. Last night we felt a draft of fresh air, which finally guided us to an opening."

It would appear that the German life-saving corps remained at the mine for about three days only, when all hope of saving any of the entombed men was abandoned. It will probably be found that only a comparatively few men were directly killed by the explosion and that the majority perished from starvation after living for many days in great agony.

Geographic Names.

The following principles have been adopted by the United States Board on Geographic Names for guidance in the selection of place names:

Euphonious and suitable names of Indian, Spanish or French origin should be retained.

Names suggested by peculiarities of the topographic features designated—such as their form, vegetation or animal life—are generally acceptable, but duplication of names, especially within one State, should be avoided. The names "Elk," "Beaver," "Cottonwood" and "Bald" are altogether too numerous.

Names of living persons should be applied very rarely, and only those of great eminence should be thus honored.

Long and clumsily constructed names and names composed of two or more words should be avoided. If the name selected consists of more than one word the words should be combined if practicable.

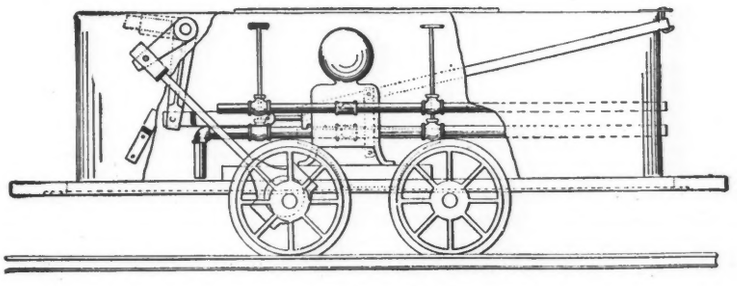


FIG. 2. ROCKWOOD WATER-CAR.

The possessive form of names should be avoided, unless the object is owned by the person whose name it bears.

The naming of forks, prongs, branches, etc., as "East Fork" or "North Prong" of a river, should be avoided unless there is special reason for it. In most cases independent names should be given to a river's branches.

The Department of Mines and Agriculture of New South Wales announces that the gold yield of this State for the year 1905 was 274,267 oz. fine, valued at £1,165,013; and that to the end of the year 1905 the State has produced 12,532,651 oz. of fine gold, valued at £53,235,286.

Ratio of Copper to Pig-Iron Consumption.

BY JAMES DOUGLAS.

The high price of copper has excited speculation as to its cause. The following statistics, giving the comparative quantity of pig iron and copper used in the various arts and industries during the last 10 years, and the ratio of consumption between the metals, may throw some light upon the subject. The column of production of iron represents also its consumption inasmuch as the trifling imports of iron and steel are nearly balanced by our exports. The home consumption of copper is taken from THE MINERAL INDUSTRY, and is calculated on the production, plus importation, minus exports. As larger or smaller quantities are carried in stock from year to year, the following years are bracketed, namely, 1897 and 1898, 1899 and 1900, 1904 and 1905. The couples then correspond closely with the average, and with the consumption of other years.

COMPARATIVE STATEMENT OF THE PRODUCTION OF IRON AND COPPER IN THE U. S. 1896—1905.

Year.	Pig iron produced and consumed. Long Tons.	Per cent. of increase.	Copper produced. Long Tons.	Per cent. of Increase.	Per cent. of copper to iron.	Tons pig iron produced to one ton copper.	Copper consumed in the U. S. Long Tons.	Tons of pig iron consumed to one ton copper.
1896	8,623,127		208,760		2.42	41	102,083	83
7	9,652,680	11.94	223,825	7.22	2.32	43	122,501	87 {78
8	11,773,934	21.97	239,241	6.89	2.03	49	122,382	{96
9	13,620,703	15.68	259,517	8.47	1.91	52	174,822	83 {78
1900	13,789,242	1.24	268,229	3.36	1.95	51	155,169	{88
1	15,878,354	15.15	271,949	1.39	1.71	58	196,836	81
2	17,821,307	12.23	288,342	6.03	1.62	62	213,300	84
3	18,009,251	1.05	319,043	10.65	1.77	56	224,026	80
4	16,497,033	*8.50	372,233	16.35	2.25	44	215,264	83 {77
5	23,010,625	39.48	413,066	10.95	1.79	56	262,678	{88
	148,676,256	12.25	2,864.205	7.92	1.93	52	1,789,061	83

* Decrease.

The production of copper shows much slighter variations than that of iron, due to the fact that the copper miners, being unprotected by either tariff or trusts, have no inducement to restrict their output to the demands of a home market, but have for many years opened and sustained commercial relations with the world at large.

What is peculiarly interesting is the ratio of home consumption of copper to that of iron. During the 10 years illustrated in the table the consumption of copper has been one ton of copper to 83 tons of iron, and so uniform is the proportionate use of the rarer to the baser metal that, assuming the bracketed years merely to correct variations due to shifting stocks or temporary disturbances, the ratio of consumption of copper to iron has never fallen below 1 to 80, nor risen above 1 to 87. But during 1905 the percentage in increase of pig iron over 1904 was 39.48 per cent. though the average for 10 years was only 12.25 per cent., while the increase of copper production in 1905 over 1904 was only 10.95 per cent., or only 3 per cent above the average.

If, therefore, there has been a demand for copper in the ratio of 1 to 83 of iron, to meet the requirements of the trade, the stocks of copper must be very low, and we need not attribute to artificial manipulation the existing scarcity. The development of our iron mines and the capacity of our iron and steel works is such that a large increase in production of raw ore and finished product can apparently be made without seriously affecting the price, but no large increase in demand can be made on either our own or the world's copper resources without producing scarcity and a high value for the metal.

Abstracts of Official Reports.

Tamarack Mining Company.

The report for 1905 shows an increase of nearly 1,000,000 lb. of copper over the previous year. Development amounted to 8450 ft., of which 5107 ft. was drifting on the conglomerate. The cost per ton of ore for mining and stamping shows a decrease; but on the basis of fine copper won the cost of production shows an increase, owing to the lower copper contents of the ore in 1905.

The operations of the two years compare as follows:

	1904.	1905.
Ore hoisted, tons	750,189	871,635
Ore stamped, tons	642,320	750,120
Mineral recovered, lb	22,662,070	24,780,945
Fine copper in mineral, %	66.022	63.855
Fine copper per ton ore stamped, lb	23.3	21.1
Fine copper produced, lb	14,961,885	15,824,008
Cost per lb. copper, for:		
Mining and stamping	10.54c.	11.31c.
Construction	1.08	0.55
Smelting, freight, selling, etc	1.36	1.51
Total cost	12.98c.	13.37c.
Cost per ton ore stamped, for:		
Mining	$1.20	$2.17
Stamping	.26	.22
Total	$2.46	$2.39

During 1905 one compound stamp, with its re-crushing rolls and concentrating apparatus, was installed in mill No. 2. The remaining six simple stamps in Nos. 1 and 2 are to be replaced by four compounds in 1906. The principal savings by the change already noted have occurred in fuel consumption and in tailing loss. Sales of copper brought in $2,448,240. Operating expenses at the mine were $1,789,243; smelting, freight and selling cost, $239,876; and $86,414 was spent on construction, leaving a net profit of $332,707, out of which dividends aggregating $300,000 were paid. Adding the balance brought up from past years, makes a surplus of $848,589 to carry forward.

Tennesssee Copper Company.

The feature of greatest interest in the operation of this company in 1905, is that raw pyrite smelting has, in this, its first complete year of trial, reduced the cost of making copper by 1c. per lb., or 46c. per ton of ore. The heap-roasting method was gradually abandoned in 1904, but during 1905, no roasted ore was smelted. Extraneous circumstances prevented a full manifestation of the benefits resulting from the change, scarcity of labor and the unfinished state of the smelter enlargement being the retarding elements.

In the course of development during the year, 1104 ft. of openings, and 1143 of diamond drill holes were made. The Burra Burra mine, the chief producer, was active throughout the year, except in February, when its shaft was being repaired. The company's two other mines, Polk County and London, in both of which mining was suspended in 1904, were re-opened in 1905. The output of each mine during the year, and the reserves of positive ore remaining in each, at the year's end, were:

	Mined, 1905.	Reserves, Dec. 31, 1905.
Burra Burra, tons	131,654	2,225,000
London, tons	63,375	445,000
Polk County, tons	17,802	315,000
Total, tons	212,831	2,985,000

Further resources, disclosed by the diamond drill, are estimated at 1,070,000 tons.

At the smelter the same equipment of three 56x180-in. water-jacketed furnaces that was formerly run on roasted ore, was in constant use throughout the year; the only alteration necessitated by the changed method was to substitute water-jacketed crucibles for the solid crucibles previously used. One of the newly constructed 56x270-in. furnaces was completed in time to go in blast in December. The tonnage of charge put through during the year consisted of: Ore, 229,116; converter slag, 14,294; blast furnace by-products, 15,647; blast furnace flue-dust briquettes, 2,802; quartz flux, 51,452; limestone flux, 332; first matte and custom matte, 54,710. Total, 368,353. The amount of coke used was 19,473 tons.

The second, or high-grade matte from blast-furnace concentration was bessemerized in two converters; a third, electrically operated, stand has been erected, and the two old ones will be reconstructed to be operated electrically, instead of hydraulically as at present. These converters treated also the Ducktown company's second matte. The comparatively high price of pig copper during 1905, rendered it uneconomical to refine any of the year's output; the refinery therefore stood idle and the whole output was sold as pig and shot copper. The fine copper yield of the year included 8,125,725 lb. in bessemer pig and 135,257 lb. in shot copper; the stock of copper in treatment was 283,000 lb. less at the end than at the beginning of the year, wherefore the net

production was 7,977,982 lb. of copper. This was equivalent to 34.82 lb. per ton of ore, or 1.74 per cent.

Based on these figures, the detailed operating costs f.o.b. cars Tennessee, are shown to be:

	Per ton Ore.	Per lb. Copper.
Mines development	$ .1712	$ .0049
Mining, hoisting, etc	.6861	.0197
Crushing and sorting	.1060	.0031
Railway	.1279	.0037
Blast furnace	1.2450	.0358
Engineering and laboratory	.0534	.0015
General	.1546	.0044
Converting	.2313	.0066
	$2.7755	$ .0797
Adjustment of ore account	.0372	.0011
Cost of fine copper in pig	$2.8127	$ .080

The corresponding totals for 1904 were $3.27 and $.0918, showing marked economy in spite of the difficulties attendant upon changes in practice. Subsequent charges in 1905 were 0.68c. per lb. of copper for freight, insurance and selling expenses and 0.52c. for taxes and general expenses, making a total cost of $0.0928 per lb. of copper sold. The selling price averaged 16.54c. per lb. for the year.

The Virginia Iron, Coal and Coke Company, under agreement with the Tennessee company, took 60,073 long tons of iron ore during the year.

The company's railway handled 305,911 tons of freight (ore, slag and matte) in its own cars, and 233,006 tons in foreign cars.

The total average force employed during the year numbered 963 men, of whom 233 were in the mines, 370 at the smelter, 187 doing construction work and the rest on railroad and miscellaneous work.

New construction finished or inaugurated in 1905, includes four 56x270-in. furnaces with flues, dust chambers and a 325-ft. brick stack, mills for mixing and charging converter linings, and new cars and bins at the smelter; new boiler house, three Nordberg cross-compound blowing-engines affording 30,000 cu.ft. of air per minute, electric generators and two additional boilers of 500 h.p. each, at the power plant; new pumping station with two 2800-gal. per min. centrifugal pumps and three 100,000-gal. storage tanks for the water supply system. Numerous dwelling houses have been built for workmen and superintendents. A large quartzite deposit 40 miles from the smelter, has been leased for 10 years, and a quarry is being opened with a plant for supplying 500 tons per day of rock suitable for flux.

Experiments on the gases from the pyrite furnace have been continued, and they indicate that the gas is sufficiently rich, while also sufficiently pure, to be utilized in making sulphuric acid; the erection of a unit with a capacity of 400 tons of acid per day, is anticipated within a year.

The treasurer's report gives the cost of mining, smelting and general operating in admirable detail; the essential items having been given above, on the basis of the ton of ore and the pound of copper, the totals need not be itemized. The profit and loss account for the year, in brief, stands thus:

Copper production, *net profit*	$482,110
Royalties, tolls, etc	61,588
Interest and discount	13,126
Total income	$556,824
Depreciation	$ 62,043
Interest on bonds	22,500
Commission and discount	20,175
Total charges	$104,718
Profit for the year 1905	$452,106
Balance from 1904	466,396
Available for dividends	$918,502
Dividend No. 3, paid	218,750
Balance carried forward	$699,752

Of the amount written off for depreciation, $37,043 was applied to the elimination of the roasting yard from the assets. Since July 1, 1901, all construction and improvements have been charged to operating; the heavy construction now under way has suspended for a time, the payment of dividends. During the year, 25,000 shares of treasury stock were sold at par, and the $625,000 is being held in the treasury, with which to enlarge the company's operations.

Questions and Answers.

Lime Roasting of Galena.

Will you kindly give me references to the Huntington-Heberlein and Savelsberg processes, and the numbers of the patents? X. Y. Z.

Answer—The literature is already extensive. As to the H.-H. process, see the JOURNAL, Oct. 20, 1904; July 6, 1905; Sept. 2, 1905; Oct. 14, 1905; Oct. 21, 1905. The Savelsberg process was described in the JOURNAL of Dec. 9, 1905. The H.-H. process is protected in the United States by patents No. 600,347 (March 8, 1898) and No. 786,814 (Apr. 11, 1905). The process is now used as described in the latter patent. The Savelsberg process is covered by patent No. 755,598 (March 22, 1904). The Carmichael-Bradford process was described in the JOURNAL of Oct. 28, 1905. It is protected by U. S. patent No. 705,904 (July 29, 1902).

The Dessau Gas Retort.

In the JOURNAL of Jan. 27, page 184, reference is made to the Dessau gas retort. Not having been able to find any reference to this in your advertisements, will you kindly furnish me the name and address of the maker, or agent, of the retort in this country? J. P. K.

Answer—We are unaware that this retort is manufactured, or represented, in this country. The patents are controlled by the Dessauer Vertical-Ofen Gesellschaft, of Berlin, Germany.

The official tests to determine the vaporizing power of New Caledonian coal are finished (*Revue Minéralogique*); they have demonstrated that this coal is 25 per cent. superior to Australian coal.

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 Mar. 30, 1906.

815,936 and 815,937. STAMP-MILL.—Martin P. Boss, San Francisco, Cal. Filed Jan. 14, 1903.

816,021. DRILL-BIT-ROTATING MECHANISM FOR ROCK-DRILLING ENGINES.—John G. Leyner, Denver, Colo. Filed June 22, 1903.

816,065. SYSTEM OF EXCAVATING AND FILLING VATS.—Hiram W. Blaisdell, Los Angeles, Cal. Filed Oct. 23, 1902.

816,071. HOISTING APPARATUS.—Jeremiah Campbell, Providence, R. I. Filed Jan. 14, 1905.

816,090. ROCK-DRILL OR ROCK-DRILLING MACHINE.—Henry Hellman and Lewis C. Bayles, Johannesburg, Transvaal. Filed Aug. 15, 1904.

816,142. PROCESS OF MAKING IRON FROM THE ORE.—Robert H. Alken, Winthrop Harbor, Ill. Filed June 1, 1903.

816,214. PEAT-OVEN.—Patrick J. Buckley, Waukesha, Wis. Filed May 27, 1905.

816,222. BLAST-FURNACE CHARGING APPARATUS.—John W. Dougherty, Steelton, Pa. Filed Mar. 17, 1905.

816,243. AMALGAMATOR.—William H. Morgan, Los Angeles, Cal. Filed June 30, 1905.

816,303. GRAPHITE-SEPARATOR.—John H Davis, Glen Falls, N. Y. Filed May 11, 1905.

816,341. WELL-DRILLING MACHINE.—William L. Knowles, Hatton, Ohio. Filed Apr. 22, 1905.

816,389. SLAG CEMENT AND METHOD OF MAKING THE SAME.—Joseph A. Shinn, Pittsburg, Pa. Filed July 8, 1901.

816,491. MAGNETIC ORE-SEPARATOR.—Richard R. Moffatt, Brooklyn, N. Y., assignor to Imperial Ore Separator Company, a Corporation of New York. Original application filed July 19, 1904.

GREAT BRITAIN.

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

Week Ended Mar. 17, 1906.

472 of 1905. BRIQUETTING MACHINE.—National Fuel Company, New York. A briquetting machine consisting of a chain of connected molds movable about two cylinders, with molding plungers carried by the molds. A mechanism for successively moving the plungers toward molding centers formed on one of the cylinders, and means of expelling the briquettes.

2532 of 1905. ZINC OXIDE PRODUCTION. W. G. Rumbold, G. Patchin and J. W. Hughes, London. A modification of the process for producing zinc oxide from complex zinc ores in which the ore is roasted, lixiviated with ferric sulphate, the other metals precipitated with metallic zinc, and the solution of zinc sulphate treated with ammonia for the precipitation of hydrated oxide of zinc.

2619 of 1905. FLUX.—A Gutensohn, London. In smelting silicious ores of low grade, the use of a flux containing five parts of borate of manganese, two and a half of fluorspar and one part of carbon.

5984 of 1905. ELECTRIC FURNACE ELECTRODE.—E. F. Price, J. G. Marshall and G. E. Cox, Niagara Falls, U. S. A. Improved form of electrode for use in calcium carbide furnaces.

6185 of 1905. COLLECTION OF FUMES.—G. A. Mower, London. Fixing a hood around furnaces, such as zinc distilling furnaces, in order to catch any escaping fumes, and drawing such fumes away by a fan to a settling chamber.

6290 of 1905. ALLOY.—M. Wagner, Wiesbaden, Germany. An alloy for use for ornamental purposes consisting of 65 to 76 per cent. tin, 20 to 25 per cent. antimony, and 4 to 10 per cent. arsenic. Plates made of this alloy show the crystalline structure in an ornamental way.

Personal.

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

Edward L. Dufourcq has returned from Peru, having arrived in New York March 29.

W. E. Defty, of Phœnix, Arizona, will be in Oregon during the early part of April.

W. G. Moore has left England for Borneo, where he will investigate gold-mining properties.

H. F. Poland, of Boston, representing the mining interests of H. C. Burrage, is visiting Butte.

F. B. Tiffany of the Gold Run Mining and Tunnel Company, of Boulder, Colo., is in the East on business.

J. D. Spargo has been appointed superintendent for the Enterprise Mining Company, at Kingman, Arizona.

O. H. Fairchild arrived in Denver a few days ago from Arizona and left on a professional trip to Washington.

W. Spencer Hutchinson, of New York, is on his way to Grant's Pass, Oregon, to examine mining properties there.

Fred G. Farish has returned from Guerrero, Mex. and is now on his way into Sinaloa on professional business.

W. H. Knowles, of Rollinsville, Colo., has returned after a visit of several weeks to Pittsburg and other Eastern cities.

John G. Goodier, manager of the Abundance Company, Breckenridge, Colo., has returned from a visit to Eastern points.

C. L. Whittle has returned to his office in Boston, after three months spent in the examination of gold properties in Costa Rica.

H. W. Hardinge has returned from London and will be in New York City for a few days. Address, care Engineers' Club.

Alex. Livingston, one of the best known civil engineers of Western Canada, has gone to the Peace River country on an exploring expedition.

J. L. Crump, of St. Paul, Minn., has been looking after mining interests of the Anglo-Saxon Mining Company at Georgetown, Colorado.

Wm. G. Mather, president of the Cleveland Cliffs Iron Company, Cleveland, has returned from a two months' trip to Germany and Scandinavia.

G. G. S. Lindsey, general manager of the Crows' Nest Pass Coal Company, has returned to Fernie, B. C., after spending some months in the East.

P. Carmody, Government analyst and professor of chemistry in the Technical School, Trinidad, British West India, is visiting friends in England.

Oscar Rohn, manager of the Pittsburg & Montana property, is recovering from a severe attack of typhoid fever. He is at the company's hotel in Butte.

Daniel M. Watters, recently at Sumpter, Oregon, has moved his office to Baker City, Oregon, and has taken over the laboratory of Frank J. Davey there.

E. W. Sebben has returned to Denver from Arizona, where he was in the interests of the Houston & Arizona Copper Company, of which he is consulting engineer.

We regret to hear that James M. Swank, general manager of the American Iron and Steel Association, has been seriously ill, having undergone an operation at a Philadelphia hospital.

Newton W. Emmens is on his way to inspect the properties of the Pittsburg & Sonora Mining Company in the district of Arizpe, Sonora, Mexico and will return to Pittsburg by way of Tonopah, Nevada.

Bruno Newman has resigned his position with the American Smelting and Refining Company at Aguascalientes, and has been appointed engineer of the Sta. Francisca mine of the same company, at Asientos, Mexico.

Flores Osmond, the eminent French metallurgist, has been awarded the Bessemer Medal for 1906 by the Council of the Iron and Steel Institute of Great Britain for his work on recalescence phenomena and in metallography.

William Brown, for the past two years superintendent of the open-hearth department of the Dominion Iron and Steel Company. Sydney, N. S., has resigned and will shortly return to the United States.

Herr Schmeisser, the director of the Berlin School of Mines and director of the Prussian Geological Survey, has been appointed head of the Department of Mines at Breslau, and Herr Bornhardt, of Bonn, has been appointed to succeed him.

Dr. Robert Bell, late acting director of the Geological Survey of Canada, will receive the medal of the Royal Geographical Society in recognition of his work as an explorer, King Edward having approved of the recommendation of the Society to that effect.

T. C. Cloud, of Steinhart, Vogel & Cloud, of London, left that city March 23 for Argentina in connection with the smelter to be erected at Chilecito for the Famatina Development Corporation. He expects to be away from London about two months.

A London press despatch dated March 24 states that, after an official inquiry, Percy Gilchrist was committed to an asylum for the insane. In collaboration with his cousin, Sidney Thomas, he invented the Thomas-Gilchrist or basic converter process of manufacturing steel.

Carl Scholtz has been appointed mining engineer for the St. Louis & San Francisco Railroad, with headquarters in the Old Colony building, Chicago. He is also mining expert for the Rock Island system, president of the Coal Valley Mining Company, of Illinois, and the Rock Island Coal Company in the Indian Territory.

F. E. Junge and H. Diederichs, of Sibley College, Cornell University, have associated themselves as consulting engineers, with headquarters at 150 Nassau street, New York. They propose to devote their attention exclusively to the subject of gas power, and have entered upon an agreement for mutual co-operation with Dr. Lucke, of Columbia University.

The British Government has awarded the Albert medal for bravery to Edward Nicholls, a West Australian miner employed in the Lake View Consols mine, Kalgoorlie. Nicholls was employed in the 1200-ft. level in the mine with two companions charging a round of holes with dynamite, when a charge exploded prematurely and seriously injured two of the men. Nicholls then, in the face of imminent danger, rescued his companions from further injury under most difficult circumstances.

Albert Peter Low, of the Dominion Geological Survey, has been appointed director of the Survey in succession to the late Dr. Dawson. The position has remained vacant for some years, during which time Dr. Robert Bell has been acting director. Mr. Low was born in Montreal in 1861 and graduted at McGill University with high honors in 1882. He immediately joined the staff of the Geological Survey and was appointed geologist in 1891. For upward of six years he was engaged in exploration work in Labrador and in 1903-04 had charge of the exploring expedition of the "Neptune" to the north of Hudson Bay, which won him world-wide recognition. He is a member of many scientific societies and in 1896 received the McGill memorial prize from the Royal Geographical Society in acknowledgment of his services to geographical science.

Obituary.

