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FROM GOLDFIELD TO RHYOLITE, NEV.

Desert Scenes Along the Automobile Road. Rhyolite, the Busy Camp.

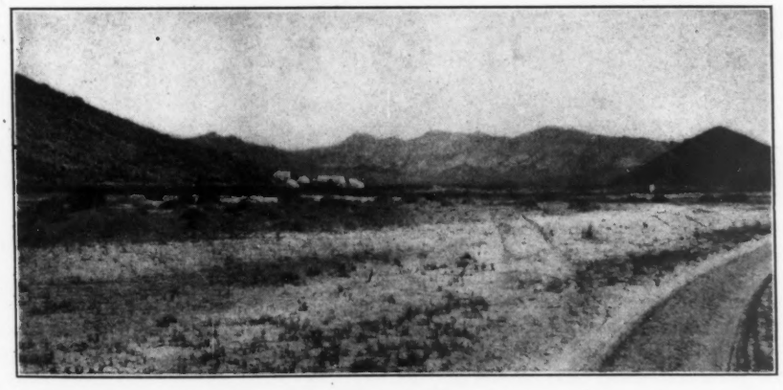
STAFF CORRESPONDENCE

There are two ways of getting to Rhyolite; one from the north, by automobile or stage from Goldfield; the other from the south via the Tonopah & Las Vegas Railroad. Other roads into Rhyolite are being talked of. The Tonopah & Goldfield is pushing a branch south to Rhyolite, but only in a desultory way. "Borax" Smith, representing the Santa Fé, has completed 70 miles of track, and has graded 40 miles further on a road calculated to reach the borax mines in Death Valley, and to extend to Rhyolite further north.

RAILROAD AUTOMOBILE

DESERT CONVEYANCE

At present most of the people going to Rhyolite do so after having visited the other gold camps of Nevada to the north. Both stages and automobiles run between Goldfield and Rhyolite, a distance of 70 miles. The automobile fare is $25 for the trip in one direction, while the stage fare is $16. The stage takes 10 or 11 hours for the trip, and the automobile from four to five hours, including the stop for lunch at Beatty; most people pay the additional fare rather than endure the hot, tiresome ride in the stage. Automobiles have made the trip is 2½ hours. Fifty-h.p. Pope-Toledo cars are used by the automobile company; these carry seven passengers, together with the small luggage.



HICK'S HOT SPRINGS

From Goldfield one passes through the broad valleys of the so-called Ralston desert. Stone Wall mountain first rises ahead seemingly blocking the way, but finally one passes to the left and it is soon lost behind. Dry lake, lying at the foot of the Grapevine mountains, at a point about half way between Goldfield and Rhyolite, is then passed. From there we follow down the broad desert valleys between the Grapevine mountains on the west and the Amargosa mountains on the left, until finally Beatty is reached. All the way from Goldfield to Beatty a string of volcanic hills on each side lines the road with a few mesa-shaped, but mostly jagged peaks of more massive volcanic flows. Bare of vegetation, and ranging from the light gray of the rhyolites through the reddish tints to the dark blacks of basaltic flows, these volcanic ridges boldly present their outlines to the traveler, only to fade gradually away in the trembling bluish haze of the distance.

Joshua trees relieve the landscape between Goldfield and Dry Lake, but further south these disappear, and only a pile of stone, or possibly a stake, marking some of the numerous blanket locations which cover the district between Goldfield and Rhyolite, rears its head above the low growth of greasewood and sage brush.

Lizzards, horned toads, chipmunks and an occasional jack rabbit live on these deserts. Rattlesnakes, and, further south, his fiercer brother, the "Side-winder," are said to be common. Occasionally a dove or other bird is seen flying from place to place, but all these vanish before the noise of the automobile. Many bright-colored flowers line the road in the spring, bright yellows, blues and reds, but a week later, a few hot days intervening, and all these will be withered before the first hot winds of summer.