George Lansell, the well-known gold-mine owner, of Bendigo, Victoria, died in that city on March 18. Mr. Lansell was a great advocate of deep sinking and invested largely in mines which were abandoned when the water level was reached, and whenever values fell off. Mr. Lansell's mines were developed to great depths and were very profitable. He was one of the richest miners in Victoria.

Eugene Grasselli, of the Grasselli Chemical Company, died at Albuquerque, N. M., March 20, 1906. Mr. Grasselli was born in Cincinnati in 1860. His father was the founder of the well known company to which he gave his name, in which the son also won a prominent position, being a director and vice-president. Eugene Grasselli claimed Cleveland as his home, at the time of his death;

he was prominent in that city not only in other lines as in banking and trust concerns, but also was active in society, and generous in charitable work. His brother, C. A. Grasselli, is president of the company.

Societies and Technical Schools.

American Electrochemical Society—The ninth general meeting of this society is to be held from May 1-3, 1906, at Ithaca, N. Y., in the Cornell University buildings.

Massachusetts Institute of Technology—At a meeting of the Mining Engineering Society of the Institute held March 9 at the Tech. Union, in Boston, E. G. Acheson, president of the International Acheson Graphite Company, of Niagara Falls read an interesting paper on "Discovery and Invention." After brief mention of his early work Mr. Acheson told of his experiments which resulted in the production of artificial graphite, carborundum, and a new product named siloxycon. Several specimens of these products were shown the students.

American Association for the Advancement of Science—The American Association for the Advancement of Science and the twenty or more national scientific societies affiliated with it will meet in New York City on Dec. 27, 1906, and the following week. It is expected that this will be the largest and most important meeting of scientific men and of those interested in science that has been held in this country. At a meeting of the local members on Jan. 18, the members of the association and of the affiliated societies living in New York City, and within a radius of 50 miles were made a local committee, and an executive committee was elected. This committee is actively engaged in making the arrangements for the meeting, and asks the cooperation of all local members. J. McKeen Cattell, Columbia University, is secretary of the local committee.

Trade Catalogs.

Receipt is acknowledged of the following trade catalogs and circulars:

Somers, Fitler & Todd Company, Pittsburg, Penn. Folder, Price list; paper, 3 by 6 in.

The Washburn Company, Minneapolis, Minn. Catalog; Pp. 75, illustrated; paper, 6 by 9 in. 1904.

The Stephens-Adamson Manufacturing Company, Aurora, Ill., Catalog No. 7. Pp. 208; illustrated; indexed; paper, 6 by 9 in.

The Dillon Iron Works Company, Denver, Colo. Booklet, The Dillon Concentrator; Pp. 8, illustrated; paper, 6 by 9 in.

J. H. Frenier & Son, Rutland, Vt. Pamphlet, The Frenier Sand Pump; Pp. 12, illustrated; paper, 4 by 8 in. Aug. 1, 1903.

The Calkins Company, Los Angeles, Cal. Catalog "E," Appliances for Assayers; Pp. 51, illustrated; indexed; paper, 4 by 8 in.

I. Weil, 2026 Farmers Bank Building, Pittsburg, Pa. The Weil System of Endless Rope Haulage. Pp. 4; illustrated; paper, 5½ by 8⅓ inches.

Wickes Brothers, 137-139 Liberty St., New York City. Booklet, The Murphy Little Champion Rock Drills; Pp. 4, illustrated; paper, 6 by 9 in.

P. H. & F. M. Roots Company, Connersville, Ind. Catalog No. 32, Rotary Blowers, Gas Exhausters and Pumps; Pp. 20, illustrated; paper, 7 by 10 in.

Crawford & McCrimmon Company, Brazil, Ind., Hoisting and Hauling Engines, Ventilating Fans, Acid Proof Pumps. Pp. 44; illustrated; paper, 5½ by 8 inches.

The Jeffrey Manufacturing Company, Columbus, Ohio, Bulletin No. 11. The Application of Electricity to Mining. Pp. 43; illustrated; paper, 8 by 10 in. December, 1905.

The Denver Engineering Works Company, 604-605 McPhee Bldg., Denver, Colo. Bulletin No. 1019-B, Rigid Rolls for Ore Crushing; Pp. 14, illustrated; paper, 8-¼ by 10-¾ in.

Arthur Koppel Company, 66-68 Broad St., New York, N. Y. and 618 Monadnock Blk., Chicago, Ill. Catalog No. 111. Railway Materials. Pp. 48; illustrated; indexed; paper, 8 by 10 in. 1906.

Alberger Condenser Company, 95 Liberty St., New York, N. Y. Catalog No. 6. Wainwright Feed-Water Heaters and Expansion Joints. Pp. 36; illustrated; paper, 6 by 9 in. January, 1906.

C. W. Hunt Company, 45 Broadway, New York City. Pamphlet No 061. An introduction to the general line of machinery manufactured by the firm, Pp. 21, illustrated; paper, 3 by 6 in. 1906.

Harron, Rickard & McCone, 110 Fremont St., San Francisco, Cal. and 164-168 N. Los Angeles St., Los Angeles, Cal. Catalog No. 2. Supplies for Mine and Mill, Machine Shop, Saw and Planing Mill. Pp. 148; illustrated; indexed; paper, 6 by 9 in. December, 1905. Catalog No. 4. Steam Engines and Boilers. Pp. 127; illustrated; indexed; paper, 6 by 9 in. September, 1905.

Industrials.

C. W. Leavitt & Co., importers of ore, metal and alloys, 15 Cortlandt street, New York, will remove to St. Paul Building, 220 Broadway, New York, on April 21 next.

The Buffalo Forge Company, Buffalo, N. Y., tendered the heads of its departments a banquet at the Ellicott Club recently. There were 24 guests, and the affair passed off most enjoyably.

The Humphryes Manufacturing Company, Mansfield, Ohio, has opened an office at 95 William street, New York, which has been placed in charge of A. I. Laing. Samples of the company's iron and brass pumps will be carried.

R. R. Nicely has been appointed Australian representative of the J. George Leyner Engineering Works, Denver, Colo. His office is located in Melbourne, Victoria. A large stock of Leyner machine drills will be carried in Melbourne.

The Power and Mining Machinery Company, Milwaukee, Wis., has opened an office at 312 17th street, Denver, Colo. This new office is in charge of Henry F. Jurs as district manager, who will give his personal attention to all inquiries coming from Colorado, Wyoming and New Mexico.

The United States District Court for Western Pennsylvania, sitting at Pittsburg, has issued decrees in the suits for patent infringement of the Stirling Company against the Rust Boiler Company. The decisions were favorable to the Rust Boiler Company, the court holding that there had been no infringement on either patent and dismissed both suits.

Construction News.

Apex, Colorado—Machinery will be installed on the Ingram mine this season. Ira Pollard, Apex, Colo., is manager.

El Paso, Texas—The Greene Consolidated Copper Company has purchased the smelter at El Paso, and will shortly enlarge it.

San Francisco, California—Work has begun on the large smelting plant which the American Smelting Company will construct at Point San Bruno.

Griffith Mountain, Colorado—It is reported that a mill will be built on the Richmond mine. Charles Estell, Georgetown, Colo., has charge of the property.

Gold Hill, Colorado—The American Queen Gold Mining Company will put in a new mill to replace one recently destroyed by fire. L. R. Johnson, Boulder, Colo., is principal owner.

Cable Cove, Baker County, Oregon—A hoisting plant, stamp-mill and concentrators will be put in at the Ophir mine in the Cable Cove district. T. C. Gray, Baker City, Oregon, is manager.

Silver Creek, Colorado—The Sherman & Macon Mining and Milling Company has acquired a group of claims in Silver Creek district, and is preparing to put in machinery. L. L. Wheeler, Central City, Colo., is manager.

Grand Forks, British Columbia—The Granby Copper Mining and Smelting Company is contemplating an expenditure of $50,000 in replacing all the woodwork in its entire smelting plant with steel. The framework will be replaced by steel studding, and the roof will be shingled with steel shingles.

Special Correspondence.

San Francisco. March 31.

The principal topic of interest in this city during the past week has been the visit of the president of the American Smelting Company and his definite announcement that the extensive new smelting plant so long spoken of will be erected at San Bruno point on the San Francisco bay shore some 13 miles south of the city. Mr. Daniel Guggenheim, of the Guggenheim Exploration Company, the American Smelting and Refining Company and the American Smelters' Securities Company states that the new smelter will have a capacity of 45,000 tons of ore monthly, and the capital to be invested in plant and accessories will be about $5,000,000. It will be a custom smelter, and will handle not only California but Nevada ores, as well as those from Central America, Mexico, Alaska, etc. Incidentally it may be mentioned that the company has entered into a 25 years' contract with Chas. M. Schwab to smelt the ores from his Nevada mines, so that the talk of a new smelter to be built by that gentleman is disproven. Arrangements will be made to condense the fumes and sulphuric acid will be manufactured, as well as fertilizers. Ores from China may also be handled, the company having obtained valuable concessions in that country. The railroad from Valdez, Alaska, into the copper region of that district will bring ores to the seaboard cheaply, and they will be reduced at the new plant on this bay.

The Selby smelting works, now owned by the Guggenheim companies, are being enlarged, and arrangements are being carried out for condensing the fumes, so as to avoid future damage suits and manufacture sulphuric acid.

The Bay Point Smelter, above Martinez, formerly owned by the Copper King Mining Company, is being cleared up and put in shape for work, and will soon be at work again. It is probable that it will be sold to satisfy the judgment of $177,767 recently given to the Crocker-Woolworth Bank by Judge Wells. Immediately after, it is said, the smelter will be started up. For several years there has been no one at the plant except a watchman. The Copper King mine is shipping its ore to Tacoma at present and rapidly paying off its indebtedness.

The Great Western smelter at Ingot, Shasta county, has been started up again after a two weeks' shut-down due to a scarcity of fuel. A new furnace with 150 tons capacity will soon be installed at the smelter. The machinery is at Bella Vista already loaded on the wagons ready to be hauled to Ingot.

Ground has been broken at Melrose, Alameda county, for the first of a series of chemical plants for the Oakland Chemical Company. It is expected that the building and equipment of the plants will consume about two years. The first plant is to be equipped to treat for chemical values the pyrites found in the mines owned by Frank M. Smith and associates in the hills near Mills College. Sulphuric acid is the chief value to be obtained, and with the acid thus saved other chemicals are to be manufactured and other buildings and plants for that purpose erected. The new plant is located at the site of the old Melrose smelter, covering a tract of 80 acres which has been held for this purpose for several years. Frank M. Smith is president, and the most heavily interested stockholder, and H. Dupont is the secretary.

The news that the Guggenheim Exploration Company, of which John Hays Hammond is president, has finally secured control of the Nevada Consolidated group of copper mines at Ely, White Pine county, Nevada, is received with pleasure here, not only because the ores will be treated at the new Point San Bruno smelter, but because San Francisco men were the sellers. The Guggenheims secured 54 per cent. of the 1,200,000 shares at $12.50 per share, netting quite a tidy sum to the sellers, who retain 46 per cent. of the stock, now quoted at about $20 per share. The largest owners were Mark L. Requa, Fred W. Bradley and Mr. MacKenzie, Requa owning the most shares.

In a letter that was received by State Mineralogist Aubury, the statement was made over the signature of J. S. Stice, Post Office Inspector at St. Louis, Missouri, that a fraud order had been issued against the Clover Creek Quicksilver Mining Company, dated March 1. The mines of the company are in Shasta county, near Redding, California. State Mineralogist Aubury has been seeking to have procedure begun ever since October, 1904. The operations of this company were recently mentioned in the JOURNAL.

W. P. Hammon and associates have again taken up active dredging operations on the Bear river. They will operate two of the very latest types of dredge boats. The pit for the first boat is now finished and the machinery is being delivered.

After several months of untiring labor the water has been all pumped out of the Banner mine. Sinking will now commence with vigor. The Banner, which is east of Nevada City, was once a rich producer, but lay idle for a long time before the present company took hold.

People around Manvel, San Bernardino county, are much excited over a rich gold discovery between that place and Goffs. Men, women and children have taken to the little buttes, and from mining camps within a radius of 100 miles people are pouring in. The strike is located in the Vontrigger buttes, where the original strike was made by Gustave Vesner and Jacob Helderman. Early last February they uncovered a rich ledge. Quietly they pursued their development work, shipping sacks of rich ore to San Francisco. Helderman and Vesner have sold their claim to Searchlignt mining men for $150,000. It was first bonded for that amount, and last week was bought outright.

Butte. April 2.

After a two weeks' period of interruption as a result of cold weather, the mining companies of Butte have assumed a normal condition and are once more working full blast. The Gagnon mine, which was closed Feb. 7 to permit of repairs in the shaft, was re-opened today, a month sooner than was at first anticipated. During the suspension the property was put in good shape for production and with luck will be a continuous producer of copper ore for some time. It is one of the Amalgamated group and yields about 400 tons of ore a day. The Washoe smelter is again in operation in all departments. The output of copper from it this month will not be so large as last month, for during the cold spell from one to three sections of the concentrator were out of commission.

The new concentrator at the Clark plant will be finished the first week in April, and simultaneously with the beginning of work in it the new converters will be started. All of the furnaces have been connected with the flues and 352-ft. stack. These are the first converters used in this plant. Prior to their instalment the company used blister copper furnaces, which were put in three years ago as an experiment. Before the old concentrator burned the company was making about 1,600,000 lb. of copper a month. Since then it has been making only 1,000,000 lb. in its Butte plant and getting between 5,000,000 and 6,000,000 from the Washoe, to which it has been shipping about 500 tons of ore a day. These shipments will cease tomorrow.

Directors of Butte & London met March 24 and ratified the sale of a controlling interest in the stock of the company to the Venture Company, Ltd., of London. Acting on advices from London, they also elected Frederick W. Baker, John C. Montgomery and Leonard Smith, of the Venture, directors in Butte & London and granted the Venture permission to appoint the consulting engineer and select a register and transfer agent for the company in New York. The Butte & London has its shaft down about 190 ft., but is not yet through the wash on the bedrock.

Boston & Montana is shaping the West Colusa mine for greater production. It has finished cutting the station on the 1600-ft. level and is now cutting one on the 1500. When this is through, sinking will be resumed and 400 ft. added to the shaft. The company has its new 1200-ft. shaft on the Leonard almost finished and

is erecting the steel head-frame, which will be 156 ft. high.

Reins Copper has reached a depth of 1165 ft. It has 55 ft. to sink, 20 for the sump. Two pumps are to be placed on the 1200. It will take a month to finish the shaft and five weeks to cut the station and install the pumps. The north vein is supposed to be about 50 ft. from the shaft.

East Butte Copper is not doing much at present. Lessees are still mining the ground, and while they are getting some ore they are not working in large veins. The veins in this part of the district contain better values between the surface and 250-ft. mark than they do deeper.

The Butte-Milwaukee Mining Company has been organized in Butte. It has a capitalization of $3,000,000 in shares of $2 each. The company has two groups of claims, one of five in the Argenta district of Beaverhead county and the other, five claims, in Butte. Development is to begin within 30 days. John F. Cowan, Owsley block, Butte, will be manager. The Butte claims are the Pollock, Sarah, Bird, Col. Sellers and a portion of the Comstock. They are a short distance northeast of the Alice property. A 300-ft. lead of copper cropping traverses the Sarah, Bird and Col. Sellers.

Cripple Creek. March 31.

The Dorcas mill at Florence was burned to the ground this week. The cause of the fire, as far as is known, was from an electric wire. It is understood that a fair amount of insurance was on the property. The mill has been doing a large amount of business in handling Cripple Creek ores for some time past. The mill will probably not be rebuilt. The burning of the mill will not make any material difference in the handling of the ores of this district, as there are a number of other mills to do the work.

Work is being pushed on the sinking of the shaft on the Aileen property on Guyot hill. This property is being operated by John Sharpe and associates under lease. It is owned by the Morning Glory Leasing Company, which is controlled by the Woods Investment Company. The company some time ago obtained a judgment against the Mary McKinney for a considerable sum of money on the question of the apex of the vein.

Telluride, Colo. March 28.

This district was exceptionally fortunate during the recent storms, having escaped without the loss of a single life and with comparatively slight damage to property. In two adjoining counties, Ouray and San Juan, the destruction of life and property was appalling, and the practical immunity of San Miguel, within a distance of less than 20 miles, is remarkable. The damage wrought by snowslides in San Miguel county will be repaired in a few days, and the mining industry will move along with its accustomed regularity. A barricade composed of log cribbing, filled in with stone, saved the boarding and bunk houses, upper terminal of the tramway and other buildings at the Liberty Bell mines from being carried away by a gigantic slide. The bulwark was built during the summer following Feb. 28, 1902, when 19 persons were killed and buildings demolished by a stupendous slide. When the recent avalanche came down, it was deflected by the wall of stone and cribbing, and the only injury resulting was to the trestle-work between the mouth of the working tunnel and upper terminal of the tramway. After the slides the employees came down town and remained several days, but the mines and mill are again operating as usual.

A slide in Bear creek basin broke in the side of the 10-stamp mill on the property of the Adams Gold Mining and Milling Company and tore out the lower terminal of the tramway, necessitating the closing down of the mine and mill until the tram is repaired. In the Ophir section a slide crushed in the side of the Carribeau mill, another gave the Butterfly mill a severe shaking up, and a third carried out a bridge on the county road between Ophir Loop and San Bernardo. On the Morning Star mine, in Bilk creek basin, a slide crushed the boarding and bunkhouse and blacksmith shop like egg shells, but fortunately the timber in the bunkhouse held up the debris in such a way as to enable the few occupants to crawl out alive.

Leadville. March 29.

Mayor S. M. McElroy, of Pittsburg, has been in the camp for the past few days, and asserts positively that the financial end of the Shinn tunnel is all right, and that whenever the snow disappears from the head of Empire gulch to permit of surface work being carried on ground will be broken for the tunnel.

A deal is nearly completed by eastern parties and Al Lynch, the owner of the Blue Bell group of claims, consisting of 108 acres in Big Evans basin and adjoining the Resurrection. The eastern people have sent out experts who have thoroughly examined the ground and the adjoining mines, and the report was favorable.

The owners of the Miller claim, Lackawanna gulch, have been at work all winter on the mill and mine. The five-stamp mill will be completed and running inside of a few weeks.

The Mammoth shaft, Big Evans gulch, is down 565 ft., and the last few feet a heavy flow of dolomite sand was encountered, which retarded the progress of sinking, as it clogged the valves of the pumps. This has been overcome and the shaft is again being sent down through heavily mineralized matter.

Considerable work is being carried on this winter at and near Winfield, at the head of Clear creek.

The lessees on the Ibex are shipping in the neighborhood of 9,000 tons per month, mostly silicious ore, and the average value holds up to $10 per ton. This is outside of the Nicholson lease in the zinc body. Some work is being carried on in virgin ground and the results so far have been satisfactory. In the immense body of low-grade silicious ore, there are frequently found rich pockets of gold ore.

Good progress is being made driving the main drift from the breast of the Yak tunnel to the Golden Eagle, and this week a double track is being laid. From the upper workings of the mine 20 tons daily of silicious ore are being sent to the smelter.

Work has been started on the Bug Gold tunnel, Big English gulch, and it will be driven to the main orebody opened in the shaft. There is plenty of low-grade gold ore in this mine and the driving of the tunnel is to prospect it at greater depth and to drain the mine.

The tunnel of the Emerald Mining Company, West Sheep mountain, is in 130 ft., and is being driven on the vein, which carries values in silver and lead.

The Tucson shaft, belonging to the Iron Silver Mining Company, and the extension east of the Moyer, is down 900 ft., and is in the parting quartzite; about another 100 ft. will be sunk before drifting to the orebody opened by the diamond drill is started. The Moyer is shipping steadily 300 tons daily.

The tunnel being driven by the East Lake Creek Mining and Milling Company, is now in 60 ft., leaving 400 ft. still to be driven before the cross-cut reaches the veins opened on the surface. The property is located in Eagle county, at the head of Lake creek, which joins the Holy Cross range.

Salt Lake City. March 31.

Last week's ore and bullion settlements, as reported by Salt Lake banks, aggregated $428,500.

The Boston Consolidated Mining Company, operating at Bingham, has placed an order for a new compressor which will double the present air supply, giving enough for the operation of 45 drills. The development of the porphyry zone continues vigorously by the extension of several tunnels into the mountain.

Practically all the contracts for the Ogden smelter of the Utah Smelting Company have been let and excavations have started. The Colorado Iron Works Company will build the 150-ton matting furnace with which the plant is to be equipped; the Allis-Chalmers Company will equip the sampling mill, and James J. Burke, a Salt Lake mechanical engineer, was awarded the contract for the 150-ft. stack and flues.

A series of bad washouts on the line of the San Pedro, Los Angeles & Salt Lake Railroad has temporarily paralyzed ore traffic to Salt Lake smelters from southern Nevada camps. It may be several weeks before traffic is resumed.

A suit instituted by Arthur S. Wilfley, inventor of the concentrator bearing that name, and the Mine and Smelter Supply Company against the Utah Copper and Daly West mining companies, and involving the use of Overstrom tables, has been decided in the Federal Court in favor of the plaintiffs. The validity of the Overstrom patents was not attacked in this action, but the defendant companies were charged with having changed the riffles on the table so as to make them conflict with the Wilfley patents. The damages were arranged out of court.

The management of the Utah Copper Company has placed an order with the Risdon Iron Works of San Francisco for 80 vanners, which are to be operated in addition to the 52 now in use.

The American Smelting and Refining Company has been made defendant in another damage suit on account of smelter fumes. The plaintiffs are Oscar J. and Abram J. Reese, farmers, who ask the court for $37,440, alleged value of crops, live stock, etc., injured or destroyed during the years 1903-1905.

The head offices of the Balaklalla Consolidated Copper Company, heretofore maintained in Salt Lake, have been moved to San Francisco. The company's mines are in Shasta county, California.

Engineers of the Tintic Mining and Development Company, owner of the Yampa mine at Bingham, are in the field locating a right of way for an aerial tramway to operate between the mine and smelter in lower Bingham.

Growing interest is being taken in mining in the Deep Creek country in western Utah. The Clifton district, which is one of several in Deep Creek, has been the scene of some important developments during the past few months. The vein opened in the Gold Hill mine on the 100 is not only extensive, but carries good values. Capt. Duncan McVichie, general manager of the Bingham Consolidated, and associates, are the heaviest shareholders.

The Bingham Consolidated Mining and Smelting Company has been smelting copper ores for the American Smelting and Refining Company, which was unable, owing to lack of equipment, to take care of the ore contracted for. The Bingham's contract with the American has terminated and the latter is now filling the bins at the new Garfield smelter with ores from the Utah Copper, Cactus and Boston Consolidated mines, which have gone to the Bingham smelter. The Dalton & Lark will supply the Bingham smelter with a large tonnage of lead ores; the Commercial mine at Bingham will supply low-grade copper ore, while the Eagle & Blue Bell, of Tintic, contains bodies of silicious lead, silver, copper and gold ores. The company will continue to buy custom ores. While nothing official has been given out, the impression prevails that the Bingham properties are now controlled by Augustus F. Heinze and associates.

Joplin, Mo. March 31.

C. T. Orr, manager of the Missouri Zinc Fields lease at Webb City and the Boston-Aurora Mining Company's land at Aurora, reports a recent discovery of a 25-ft. face of zinc ore at a depth of 250 ft. in a new shaft at Aurora. This is one of the deepest mines in the district.

The Bailey lease on the Hamilton land north of Joplin was this week taken over by Coyne & Hatten, of Webb City, for a consideration of $50,000. They immediately transferred it to the LeRoy Mining Company, of Pittsburg, Penn. A new 150-ton concentrating plant will be erected at once.

John F. Wise and John Malang, of Joplin, closed a deal this week whereby the Bradford-Kansas City mine and 40-acre fee located just north of the Center Creek Mining Company's lease at Webb City was transferred to a company composed of New York, Indiana, Michigan and Joplin parties. The consideration was $150,000 cash.

The Rogers Mining Company, operating on the Guinn land north of Webb City, who had the misfortune to lose the new mill by fire the first day it operated, will immediately begin the erection of another one. Their loss was about $20,000.

The Vantage Lead and Zinc Company, of Webb City, has filed articles of incorporation, with a capital stock of $500,000 in 500,000 shares of $1 par value each.

A company composed of Carthage parties will soon begin the erection of a large tailing mill on the Luscombe land in south Carterville. The mill will be much larger than the ordinary tailing mill and will cost about $8,000.

Calumet, Mich. April 3.

The greatest activity in exploratory work in the Lake Superior copper district this season will be at the northern and southern extremities. While there will be considerable new work prosecuted on the properties between these two points, in Houghton county, the pronounced activity will be in Keweenaw and Ontonagon counties.

Deeds to the Norwich and Lafayette mines in Ontonagon county have been given to the Copper Crown Mining Company by Alfred Meads, of Marquette. The delay in the formal transfer of these properties was caused by legal technicalities. The Copper Crown Company proposes to prosecute work at the Norwich, where the old openings will be unwatered and new equipment installed. The Meads vein, an amygdaloid 35 to 45 ft. in width and fairly well charged with copper, will be explored first.

With the exception of the Victoria, the Norwich is the most important property west of the Ontonagon river. It has produced 1,000,000 lb. of refined copper. The Lafayette is located in the western section of the Porcupine mountain district, and was worked by the nomadic tribes which frequented the lake region centuries ago. Alexander Henry, an English explorer, and one of the first white men to visit the district, did a little work on the Lafayette location in 1673.

Diamond drill work on the lands of the Keweenaw Copper Company in Keweenaw county is progressing steadily. One drill is located on the western part of the Resolute property, near the Calumet & Hecla's Delaware tract, and is searching for the Montreal river lode. This bed has already been opened on the Keweenaw's Mandan property, directly eastward, by diamond drilling, and copper is shown in the cores. The formation has also been extensively developed directly westward by the Calumet & Hecla, which has done diamond-drill work, test-pitting and shaft-work on the Delaware tract. The Keweenaw's drill is being driven vertically, and has reached a depth of 600 ft. At a point 1200 ft. east of this hole, another hole is being primed by means of a jumper drill. This jumper drill will penetrate the overburden and case the hole with a sand pipe, through which the diamond drill will be operated.

At the Mandan property a diamond drill has reached a depth of 500 ft., in the search for the Kearsarge amygdaloid bed The core will form a portion of the cross-section which is being made of the property, and it is probable that the hole will be driven to a vertical depth of 1500 ft., the capacity of the drill being 3000 ft. At present 30 men are employed.

The approaching summer will witness considerable exploratory work in Ontonagon county other than that conducted by the companies already in the field, it is believed. Last summer the Mulock tract, west of the Hamilton, received some attention, and it is presumed that work will be resumed there this season. Another exploratory party is expected to do some work upon the Garlick and Andrews properties, near Union Bay. The Walsh farm, east of the Victoria, may be explored, some copper having been found last year. The Tremont & Devon Company, a close corporation formed by a dozen Lake Superior mining men, owns property west of the Victoria, and if the latter proves a success will start work. Thomas F. Cole, of Duluth, Minn., is credited with owning lands immediately west of the Tremont & Devon tract.

Tamarack-Osceola Stamp Mills—Work on the 40,000,000-gal. pump which is being erected for the joint use of the stamp mills of the Tamarack and Osceola companies has been progressing for

10 months, and is nearing completion. The new pump is a duplicate of one already in commission. As soon as it goes into service a smaller pump will be laid up and held as a reserve.

Scranton. April 3.

Prompt action was taken by all the anthracite coal carrying companies upon the receipt of the telegram from John Mitchell directing the mine workers to suspend work, pending the making of an agreement with the operators. It was a distinct surprise to both operators and mine workers. Although the whistles will blow as usual, it is not expected that many men will disobey the order. The suspension will, however, be of short duration, according to the sentiments freely expressed by the men. They are greatly discouraged by the elaborate preparations immediately made by the companies. The miners who discuss the order of Mitchell console themselves with the thought that they are not out on strike, but are merely awaiting developments. One of the officials who attended the conference stated: "There has been some surprise at our action. In the absence of a working agreement what could the miner do but cease work? That has been our stand all along; a determination to have a definite understanding with the operators concerning terms of labor. We have had an agreement for the past three years, and now we want a new working agreement. That is the situation in a nutshell."

The first step taken by the coal companies was the posting of notices that they stood ready to continue operations under the provisions of the Anthracite Commission's award. The Delaware, Lackawanna & Western Company operated four washeries on Sunday, the first day of the suspension and no trouble was reported.

All the companies in the anthracite region, with the exception of the Delaware, Lackawanna & Western, have made various arrangements for the protection of the breakers and other properties. Men have been hired as special officers, while hundreds of men have been secured for working the washeries in case the suspension is prolonged. Eighty-six men were imported to Dunmore on Sunday, and will be placed at work immediately. Other companies will concentrate work on one colliery with as many men as can be secured, and will increase the number of collieries in operation according to the number of men who can be hired.

The Philadelphia & Reading Company, as soon as the suspension was ordered, issued directions to its officers over the entire system to confiscate and hold for the use of the company all coal that was being shipped over the lines. Immediately long trains of coal were confiscated. The other railroads are issuing similar orders. A. Pardee & Co., of Hazleton, gave orders for the branding of all their mules in case they were placed in pasture during a strike.

The exchange of coal lands between the Lackawanna and the Lehigh & Wilkes-Barre Company was effected last week, when a deed was filed for the transfer to the Lackawanna of seven tracts of land lying between Wilkes-Barre and Nanticoke, which will make the company the sole owners of the land between the two places named. The Lehigh & Wilkes-Barre Company will, in exchange, receive the Pettebone colliery and some coal land now owned by the Lackawanna.

The Parrish Coal Company has obtained a lease from the Lehigh & Wilkes-Barre Coal Company to mine coal in the Baltimore vein in Plymouth.

A Philadelphia syndicate is prospecting for anthracite in Little mountain, Beaver Meadow. If successful, the operations may be extended the entire length of Beaver Valley.

A dastardly attempt was made a few days ago to wreck the Greenough colliery near Shamokin, one of the hotbeds of lawlessness during the last strike. A stick of dualin had been placed in the machinery of the fan with the result that the fan was totally destroyed, and work had to be suspended until another could be placed.

A fire which had a remarkable origin is now raging in the Beaver Brook mine. A small engine drawing culm cars on the culm bank suddenly fell into a cave-in. Before any steps could be taken the engine disappeared in the big hole, the crew escaping. The fire in the locomotive set fire to the coal in the mine, and it is feared that the work of fighting the fire will be expensive and prolonged. The officials have constructed a flume from the breaker to the cave, and a large volume of water is being turned into the mine.

The new Susquehanna washery of the Hillside Coal and Iron Company was placed in operation last week.

The foremen of the Kingston Coal Company have formed an association for the purpose of mutual improvement, and the formation of a library to be used by all the employees of the company. The company will furnish a room.

Toronto. March 31.

The main shaft of La Rose mine at Cobalt has been sunk to the 200-ft. level and next week drifting will be started at that point. The south winze, 150 ft. distant from the main shaft, is also at the 200-ft. level. The mine has been developed by 500 ft. of drifting on the 90-ft. level with winzes to the surface. To the north on this drift the veins carry good values, the ore occurring in bunches. The southern drift is more regular, and in neither direction are there signs of the vein failing. At the bottom of the 200-ft. level the richest ore so far found in the mine was encountered, comprising large slabs of native silver and argentite. This was found altogether away from the vein in country rock. The ore at this level retains its general character. Some extensive shipments from this mine have recently been made.

Agents of Thomas A. Edison at Cobalt are offering to take all the cobalt ore that can be supplied at 35c. per pound, with full price for 90 per cent. of the silver content. The unwillingness of refiners to allow anything on account of the cobalt content of the ore has long been a cause of complaint.

The depth of snow in the woods still delays the opening of the prospecting season. Owing to the township of Coleman being practically all taken up, attention is being directed to the adjoining township of Bucke, where some good finds have been made. In this locality much of the Huronian rock is covered with drift, rendering prospecting slow and difficult. The McBride location in this township is the most important find hitherto made outside of Coleman township, and is rich in smaltite, with some native silver. The Green claim has an important vein of cobalt, with a cross-vein carrying silver. The Leith claim has a large cobalt vein averaging 10 to 12 in. solid smaltite. The shaft of the latter is down 80 ft., and a mass of smaltite weighing 800 lb. was taken out not long since.

The high price of lead has acted as a stimulus to the lead mining and refining industry. The Stanley smelting works at Bannockburn, in Hastings county, operated by the Ontario Mining and Smelting Company, shipped a car-load of lead pig to Toronto last week. The new smelter is running steadily, hematite from the Eldorado mine being used for fluxing.

Sudbury, Ont. March 26.

The cancellation of 100 more leases in the Rainy River district has been announced by the Ontario *Government Gazette*. The action of the Department of Lands and Mines is approved of and puts an end to parties holding properties under leases *ad infinitum*, thus tying up the country and retarding its development.

The rush of prospectors and others into the Cobalt country is unprecedented and every day brings a train-load of people. In fact, the commissioners are wisely considering the placing of another train daily to meet the demand of travel. Notwithstanding the inclement weather, development work proceeds and the village of Cobalt has developed into a fair-sized town within the last few months. Several parties endeavored to operate a diamond drill on Cobalt lake, adjoining the town. They erected a wooden building on the ice and were preparing to examine the bottom of the lake when they were ordered to discontinue work. It has been hinted upon several occasion that there are rich

deposits on the lake bottom, and several have made applications for leases to test same, but so far the Department has withheld the granting of same.

Other applications have been received to operate and mine beneath the right-of-way of the railroad, but so far no privileges have been granted. The next vexing problem that the Government will have to deal with is the disposition of the claims on the timber limit of Gillies Bros., some of which were taken up and surveyed before the order in council was passed prohibiting prospecting thereon. There are quite a number of good showings on the limit, and considerable work has been done on some of the properties. The Department has returned all papers and applications, together with all money paid in behalf of same, to the applicants, informing them that their applications cannot be entertained. The Department has further ordered the limit-holders to cut the pine therefrom and lumbering operations are now in progress with this end in view. What disposition will be made after the timber has been cleared is at present a secret; several remedies have been suggested, but so far none have been acted upon. The richness of the country and the high prices paid for claims are not assisting the solution of the matter, and the situation is a complex one.

The McBride brothers have sold their claim in the township of Bucke, realizing $85,000 and retaining one-fifth interest in the property.

The district is alive with agents of companies selling stock, and it is a repetition, only on a larger scale, of Rossland during the mining boom of 1896-7.

Major Leckie and Hiram Hixon returned from the annual meeting of the Canadian Mining Institute at Quebec last week. Mr. Hixon's paper on "The Ore Deposits and Geology of the Sudbury District" elicited much comment and was much appreciated by students of geology in this section.

A discovery of asbestos has been made on a lot on the northerly limit of Coleman township in the Cobalt district, and bordering on the township line of Bucke. The vein is 10 in. wide.

The Rat Portage Diamond Drill Company is at work on the Crane Hill nickel property near Victoria mines. Considerable drilling has been done on the property, which is owned by the Canadian Copper Company and is under the management of Captain Boss.

Victoria, B. C. March 24.

Kamloops—The following reference to mining in the Kamloops district in 1905 was made in the recently issued annual report of the local Board of Trade: "Development in our camp has continued without abatement during the year, and some carloads of ore were shipped as smelter tests by claims under development. The Iron Mask has maintained its reputation as an ore producer, shipments having been 343 cars, representing 6847 tons of ore and 20 tons of copper matte. The operating plants of this mine were considerably augmented, and as the orebodies show no diminution the management looks forward to a prosperous future.

East Kootenay—The output of the Crow's Nest Pass Coal Company's collieries for the week ended March 2 was 19,769 tons of coal or a daily average for the six-day week of 3295 tons. That of the corresponding week of 1905 was 18,113 tons, or an average of 3019 tons per day.

It is reported that all construction work toward an increase of the treatment capacity of the lead smelter at Marysville, in the Fort Steele mining division of East Kootenay, has been stopped. It is understood that a deal is pending for the transfer of the Sullivan Group Company's mine and the smelter, and that construction work will not be resumed until after this deal shall have been completed or abandoned. Only one of the two 100-ton lead stacks is being operated, as there is not a sufficient roasting capacity to provide suitable ore for both to be run simultaneously. The Huntington-Heberlein process is in use at these works, but the large percentage of zinc in the Sullivan ore makes it a diffcult ore to reduce.

Mexico. March 26.

It is understood that the Venture Corporation, holding an option on the properties of the Peregrinas Mining and Milling Company, of Guanajuato, at $2,500,000 gold, has asked for an extension on time, for by reason of its recent purchases in other districts it is not just now prepared to make payments. As the Peregrinas Company has, since giving the option, opened up considerable more ore, it is questionable whether the option will be extended at the same figure, and George W. Bryant is now in New York in this connection.

In a paper read by Dwight Furness recently before the Guanajuato Saturday Night Club he showed that the monthly expenditures of the mining companies in that camp at the beginning of 1905 were but $80,000 Mexican, while by the end of 1905 they had reached $200,000, and it was estimated that at the end of this year they will increase to $400,000; that Jan. 1, 1905, saw 90 stamps dropping, which, with the "patios," were treating 300 tons of ore daily, and the year closed with 200 stamps treating 600 tons daily, or 200,000 tons a year, with an estimated value of $4,000,000 Mexican. The new work already projected for this year will bring the total up to 700 stamps, with a capacity of 2000 tons daily, or 700,000 tons a year, valued at $14,000,000 Mexican, being about 50 per cent. higher than any previous production of the camp in its palmiest days of bonanza times, and from which there should be a profit of at least $5,000,000 Mexican. Preparations to treat the low-grade ores and the immense old dumps, together with the work of new capital that is continually coming in, should see great increases to this in 1907 and 1908.

In Jalisco the Boca Aucha Mining Company, of 34 Monroe street, Chicago, with C. E. Lee, of Chicago, president; C. C. Bruckner, Guadalajara, vice-president and treasurer, and G. E. Purnell, general manager, has acquired 10 pertinencias (25 acres) in the Paruaso district, 60 miles southwest of Ameca, and is preparing for the erection of a 10-stamp concentrating and cyanide mill.

Chas. Butters, of the Butters Mining Syndicate, is negotiating for several rich properties at Hostotipaquillo. George L. Cuming has completed his survey for Carlos Romero of the projected railroad from this camp to Tequesquite to connect with the proposed line of the Southern Pacific or Mexican International between Durango and Guadalajara. The Santo Domingo Mining Company has been organized, with Wm. B. Davis, U. S. consular agent at Guadalajara, as president and M. M. Mathews, vice-president and general manager, as a sub-company of a large development company being formed in St. Louis, Mo., with a capital of $5,000,000 gold, by Chas. H. Brooks, to take over the Iguana and other mines in Etzatlan; also the Santa Maria group of the Dwight Furness Company in Hostotipaquillo, being 161 acres across the Santiago river from the San Pedro Analco Mining Company. On this river the latter company is preparing to erect a 5000-h.p. electric-power plant for the working of its Cinco Minas, Tamara and other properties.

The Ohio-Mexican Mining Company, of Cincinnati, John Henderson, general manager, is building a 60-ton smelter at Caborca, 70 miles west of the Santa Ana station on the Sonora Railroad, and has in contemplation a railroad of its own to the California Gulf coast, a distance of 75 miles.

Aguascalientes, Mexico March 26.

The Aguascalientes Metal Company is the owner of a heavy producing group, located in the State of Aguascalientes. The stock is practically held by the Doerr family. Edward Doerr, whose death a few years ago was widely lamented, founded the company. The various claims, composing the group, represent the labor of several years. Some were acquired by purchase, others by denouncement under the Mexican laws. At first, because of the total lack of capital, the mines were operated on the Mexican plan. Ore was mined in the ancient workings by following the rich seams and stringers. Hoisting was conducted over notched ladders, and upon men's backs. Sorting was performed on the dump, without the use of any mechanical appliances. When water

was encountered it reached the surface in oil cans, carried by boys. The ore produced was transported to the railroad on burros. Railroad freight cars, the only modern factor in the transaction, finally carried the mine product to market. The holdings of the company in the section under consideration consist of two groups. The most important, known as the Mercedes mine, is located within three miles of the town, Asientos, centuries old, and enjoying a national reputation as a mining center. The other group, of minor importance, is located some three miles distant from another famous mining town, called Tepezala. Surrounding both groups on every side are producing properties, or properties that have played important parts in the history of Mexican copper production. An experienced member of the Doerr family is resident manager. Persistence under the most adverse circumstances, has finally crowned his labors with success. Albert Doerr is a graduate of the German mining schools, and still continues his studies in the field, keeping abreast of all the newest developments in his profession by travel and study.

From the beginning mining proved profitable. The surplus, instead of being distributed among the owners, oftentimes the ruin of Mexican mining enterprises, was accumulated for the purpose of introducing the most modern mining processes. A little over a year ago study was devoted to the installation of American machinery. Immediate needs demanded a plant for hoisting, for drilling and for electric lighting, on the surface and underground. The purchases finally made embraced a steam turbine, a dynamo, an electric hoisting engine, an electric lighting plant, together with electric drills. The old Mexican shaft was straightened and enlarged. Cables were placed as guides. A large bucket is employed for ore hoisting. A device, invented by Mr. Doerr, serves to unload automatically, and subsequently to place the ore and rock where most convenient for sorting or for ultimate discharge into the waste pile. The levels are illuminated by incandescent lamps, rendering unnecessary the carrying of candles, except where blasting is carried on. Fortunately for the profits of the concern, no water of consequence has been encountered. Eighty-two meters is the greatest depth attained in the lowest workings. The freedom until now enjoyed from this costly and disturbing element can be counted upon for another 100 feet.

Santa Francisca mine, an adjoining property, owned by the American Smelting and Refining Company, is pumping 500 gal. per minute. Singular to relate, no complaint is heard at these mines concerning the scarcity of labor. Patience and consideration were the traits solving the problem here. Double the number employed are readily procurable. All work, whether underground or surface, is performed by either task or contract. Mining in the stopes is paid for at $1 Mexican per meter length of drill-hole. Development work, either sinking or driving, is carried on by linear meter.

Parral, Mexico. March 26.

The Veta Colorado Mining and Smelting Company is installing a 1500-h.p. electrical power plant. The company is shipping 3000 tons of ore monthly. A three-compartment shaft, now down 400 ft., is being sunk to a depth of 1000 ft.

The Hidalgo Mining Company, at Mina Nueva, is shipping 5000 tons of ore monthly to the smelter and is getting its mill in shape to start up in about two months' time. It is expected that its capacity will be increased to 150 tons per day.

In the Zaynes shaft in the San Francisco del Oro mine a body of sulphide ore is being developed. In No. 2 level the vein is about 27 ft. in width.

In the Santo Tomaso mine No. 3 level, 400 ft. north, is in ore, and for 800 ft. south there is a good showing. In both the above mines, owned by the San Francisco del Oro Mines Company, it is estimated there is already 20 years' ore developed. At present the company is employing 350 men and is erecting a large power plant, consisting of electric motors, air compressors, electric hoists and pumps. The company is shipping 1500 tons of ore monthly to the Torreon smelter. J. E. Hyslop, Parral, is general manager.

The American Smelters Securities Company is rebuilding its mill. It will be increased to 400 tons daily capacity. This mill will treat argentiferous lead ore. The ore will be coarsely crushed, sized and treated in Hartz jigs, Wilfley tables and Frue vanners. A magnetic plant will treat the zinc middling. Gas producers will supply gas to American Crossley gas engines of 220 h.p. each, which will drive alternating-current electric generators. The power plant will have a total capacity of 1500 h.p. Hugh Rose is superintendent.

Paris. March 15.

Some little time ago it was reported in this letter that freight cars of 40 tons capacity were authorized for use on French railways. As these are quite new to French constructors, it may be imagined that there are few firms ready or able to deliver satisfactory cars of this description. The American pressed-steel mineral cars should find a ready sale in France just now, if well represented, and for the following reasons: (1) The lack of French enterprise in this direction, whereby no firms are able as yet to quote for these wagons. (2) The recent appeal of M. Gauthier, Minister of Public Works, who has issued a protest against the dearth of freight cars on French railways, and requests that attention be given to the matter of construction and supply by French firms. (3) The fact that there will be shortly a great need of improved and increased facilities for handling goods, in view of the improved conditions of trade in France, and (4) the fact that the German State railways are securing an additional lot of 679 locomotives and 16,665 wagons, of which some 14,700 are freight cars, will stimulate effort on the French side of the frontier. In this connection it would be perhaps inadvisable to introduce American wheels and axles into France with any importation of cars. The requirements of French railways are special in this particular, and wheels and axles can be procured here to suit the conditions.

Paris is not without some of the large electric-power stations which characterize New York and London. At St. Denis, on the north of Paris, the Société d'Electricité de Paris has constructed a large turbine station, the output of which is used mostly for the Paris Metropolitan Railway. It includes at the present moment four 6000-kw. turbo-alternator groups of the Brown-Boveri-Parsons type, constucted at the works of the Compagnie Electro-Mecanique at Bourget, France. There are six new groups of the same size on order, thus bringing the output of the station up to about 60,000 kilowatts.

There is another large power station designed for the supply of current to some of the principal Paris tramway companies, and this will be situated on the Seine, in the southeastern part of Paris. The Compagnie Générale de Distribution d'Energie Electrique, of 12 Rue de Londres, in conjunction with the Compagnie des Grands Travaux de Marseilles, has undertaken the work, which will be pushed forward to be completed within 18 months. The total output of the station will eventually be 50,000 or 60,000 kw., and the machines at present on order include two 5000-kw. three-phase Curtis turbo-generators, 13,200 volts, 25 cycles. These are being supplied by the Compagnie Française Thomson-Houston, Paris, which will also supply the remainder of the electrical equipment of the station. This firm is in the market for the supply of accessory power-station material, including boilers, transporters, stokers, and generally all that pertains to the equipment of a large steam-turbine power station, and offers of services may be made to them at 10 Rue de Londres, Paris.

London. March 24.

The disaster at the Camp Bird mine, Ouray, Colo., has naturally has a depressing effect on English shareholders and the official quotation has dropped. The bulk of the shares of this company are now held for dividends and the speculation in connection with them is confined within very narrow limits. The company has £120,000 undivided profit in hand, so that all the damage can be made good without raising any further capital. It is not prob-

able that shareholders will know the exact amount of damage done by the avalanche until the beginning of summer.

Last week I mentioned the Salt Union, Ltd., and gave some account of the present state of its finances. This week the report of the United Alkali Company has been issued. Though the history of these two combines is nearly identical, the present position of the United Alkali Company is much more hopeful than that of the Salt Union. During 1905 the net profit of the United Alkali Company was £426,000, which is a distinct advance and is the highest profit made since 1893. This, however, is not sufficient to provide any dividend on the ordinary shares, which have now gone without any distribution since 1896. In fact, the total return to ordinary shareholders since the commencement of the company in 1892 has only been 14 per cent., of which 11 per cent. was paid during the first two years of the company's existence. The company, as has been repeatedly mentioned in these columns, is weighted with £9,000,000 capital, divided equally between debentures, preferences and ordinary shares. It was floated in the heyday of the British chemical trade, before German and American competition became acute. Comparatively little of the profits are written off year by year for depreciation, and hardly anything is put to reserve fund, so that it cannot be said that the finances are in perfect condition. For some years now I have pointed out that the company would never be in a sound condition until the capital was drastically written down, but the various interests among the shareholders prevents this question from being even discussed.