After many miles of this landscape, and a short climb over a ridge, one looks down into the Amargosa valley with its straggly fringe of green outlining the course of the stream through a desert valley. Straight ahead is the cross spur of the Grapevine mountains at whose foot is Beatty and on whose other side, in a broad gulch between Tadd and Bonanza mountain, is Rhyolite.

Going down the Amargosa one passes Indian ranch, Howell ranch, Hicks Hot Springs and a succession of other smaller

ranches, until just this side of Beatty one comes to the ranch where old man Beatty lived alone among the Indians for many years before the mining excitement reached this part of Nevada.

At Beatty one sees the first of the rival towns of the Bullfrog district. Beatty alone of all these towns is situated upon a running stream, if such the Amargosa river can be called. Many towns have been started in this district, Amargosa,

BEATTY, NEVADA

Bonanza, Bullfrog, South Bullfrog, Rhyolite, all without any water near them, depending upon their nearness to mines or their possession of good stores for their existence.

At this time, Beatty, on account of its being near running water and the enticing farms along the Amargosa, and Rhyolite alone are of any importance, and several of the others have already vanished. A small town called Gold Center has sprung up near a point where it is thought that the Tonopah & Las Vegas Railroad will establish its yards. Bullfrog, which was formerly the chief town, has now dwindled into a small string of houses; its hotel is closed and only the water company, the bank and the ice company carry on business there.

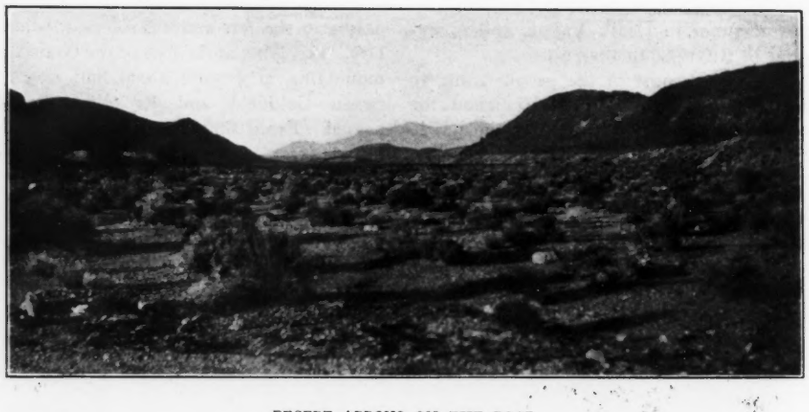
Rhyolite is a town of tents with a few more substantial houses scattered through it. Several stores make this the trading center of the district. Gasolene street lamps light the town at night.

One of the notable men of Bullfrog and Rhyolite is Ex-Senator Wm. B. Stewart, who was so prominent a lawyer on the Comstock in the early days and who has served his State so many years as senator at Washington. Senator Stewart, although almost 80 years of age, is still on the firing line. In former years he helped frame the mining laws of the United States; lately he has become rather unpopular in Rhyolite because he has dared to make a fight against the blanket locations so prevalent all over Nevada, where at present the clause requiring the discovery of ore in place is not enforced.

Prior to August, 1905, all the water used in Rhyolite was hauled in barrels from the Amargosa river and sold at $5 a barrel (50 gal.). On that date the Bullfrog Water Company completed its pipe-line 12 miles long, at a cost of $75,000. Water flows by gravity from springs on the Amargosa to Bullfrog and Rhyolite, there being a head of about 200 ft. at the office of the water company in Bullfrog.

Rhyolite has become a flourishing town in less than two years, and Goldfield a modern city in four years, after the first discovery of ore. In six years Tonopah has become a camp with an assured future. Things progress fast in these Nevada camps. An ice plant was started up soon after the pipe line was completed, and now there are three ice plants in the Bullfrog district. Similarly there are now three pipe lines from the Amargosa to Rhyolite and Bullfrog; the two later lines, however, have to pump the water into camp, gasolene engines being used.