Toward the end of last year you published an account of the position of the British South Africa Company, as outlined in the report for the year ended March 31, 1905. At the time the balance sheet of the company for that period had not been published—in fact, the balance sheet that was published with the report was for the year ended March 31, 1904. It has always been a mystery why these financial statements were not published earlier, and it was felt that efforts ought to be made to bring the finances more up to date. It is of interest, therefore, to note that the balance sheet for the year ended March 31, 1905, has now been issued. It fully confirms the opinion expressed in your article that the expenditure would continue to exceed the income. Southern Rhodesia is the most important and the most developed of the company's territory. Its income during the year specified was £456,000 and the expenditure £590,000. The income of the remainder of the territory was £48,000 and the expenditure £150,000. The company estimates that the income and expenditure of Southern Rhodesia will within a short time more evenly balance, but in previous years the estimates have been equally optimistic.

Johannesburg. Feb. 10.

This is a trying time for the mines employing Chinese, for the Celestials have been celebrating their new year with great pomp and circumstance. Under the importation ordinance they were entitled to three days' holiday, and it is almost impossible to induce them to work during that period. They will carry out such essential work as pumping, but the ordinary routine labor was forsaken for these three days. The holidays started on the Chinese new year's eve, when the coolies quit work. Those mines employing Chinese labor solely found it impossible to keep the stamps crushing during the holidays, and were forced to close down from 48 to 60 hours. On some mines employing a number of Kafirs it was possible to keep the mill going by tramming the accumulated ore from the mines.

On the mines where only Kafir labor is used the holidays were unnoticed, for, unlike the Chinaman, the Kafir has no national day or days for celebrating.

The festivities went off quietly. As this is the great peace time of the year with the Chinese, when everyone pays his debts and is on his best behavior, there was no danger of outrages. Coolies from one compound paid visits to neighboring mines, to wish the compliments of the season.

Some mines were more elaborate in their celebrations than others. There was a variety of entertainment. Chinese sports were the feature of the day in some compounds, while at others the coolies sat for hours listening to theatrical performances.

Unless we get an abundant rainfall during the next three months, many mines will be in a serous state during the dry season. So far the rainfall for this season is far below the average. The dearth of rain has affected agriculture. In Johannesburg the rainfall has been much more abundant than in the east or west Rand.

Another mill has commenced crushing in the Klerksdorp district. There is much need of successful mines in this part of the country, where there has been so much disappointment. Lord Selborne on a recent visit started off the 40-stamp battery of the Klerksdorp Gold and Diamond Co. Labor scarcity and the need of adjustment of machinery have delayed matters considerably. Samples from the ore average 8 dwt. The screening used is 900 mesh and as the gold of the property is flakey and coarse, a good deal is retained in the die sands, which are very rich. Another mine in the Klerksdorp district which promises to be a success, is the West Bonanza. A battery of 20 heavy stamps, with cyanide and slime plant, is now complete, and as there is a lot of good ore developed this mine should be a success.

Gold shares have been more or less neglected for tin shares. The tin people are encouraged by a report made by Mr. W. Frecheville.

General Mining News.

ALABAMA.

JEFFERSON COUNTY.

Imperial Coal and Coke Company—This company has been organized in Birmingham with capital stock $30,000. The officers in the company are: Y. A. Dyer, president; H. Hammond, secretary, and J. C. Persons, vice-president. The new concern has acquired the coal mines of R. D. Smith, at Bradford and Dixiana, 18 miles north of Birmingham, on the Birmingham Mineral railroad, and in addtion, 302 coke ovens. The purchase price was $106,500. The mines will be actively operated, and further development will take place.

WALKER COUNTY.

Some large deals are under negotiation for coal lands adjoining the Jefferson county line. The Southern Railway has filed notice with the Secretary of State that a branch, one dozen miles in length, will be constructed along the Warrior river to traverse the coal-fields which are to be developed. The Ensley Southern railroad, from Ensley, in Jefferson county to Parrish, in Walker county, is part of the development.

ARIZONA.

YAVAPAI COUNTY.

Arizona Smelting Company—The works of this company were put in operation on March 19, and it is reported that everything moved off in a satisfactory manner. These works are particularly interesting, in view of the fact that reverberatory furnaces fired by oil fuel are employed, this being the first installation of that kind on a large scale.

CALIFORNIA.

AMADOR COUNTY.

Mitchell—This mine, near Pine Grove, has been closed down, the parties holding the bond not being satisfied with the result of crushings in their five-stamp mill.

CALAVERAS COUNTY.

Stockton Ridge—At this gravel mine near Mokelumne Hill, D. A. Nuner superintendent, the tunnel has reached 800 ft. and has 100 ft. to be cut to reach the gravel channel.

Phoenix—This mine, adjoining the Reed at Central Hill, will soon be started up again by a San Francisco company.

Lloyd—This gravel mine, Central Hill, Chas. Nielson, superintendent, is being worked through the east shaft with good results. The gravel found at that point is not cemented, so is washed without milling.

Galena—This mine at West Point is working 14 men on eight-hour shifts under management of John McCuch; a fine body of ore was recently struck in the bottom of the shaft.

Volcano—At this property near West Point, C. J. Numan, superintendent, sinking is going on and new machinery has been ordered. There is a large body of ore in the tunnel and the 10-stamp mill is running steadily.

EL DORADO COUNTY.

Vivian—At this mine, Greenwood, a 10-stamp mill is to be installed as soon as weather conditions permit. The vein is 4 ft. wide at the 60-ft. station.

Lilly Emma—This copper mine, near Coloma, is under bond and considerable development work will shortly be done by the intending purchasers.

INYO COUNTY.

Great Western Ore Purchasing Company—This company will have its new smelting plant at Keeler in running order within a few weeks. The capacity will be 150 tons daily. The ore will be transferred by traction engine from Cerro Gordo.

Wellington Group—A strike has been made in this group in Coso district, the ledge being a large one and carrying values from $3 to $22 per ton in gold.

KERN COUNTY.

Chase Creek Copper Mining Company—The tunnel on these claims near Tehachepi is now in over 1200 ft., cutting veins at a depth of 700 ft. The tunnel is to cut through the continuation of the Longfellow lead, and until this is done no ore will be shipped.

NEVADA COUNTY.

Sierra Nevada Mines and Development Company—This company, owning 14 quartz claims in Gaston district, will start a new tunnel this spring, and when the orebodies are sufficiently developed will build a mill. The vein is a very wide one.

SACRAMENTO COUNTY.

Blue Ravine—The damage by caving of ground in this mine near Folsom, has been repaired, and work is again progressing under Superintendent Henry Trentman. The prospects are considered quite encouraging.

SHASTA COUNTY.

Midas Mining Company—In this mine, Harrison Gulch (Knob P. O.), 40 men are now doing development work. The company is getting the mine into shape to resume ore extraction on an extensive scale. The shaft is being deepened to open up the mine on lower levels.

Bully Hill Copper Mining Company—The smelter of this company will shortly close down pending extensive improvements and remodeling. The old Copper City tramway is being repaired and a standard gage track added. Ore from the Winthrop mine will be conveyed by electric power.

National—The new cyanide plant of this mine, in Reed Gulch, near Buckeye, is now in regular operation. The 10-stamp mill is kept busy on ore and 25 men are on the payroll.

SIERRA COUNTY.

Royal Quartz Mining Company—This company, recently incorporated by Los Angeles men, is to work the Royal mine at Sierra City, near the old Sierra Butte property.

SISKIYOU COUNTY.

Shaft Rock Mining Company—This property, on Enterprise creek, four miles from Gottsville, is about to be properly opened, and a road is being built to haul machinery and supplies. A 20-stamp mill has been purchased and will be installed as soon as circumstances permit.

Six Mile—This property at Cecilville has been bonded by W. H. Young to H. Janse and will now be developed.

Kingsbury Gulch—The Layman Bros., of Hayfork, have struck very good gravel in the back channel of this mine, and numbers of nuggets are being found.

TRINITY COUNTY.

Bullychoop Mining Company— At this property 75 men are now employed building roads, sawmills, preparing for an electric power plant and development of the mine. The 10-stamp mill is connected with the mine by aerial tramway, and 10 stamps are to be added. W. R. Beall is the superintendent.

COLORADO.

BOULDER COUNTY.

American Queen Gold Mining Company—The shaft-building and machinery of the Cash mine at Gold Hill was destroyed by fire, March 15, entailing a loss of $6000, with no insurance. Property was producing about $20,000 per month and 60 men were thrown out of work. L. R. Johnston, Boulder, is one of the principal owners, and a new equipment will go on.

CLEAR CREEK COUNTY.

International Mining Company—This company has purchased for $7,000 the Mendota group of three claims and water rights on Santa Fe mountain from W. H. Doherty. Property is located near Idaho Springs.

Continental Mines, Power and Reduction Company—This company is asking for bids for driving the Seeman tunnel from 1000 to 5000 ft. on Fall river. A power plant is to be installed and the company figure on a mill in the future. H. I. Seeman, Equitable building, Denver, Colorado, is manager.

Pay Rock—It is reported that arrangements are being made for the resumption of work on this property, one of the former lead-silver-ore producers in upper Clear Creek. Hendrie & Bolthoff, of Denver, are the owners. The property is equipped with machinery and 50-ton concentrating plant.

Big Forty Mining Company—The Last Chance claim in Trail creek district has been sold to this company by R. W. McKenzie.

Main Gulch Mining and Milling Company—This company has been formed to operate the Smuggler group on Brown mountain; machinery is being overhauled and heavy developments are planned. J. R. Hutchinson, Silver Plume, is in charge.

GILPIN COUNTY.

Gilpin County Chamber of Commerce—This is a new organization which has for objects the advertisement and betterment of the county. The new body starts out with nearly 200 members; the annual dues are $10 and the directors are: R. L. Martin, J. C. Fleschhutz and H. C. Eastman, of Central City: H. C. Bolsinger, of Nevadaville; E. R. Fouts, of Russel Gulch; T. Dunstone and J. L. Robins, of Black Hawk; Lieut. C. S. Ripley, of Apex. The board has selected as secretary P. R. Alsdorf, of Central City; W. A. Frank, of Central City, treasurer.

SAN MIGUEL COUNTY.

Buckeye Mining and Leasing Company—This company was recently incorporated by Melvin Edwards, Albert C. Krez and John L. Donahue for $100,000 in 10,000 shares of a par value of $10. Win J. Morgan, John Manser and H. Semler constitute the first board of directors. James L. Brown and Baptiste Mattiotti, of Telluride, are general manager and superintendent, respectively. The company has leased the Butterfly-Terrible group of mines and 30-stamp mill at Ophir Loop, 14 miles from Telluride, for a long term, subject to the lease of M. Mongrandi on some of the upper workings of the Butterfly and 10 stamps of the mill for a period of two years from Dec. 1 ,1905. The lessee has begun extensive development. The mill-tunnel level, which has been projected about 1200 ft., will be continued 1300 ft. more to get under the ore-shoot in the Ida vein, which will give a block of stoping ground 750 ft. in hight by nearly 1000 in length. The lessee of the upper workings has been taking out mineral which has been yielding $14.70 in gold on the plates, and concentrates in addition.

IDAHO.

SHOSHONE COUNTY.

Snow Storm—This property, near Mullan, is shipping 200 tons of copper ore daily.

KOOTENAI COUNTY.

Panhandle Smelting Company — This company has erected a lead smelter near Sandpoint. Its buyers are now making contracts for ore to enable blowing-in to commence about May 1.

IDAHO COUNTY.

Thunder Mountain Gold Mine Company—This Philadelphia company is purchasing five additional stamps and a 40-ton cyanide mill from the Bradley Engineer-

ing and Machinery Company, of Spokane, to be installed at once on its Champion group near Elk City. The plant should be running in 30 days, for a millwright has the timbers all framed. It will supplement a five-stamp mill which has been treating the ores of the higher-grade vein since last August. The property also includes a portion of a low-grade gold dike, believed to be an extension of the Hogan or Crooked river mine, which has its mill only a mile and a half away. It is expected that tests of the ore from the reef, assaying about $2.50 a ton, will be made in the mill.

INDIAN TERRITORY.

R. E. Wipfler, chief engineer of the Rock Island Coal Company; John H. Mitchell, prospector for the Chicago, Rock Island & Pacific Railway, with C. W. Brown, of Comanche, I. T., and R. V. Le Grand, of Dallas, Tex., have been at work from Comanche to Ardmore, 60 miles, examining the deposits of asphalt, grahamite and gilsonite, which are largely controlled by Brown and Le Grand; also the oil territory near Ardmore, which is being prospected in the interest of the Santa Fe Railroad.

KENTUCKY.

Green River Coal and Mining Company—The stockholders of this new company have elected the following officers and directors: C. H. Shattuck, president; Lysander Dudley, vice-president; J. W. Dudley, Jr., secretary; J. H. Grogg, treasurer; H. H. Moss, Reese Blizzard, J. M. Dare, Gordon C. Enoch, B. D. Stout, W. F. Harvey, A. D. James, W. U. Grider, E. M. Gilkeson, E. L. Morgan and W. H. Wolfe, directors. The company holds options on coal property in Ohio and Muhlenberg counties, Kentucky. The tract is located on the Green river in Kentucky and on the lines of the Louisville & Nashville and Illinois Central railroads. If its purchase is closed arrangements will be made to develop daily output of 10,000 tons of coal. The capital stock is $1,500,000; the office is in Parkersburg, West Virginia.

LOUISIANA.

CALCASIEU PARISH.

Jennings—Crowley Oil & Mineral Company No. 18 came in gushing at the rate of 10,000 bbl., but as no preparation had been made for such a large output it had to be shut off. This caused the well to sand up, but when cleaned it will be a large producer.

The Jennings Oil Refinery, which has been idle for more than one year, has resumed operations under the management of Theile & Brack, who expect to produce lubricating and illuminating in addition to solar oil.

In 1905, Louisiana produced about 10,000,000 bbl. crude, of which 7,200,000 were shipped. Present output is 23,000 bbl. daily; prices 28c. per barrel.

ST. MARTIN'S PARISH.

Anse Le Butte—Shipments of crude are now being sent through the new 4-in. line from the field to Breaux Bridge. The pipe-line is owned jointly by the Heyward Oil Company, Lake Oil Company and the Louisiana Oil Company. The largest oil operators in the South look on this field as the most promising one for development. It now has five producing wells and others are being drilled by the Guffey Petroleum Company. Louisana Oil Company is now down 1000 ft. and Lake Oil Company No. 3 is down 2200 feet.

MARYLAND.

ALLEGANY COUNTY.

Consolidation Coal Company—At the annual meeting in Baltimore recently, S. Davies Warfield and Grier Hersch, of Baltimore, and former Governor A. B. Fleming, of West Virginia, were elected directors to succeed Edward R. Bacon, of New York, and George M. Shriver and C. W. Woolford, of Baltimore, who resigned. C. W. Watson was re-elected president by the stockholders. The gross earnings of the company for the year 1905 were $4,165,437; the surplus, after paying fixed charges and depreciation, was $1,017,289, from which dividends amounting to $615,000 were paid. The coal mined was 2,096,213 tons, an increase of 62,842 tons over 1904.

In his report President Watson states that in November the Board authorized the purchase, for $400,000, of a majority of the stocks and $400,000 par value of the bonds of the Southern Coal & Transportation Company, whose property is located at Berryburg, West Virginia, consisting of some 4,500 acres of the Pittsburg seam of coal, equipped with a modern plant and producing about 250,000 tons per annum. This was done.

MICHIGAN.

HOUGHTON COUNTY—COPPER.

Baltic—The new compressor for No. 2 shaft will be ready to go into commission early in May, when production on a permanent basis will start at that opening. Work on the steel rock and shaft-house is advancing rapidly. It is enclosed, and the interior is being finished. The permanent hoist has been installed for some time, and the boiler equipment is completed. As the mine is operating up to the limit of its compressor capacity, it will be impossible for No. 2 shaft to become a source of production on a large scale until the new compressor is installed. No work has been done underground in No. 2 shaft for some time.

Mayflower—Work is confined to the crosscut which is being driven eastward from the shaft on the 580-ft. level. This crosscut recently cut a lode offering some promise and the formation is being investigated by a drift going north on its course.

Old Colony—Crosscutting eastward from the shaft at the 700-ft. level has progressed 87 ft. without encountering anything of an encouraging nature. If nothing of value is found at the present depth within a reasonably short time sinking will be resumed in the shaft.

Rhode Island—Another diamond drill hole is being put down upon the Kearsarge amygdaloid bed. It is going down on the dip and will extract a core from the lode at great depth. Two holes already opened positively identified the formation by intercepting the Wolverine sandstone.

MONTANA.

FERGUS COUNTY.

Kendall Gold Mining Company—This company, of which Finch & Campbell, of Spokane, have the management, declared its regular monthly dividend of three cents a share or $15,000, March 20. No. ore has yet been found in the sinking shaft, below the cyaniding rock. However, there is much ore still in the upper workings, and the exploration in depth is confidently expected to result in the discovery of new orebodies.

NEW MEXICO.

LUNA COUNTY.

Mining activity in Luna county has been rapidly increasing the past few months. Mining men from the East are investigating properties and several deals are now pending.

Several carloads of machinery and lumber have arrived for the old Florida camp southeast of town, which was recently purchased by R. C. Arnold, of St. Louis.

Much activity is being revived in the Tres Hermanos district, 25 miles south of Deming, where extensive work is being done in the lead and zinc mines owned by Frank Thurmond and others.

Ore is rapidly being shipped to the smelter of the Luna Lead Company, and as soon as the extensive improvements now nearing completion on the plant are finished a large force of men will be put to work operating the smelter.

OREGON.

GRANT COUNTY.

Standard Consolidated Mines Company—This company, operating in eastern Oregon, is reported to have a vein, which contains ore rich in silver, together with an average of 2 to 4 per cent. of cobalt, a small percentage of nickel and a high percentage of arsenic.

Crane Placers—Fred Burbidge, of Burch & Burbidge, recently visited the Crane Flat placer grounds near Granite. The dredge taken into the camp last year from the old placer camp of Murray, Idaho, was worked enough to prove the value of the ground, which went about 15c. a yard. This year a new dredge manager has been secured, who expects to put through about 800 yds. a day.

PENNSYLVANIA.

ANTHRACITE COAL.

Washery Coal—The production of marketable coal from the washeries in the anthracite region in 1905 showed a considerable falling off as compared with previous years. The heaviest shipments by the washeries were in 1903, when 3,963,606 tons were sent to market. In 1904 the product fell to 2,800,466 tons, and in 1905 to 2,644,045 tons, which was 4.3 per cent. of the total production in the year. A decrease in the washery output is to be expected, as the more profitable of the old culm banks in the anthracite country are worked out.

Philadelphia & Reading Coal and Iron Company—This company's statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	ary.	Eight Mos
Earnings	$2,943,199	$23,861,243
Expenses	2,741,695	22,247,345
Net earnings	$ 201,504	$ 1,613,898

For the eight months the earnings increased $678,927, and the expenses $662,316; leaving an increase of $16,611 in net earnings.

Lehigh Coal and Navigation Company—The company's statement for 1905 shows that the revenue from all sources amounted to $3,422,662. General expenses, taxes and interest were $1,305,265; coal land sinking fund, $121,415; depreciation of mine plant, $200,000; a total of $1,626,680, leaving a balance of $1,795,982. From this dividends of 8 per cent. were paid on the stock, amounting to $1,387,604, and the balance of $408,376 was placed to credit of profit and loss.

The coal mined by the company was as follows, in long tons:

	1904. Tons.	1904. Per Ct.	1905. Tons.	1905. Per Ct.
Shipped to market	2,045,549	91.1	2,428,304	91.6
Used at mines	199,495	8.9	223,234	8.4
Total	2,245,044	100.0	2,651,538	100.0

The increase in coal mined was 406,494 tons, or 18.1 per cent.; in coal shipped, 382,755 tons, or 18.7 per cent. In addition to the coal shipped by the company 95,341 tons were mined by the Alliance Coal Company, a controlled operation. The proportion of large and steam sizes made for two years past was as follows:

	1904.	1905.
Prepared, chestnut and over	48.5	48.7
Pea coal	13.8	13.8
Buckwheat	15.2	15.1
No. 2 buckwheat, or rice	22.5	22.4
Total small sizes	51.5	51.3

The report says: "The large percentage of the small and cheaper sizes produced by this company, as compared with other companies in the anthracite region, is due largely to physical reasons, relating to the coal as found in the ground. The veins on this company's property are unusually thick, and the increased thickness is largely made up of coal of friable nature; further, the dips of the veins are very steep, causing more or less crushing of the coal. In addition to the above, this company has been most careful in saving the small sizes in the preparation of its coal, and has been able to find a market for them, instead of wasting the coal on the dirt banks. . . .

"Ten collieries were in operation during the year, without any serious interruptions due to accidents or other causes. . . .

"The average time worked at each of our collieries was 242.65 days, as compared with 233.71 days in 1904. The cost of mining and preparing coal was $1.75 per ton, a decrease of 4.2c. compared with that of 1904. This decrease in cost was due to the increased tonnage and increased facilities furnished, both of which are the result of the large sums spent in the last few years on coal improvements. The cost of mining coal at the collieries owned by the company, based on the production of all sizes, exclusive of the coal used by the company in its mining operations, and including all expenditures for extraordinary improvements, consisting of work on two new breakers, two new shafts, extinguishing old fires, additions to boiler plants to burn refuse coal, was $1.905 per ton."

SOUTH DAKOTA.

CUSTER COUNTY.

Ivanhoe—The stamp mill on the company's ground started up a few days ago. The main ledge has recently been encountered in the east drift and the ore averages $5 a ton. It is largely free-milling. Dr. Ratte is the manager of this company.

Clare Bell—The two-stamp mill on this property is running only at nights, as the engine runs the sawmill during the daytime. About $65 is the net production per night. The sawmill is busy turning out lumber for the proposed annex to the mill. The capacity of the mill will be increased to 10 stamps. Tests are now being made of the tailings with a view to putting in a cyanide annex to the mill.

LAWRENCE COUNTY.

Minnesota—The work of draining the shaft on this property by means of a tunnel has been completed. The shaft passed through the flat formation at about the 200-ft. level, and has now been sunk 14 ft. into the verticals below. A well defined vein of ore has been encountered. Funds are being raised for the prosecution of work.

Spearfish—The bullion output for January was about $13,000 and the February output will be about the same. The ore shows a marked improvement, the main drift in the Black Diamond claim showing a face of ore 8 ft. thick, 18 ft. wide and averaging about $13 a ton. The course of this ore shoot indicates considerable length. Some ore is being taken from the Metallic Streak but the grade is much lower than that found in the Black Diamond.

Gold Stake—The main tunnel has been driven more than 1700 ft., 138 ft. being made during February. It is expected to reach the vein in about 300 ft. more. This is a close corporation, most of the stock being held by local and California parties.

Gilt Edge-Maid—New tanks have been ordered for the mill which will be changed to a dry-crushing process. The capacity of the mill will be increased 50 per cent. A compressor and drills, to be driven by electric power, are being installed. The company has immense quantities of low-grade ore in sight.

Dizzy—An incline shaft is being sunk on this property on False Bottom, west of the Maitland. About 205 ft. is the distance to quartzite and the shaft has now been sunk 75 ft.

PENNINGTON COUNTY.

Bullion—A new body of ore has been cut by the lower tunnel for a length of several hundred feet. A force of men is employed in timbering and straightening the tunnels and putting the workings in shape for operation. As there are large quantities of ore in sight no more development work will be done until the mill is ready to run, which will be some time early in the summer. The Bullion rock is heavily mineralized with arsenical pyrite carrying high values in gold, Several thousand tons of this ore have been milled in test runs at different times and the results have justified the erection of the mill.

TEXAS.

JEFFERSON COUNTY.

Beaumont—The Heywood Oil Company paid its 18th dividend of 3 per cent. this month, making a total of $424,000 paid stockholders. Operations are more active at Spindletop than for a long period, the quality of the crude and the advance in prices make the operation of a 50-bbl. pumper profitable, so that new wells are being drilled and old ones cleaned out and deepened. The Guffey Petroleum Company is the largest operator. Others drilling wells are: James Sharp Paulhamus Oil Company, Gordon & Nelson, Phillips & Co., Sheppard & McCauley, Henderson & Brass, J C. Wilson, L. Solinsky & Bowles Brothers, Moore & Pater and Bass & Moore.

The prices for crude have been advanced 2c. in all fields. Production and present prices of the different fields are as follows: Spindletop, 4300 bbl., 54c.; Batson 6600 bbl., 35c.; Sour Lake, 6900 bbl., 45c.; Saratoga, 5700 bbl., 36c.; Humble, 7000 bbl., 39c.; Jennings, 23,000 bbl., 28c.; The estimated 1905 production of Texas fields is 29,500,000 bbl. Wells completed in Southeastern fields March 1 to 15, 13; producers, 9; dry holes, 4; abandoned, 32; drilling, 66 rigs.

holes, 4; abandoned, 32; drilling, 66 rigs

UTAH.

JUAB COUNTY.

Scranton—Conditions are favorable for a large output of ore from Tintic property this year. The ore carries high-grade zinc values.

Godiva Mill—This plant will probably be in commission in April.

May Day—The past few weeks have witnessed some important developments in this property, and the management is preparing to make an increase in regular shipments.

PIUTE COUNTY.

Sevier—This company is now running a mill in the Gold Mountain district, and is preparing to do custom work for many prospects, which heretofore have been held back by the excessive cost of hauling, freighting and smelting charges on their product. At present the district is practically undeveloped, but it is considered to have valuable resources and good prospects for the future.

SALT LAKE COUNTY.

Butler Liberal—At this Bingham property the tunnel now being driven has cut a body of high-grade lead ore. A sampling of 2 ft. across the face showed average values of 60 per cent. lead and 8 oz. silver.

Bingham Central—The $250,000 worth of bonds, recently subscribed for, have been signed by the proper officials and sent to the Morton Trust Company, New York, to be registered for subsequent delivery. This company is getting ready for a very active campaign of development.

Continental Alta—The late storms have greatly interfered with the repairing of the tramway damaged by snowslides at Alta. The management expects to have the line in operation in April.

City Rocks—This company has paid all but $100,000 on the purchase price of its Alta property. With the opening of spring an active shipping campaign will be inaugurated.

SUMMIT COUNTY.

Park City Shipments—During the past week shipments amounted to 5,050,000 lb., of which the Silver King furnished, 2,000,000; Daly West, 1,150,000; Daly Judge, crude ore and concentrate, 970,000; ditto, zinc middlings, 654,000; other mines, 276,000 pounds.

Jupiter—Conditions at this property are looking excellent, and the company is shipping considerable high-grade ore.

Monarch—Development work will soon be inaugurated at this property. The Jupiter orebody, from which shipments are being made, penetrates this group.

WEBER COUNTY.

Utah Smelter—The railway spurs to the site of this plant will be completed within the next 10 days. The management is preparing to push the construction. David Eccles, of Ogden, is president of the company.

WASHINGTON.

FERRY COUNTY.

Copper World—This adjoins the Copper World Extension mine. It is stated by the management that work will soon be resumed, with a view to continuous operation. So far the work done on this property has been confined to the surface, and a tunnel which has crossed a part of the vein at little depth of consequence, but the prospects of the property appear bright.

Copper World Extension—The south crosscut on the 200-ft. level, after intersecting the ore heretofore reported, has passed through 23 ft. of solid copper-gold ore, with a large excess of iron, thence through strata of country rock and stringers of ore 36 ft. The latest report is that the crosscut intersected 10 ft. of quartzite and again ran into solid ore.

STEVENS COUNTY.

Copper King—This mine, in Chewelah district, is working and shipping an excellent quantity of copper-gold ore. There is considerable activity in mining circles in this district, and several mines have been bonded recently.

Old Dominion—This mine, the oldest in the State of Washington, has been idle for a year and a half.

Kettle River Marble Company—This company is operating its quarry at Barstow. The Jefferson Marble Company has been operating the last six months. The Crystal marble quarries, west of Addy, are in operation.

Standard Marble & Onyx Company—Preparation is being made for extensive operations the coming summer, at the quarries, five miles east of Colville.

WEST VIRGINIA.

Fairmont Coal Company—This company operates mines in the Fairmont district, covering several counties. The report for 1905 gives the shipments as follows, in short tons:

	1904.	1905.	Changes.
Coal mined	3,750,176	3,748,230	D. 1,946
Coke sold	68,473	106,085	I. 37,612
Crushed coke sold	3,747	10,955	I. 7,208

The gross earnings for 1905 were $3,518,674, and the net earnings $699,709. The gross earnings were $0.94 per ton of coal reported.

KANAWHA COUNTY.

Olcott Coal and Iron Company—This company has been organized, with $500,000 capital stock, to take over 6000 acres of land on Brier creek, formerly owned by the Emmons Tract Coal Company, and recently sold by order of the court. The officers are: R. Morgan Olcott, president; Duncan B. Cannon, vice-president; A. de Costa Gomez, secretary and treasurer, all of New York. The directors include, besides Messsrs. Olcott and Cannon, T. A. Potts and John B. Loree, of New York, and S. B. Avis, of Charleston. The company intends to open up coal mines and also to mine iron ore.

WAYNE COUNTY.

Le Roy Coal Mining Company—This company has been organized at Preston to develop a tract of 960 acres of coal land. It is proposed to put in a mining plant to have a capacity of 500 tons per day. Officers of the company are C. V. LeRoy, of Preston, president and general manager; Charles R. LeRoy, Dingess, W. Va., vice-president; W. T. Cook, Dingess, W. Va., secretary; Harry C. LeRoy, Huntington, W. Va., treasurer; Henry Mace Payne, Williamson, W. Va., engineer in charge.

Foreign Mining News.

CANADA.

NOVA SCOTIA.

Coal shipments reported for the two months ending Feb. 28, were 369,137 tons in 1905, and 591,257 tons in 1906; an increase of 222,120 tons, or 60.2 per cent. The shipments this year by companies were: Dominion, 357,089; Cumberland, 85,173; Nova Scotia Steel, 66,116; Intercolonial, 39,141; Acadia, 38,514; Gowrie and Blockhouse, 5224 tons.

QUEBEC.

A molybdenite deposit has been discovered in the township of Egan, on the Gatineau river, about 80 miles north of Ottawa, on the Lachance farm. Numerous indications of the mineral have been found in this vicinity.

The Union Asbestos Mines at Black Lake in the Eastern Townships, in the heart of the asbestos region and operated by German capitalists, has been bonded by John Mackintosh, of Ottawa. The area covered by operations is 104 acres of asbestos land. The property was first operated in 1888 and has been worked intermittently since that time. Two mills with a capacity of 100 tons of asbestos rock daily handle the output of the mine.

YUKON TERRITORY.

The Dominion Railway Commission has been called on to take action in connection with the freight charges of the White Horse Pass Railroad in the Yukon which, it is claimed, prevent mining operations from being profitably carried on on any extended scale. The line runs from Skagway, Alaska, to White Horse in the Yukon, a distance of 112 miles. During the last season freight on one dredge forwarded by the Anheuser-Busch syndicate, of St. Louis, to operate on the Klondike, was $40,000. The commissioners held that, while they had power to order a reduction, the difficulty would still remain, as the company might then in-

crease the charges over the American portion of the road. Judge Dawson, of St. Louis, who represents the syndicate, will accordingly invoke the aid of the United States Interstate Commerce Commission, to see whether redress could not be had from that quarter. Governor McInnes, of the Yukon, asserts that the freight charges are so exorbitant as to absorb half the products of the mining industry.

Coal Trade Review.

NEW YORK, April 4.

Work was stopped April 1 throughout the anthracite region, but the Miners' Union does not call it a strike, but a suspension. The men, however, were called out on the ground that the contract has terminated, and that there will be no working agreement in existence until the new conference is concluded. The miners representatives met the operators' committee on Tuesday, April 3, and several days will probably be occupied in discussion. The general feeling seems to be that some ground of compromise will be found, and neither a long suspension nor a serious strike is expected. The anthracite operators are firm in their intention to maintain the "open shop" principle, but may be willing to make some minor concessions.

The Joint Conference Committee of the coal operators and the miners of the central competitive district at Indianapolis reached a total disagreement on March 27. All propositions made by either the operators or miners were rejected and on motion the conference was declared adjourned. The miners held a meeting and voted to call out the men except in mines where contracts are signed with operators willing to pay the 1903 scale for two years. Developments thus far indicate that the strike will not be of the extent at first anticipated. The action of the miners in deciding to make partial agreements by districts bids fair to relieve the situation before it bears heavily upon the public.

The National Executive Board of the Miners' Association held an all-day meeting March 31, arranging to carry out the policy of authorizing district and sub-district officers to supervise the making of contracts where operators indicate their willingness to grant the 5.55 per cent. increase in wages and the other conditions of the scale of 1903 for a period of two years. No general strike order has been issued by the board. The local unions have been requested to quit work until they are ordered back under the new contracts.

The miners were not a unit in giving up the principle of Interstate negotiation. They have heretofore refused to settle, except with all the operators in the Central district. Some of the miners, including Vice-President Lewis, thought that the course adopted would be fatal to the Interstate agreement, which it had taken years to gain. However, President Mitchell and about two-thirds of the delegates were willing to take the chances. It looks now as though the miners had acted wisely, since a number of operators in addition to Mr. Robbins, have indicated their willingness to sign the 1903 scale.

On the whole the public is encouraged over the outlook and it is believed that all of the operators will have signed the contracts within 10 days. The miners are especially pleased with the outlook and expect to be back at work again under contracts that will enable them to make more money.

On the other hand, President Kolsem of the Indiana Operators' Association says that not 2 per cent. of the output can be signed; that the operators already signed have small mines and few of them are members of the association. The Indiana Operators' Association will hold a meeting in Terre Haute this week to determine upon a course to be pursued.

Large quantities of coal were stored during the past two weeks by the interurban and steam railroads and also by many large manufacturers. This was done because of the expected suspension of the mines. The price of coal has advanced generally throughout the West.

COAL TRAFIC NOTES.

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

	1905.	1906.	Changes.
Anthracite	936,901	1,188,924	I. 252,023
Bituminous	6,122,093	8,586,283	I. 2,464,190
Coke	2,431,938	2,896,977	I. 465,039
Total	9,490,932	12,672,184	I. 3,181,252

Shipments of Broad Top coal for the week ending March 31 were 17,024 tons; for the year to March 31 the total was 273,637 tons.

The coal tonnage of the Baltimore & Ohio Railroad in January was, in short tons:

	1905.	1906.	Changes.
Anthracite	97,766	98,488	I. 722
Bituminous	1,881,922	2,244,691	I. 362,769
Coke	328,220	533,953	I. 205,733
Total	2,307,908	2,877,132	I. 569,224

The coal tonnage of the Norfolk & Western Railway in January was, in short tons:

	Coal.	Coke.	Total.
Tidewater	255,034	18,976	274,010
Line points	705,801	201,678	907,479
Total	960,835	220,654	1,181,489
Total, 1905	830,731	190,005	1,020,736

The increase in coal this year was 130,104 tons; in coke 30,649 tons; total, 160,753 tons, or 15.8 per cent.

Coastwise shipments of coal in January are reported by the Bureau of Statistics for the following Atlantic ports:

	Anthracite.	Bituminous.	Total.
New York	1,196,031	780,598	1,976,629
Philadelphia	112 912	424,645	537,557
Baltimore	12,118	314,379	326,497
Newport News	.....	233,842	233,842
Norfolk	.....	185,128	185,128
Total	1,321,061	1,938,592	3,259,653

The total increase over January, 1905, was 682,075 tons, or 26.5 per cent.

New York. April 4.

ANTHRACITE.

Local business in hard coal has come to a standstill pending some settlement in the labor controversy. The joint meeting on Tuesday was adjourned for two days without having brought about any agreement. In the meantime, mining in general has ceased, and but little coal is coming forward, the producers being unwilling to draw upon their stocks under the present conditions. They have not, however, added anything to the f.o.b. prices. The local dealers, on the other hand, have raised their prices, they claim, in order to discourage trade, as they say they are not able to get prompt shipments from the producers. Considerable coal has found its way into the hands of speculators, although the producers try to prevent any such accumulations.

No April discount has yet been heard of and prices hold at $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.

The Atlantic seaboard soft-coal trade is not as feverish as it was last week. Speculators have considerable coal on hand, which they expect to dispose of at higher prices than now prevail, but there are few purchasers. At this writing prices vary from hour to hour, but range somewhere around $3@3.25 f.o.b. New York harbor.

It is the opinion that whatever strike may occur will be of a sporadic nature. Large stocks have been accumulated and it is a difficult matter to dispose of the coal now arriving; if no strike should occur, a three months' period of stagnation may be looked for.

Trade in the far East is dull and the Sound shows only a slightly better demand; New York trade is largely in the hands of speculators. As many contracts have been closed as the producers are willing to make. All-rail trade is not as active as would be expected. Car supply is fair and transportation is excellent.

Rates in the coastwise vessel market do not soar to the high speculative prices anticipated, but remain at last week's quotations. Rates on New York harbor boats are reduced to about 25c. alongside.

Birmingham. April 2.

Alabama coal producers are not anxious to see a strike in the anthracite fields in Pennsylvania and bituminous fields in the North and West. Very

little more business could be handled than is coming to them from their own markets. The work of development in this district continues. By the coming fall the output in this State will have been increased at least 20 per cent.

The coal miners belonging to the union in this State, who have been out on strike since July 1, 1904, are encouraged by the change in management of the Tennessee Coal, Iron and Railroad Company, the claim being that President Bacon is an ardent advocate of the open-shop policy. There are many leaders of the miners who express the belief that they will get a hearing at the hands of the new chairman of the board, and that somehing in their favor is likely to follow. Positively nothing definite, not even an intimation, has been held out by the directors, who were in the district for several days last week, that there was to be any change in the open-shop policy at the coal mines.

Chicago. April 2.

Strike news has operated to advance the local market for coal to purely speculative prices. Large sales are being made, the disposition of manufacturers and railroads being to lay in as large stocks as possible in anticipation of a prolonged struggle. Eastern bituminous and anthracite are not so much affected, the understanding of the public being that the West Virginia mines will not be tied up, while the coming of mild weather makes anthracite demand generally dull.

Confiscation of coal by railroads is generally complained of by the bituminous shippers, it being estimated that 3000 carloads have been confiscated out of shipments for Chicago in the last two weeks.

The difficulty of storing bituminous coal without slacking taking place makes the situation grave for many manufacturing concerns. To most users of Western coal supplies will be imperative within a month or six weeks. There is an impression that a strike in Illinois will not last longer than that time—that public pressure will be too great for one side or the other to stand out after the end of that time. The beginning of this week sees active buying, but a real test of the market will not come for two or three weeks yet, assuming that the strike continues.

Quotations are in general 50@75c. higher than last week on Western coals, and 25 @50c. on Eastern coals. All grades are in demand and seem bound to increase greatly in demand.

Cleveland. April 3.

The coal market in this territory has been excited. The coal strike has been the predominating influence. Disappointment was experienced by some operators at the turn toward a compromise and settlement, since some of them had turned jobbers instead of producers and bought coal in West Virginia for sale to the trade here, expecting to make a turn in prices. The only possible relief to the situation now will be a sharp movement up the lakes, which seems to be prevented by the prospects of labor difficulties in that quarter.

The tangled situation has brought about some peculiarities in prices. Coal has been screened to get the slack; three-quarter and mine-run coal are now selling at the same price, $3 delivered in Cleveland, while slack is selling for $2.60 in Cleveland. In the coke market active buying by furnace interests has brought about good prices and a parity of value between foundry coke and furnace coke, both of which are selling at $3.15 to $3.25 at the oven.

Pittsburg. April 3.

Coal— According to the decision of the convention of the United Mine Workers any operator may sign the 1903 scale which provides for an advance 5.5 per cent., and start his mine. In compliance with this decision the district convention of miners in session here appointed a scale commmittee. This committee met yesterday at the office of the Pittsburg Coal Company, where a number of independent interests assembled and signed the agreement for the next two years. The Pittsburg Coal Company signed for all its interests, including the Monongahela River Consolidated Coal and Coke Company, except for the New York & Cleveland Gas Coal Company's mines, which are not regarded as being in the Pittsburg district. About a dozen independent concerns also signed and a resumption of operations was ordered for this morning. Not more than half of the mines were started, however, and it is explained that notice could not be got to the mines in time, but it is expected that all will be running tomorrow. At the mines signed for over 22,000,000 tons of the 41,848,630 tons mined in this district in 1905, was produced. The independent operators who represent the rest of the production will hold a meeting tonight to take action. If assured that the miners will work for the companies that have signed it is understood all of the operators will sign. If the miners refuse to return to work tomorrow, the independents will make a fight for last year's scale. It is doubtful at this time if mining operations in the Pittsburg district can be tied up, but it may be a week or two before all mines are in full operation again. The operators who were parties to the interstate agreement are indignant over the action of Chairman Francis L. Robbins, of the Pittsburg Coal Company, in forcing a settlement by conceding the miners' demands for a restoration of the 1903 scale. The district organization of miners is holding a convention and it is the liveliest ever held. This morning the delegates ejected President Patrick Dolan, whom they had formally deposed, from the hall. Dolan had obtained an injunction restraining the delegates from interfering with him, and today insisted on presiding at the convention. He sent for his attorney to explain the terms of the injunction, but the delegates would not listen, and put both out of the hall. The quarrel will now be taken into court, and there may be a division in the district organization that may complicate the mining situation here. The questions involved are so unusual that it is impossible to make a prediction as to the probable result. Coal prices have not advanced to the high point anticipated, and sales are reported at $1.40, and some at $1.50 a ton for mine-run, but deliveries are still being made at the old prices of $1@1.10 a ton at the mine.

Connellsville Coke—For prompt shipment furnace coke is quoted at $3 a ton, and foundry at $3.25 a ton. On contracts for future delivery quotations remain at $2.35@2.50 for furnace and $2.90@3.10 for foundry. The production for the week was 277,909 tons, and the shipments aggregated 12,125 cars distributed as follows: To Pittsburg and river points, 4,383 cars; to points west of Pittsburg, 6,485 cars; to points east of Everson, 1,267 cars. The combined output of the Connellsville and Masontown fields amounted to 352,308 tons..

San Francisco. March 29.

The market remains quiet, but steady, with no further changes in prices reported.

For coast coals, in large lots to dealers, prices are: New Wellington and Richmond, $7.50; Roslyn, $7; Wellington, Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; White Ash, $5.25. For Rocky Mountain coals, in car-lots, prices are: Colorado anthracite, $14; Castle Gate, Clear Creek, Rock Springs and Sunnyside, $8.50. Eastern coals are largely nominal at $14 for both anthracite and Cumberland. Foreign coals, ex-ship, in large lots are: Cannel, $8.50; Brymbo and Walsend, $7.50. No Welsh anthracite on the market.

Foreign Coal Trade.

April 4.

Exports of coal and coke from the United States for the two months ending Feb. 28 are reported as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1905.	1906.	Changes.
Anthracite	244,135	259,367	I. 15,232
Bituminous	775,306	1,060,288	I. 284,982
Total coal	1,019,441	1,319,655	I. 300,214
Coke	75,282	117,159	I. 41,877
Total	1,094,723	1,436,814	I.342,091

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

	1905.	1906.	Changes.
Canada	712,642	924,159	I. 211,517
Mexico	152,873	177,837	I. 24,964
Cuba	57,956	123,825	I. 65,869
Other W. Indies	40,186	54,577	I. 14,391
France	95	521	I. 426
Italy	735	597	D. 138
Other Europe	3,189	5,214	I. 2,025
Other countries	51,765	32,925	D. 18,840
Total	1,019,441	1,319,655	I. 300,214

The coal to other countries goes chiefly to South America. Canada took this year 70.3 per cent. of all the coal shipped. The exports to Canada in detail were:

	1905.	1906.	Changes.
Anthracite	239,419	253,565	I. 14,146
Bituminous	473,223	670,594	I. 197,371
Total	712,642	924,159	I. 211,517

Shipments to Canada in the early part of 1905 were impeded by severe weather.

Imports of coal and coke into the United States for the two months ending Feb. 28 were as follows:

	1905.	1906.	Changes.
Canada	206,231	309,225	I. 102,994
Great Britain	15,392	45,774	I. 30,382
Other Europe	110	3,962	I. 3,852
Japan	15,524	4,962	D. 10,562
Australia	15,745	30,441	I. 14,696
Other countries	37	23	D. 14
Total coal	253,039	394,387	I. 141,348

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, 6461 tons were classed as anthracite.

Iron Trade Review.

NEW YORK, April 4.

The situation of the trade shows little change during the week. The prospects of settlement in the coal trade in the West have relieved some of the tension; but the anthracite situation is still uncertain, and may cause some trouble in the East.

New business is developing largely at present in the way of small orders, but these are usually the precursors of a larger trade. Structural business continues to be pressing, and rail orders are still coming in. The quantity of material asked for in electric railroad building is quite unexpected.

Weather conditions promise an early opening of Lake navigation, but there is a prospect of labor troubles which may delay the first shipments of iron ore from the Lake Superior region. Meantime the Lake docks are being rapidly cleared of their stocks of ore.

A late report is that Pittsburg and New York parties are considering the establishment of a large steel plant at some point on Puget Sound, to supply Pacific Coast demand; and also to manufacture for export to the East.

Birmingham. April 2.

Alabama pig-iron manufacturers assert that there is a little better demand for their product, and that quotations are firmer than they have been for the past four weeks. The larger concerns in this district are not quoting No. 2 foundry iron under $14 per ton. Some sales have been made for delivery during the third quarter of the year. A lively inquiry is being received for iron.

The event during the past week was the meeting of the directors of the Tennessee Coal, Iron and Railroad Company in this city. The meeting was attended by J. W. Gates. L. C. Hanna, E. W. Oglebay, Grant Schley, Don H. Bacon, S. G. Cooper and L. T. Beecher. The following statement was authorized after the meeting: "At a meeting of the board of directors of the Tennessee Coal, Iron and Railroad Company, John A. Topping was elected a director and made chairman of the board; but this change in the board of directors does not involve any changes in the organization. The board declared its regular quarterly dividend of 1 per cent. on the common stock and its quarterly dividend of 2 per cent. on its preferred. No action was taken in the matter of extensions or new improvements at this meeting, but it was determined to remodel thoroughly the steel plant and blast furnaces so as to bring them up to the highest state of efficiency. This work will necessarily involve the expenditure of large sums of money and will materially increase the output of the company in its various finishing departments. General improvements will also be made in the coal-mining department of the company by additional equipment necessary to secure a greater output in coal and coke, as well as to improve the quality."