The days are very hot and still, but owing to the fact that the breezes that blow up from the desert, though hot, are quite dry, the heat is not especially noticed. Fortunately the nights are cool and one can get a refreshing sleep if you are not serenaded by the burro, which forms a conspicuous part of Rhyolite's "Floating Population," or disturbed by the noise from some near-by gambling table.



DESERT ARROYO ON THE ROAD

In stamp mills, where lubricating oil is apt to interfere with amalgamation, graphite lubricant finds a field.

Hoisting in Southwest Wisconsin

There is considerable difference of opinion in the Wisconsin zinc fields as to the most economical method of hoisting. A majority of the mines have the hoist set in the derrick, the engine being usually large enough to raise 1000 to 1500 lb. of mine dirt. The idea is to save labor, for, by this method, the hoister man can, after bringing his tub to the top, discharge the contents of the tub direct into a hopper built in such a manner as to cause the dirt to slide toward the mouth of the crusher, or if the hoisting shaft is situated some distance from the mill, the dirt is discharged into a car and thence conveyed to the mill by gravity.

So far, only one mine has been equipped with a cage, the hoist being set on the ground, but as yet no definite figures are obtainable. It is obvious that the former method dispenses with at least one laborer, but the time consumed in the round trip at one of the principal mines, at which it is 160 ft. from bottom of shaft to landing platform, is from 25 to 30 sec., including dumping. The advantage of the latter method is the greater tonnage hoisted at one time. Of course, if an incline shaft and skip can be used, there is no question as to which would be the more economical. The JOURNAL would like some figures on this subject.

The above remarks are intended to apply only to zinc mines, for it is well known that the chief aim of the zinc operator is to keep his investment as close as possible to the minimum and at the same time maintain economy of operation. It must be borne in mind that a majority of the mines are so developed that it is possible to hoist from only one shaft and experience has taught the operator that the simplest and easiest repaired apparatus is the most effective, and the upright hoisting engine set in the derrick seems to take the lead. The most popular sizes are 7x7-in. and 8x8-in. engines, when steam is used, or 20- and 25-h.p. motors, when electric power is used.

Mining in New Caledonia.*

New Caledonia is a mountainous island 400 km. long by 40 km. wide, lying in the Pacific Ocean, about 1600 km. to the northeast of Australia. Its mountain chains are almost continuous, and reach an elevation of 1000 m. The three principal rock formations are Paleozoic, then a group of more recent sedimentary rocks, and finally an eruptive serpentinous rock which covers about two-fifths of the island. It is in this latter formation that the orebodies are found.

LOOKING SOUTH FROM STONEWALL SUMMIT

Nickel—The nickel deposits are scattered irregularly through the serpentine area, and yield an ore consisting apparently of garnierite, or nickel silicate, although it is actually a compound silicate of nickel and magnesia. It is found in masses, often widely extended, but always of shallow depth, which are, without exception, mined in open quarries. The average grade of the ore, as shipped, ranges between 6 and 8 per cent. nickel.

Cobalt—The cobalt deposits consist of irregular impregnations of cobalt oxide in ferruginous clays, derived by alteration of the serpentine rock. Nickel and manganese oxides are associated with it, forming a mixture with a bluish-black color, and an earthy appearance, going under the name of asbolite. The cobalt deposits are not extensive, and permit only small-scale working, which is undertaken by individual miners. Owing to the high price of cobalt, these miners are able to make a living from an ore carrying between 4 and 6 per cent. cobalt. This is sold at Noumea for 250 fr. per ton.

Chrome Ore—Chromite is found scattered in varying quantities throughout the mass of serpentine. The workable deposits are of two kinds: The first, like cobalt orebodies, are found in extensive areas of ferruginous clay, forming a very rich, soft and easily disintegrated ore; the other deposits occur as veins or included masses in the hard serpentine.