Don H. Bacon, who has been president of the Tennessee company for five years, tendered his resignation, effective May 15, or, in other words, he gave notice that he will not stand for re-election when the annual meeting is held at that time. Who will succeed him has not been stated yet.

Chicago. April 2.

Buying of pig iron is still dull, but there are no signs of a slump in the market. Because of labor troubles and other reasons conducing to caution, the melters are yet shy of contracts that will assure supplies for the last half of the year. Several local foundries have shut down because of labor troubles, and general conditions are such as to make the users of iron cautious.

Buying is chiefly confined to small lots for quick shipments—within 30 days after the order is placed. It seems probable that the present dulness of pig iron buying will drag along with the result of a rapid upward shoot of prices.

Prices are steady—$19@19.50 for Northern and $14 Birmingham for Southern, No. 2 iron. There is a little Lake Superior charcoal moving at $20. Coke is eagerly taken and has speculative values—the coal situation has made the demand and the price abnormal. Business in iron and steel products is very good.

Cleveland. April 3.

Iron Ore—The Lake season of navigation will not open before May 1, if then. The longshoremen and the dock managers are not planning to end the difficulty which separates them and until they come to terms boats cannot run. The one thing which may settle the dispute will be the outcome of the conference between the longshoremen and the seamen at Erie, Pa., April 18. If the seamen win their contention that the pilots ought to be affiliated with them, this will end the lake dispute, since the pilots affiliated with the seamen have already obtained recognition from the Lake Carriers' Association and have made terms for the year.

Pig Iron—One big concern came into the market this week and placed an inquiry for 12,000 tons of No. 2 foundry iron which will be sold before the week is out. This entails delivery through the last half of the year. Other inquiries are in for amounts ranging between 1000 and 5000 tons of material. Spot buying is heavy and in most instances foundrymen are asking an anticipation on their shipments, but some of these movements are precautionary, fearing the effects of the coal strike. No. 2 foundry is selling for $17 in the Valleys, with some producers shading to $16.75. Southern furnaces are holding for $14 for No. 2 Birmingham.

Finished Material—The situation has not changed, with the exception that billets are scarce and consequently higher, the forging quality selling at $35 at the mill or $38 Cleveland. Bessemers are almost out of the market, with $30 a reasonable price at the mill. Sheets are stronger, jobbers doing most of the business and bar iron is weak at 1.65c. to 1.70c. at the mill.

New York. April 4.

Pig Iron—Business has been more active in this district. Many small orders have come in, which make up a considerable aggregate. Apparently foundry stocks are running low and new supplies are needed in many places. The general impression about the coal situation seems to be less apprehensive.

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, $16.50@17. For Southern iron on dock prices are: No. 1 foundry, $18.25@18.50; No. 2, $17.75@18; No. 3, $17@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 held at $19 for Virginia, $18.50 for Alabama and $18 for Northern.

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 have still lots of work on hand.

Bars—Business is fair, and prices are steady. Sales are at 1.645@1.695c. for common iron bars, and 1.745c. for refined iron. Steel bars are also 1.645c., tidewater. Store trade is easy, at 2c., delivered.

Plates—Steel plates are in steady 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. New business on a large scale is under negotiation.

Steel Rails—No change in standard sections. Light rails are in steady demand, prices ranging from $26 for 25-lb. up to $33 for 12-lb. rails. The demand for trolley rails is increasing, and new projects are still coming forward for electric-railroad work.

Old Material—Business is quiet, but prices are steady. No. 1 railroad wrought is $18@19; No. 1 yard wrought can be had for $17@18; machinery cast, $14@14.50; heavy steel melting scrap, $15@16.50. These prices are on cars, Jersey City or other terminal delivery.

Philadelphia. April 4.

Pig Iron—The inauguration of the coal strike has unsettled business in this territory and threatens to unsettle prices, although the strike is too young yet to be able to note any decided change in the situation. Considerable business has been quietly done in basic iron, and more business is promised. Negotiations are pending for large quantities of pig iron for pipe concerns, and it is probable that this business will go through. The entire situation is liable to change at any time. Quotations for No. 1X foundry are $19.25; No. 2X foundry, $18.50; No. 2 plain, $17.75; standard forge, $17; basic, $18; bessemer, $20; low phosphorus, $24.50.

Steel Billets—Several large lots of steel billets have been sold, and there is an urgent demand for still larger lots, which will probably be taken care of on a basis of about $29.

Bars—Urgent buyers of steel bars are paying premiums. A great many of our small consumers are buying in a hand-to-mouth way. The makers of refined iron report today that they are taking all the business they care to on a basis of 1.73½. The mills are all crowded.

Sheets—The last few days have brought out a demand for light sheets, and in some instances premiums were paid for prompt delivery.

Pipes and Tubes—The tube market remains unchanged, the mills are all behind in delivery.

Merchant Steel—Prices remain where they have been for months.

Plate—The new orders for plates that are coming in are all for small lots. It is stated today that inquiries were received yesterday for ship material and for bridge material, but the nature of the business cannot be ascertained at present.

Structural Material—An enormous amount of business is being done, which is only limited by the capacity of the mills and the willingness of the mill people to accept the orders. A good deal of material intended for New York and New England delivery has not yet been contracted for, but it is not the fault of the buyer.

Steel Rails—Large orders for steel rails have been placed during the past week. Orders for light rails are now being hurried in, and in most cases they are wanted for the quickest possible delivery. Electric roads are also liberal buyers, or are at least endeavoring to make satisfactory terms for delivery, which they are not able to do in all cases.

Scrap—The scrap market has again turned upward, and prices for heavy steel scrap rails are $17.25. Holders are asking $17@17.25 for No. 1 steel scrap; there are quite a number of buyers in the market, and their inquiries are encouraging the large scrap dealers to hold out for strong prices. Machinery scrap sold at $15.75; No. 1 forge fire scrap at $15.50, and wrought iron pipe at $15. Old rails are nominally $22 per ton.

Pittsburg. April 3.

The averting of a serious coal strike in the Pittsburg district is expected to have a stimulating effect on the iron and steel market. Buying had almost stopped on account of the uncertainty, but late last week, when it was learned that the operators were not a unit in the refusal of the miners' demands, there was a marked increase in inquiries for pig iron, particularly for foundry iron. The Westinghouse Electric and Manufacturing Company is in the market for 12,000 tons of foundry iron for equal deliveries through the second half, 8000 tons for Pittsburg, and 4000 tons for Cleveland. All of the iron will be Northern except on 1250 tons of No. 4 grade, which calls for Southern iron. An Eastern cast-iron pipe concern is inquiring for 6000 tons of foundry iron and some Western malleable concerns also have come into the market. Sharp competition between two Cleveland interests was responsible for a decline in prices, but it has been checked and the market is firm. Second quarter bessemer iron is limited and it is understood the United States Steel Corporation will close negotiations this week for about 15,000 tons for April delivery at a price somewhat above $17.25, Valley furnaces. The sale will be made by the Bessemer Furnace Association, as the leading independent interest that usually sells to the corporation has disposed of its entire output up to July 1. Some inquiries are being received for bessemer iron for the third quarter but so far no large contracts have been closed. It is reported that several small lots have been sold at prices a trifle under $17.50, Valley.

Despite the fact that all the large mills in this district have large stocks of coal stored all were anxious for a settlement of the mining rate. The Jones & Laughlin Steel Company, which was believed to have a big supply, was the first to sign the new agreement when it was offered yesterday. While there has not been any avtive buying for over a month, except in structural material, plates and steel rails, it has developed that a strike of coal miners would have seriously affected the mills, as all are busy and have orders that will keep them running steadily for several months. Some of the merchant steel bar makers held a meeting here on Wednesday to discuss prices but did not make any change. A number of buyers sent in heavy specifications last week to close up their tonnages before April 1, when they would otherwise have had to try to get the contracts extended. Contracts with some of the largest agricultural-implement makers will not expire until July 1. Over 100,000 tons of steel-rail orders have been added to the immense tonnage now on the books of the different interests, the Carnegie Steel Company getting about 50,000 tons, and will keep its Ohio works on rails probably all year. New business in structural material and plates continues heavy. A meeting of the presidents of the subsidiary companies of the United States Steel Corporation was held here on Friday and Saturday, at which some encouraging reports were made. Most of the plants, particularly those of the Carnegie Steel Company, are being operated to capacity with business on the books and in sight that will keep them in steady operation the rest of the year. Owing to the excessive sheet capacity in the country it seems impossible to maintain the prices established some time ago and of late there has been some shading in the West and it amounts in several instances according to reports, to about $2 a ton, sales being made on a basis of 2.30c. f.o.b. Pittsburg. All the wire and wire-nail mills in this district are busy but are running on old contracts, no new busness of any consequence having been booked for over a month. Common iron bars continue to decline and are now quoted at 1.60c. Pittsburg, or $2 a ton above steel bars.

Pig Iron—Sales of bessemer pig iron in small lots during the week aggregated about 2500 tons at $17.50, Valley furnaces. The foundry-iron market has been

strengthened somewhat, but it is reported that sales have been made as low as $16.75, Valley. The gray forge market remains about the same, $16.85@17 Pittsburg, being quoted.

Steel—Open-hearth billets and sheet-bars are strong at $28 and bessemer billets remain at $27. Sales of both billets and sheet-bars have been very light; there is a great deal of inquiry for small lots for quick shipment. Steel bars remain at 1.50c. and plates at 1.60c.

Sheets—Black sheets are still quoted at 2.40c. and galvanized at 3.45c. for No. 28 gage.

Ferro-Manganese—The market is unchanged and $140 a ton seems to be the price for prompt shipment; and for delivery through the second quarter $110@120 is quoted.

Dusseldorf, German y March 20.

Exports of iron and steel from Germany, including machinery, were as follows, in metric tons, for the month of January:

	1905.	1906.	Changes.
Pig iron and scrap.....	27,426	48,563	I. 21,137
Blooms and billets.....	37,603	46,956	I. 9,353
Finished iron and steel.	153,977	248,470	I. 94,493
Total.....	219,006	343,989	I. 124,983
Machinery.....	20,258	27,377	I. 7,119
Total.....	239,264	371,366	I. 132,102

The exports show a large increase over last year. In the German customs reports, all machinery is given by weight.

Exports of slag and slag products were 1808 tons in 1905, and 2607 tons in 1906. In addition to this the exports of basic slag, used as fertilizer, were 6338 tons in 1905, and 11,360 tons this year.

Imports into Germany in January were as follows, in metric tons:

	1905.	1906.	Changes.
Pig iron and scrap.	13,972	19,656	I. 5,684
Blooms and billets.....	504	560	I. 56
Finished iron and steel..	8,820	11,825	I. 3,005
Total.....	23,296	32,041	I. 8,745
Machinery.....	4,505	6,119	I. 1,614
Total.....	27,801	38,160	10,359

The imports also show an increase. Imports of slag and slag products were 65,900 tons in 1905, and 83,269 tons in 1906; of basic slag, 6465 tons in 1905, and 15,276 tons this year.

Exports of iron ore—chiefly to France—were 303,296 tons in 1905, and 304,109 tons in 1906; an increase of 813 tons only. Imports of iron ore were 243,305 tons in 1905, and 407,187 tons in 1906; an increase of 163,882 tons this year.

Cartagena, Spain. March 17.

Iron and Manganiferous Ores—Messrs. Barrington & Holt report that shipments for the week were one cargo, 1500 tons dry ore, and three cargoes, 7700 tons manganiferous ore, all to Great Britain; one cargo, 4700 tons Calasperra magnetic ore to Rotterdam. The sierra continues active, with considerable competition for the higher-grade ores, which are yearly getting scarcer, though it is expected that within the next few months the manganiferous yield will be considerably increased if the pumping operations of the Desague Company reduce the water in the mines to the extent expected. From February last the mines in the zone calculated to be affected by the company's pumping are obliged to pay the company 12 per cent. of the value at pit mouth of all minerals extracted. Shipments continue heavy, chiefly owing to the declining freights, and stocks during the last few weeks have been considerably lowered. There is a continued demand for most classes of ore, but the steady fall in exchange takes a great deal off the advantage of the higher prices offering this year.

Quotations are 8s. 3d.@8s. 7d. for ordinary 50 per cent. ore; 8s. 10d.@9s. 2d. for special low phosphorus; 11s. 7d. for specular ore, 58 per cent.; 10s. for S. P. Campanil. All prices are f.o.b. shipping port. Manganiferous ores, same terms, range from 11s. 6d. for 35 per cent. iron and 12 manganese, up to 18s. for 20 iron and 20 per cent. manganese.

Pyrites—Iron pyrites, 40 per cent. iron and 43 sulphur, are quoted 10s. 6d. per ton, f.o.b. Cartagena.

Heavy Chemicals and Minerals.

NEW YORK, April 3.

The quotations for heavy chemicals are shown in the table given herewith; and in particular:

Arsenic—This is still unsettled; for shipment it is a shade off from the figures quoted herewith.

Blue Stone (copper sulphate)—This has shown much activity lately, jumping 10 points on two separate occasions recently. As we go to press it is quoted as in the table given herewith.

Nitrate of Soda—Conditions on the west coast (of South America) are lively; the market is firm and prices are advancing, owing to the chronic scarcity of labor and increasing consumption of fertilizer. The West Coast combination will undoubtedly be readjusted, and perhaps while we go to press, as 95 per cent. of the concerns have signified their willingness to join in an agreement; further particulars next week.

Total imports from Jan. 1 to date into Atlantic ports from West Coast were 78,600 tons, as compared with 50,100 tons in same period in 1905; and 81,161 tons in 1904. Total visible supply in store and afloat, to arrive before July 15, is 78,800 tons, as compared with 103,500 tons in 1905; and 71,900 tons in 1904.

Phosphate—The market is stiff on account of an apparent shortage for 1906; in accord with which quotations hold their own in the recent advances.

Foreign shipments of high-grade Florida phosphate rock made through the port of Savannah, Ga., in the month of February reached a total of 13,876 tons, consigned to Bremen, Hamburg, Rotterdam and Karstrup.

Potash Salts—New quotations were recently announced by the American agents of the German Kali Syndicate. It is reported that most of the independent German producers have joined the syndicate.

Thorium—The nitrate is quoted at $3.78 per lb., with a small rebate for large quantities (8c. per lb. for 1500 kilos). Monazite sand not quoted; market unsettled.

Tin Salts—Formerly these were quoted once at the beginning of each month for the respective month, and this is still true of the *bi-chloride*, which is given in the table herewith. But *crystals* are not now held to one quotation for the month; they vary with the fluctuations of the metal, even from day to day.

PRICES.

Alkalies.	
Soda ash, (alkali) per lb., future....	0.80@.87½c.
" " " ". prompt...	.85@.95c.
Bicarb. soda, per lb.....	1.8@1.5c.
Bleaching powder, per lb.....	1.25c.
Soda, caustic, per lb., future.....	1¾@1.8c.
" " April, May...	2⅛@3c.
Salt cake, per lb.....	.65c
Sal soda, per lb.....	.6@1.4c.
Soda, monohydrate, per lb.....	1¼@1½c.
Potash, caustic, per lb.....	4½@6¼c.
" carbonate, 82-85%.....	3¾@4¼
Alum, per lb.....	1.75@1.95c.
Ammonia, aqua, 26 deg., per lb.....	4¾@5¾c.
Nitrate of soda, 100 lb. 96% for 1906....	$2.30
95% for 1906....	2.12½@2.25
96% for 1907....	2.20@2.22½
95% for 1907....	2.15@2.17½
Saltpeter, per lb.....	4¾@5½c.
Potash, muriate, per cwt.....	$1.90@$1.98
Potash, kainite, per long ton.....	$8.50@9.50
Potash, sulphate, 90%, 100 lb.....	$2.18@2.21¼
Sulphate of ammonia, per 100 lb.....	$3.10@3.12½
Acids.	
Carbonic, liquid gas	.12½
Hydrochloric, nominal, per lb.....	1.1c.
Hydrofluoric, 30%.....	per lb. .03
48%.....	" .05
60%.....	" .11
Nitric acid.....per lb.	3¾@5¾c.
Oxalic acid, com'l, per lb.....	5¼@5½c.
Sulphuric acid, 50°, bulk, per ton.....	$12 up.
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., nominal.....	5½@6½c.
" red, per lb.....	6½c.
Blue stone (copper sulphate), carload,	$6.00@$6.15
Sulphur.	
Louisiana(prime)to New York,Boston or Portland.....ton	$22.12½
To Philadelphia or Baltimore.... "	22.62½
Tin, bichloride per lb., for month...	.11
Crystals, per lb., varies with metal	.22½
Pyrite.	
Domestic, furnace size....per unit	10½@11c.
Fines..... "	8@10c.
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.	
*Fla., hard rock.....	$8.00@8.50	.....
land pebble.....	4.50@5.00	.....
†Tenn , 78@80%.....	4.60@4.65	.....
78%.....	4.00@4.25	.....
75%.....	3.75@4.00	.....
68@72%.....	3.25@3.50	.....
‡So. Car. land rock.....	4.00@4.25	.....
river rock.....	3.75@4.00	.....

Fla., hard rock guaranteed 77% phosphoric acid, to London, Rotterdam or Hamburg, 1907, per unit.....	7¾d.
Ditto to Stettin, 1907, per unit.....	8¼@8½d.
Ditto to Stettin, 1908, "	8½d.
Ditto, to Mediterranean ports, 1908, per unit.....	8¾d.

Prices for 1906 are merely nominal, as there is practically none to be had.

***F. o. b. Florida or Georgia ports. †F. o. b. M. Pleasant. ‡On vessel Ashley River, S. C.**

Metal Market.

New York, April 4.

Gold and Silver Exports and Imports.

At all United States Ports in February and year.

Metal.	Exports.	Imports.	Excess.
Gold:			
Feb. 1906..	$7,686,330	$2,083,938	Exp. $5,605,392
" 1905.	14,794,312	2.192 919	" 12,601,393
Year 1906..	13,427,995	4,689,647	" 8,783,348
" 1905..	31,622,480	4,088,610	" 27,533,870
Silver:			
Feb. 1906..	7,235,129	4,451,376	Exp. 2,783,753
" 1905..	4,036,075	2,061,358	" 1,974,717
Year 1906..	14,751,797	9,138,087	" 5,613,710
" 1905..	8,400,820	3,983,560	" 4,417,260

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 31, and for years from January 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$113,546	$ 663,498	$1,042,772	$ 57,051
1906.....	3,140,925	2,062,985	18,373,802	503,261
1905.....	31,935,270	3,974,111	9,335,041	677,437
1904.....	1,927,160	1.533,704	12,204,640	177,530

Of the gold imported for the week $608,298 came from Liverpool, the balance from the West Indies. The gold exported went directly to Panama; the silver to London.

The statement of the New York banks—including all the banks represented in the clearing house—for the week ending March 31, gives the following totals, comparison being made with the corresponding week of 1905:

	1905.	1906.
Loans and discounts..	$1,099,289,700	$1,025,503,900
Deposits.....	1,138,661,300	1,004,290,500
Circulation.....	43,718,700	51,845,000
Specie.....	209,481,100	177,895,000
Legal tenders.....	83,848,800	78,308,900
Total Reserve.....	$293,329,900	$256,203,900
Legal requirements....	284,665,325	251,072,625
Surplus reserve.....	$8,664,575	$5,131,275

Changes for the week this year were increases of $101,800 in legal tenders and $485,300 in circulation; decreases of $3,829,700 in loans, $4,529,500 in specie, $8,780,800 in deposits and $1,232,500 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.....	.....	.....	$177,895,000
England.....	$192,251,090	.....	192,251,090
France.....	584,531,680	$210,176,160	794,707,840
Germany.....	193,960,000	64,655,000	258,615,000
Spain.....	75,380,000	119,295,000	194,675,000
Netherlands....	30,270,500	30,228,000	60,498,500
Belgium.....	17,110,000	8,555,000	25,665,000
Italy.....	141,485,000	19,278,000	160,763,000
Russia.....	463,175,000	23,810,000	486,985,000
Austria.....	230,445,000	64,295,000	294,740,000

The returns of the associated banks of New York are of date March 31, and the others March 30. 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.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows for the year to March 22:

	1905.	1906.	Changes.
India.....	£ 1,956,287	£ 4,761,910	I. £ 2,805,623
China.....	1,370	.....	D. 1,370
Straits..	2,800	.....	D. 2,800
Total.....	£ 1,960,457	£ 4,761,910	I. £ 2,801,453

Receipts for the week were £2000 from South America; £159,000 in bars and £100,000 in Mexican dollars from New York; a total of £261,000. Exports were £186,700 in bars and £61,200 in Mexican dollars; a total of £247,900, all to India.

Indian exchange has been easier, owing to light exports and plentiful supply of money in India. The council bills offered in London were taken at an average of 15.97d. per rupee. Shipments of silver to India have been moderate only.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.50	$0.53
Peruvian soles and Chilean.....	0.46	0.49
Victoria sovereigns.....	4.85⅛	4.87⅛
Twenty francs.	3.87	3.89
Spanish 25 pesetas.....	4.78	4 80

SILVER AND STERLING EXCHANGE.

Mar.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Apr.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
29	4.8520	65¼	30⅛	2	4.8540	64⅝	29¾
30	4.8520	64⅞	30	3	4.8530	64½	29 11/16
31	4.8535	64¾	29 15/16	4	4.8520	64¼	29 11/16

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.

Mar.-Apr.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
29	18⅛ @18¾	18¼ @18⅜	83⅞	37⅜	5.35	6.15 @6.20	6.00 @6.05
30	18⅛ @18¾	18¼ @18⅜	83⅞	37⅛	5.35	6.15 @6.17½	6.00 @6.02½
31	18⅛ @18¾	18¼ @18⅜	....	37⅛	5.35	6.15 @6.17½	6.00 @6.02½
2	18⅛ @18¾	18¼ @18⅜	84¼	37⅛	5.35	6.10 @6.15	5.97½ @6.02½
3	18⅛ @18¾	18¼ @18⅜	84¼	37⅛	5.35	6.10 @6.15	5.97½ @6.02½
4	18⅛ @18¾	18¼ @18⅜	84¼	38¼	5.35	6.10 @6.15	5.97½ @6.02½

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.

The average price of lake copper in March was 18.641c. per lb.; the average for electrolytic copper was 18.361c. per lb. In making up our averages, where two figures are given to represent the range of the market on any particular day, as is commonly the case, we take the mean of the two, in calculating the monthly averages.

Copper—The market has remained very firm. However, quotations remain the same, as the leading interests are still booking all business that is submitted to them at unchanged prices. The market closes at 18⅝@18¾ for Lake copper; 18¼@18½ for electrolytic in ingots, cakes and wirebars; 18@18¼ for casting copper.

The situation in the London market has shown conclusively that an absolute corner in standard warrants exists over there, bears being forced to cover their commitments at continully advancing prices. The market closes at £84 5s. for spot, £82 for three months.

Statistics for the second half of March show a decrease in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £85@86; best selected, £88 10s.; strong sheets, £96.

Copper Exports and Imports—The exports of copper from the United States for the two months ending Feb. 28 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.....	5,906	3,051	D. 2,855
Belgium.....	298	402	I. 104
France.....	7,734	6,027	D. 1,707
Italy.....	1,674	938	D. 736
Germany and Holland	12,523	16,571	I. 4 048
Russia.....	2,084	662	D. 1,422
Other Europe.....	1,783	1,844	I. 61
Canada.....	220	269	I. 49
China.....	4,595	600	D. 3,995
Other countries.....	2,515	28	D. 2,487
Total metal.....	39,332	30,392	D. 8,940
In ore and matte.....	805	1,333	I. 528
Total.....	40,137	31,725	D. 8,412

The decrease in the total is 21.0 per cent. The actual quantities of ore and matte were 4668 tons in 1905, and 10,548 tons in 1906; contents are estimated chiefly on the basis of values.

Imports of copper and copper material for the two months are reported as follows; the figures giving the contents of all material in long tons of fine copper:

	Metal.	In ore, etc.	Total.
Mexico.....	6,522	2,425	8,947
Canada.....	2,537	585	3,122
Great Britain.....	1,217	.....	1,217
Other countries.....	1,542	931	2,473
Total imports.....	11,818	3,941	15,759
Net imports, 1905.....	11,196	2,564	13,760

There were no re-exports of foreign material this year, so that the total imports are also the net imports. The increase in the total imports this year was 1999 tons, or 14.5 per cent. The actual tonnage of ores and matte from Mexico this

year was 21,641; from Canada and Newfoundland, 4150 tons. The exports exceeded the net imports by 26,377 tons in 1905, and 15,966 tons in 1906; a decrease of 10,411 tons this year.

Tin—Reports from London indicate that the spot supplies are cornered over there, which accounts for the violent advance which has been experienced during the last few days. Supplies in our market are also of a very limited nature, and premiums over the import price have to be paid for tin which is wanted on the spot. This market closes at 38@38.50c.; while London quotes £173 5s. for spot, £169 for three months.

Statistics for the month of March show a decrease in the visible supplies of 400 tons.

Imports of tin into the United States for the two months ending Feb. 28 are reported as follows, in long tons of 2240 lb.:

	1905.	1906.	Changes
Straits	2,996	3,430	I. 434
Australia	15	50	I. 35
Great Britain	3,908	4,919	I. 1,011
Holland	104	95	D. 9
Other Europe	160	190	I. 30
Other countries	5	3	D. 2
Total	7,188	8,687	I. 1,499

There was a considerable increase—20.8 per cent.—this year.

Lead—A little better demand has sprung up, probably in consequence of the more seasonable weather, but prices remain entirely unchanged at 5.35c. New York, 5.27½c. St. Louis.

The market abroad has declined somewhat, due to pressure to sell arrivals of London lead, and the closing quotations are cabled as £15 12s. 6d. for Spanish lead, £15 15s. for English lead.

Imports of lead into the United States for the two months ending Feb. 28, with re-exports of foreign metal, are reported as follows, in short tons of 2000 lb. each:

	[illegible]		Changes.
Lead, metallic	1,608	1,776	I. 168
Lead in ores and base bullion	18,058	14,951	D. 3,107
Total imports	19,666	16,727	D. 2,939
Re-exports	5,316	7,055	I. 1,739
Net imports	14,350	9,672	D. 4,678

Of the lead imported this year 14,607 tons were from Mexico and 603 tons from Canada. There were 1446 tons imported from Europe, an unusual movement. Exports of domestic lead were 36 tons in 1905 and 40 tons in 1906; an increase of 4 tons.

St. Louis Lead Market—The John Wahl Commission Company telegraphs us on April 4, as follows: Lead is firm but very quiet. The latest sales here are on a basis of 5.25 to 5.27½c. for Missouri brands, East St. Louis. Corroding lead is scarce, and 5.40@5.45c. is asked.

Spelter has been somewhat neglected during the week, and prices are dull and sagging at 6.10@6.15c. New York; 5.97½@6.02½c. St. Louis.

The foreign market has improved a trifle and closes at £25 2s. 6d. for good ordinaries, £25 7s. 6d. for specials.

Exports of spelter from the United States for the two months ending Feb. 28 were 1237 short tons in 1905, and 1491 tons in 1906; an increase of 254 tons. Exports of zinc ore were 3554 tons in 1905, and 4517 tons in 1906; an increase of 963 tons. Exports of zinc dross were 2556 tons in 1906; this article was not reported separately last year.

St. Louis Spelter Market—The John Wahl Commission Company telegraphs us on April 4, as follows: Spelter is steady. The latest sales are on a basis of 6c., and the demand at that price is fairly good.

Spanish Zinc Ore Market—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 17, that the falling tendency of both spelter and exchange has kept the local market rather quiet lately; a fair amount of ore has passed from miners to merchants this week, but stocks at mines are large and miners who can afford to are waiting, hoping to see spelter improve. Shipments for the week were 3000 tons blende to Stettin, and 1000 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. cases for gages No. 9 to 22, both inclusive; widths from 32 to 60 in., both inclusive, and lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 lb. The fluctuations in the base price for sheet zinc since January 1, 1906, has been as follows: Jan. 6, 1906, $8; Feb. 5, $7.75.

Antimony has been the banner article of the week. Prices have advanced by leaps and bounds in consequence of urgent buying on the part of consumers all over the world. Stocks in the hands of producers, as well as middlemen, are exceedingly light and the supply of raw material is limited. Cookson's is quoted at 19@19½; Hallett's, 18½@19c.; Hungarian and French, 18¼@18¾c.

Imports of antimony into the United States for the two months ending Feb. 28 were as follows, in pounds:

	1905.	1906.	Changes.
Metal and regulus	766,544	1,397,176	I. 630,632
Antimony ore	730,600	82,777	D. 647,823

This shows an increase of 82.3 per cent. in metal, but a decrease of 88.7 per cent. in ore.

Nickel—Quotations for large lots, New York, or other parallel delivery, are 40@47c. per lb., according to size and condition of order. For small quantities, prices range from 48c. up to 60c., also according to size of order and deliveries.

Exports of nickel, nickel oxide and nickel matte from the United States for the two months ending Feb. 28 were 1,636,995 lb. in 1905, and 1,819,954 lb. in 1906; an increase of 182,959 lb. this year. Imports of nickel ore and matte were 2018 tons in 1905, and 2020 tons in 1906; an increase of 2 tons only.

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 for the two months ending Feb. 28 were 1616 lb. in 1905, and 2284 lb. in 1906; an increase of 668 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 for the two months ending Feb. 28 were 135,135 lb. in 1905, and 165,981 lb. in 1906; an increase of 30,846 lb. this year.

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	490
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.

Minor Metals—For minor metals and their alloys, wholesale prices are f.o.b. works:

Aluminum.	Per lb.
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
Bismuth	$2.10
Cadmium, 99.5% f. o. b Hamburg	92c.
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybdenum (50%)	95c.
Ferro-Titanium (20@25% N. Y.)	75c.
Ferro-Chrom. (75%)	12½c.
Ferro-Tungsten (37%)	29c.
Magnesium, pure (N. Y.)	$1.60
Manganese (98@99% N. Y.)	75c.
Manganese Cu. (30@70% N. Y.)	40c.
Molybdenum (98@99% N. Y.)	$1.75
Tantalic 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. Our correspondents report that cadmium is in strong demand, and prices are advancing.

Missouri Ore Market.

JOPLIN, March 31.

While there was a report of two bins sold today at $52 per ton, the statement is discredited by leading producers, from the fact that there are several hundreds of tons on the market for which a basis price of $47 is all that is asked, while the sale reported at $52 would be equivalent to a basis price of $49.50 per ton. The contention of the producers seems unquestionably well founded. The $52 price was reported direct by the seller, and later corroborated by the buyer. Other buyers declare it a rank fake, and hint at some sort of collusion, and sellers assert that there is no reason for such a price being paid. It is an unheard of anomaly, a price reported by a seller and a buyer, and other sellers declining to believe in it, explainable, however, in the simplest manner; such a price is approximately $5 per ton higher than hundreds of tons of as good ore could be purchased for. Aside from this report $49 was the highest settling price of the week. A carload of ore sold today, for next week's delivery, on a basis price of $47. As the bin sample assayed 64 per cent. zinc, this ore will be settled for at $51 per ton. The exceptional purity of this ore is reason for a premium price being paid. Aside from this one bin the assay basis price is reported at $43 to $46 per ton of 60 per cent. zinc. The average price is $39.64.

The highest price reported for lead was $78, ranging down to $72 for 78 per cent. grades. The average price was $75.56.

	Zinc, lb.	Lead, lb.	Value.
Carterville-Webb City..	1,971,630	544,210	$64,050
Joplin	2,250,060	281,170	61,310
Duenweg	667,390	216,640	22,910
Galena-Empire	846,470	121,730	21,805
Granby	630,000	35,000	11,000
Alba	348,320	.....	8,010
Sherwood	324,290	4,310	7,450
Badger	316,530	4,560	7,280
Aurora	342,460	.....	5,050
Neck City	212,030	.....	4,875
Oronogo	204,930	.....	4,380
Prosperity	158,960	29,650	4,380
Spurgeon	143,530	61,070	4 020
Springfield	124,230	.....	2,790
Central City	125,220	2,750	2,665
Stott City	116,190	.....	2 610
Carthage	63,890	.....	1,470
Zincite	65,230	.....	1,465
Totals	9,501,360	1,301,090	$237,520
Thirteen weeks	128,526,240	18,928,730	$3,529,075

Zinc value, the week, $188,355; 13 weeks, $2,865,350.
Lead value, the week, 49,165; 13 weeks, 663,725.

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	57.62	72.83
March	47.40	42.68	March	57.20	73.73
April	42.88	....	April	58.00	....
May	43.31	....	May	58.27	....
June	40.75	....	June	57.80	....
July	43.00	....	July	58.00	..
August	48.83	....	August	58.00	....
September	46.75	....	September	63.50	....
October	47.60	....	October	63.86	....
November	49.55	....	November	68.67	....
December	49.00	....	December	76.25	....

Wisconsin Ore Market.

PLATTEVILLE, MARCH 31.

One of the best posted local buyers stated last week that the price of ore would not change materially for some time. Attention was called to the fact that the bad roads were likely to continue and little ore would be loaded. The price for 60 per cent. zinc ore is $47 strong, some lots of easy access to railroads being $48.

Owing to the heavy local rains the lead mines were nearly all flooded. The price remains the same as last week. Drybone ranges from $10 for 30 per cent. up to $20 for the higher grades. Sulphur $4 to $6 according to manner cleaned.

The camps report ore loaded as follows:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville	198 000	.....	... .
Buncombe-Hazel Green.	132,200	.....	.....
Linden	123,850	.....	.....
Livingston	90,000	.....	.....
Cuba City	88,300	.....	.....
Highland	60,000	....	.....
Mineral Point	39,200	. ...	.....
Total	731,550	.....	.....
Year to Mar. 31	17,314,440	761,770	2,026,400

Several of the producers have had to build extra ore-bins, on account of the difficulty in hauling ore.

Mining Stocks.

New York. April 4.

The market has continued to fluctuate in rather a meaningless fashion, showing that the operations are still largely of a professional character. There have been several little spurts, but the promised bull movement is still in the future. Amalgamated Copper closes at $111½; United States Steel at $43, with $108½ for the preferred.

On the outside market the fluctuations were comparatively small, with business rather light. The chief trading was in Nevada Consolidated, which closes at $18½; and in United Copper, which is quoted today at $67¾, with $99½ for the preferred.

On the Consolidated Exchange trading was a little more active. Sales are noted of Montana Tonopah at $3; Diamond field at 50c.; Comstock at 23@24c.; Anaconda Gold at 14c. per share.

Boston. April 3.

The feature of this market the past week has been the strength of Lake Superior mining shares. Prices sagged late last week, but have since improved, and, as remarked above, the strength and activity has been in the Michigan issues. Calumet is up $18 to $710; Tamarack $3 to $110, and Osceola is being accumulated with the price $2.50 above last week, at $105.50. Franklin has been bulled hard and rose $1.25 to $20.75, but lost the fraction today. Wolverine holds steady around $135@136. Allouez spurted $1.75 to $40.75, losing part of it. Centennial is also up $1.50 to $27.75. Atlantic, on the other hand, is off $1.25 to $21 on free offerings of the stock. Mohawk advanced $1 to $62.

Old Dominion got a bad slump Saturday, breaking $3 to $46 on knowledge of a flood in the mine, but has since recovered $1.75. Utah Consolidated closes the same as a week ago at $64.50. The favorable annual report issued Saturday had been discounted, although it shows $6.20 earned on each share.

Greene Consolidated was restored to the Stock Exchange list last Thursdey, and the stock has advanced $1 during the week to $31. United States Coal and Oil had a smart spurt of $2.25 on the announcement of the coal strike, but has settled to $13 again. This is an independent company and would benefit by a prolonged soft-coal strike. North Butte is $1.50 higher for the week at $85.50, and United Copper is $1 better at $69.50. United States Smelting has been particularly strong, selling up $4 to $62. Amalgamated has been strong.

Colorado Springs. March 30.

There has been but little activity on the local exchange, and but few of the Cripple Creek stocks have been in much demand. The feature of the week was the sudden decline in El Paso, which tumbled from 91 to as low as 51½c., but recovered on today's market to 57, with a closing quotation of 55¼@56c. This is due to the flooded condition of the mine, which occurred this week when a shot opened up a stream of water of such volume that the miners barely escaped, and all the lower levels are completely submerged. The last sale of Portland was for $1.80. Findley has declined from 77 to 74c. Elkton sold for 42, C. K. & N. for 10, Isabella at 25¾c. Work has held quite strong and sold today for 95⅝c. Vindicator has been traded in at 95c. Golden Cycle is quoted at 75@90, with no sales.

Heavy snows in the Cripple Creek district have greatly handicapped the smaller producers and no doubt the March production will be considerably curtailed.

San Francisco. March 29.

A tumble in Ophir early in the week was the main feature. The stock went down to $4.75, but recovered to $5 today. This seemed to start interest in the Comstocks, and business was more active than for several weeks. Consolidated California & Virginia closed at $1.40; Hale & Norcross, $1.25; Mexican, $1.15. The tendency is strong.

The market for the Tonopahs was strong and active, with many fluctuations and some sharp advances. The public is taking hold freely and buying orders for these stocks are much in evidence. Montana Tonopah sold up to $3; Jim Butler,

$1.55; Sandstorm, $1.40; Manhattan Consolidated, $1.25. Gold Bar made a big jump, to $2, losing only $1.90 at the close.

Oil stocks remain dull. Home sold at 38c., and Independence at 10c., on small transactions.

Hibbert & Burns—At this property, Browns Valley, a new shaft is to be sunk, a new hoist put in and finally a 20-stamp mill is to be erected. The mine is to be re-opened under superintendency of H. H. Hicks. The property has produced considerable gold from surface workings, but no deep development has been done.

Dividends.

Company.	Payable.	Rate.	Amt.
Am. Smelting & Ref.	Apr. 16	$1.75	$875,000
Anaconda Copper	Apr. 19	1.12½	1,350,000
Green Con. Copper	Apr. 18	0.40	345,600
International Nickel, pfd.	May 1	1.50	133,689
New Idria Quicksilver	Apr. 2	0.20	20,000
Penna. Salt Mfg. Co.	Apr. 16	3.00	180,000
Philadelphia Co.	May 1	0.75	434,296
Tonopah Extension	Apr. 20	0.15	150,000
Tenn. C., I. & R. R. pfd.	May 1	2.00	4,960
Tenn. C., I. & R. R.	May 1	1.00	225,536
United Copper	Apr. 30	1.75	767,500
United Copper, pfd.	May 15	3.00	150,000

Assessments.

Company.	Delinq.	Sale.	Amt.
Caledonia	Apr. 20	May 11	$0.10
Challenge Con.	Apr. 17	May 8	0.10
Confidence	Apr. 11	May 2	0.20
Christmas, Utah	Apr. 16	May 5	0.00½
Crown Point, Nev.	Apr. 25	May 16	0.10
Gould & Curry	Apr. 3	Apr. 23	0.10
Julia Con.	Apr. 9	Apr. 27	0.03
Kentuck Con.	Apr. 11	May 4	0.05
Lower Mammoth, Utah	Mar. 19	Apr. 9	....
Red Slide, Cal.	Apr. 10	.....	0.05
Segregated Belcher	Apr. 5	Apr. 26	0.05
Sonora, Idaho	Mar. 31	Apr. 21	0.003
Tetro, Utah	Mar. 26	Apr. 20	0.01
Union Con., Nev.	Apr. 10	Apr. 30	0.10
Utah, Nev.	Apr. 18	May 9	0.05
Yellow Jacket	Apr. 20	May 15	0.10

Tonopah Stocks.

Apr. 4.

(Revised by Weir Bros. & Co., New York.)

	High.	Low.	Last.
Tonopah Mine of Nevada	19.00	18.50	18.75
Tonopah Montana	2.90	2.85	2.90
Tonopah Extension	10.50	10.25	10.50
Tonopah Midway	2.35	2.30	2.35
Tonopah West End	3.45	3.35	3.40
Goldfield Mining Co.	.65	.63	.64
Jumbo Mining	1.80	1.75	1.75
Red Top	1.80	1.75	1.80
Sandstorm	1.40	1.30	1.35
Montgomery Shoshone Cons.	17.50	17.00	17.25
Eclipse-Bullfrog	1.15	1.10	1.12½
Denver-Bullfrog	1.75	1.75	1.75

St. Louis.

Mar. 31.

Adams, $0.40—$0.25; American Nettie, $0.20—$0.15; Center Creek, $2.50—$2.00; Central Coal and Coke, $63 00—$62.00; Central Coal and Coke, pfd., $80.00—$78.00; Central Oil, $60.00—$55.00; Columbia, $1.00—$0.50; Con. Coal, $20.00—$15.00; Doe Run (old stock), $350.00 - $300.00; Granite Bimetalic, $0.27—$0.20; St. Joe (old stock), $33.00—$30.00.

LONDON. (*By Cable.**)

Apr. 4.

Dolores, £1 17s. 6d.; Stratton's Independence, £0 7s. 6d.; Camp Bird, £1 4s. 9d.; Esperanza, £3 18s. 6d.; Tomboy, £1 7s. 6d.; El Ore, £1 8s. 9d.; Oroville, £0 18s. 6d.; Arizona Copper, pf., £3 7s. 6d.; Arizona Copper, def., £3 7s.

*Furnished by C. Schumacher & Co., New York.

PHILADELPHIA.

Cambria Steel	36	36¾	35⅞	36½
Philadelphia Co.	51¾	51⅞	51	50¾
Tonopah	18⅝	18⅝	18½	18⅝

PITTSBURG.

Crucible Steel	14⅝	15⅛	14⅛	15
Crucible Steel, Pref.	78½	79½	78¾	79
Tonopah Ext.	11¼	11¼	10¾	10⅞

STOCK QUOTATIONS.

NEW YORK. Week Apr. 3.

Name of Company.	High	Low	Clg.	Sales
Amalgamated	113¾	107	111⅞	485,705
Anaconda	284½	270	278½	168,100
Boston Copper	24	23	23¾	3,960
British Col. Copper	8⅝	8	8¾	11,100
Federal	180	180	180	200
Federal, Pf.	106¼	103	105	10,200
Greene Copper	31	29½	30½	21,400
Greene Gold	3⅝	3½	3½	3,750
Mitchell	12¼	11⅞	12	6,795
Tennessee Copper	49⅜	47	48	4,300
Union Copper	2	1⅞	1⅞	7,500
United Copper,	69¾	66⅞	68	37,400
United Copper, Pref.	99½	99½	99½	50
Utah Apex	6⅜	6⅜	6⅝	450
Utah Copper	30½	29⅞	29½	1,660

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.	163½	159½	161⅝	159,000
Am. Smelting & Ref., Pf.	123½	122	122½	3,950
Col. Fuel & Iron	67⅞	64	66	199,900
Pittsburg Coal	17⅝	14½	16⅜	8,800
" " pfd	62	57½	60	1,300
National Lead	84⅛	79	82	29,210
Republic I. & S.	32½	28¾	32	19,310
Republic I. & S., Pf	103½	101	102¾	9,000
Tenn. C. & I.	152	147⅜	150	2,700
U. S. Red. & Ref.	28	26½	27	1,200
U. S. Red. & Ref., Pf.	63¾	63	63½	1,200
U. S. Steel	43½	39⅞	43	387,311
U. S. Steel, Pf	109½	105½	108¾	94,875
Standard Oil	658	650	650	
Bethlehem Steel	32¾	27½	30⅞	

These stocks, not elsewhere quoted, had the following range of prices during the week: (New York) Bamb. Delamar, 5—6; Butte Coalition, 35⅛—38¾; Cumb. Ely Min., 5⅝—7; Greene Gold-Silver, 2⅞—4; Mont. Shoshone, new, 16½—18; Nevada Con. Copper, 17⅞—19. (Boston) Adventure, 6¼—7½; Montana C. & C., 3¾—4⅛; Nevada, 18—19; Trinity, 10—10⅝; U. S. Oil, 12—14⅜; Wolverine, 134—137; Wyandotte, 1¼—1⅜.

BOSTON.

Allouez	40¾	38¾	38¾	2,070
Amalgamated	113⅜	107⅞	111¾	39,327
Atlantic	22	21	21	3,405
Bingham	41¼	38¾	40	3,349
Boston Consolidated	24	23	23½	4,965
*Calumet & Hecla	710	690	709	170
Centennial	27⅛	26¼	27¼	1,845
Mercur	65	63	62½	350
*Copper Range	82½	80	81⅝	6,712
Daly-West	14⅛	14	14	665
Franklin	20¾	19¾	20	4,083
Granby	13⅜	13	13¼	3,300
Green Con. Copper	31¼	30	30	15,811
Isle Royale	23½	22½	23	250
Mass	9	8½	8¾	1,035
Michigan	13¾	13	13¾	870
Mohawk	62	61	61½	2,062
*North Butte	85½	82	85	5,037
Old Dominion	46	43	44½	4 680
Osceola	105½	103	104½	1,784
Parrot	40¾	38	39	2,182
Quincy	96	94	95	260
Rhode Island	6¼	5½	6	1,205
Shannon	7⅛	7	7	1,755
Tamarack	110	107	108	235
Tecumseh	13	12	12	52
*United Copper, com	69½	66½	68¾	16,810
" " pfd	99	98	98	60
U. S. Smg. & Ref.	62	57¾	61⅛	10,172
* " " pfd	46	45¾	45¾	4,650
Utah	65¼	63¾	64¼	10,535
Victoria	9	8½	8⅞	743
‡Winona	9	8	8	50

COLORADO SPRINGS.

Name of Company.	First	High	Low	Clg
Elkton	43	45	40	40
El Paso	55	58¾	51⅛	56½
Isabella	26¾	26¾	25⅞	26
Portland	182	190	175	180
Vindicator	95	95	92	92

SAN FRANCISCO.

Best & Belcher	1.05	1.15	1.05	1.15
Bullion	.29	.31	.27	.30
Caledonia	.35	.37	.34	.37
Confidence	.65	.75	.65	.72
Con. Cal. & Va.	1.30	1.40	1.30	1.40
Gould & Curry	.13	.29	.12	.28
Hale & Norcross	1.30	1.35	1.10	1.25
Mexican	1.10	1.20	1.10	1.15
Occidental Con	.94	.96	.94	.96
Ophir	4.90	6.00	4 90	5.75
Savage	.74	.98	.70	.98

*Ex-dividend. †1st Installment Paid.
‡Assessment Paid. §2d Installment Paid.

Monthly Average Prices of Metals.

SILVER.

Month.	New York.		London.	
	1905.	1906.	1905.	1906.
January	60.690	65.288	27.930	30.115
February	61.023	66.108	28.047	30.464
March	58.046	64.597	26.794	29.854
April	56.600	.....	26.108	.....
May	57.832	.....	26.664	.....
June	58.428	.....	26.910	.....
July	58.915	.....	27.163	.....
August	60.259	.....	27.822	.....
September	61.695	.....	28.528	.....
October	62.034	.....	28.637	.....
November	63.849	.....	29.493	.....
December	64.850	.....	29.977	.....
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.

	NEW YORK.				LONDON.	
	Electrolytic.		Lake.			
	1905.	1906.	1905.	1906.	1905.	1906.
Jan.	15.008	18.310	15.128	18.416	68.262	78.896
Feb.	15.011	17.869	15.136	18.116	67.963	78.147
March	15.125	18.361	15.250	18.641	68.174	81.111
April	14.920	.....	15.045	.....	67.017	.....
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	36.662	Sept	32.095	.....
April	30.525	.....	Oct	32.481	.....
May	30.049	.....	Nov.	33.443	.....
June	30.329	.....	Dec.	35.835	.....
			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	5.350	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; March, £ 15.922.

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	6.209	5.917	6.056	23.825	24.563
April	5.817	.....	5.667	.....	23.813	.....
May	5.434	.....	5.284	.....	23.594	.....
June	5.190	.....	5.040	.....	23.875	.....
July	5.396	.....	5.247	.....	23.938	.....
Aug.	5.706	.....	5.556	.....	24.675	.....
Sept.	5.887	.....	5.737	.....	26.375	.....
Oct.	6.087	.....	5.934	.....	28.225	.....
Nov.	6.145	.....	5.984	.....	28.500	.....
Dec.	6.522	.....	6.374	.....	28.719	.....
Year.	5.882	.....	5.730	.....	25.433	.....

New York and St. Louis prices are in cents per pound. The London prices are in pounds sterling per long ton (2,240 lb.) good ordinary brands.

DIVIDENDS.

Metal and Mining Companies—U. S.

Name of Company and Location.		Authorized Capital	Shares. Issued.	Par Val.	Dividends. Total to Date.	Latest. Date.	Amt.
Alaska Mexican, g.	Al'ka	$1,000,000	180,000	$ 5	$1,374,381	Feb. 1906	$ .30
Alaska Treadwell, g.	Al'ka	5,000,000	200,000	25	8,535,000	Feb. 1906	1.00
Alaska United, g.	Al'ka	1,000,000	180,200	5	.....	Feb. 1906	0.40
Amalgamated, c.	Mont	155,000,000	1,530,879	100	35,041,448	Feb. 1906	1.50
Am. Sm. & Ref., com.	U. S.	50,000,000	500,000	100	6,750,000	Apr. 1906	1.75
Am Sm & Ref. pf.	U. S.	50,000 000	500,000	100	20,891,553	Apr. 1906	1.75
Am. Smelters, pf. A	.....	17,000,000	170,000	100	765,000	Mar. 1906	1 50
Am. Smelters pf. B	.....	30,000,000	300,000	100	1,125,000	Mar. 1906	1.25
Anaconda, c.	Mont	30 000,000	1,200,000	25	28,200,000	Apr. 1906	1.12½
Annie Laurie, g.	Utah	5 000,000	25,000	100	465,061	July 1905	.50
Arizona, c.	Ariz	3 775 000	.....	.....	6,186,826	Apr. 1905	.....
Atlantic, c.	Mich	2,500,000	100,000	25	990,000	Feb. 1905	.02
B. & H., l. z.	Mo	400,000	400,000	1	40,000	Dec. 1905	.01
Boston & Montana.	Mont	3 750,000	150,000	25	44,825,000	Jan. 1906	12.00
Bunker Hill & Sull.	Ida	3,000,000	300 000	10	6,186,000	Mar. 1906	.60
Butte & Boston, c.	Mont	2 500,000	200,000	25	1,800,000	Feb. 1904	1.00
Calumet & Arizonac	Ariz	2 500,000	200,000	10	3,900,000	Mar. 1906	2.50
Calumet & Hecla, c.	Mich	2,500,000	100,000	25	93,850,000	Mar. 1906	15.00
Camp Bird, g., s.	Colo	5,500,000	820,000	5	4,582,500	Feb. 1906	.24
Center Creek, l. z.	Mo	1.000.000	10.000	10	170 000	Oct. 1904	.10
Central Eureka g.	Cal	4 000,000	398,425	1	643,159	Mar. 1906	.07
C. K. & N., g.	Colo	1 500,000	1,431,900	1	229,104	Dec. 1904	.01
Con. Mercur, g.	Utah	5,000 000	1,000,000	1	1,130,000	Jan. 1906	.02½
Continental, z. l.	Mo	550,000	22,000	25	143 000	July 1905	.50
Copper Range	Mich	2,500,000	100,000	25	150 000	Oct. 1905	1.50
Copper Range Con.	Mich	38.500 000	383,781	100	1,968,374	Mar. 1905	1.25
Creede United, g.	Colo	1,625,000	1,625,000	1	173,428	July 1905	.02
Cripple Creek Con g	Colo	2,000,000	2,000,000	1	180,000	Mar. 1905	.00½
Daly West, g. s. l.	Utah	3,600,000	180,000	20	5,667,000	Dec. 1905	.60
De Lamar, g. s.	Ida	400 000	67,180	5	2,926,370	May 1905	.72
Dillon, g.	Colo	1,250 000	1,250,000	1	21,875	July 1905	.01
Doe Run, l.	Mo	1,500,000	15,000	100	752,072	Apr. 1905	1.50
Elkton Con., g.	Colo	3 000,000	2,500,000	1	1,491,961	May 1905	.00½
El Paso, g.	Colo	2,500,000	2,450,000	1	999,750	Nov. 1905	.01
Fed. Sm., com.	Idaho	10 000,000	60.000	100	968,750	Mar. 1906	4.00
Federal Sm., pf.	Idaho	20,000,000	120,000	100	1,811,250	Mar. 1906	1.75
Findley, g.	Colo	1,250,000	1,250,000	1	75,000	Feb. 1906	.02
Gemini-Keystone	Utah	500,000	5 000	100	1,300,000	Aug. 1905	10.00
Gold King Con	Colo	5 750 370	5,750,370	1	1,407.504	May 1905	.01
Gold Sovereign	Colo	2 000,000	2,000,000	1	10,000	Jan. 1905	.00½
Grand Central, g.	Utah	250,000	250,000	1	1,056,250	Mar. 1906	.05
Gwin Mine, Dev., g.	Cal	1,000 000	1,000,000	1	.....	Mar. 1906	.02½
Hecla, s. l.	Idaho	250 000	1,000,000	25	600 000	Mar. 1906	.07
Homestake, g.	S. D.	21,840,000	218 400	100	14,442,550	Mar. 1906	.50
HornSilver, g. s. c. l.	Utah	10,000 000	400,000	25	5,482,000	Mar. 1906	.05
Inter'l Nickel pf.	N. Y.	12,000,000	8,912,646	100	133,689	Feb. 1905	1.50
Iron Silver	Colo	10,000,000	500,000	20	3,600,000	Apr. 1906	.20
Jamison, g.	Cal	3,900 000	390,000	10	213,800	Jan. 1906	.03
Jerry Johnson.	Cal	2,500,000	2,500,000	1	50,000	Jan. 1906	.01
Kendall, g.	Mont	2,500,000	500 000	5	795,000	Mar. 1906	.03
Liberty Bell g. s.	Colo	700.000	65 ,755	1	110,857	Jan. 1904	.15
Lightner, g.	Cal	125,000	102,255	1	295,694	Aug. 1905	.05
Lucky Budge, z.	Mo	40,000	400	100	46,800	Apr. 1905	12.00
Lyon, z. l.	Mo	50 000	4,585	10	2 117	Jan. 1906	.20
Mammoth, g. s. l.	Utah	10,000.000	400,000	25	1,980 000	Nov. 1904	.05
Mary McKinney, g.	Colo	1,000,000	1,000,000	1	567,000	Oct. 1904	.03
Mines Co. of Am.	Mex	2,000,000	2,000,000	1	1,845,000	Feb. 1906	.18
Mott. Ore Purch.	Mont	2,500,000	81.000	25	4,104.000	May 1905	4.00
Monument, g.	Colo	300,000	300,000	1	27,124	Apr. 1905	.01
Nat'l Lead, pf.	U. S.	15.000 000	1 9 040	100	14,607,600	Mar. 1906	1.75
Nevada Keystone, g	Nevada	1,000,000	638 877	1	61,790	Feb. 1904	.03
New Century. z.	Mo	150,000	150,000	1	21,000	ly 1905	.02
New Idria, q.	Cal	500 000	100,000	5	820,000	Apr. 1906	.20
New Jersey, z.	U. S.	10,000,000	100,000	100	8,400,000	Feb. 1906	3.00
North Butte	Mont	6,000,000	400,000	15	1 000,000	Mar. 1906	1.25
North Star, g.	Cal	2,500 000	250,000	10	1,056 356	Dec. 1905	.50
Northern Light g. s.	Utah	2,000,000	400,000	5	20,000	Feb. 1904	.05
Old Dominion Cop.	Ariz	7,500,000	288,000	25	144,000	Dec. 1905	.50
Old Gold	Colo	2,101,150	2 101 150	1	10,506	Mar. 1904	.05
Ophir, g. s.	Nevada	302,400	100,800	3	1,797,400	July 1904	.25
Osceola, c.	Mich	2,500,000	96,150	25	5,221,200	Jan. 1906	4.00
Parrot, c. s.	Mont	2,300,000	229,850	10	6,462,875	Mar. 1906	50
Peacock Valley, l. z.	Mo	25,000	2,500	10	47,500	May 1905	.....
Pennsylvania, g.	Cal	5,150,000	51,500	100	284,925	July 1905	.10
Penn-Wyoming	Wyo	10,000,000	10000000	1	50,000	July 1905	.01½
Platteville, l. z.	Wis	20,000	500	40	89,500	Oct. 1905	10.00
Portland, g.	Colo	3,000,000	3,000,000	1	6,697,080	Jan. 1906	.18
Quicksilver, pf.	Cal	4,500,000	43,000	100	1,931,411	May 1903	.50
Quilp, g.	Wash	1 500.000	1,500,000	1	15.000	Apr. 1904	.01
Quincy, c.	Mich	2,500,000	100,000	25	15,720,000	Feb. 1906	5 00
Red Bird, g. s. c. l.	Mont	1,500,000	300,000	5	72,000	Dec. 1904	.01
Bob Roy, z.	Mo	15,000	15,000	1	8,700	Jan. 1906	.03
Rocco Homest'k, l. s.	Nevada	300,000	300,000	1	112 000	Dec 1905	.02
Sacramehto, g, q.	Utah	5,000,000	1,000,000	1	230,000	Mar. 1906	.01½
Salvator, g. s. l.	Utah	200 000	200,000	1	6.500	Aug. 1904	.01
St. Joseph, l.	Mo	6,000,000	375 000	10	4,508,357	Mar. 1906	.01½
Silver Hill, g. s.	Nevada	108,000	108 000	1	64.800	Feb. 1906	.05
Silver King, g. s. l.	Utah	3,000,000	150,000	20	10 125,000	Mar. 1906	.66⅔
South Swansea, g. s.	Utah	300,000	300 000	1	170 500	Apr. 1904	.01
Spearfish, g.	S. D.	1,500,000	1,500,000	1	165.500	Jan. 1905	.01½
Standard Con., g. s.	Cal	200,000	178,394	10	4,178,174	Feb. 1906	.10
Stratton's Independ	Colo	5,500,000	1,000.007	10	4 505,863	May 1905	.12½
Tamarack, c.	Mich	1.500,000	60,000	5	9,000,000	Jan. 1906	3.00
Tennessee, c.	Tenn	5,000,000	175,000	25	437,500	Jan. 1904	1.25
Tomboy, g. s.	Colo	1,500,000	300,000	25	1,316.000	Dec. 1904	.24
Tonopah of Nev.	Nevada	1,000,000	1,000,000	1	1,100,000	Jan. 1906	.25
Tonopah Ext'nsion	Nevada	1,000,000	928,433	1	.....	Mar. 1906	.10
Tonopah Midway	Nevada	1.000.000	1,000,000	1	50,000	Dec. 1905	.05
Uncle Sam,	Utah	500.000	500,000	1	100 000	Mar. 1906	.02
United Cop. Com.	Mont	45,000,000	450,000	100	2,287,500	Jan. 1906	1.00
United, c. pf.	Mont	5 000.000	50 000	100	1,050,000	Nov. 1905	3.00
United, z. l., com.	Mo	5,000,000	92,400	5	27,450	Oct. 1903	.05
United, z. l., pf.	Mo	1.000.000	19 556	25	197,084	July 1905	.50
United, (Crip'le C'k)	Colo	5.000.000	4,009,100	1	280,071	Apr. 1905	.00½
United Verde, c.	Ariz	3,000,000	300 000	10	17,085,322	Dec. 1904	.75
United States, g. s. c.	Utah	21 500,000	480,000	25	780,000	July 1905	.75
Utah, g.	Utah	1,000 000	100,000	10	226.000	Mar. 1906	.01
Utah Con., c.	Utah	1,500.000	300,000	5	4,386.000	Jan. 1906	2.50
Victoria, Utah	Utah	250,000	250,000	1	35,000	Mar. 1906	0 04
Vindicator Con., g.	Colo	1.500,000	1 100,000	1	1,401,000	Jan. 1906	.03
Wolverine, c.	Mich	1,500,000	60,000	25	2,790,000	Oct. 1905	6.00
Work, g.	Colo	1,500,000	1,500,000	1	15,000	May 1905	.00½
Yankee Con.	Utah	500,000	500,000	1	100 000	Aug. 1905	.05
Yellow Aster, g.	Cal	1.000.000	100.000	10	538,789	Feb. 1904	.15

Coal, Iron and Other Industrials—United States.

Name of Company and Location.		Authorized Capital.	Shares. Issued.	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Ala. Con., C. & I., pf.	Ala	$2,500,000	$24,638	100	$905,265	May 1905	$1.75
Allis-Chalmers, pf.	U. S.	25,000,000	200,000	100	3,213,750	Feb. 1904	1.75
Amer. Ag. Chem., pf.	U. S.	20,000,000	181,350	100	6,286,790	Apr. 1905	3.00
American Cement.	Pa.	2,000,000	200,000	10	888,000	Jan. 1906	.30
American Coal	Md.	1,500,000	50,000	25	1,757,500	Mar. 1905	1.25
Associated Oil.	Cal.	21,000,000	21,000,000	1	630,000	Aug. 1905	.01½
Bethlehem Steel, pf.	Pa.	.....	150,000	100	525,000	Feb. 1906	1.75
Bon Air C. & I., pf.	Tenn.	2,500,000	18,803	100	249,757	Oct. 1904	1.50
Cambria Steel	Pa.	50,000,000	900,000	50	10,500,000	Jan. 1906	.75
Caribou Oil.	al	100.000	80,000	1	56,000	July 1905	.07
Central C. & C., com.	Mo	5,125,000	51,250	100	1,166,250	Oct. 1905	1.50
Central C. & C., pf.	Mo	1,875,000	18,750	100	984,370	Oct. 1905	1.25
Central Oil	W. Va.	1,500,000	60,000	25	182,500	May 1904	.25
Claremont Oil.	al	500,000	450,000	1	58,500	June 1905	.01
Col. & Hock. C. & I.	Ohio	7,000,000	69,244	100	173,086	Feb. 1905	.25
Consolidated Coal	Ill	5,000,000	50,000	100	350,000	July 1904	1.00
Consolidation Coal.	Md.	10,250,000	102,500	100	7,971,650	Feb. 1906	6.00
Crucible Steel, pf.	Pa.	25,000,000	25,000,000	100	250,000	Dec. 1906	1.00
Empire S. & I., pf.	N. J.	5,000,000	23,700	1	535,500	Jan. 1905	1.80
Fairmont Coal,	W. Va.	12,000,000	120,000	100	840,000	Feb. 1905	2.00
Four Oil.	Cal.	500,000	300,000	1	105.406	July 1905	.01
General Chem. com.	U. S.	12,500,000	74,103	100	1,448,713	Mar. 1906	2.00
General Chem., pf.	U. S.	12,500,000	100,000	100	3,925,178	Apr. 1906	1.50
George's C'k Coal	Md.	2,500,000	22,000	100	1,188,000	July 1904	3.00
Home Oil.	Cal.	100,000	100,000	1	507,500	Oct. 1904	.02½
Ill. Crude Oil	Cal.	200,000	200,000	1	12,500	Dec. 1904	.01½
Imperial Oil	Cal.	1,000,000	100,000	100	880,000	July 1905	.20
Int. Steam Pump, pf.	N. Y.	12 500,000	8,850,000	100	.....	Feb. 1906	1.50
Jeff. & Cl'f C. & I., cm.	Pa.	1,500,000	15,000	100	330,000	Aug. 1905	5.00
Jeff. & Cl'f. C. & I., pf.	Pa.	1,500,000	15,000	100	788,000	Feb. 1906	2.50
Kern River Oil.	Cal.	2,000,000	20,000	100	39,500	May 1905	.12
Lehigh Coal & Nav.	Pa.	14,345,650	346,897	50	23,533,303	Nov. 1905	2.00
Maryland Coal, pf.	Md.	2,000,000	18,850	100	1,367,160	Dec. 1905	4.50
Monon R. Coal, pf.	Pa.	10,000,000	100,000	100	3,154,945	Jan. 1906	.97
Monte Cristo Oil	Cal.	500,000	500 000	1	120,000	July 1905	.01
National Carbon, pf.	U. S.	4,500,000	45,000	100	2,047,500	May 1905	1 75
National Lead, pf.	N. Y.	15,000,000	149,040	100	.....	Mar. 1906	1.75
Nat'l Steel & Wire, pf.	N. Y.	5,000,000	2,577,800	100	.....	Jan. 1906	1.75
New Central Coal	Md.	1,000,000	50,000	20	310,000	Nov. 1905	.40
Oil City Petroleum	Cal.	500,000	500,000	1	55,000	July 1905	.00½
Pacific Coast Borax	Cal.	2,000,000	19,000	100	2,086,500	Aug. 1905	1.00
Peerless Oil.	al	1,000,000	92,000	10	396,320	May 1905	.14
Penna. Salt.	Pa.	3,000,000	60,000	50	13,988,000	Oct. 1905	3.00
Penna. Steel.	Pa.	25,000,000	168,214	100	5,849,497	Nov. 1905	3.50
Phila. Gas, com.	Pa.	28,953,029	579,061	50	6,684,142	Nov. 1905	.75
Phila. Gas, pf.	Pa.	5,744,813	114,896	50	1,583,505	Mar. 1905	1.25
Pittsburg Coal, pf.	Pa.	32,000,000	297,010	100	11,434,962	Apr. 1905	1.75
Pocahontas Coll., pf.	W. Va.	1,500,000	15,000	100	347,500	Aug. 1905	1.50
Republic I. & S., pfd.	.....	.....	204,169	100	1,074.38	Jan. 1906	3 12½
Sloss-Sheffield, com.	Ala	7,500,000	75,000	100	375,250	Oct. 1905	2.50
Sloss-Sheffield, pf.	Ala	20,000,000	67,000	100	2,674,000	Jan. 1906	1.75
Somerset Coal.	Pa.	4,000,000	40,000	100	80,000	Feb. 1904	2.00
Standard Oil	U. S.	100,000,000	970,000	100	295,035,000	Mar. 1906	15.00
Tenn. C. & I., com.	Tenn.	22,553,600	225,536	100	2,004,281	Feb. 1906	1.00
Tenn. C. & I., pf.	Tenn.	248,000	2,480	100	360,250	Feb. 1906	2.00
Texas & Pacific Coal.	Texas.	2,000,000	20,000	100	1,930,000	Mar. 1905	2.00
Thirty-three Oil.	Cal.	500,000	100,000	5	430,000	July 1905	.10
Union Oil	Cal.	10,000,000	100,000	100	1,118,766	May 1905	.50
Union Nat. Gas	Pa.	9,000,000	90,000	100	1,260,000	Apr. 1905	2.00
U. S. Steel	U. S.	550,000,000	5,083,025	100	53,360,978	Dec. 1903	1.50
U. S. Steel Corp., pf.	U. S.	360,281,100	3,603,141	100	149,623,486	Feb. 1906	1.75
Va. Carolina Ch., cm.	U. S.	38,000,000	279,844	100	3,678,829	June 1903	1.25
Va. Carolina Ch., pf.	U. S.	2	180,000	100	10,020,869	Jan. 1906	2.00
Westmoreland Coal.	Pa.		60,000	50	8,580,000	Oct. 1905	2.50

Canada, Mexico, Central and South America.

Name of Company and Location.		Authorized Capital.	Shares. Issued.	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Amistad y Conc'rdia.	Mex	$480,000	9,600	50	$258,064	Jan. 1905	$1.71
Butters' Salvador, g.	Salv	750,000	150,000	5	600,000	Apr. 1905	.25
Cariboo McK. 'y, g.	B. C.	1,250,000	1,250,000	1	546,837	Feb. 1904	.04
Carmen, g. s.	Mex	27,500	1,100	25	117,437	Jan. 1905	2.37
Copiapo, c.	hile	1,125,000	112,500	10	3,000,900	Oct. 1904	1.20½
Crow's Nest Pass	B. C.	3,500,000	121,486	25	968,947	Apr. 1904	2.50
Dominion Coal, com.	N. S.	15,000,000	150,000	100	1,050,000	Dec. 1903	1.75
Dominion Coal, pf.	N. S.	3,000,000	30,000	100	3,330,000	Jan. 1905	4.00
Dos Estrellas, g. s.	Mex	150,000	3,000	50	1,020,555	July 1905	13.65
El Oro, g. s.	Mex	5,750,000	1,080,000	5	2,708,800	July 1904	.1b
Esperanza, s. g.	Mex	2,275,000	455,000	5	2,667,599	Jan. 1906	2.62½
Granby Con.	B. C.	13,363,030	1,336,303	10	533,621	Jan. 1906	.30
Greene Con., copper.	Mex	8,640,000	864,000	10	4,094,400	Feb. 1906	.40
Greene Con., gold.	Mex	5,000,000	500,000	10	300,000	July 1905	.20
Guggenheim Expl.	Mex	17,000,000	105,000	100	2,021,250	Jan. 1906	1.75
LeRoi No. 2, g.	B. C.	3,000,000	120,000	25	432,000	Oct. 1905	.24
Mexican Coal & Coke	Mex	5,000,000	50,000	100	600,000	Dec. 1905	3.00
N. Y. & Hond. Ros.	C. A.	1,500,000	150,000	10	2,107,500	Feb. 1906	.20
North Star.	B. C.	1,500,000	1,300,000	1	351,000	Dec. 1904	1.00
N. S. St. & Coal, com.	N. S.	5,000,000	50,000	100	788,600	Nov. 1904	2.00
N. S. St. & Coal, pf.	N. S.	2,000,000	10,300	100	309,000	Apr. 1905	2.00
Penoles.	Mex	.....	3,399,800	...	59,375	July 1905	23.75
Providence, g. s.	B. C.	200,000	40,000	5	22,224	Oct. 1904	.10
Reco, g. s. l.	B. C.	1,000,000	958,000	1	307,082	Apr. 1905	.02
Slocan Star.	B. C.	500,000	500,000	1	575,000	Dec. 1904	.08
St. John del Rey, g.	Brazil.	3,000,000	546,265	5	14,228,101	Dec. 1904	.12
St. Eugene Con.	B. C.	3,500,000	3,202,000	1	402,120	Oct. 1905	.02
Teziatlan Copper	.....	.....	80,000	..	.....	Apr. 1906	2.00
Tilt Cove, c.	N. F.	1,000,000	89,000	2	21,360	Jan. 1905	.24
Tyee, c.	B. C.	940 000	180,000	5	136,800	Dec. 1904	.48