The early development of chrome ore was on a small scale, but since the formation of "Le Chrome," this company has obtained possession of all the deposits, controlling an area of 60,000 hectares, of which 6000 hectares are held in concession, 6000 more are applied for, and 48,000 are under exploration. The mineral areas are found in three different parts of the island. The largest is at the north, around the Tiebaghi mine, which yields an ore carrying up to 67 per cent. sesquioxide of chromium. This mine produces between 4000 and 5000 tons of ore per month. The second group is situated at 20 km. to the south of Noumea, and contains the Lucky Hit mine. Here a chromiferous vein having a width up to 15 m. is developed in depth, and forms the only chrome-ore mine in the island that is developed below the surface. This ore, containing 30 to 40 per cent. sesquioxide, is concentrated in a mill. The third group is situated in the south of the island and is not yet developed, although a railroad has been built to it.

*From a paper read by M. Dupuy before the Société de l'Industrie Minérale, August, 1906.

"Aluminum-silver" has the composition: Copper, 57; nickel, 20; zinc, 20; aluminum, 3. The copper and nickel are melted together under charcoal and a small quantity of borax. When the nickel has thoroughly melted, the aluminum is added. The introduction of the aluminum is followed by a rise in temperature, so that the metal must be cooled until the zinc may be introduced without danger of its being volatilized.

The Electrolytic Alkali Company

BY EDWARD WALKER

Toward the end of last year the JOURNAL referred at some length to the chaotic state into which the Electrolytic Alkali Company, of Middlewich, England, had drifted. Owning the Hargreaves-Bird process, scientifically the simplest and easiest to operate of all electrolytic processes, the company was not able to turn it to financial advantage. It is pleasant, therefore, to be able to record now that things are improving. The report for the twelve months ended Aug. 31 shows a profit of £12,000, after full allowance for depreciation, expenditure on upkeep, etc., had been made. The directors are thus able to pay off some of the defaulted preference dividend, though not all up to date. The ordinary shareholders do not get anything yet, but their prospects are brighter than ever before. This improved state of things is not in any way due to the increase in the prices obtained for the soda and bleach, for prices have remained practically the same as in the previous year. It is rather due to more efficient management, by which it has been possible to reduce the costs greatly. Further economies may be expected in future, and it would not be surprising if the directors decided eventually to use suction-gas plants instead of coal-fired boilers. The improved state of things is chiefly due to J. T. Irwin, the new general manager, who was appointed in February last. Mr. Irwin is a chemist of experience, equally versed in the science and finance of chemistry, and this report shows his work.

THE AMARGOSA RIVER

In drawing off the gold-bearing solution from a cyanide-leaching tank, the pipe should be provided with a small outlet, cock and pipe, leading downward, through which a continuous drip sample may be collected in a bottle to go to the assay office.

Atacamite is the name given to the peculiar mixture of copper oxide and chloride found rather abundantly in Chile.

A Rapid Method of Determining Molybdenum

BY JAMES DARROCH AND C. A. MEIKLEJOHN.

This method, which gives excellent results, both with ores and ferromolybdenum, is an adaptation of the molybdate method of estimating lead. It possesses, among others, the following advantages: The results are much better than those obtained by any of the gravimetric methods usually employed. The time required is very much less than by any other method, it being possible to complete the assay in from 30 minutes to one hour. No special chemicals are required, and only the usual apparatus, found in every laboratory, is necessary.

The estimation is conducted as follows: From 0.5 to 1 gram of the ore, or ferromolybdenum (which should be fine enough to pass a 100-mesh screen) is fused, until liquid, with 4 grams of sodium peroxide in a nickel crucible. After the assay has melted the fusion is continued for 3 to 5 minutes, the contents being gently swirled around in the crucible during this period. The temperature should not exceed dull red. The rotary motion is kept up until the assay has solidified. This treatment oxidizes the iron to ferric oxide, converts silica to sodium silicate, sulphur to sodium sulphate, and the molybdenum to sodium molybdate, soluble in water. Lead, if present, is oxidized.

When the assay has set, the crucible should be placed in water in order to hasten cooling; when cold it is transferred to a beaker and the fused mass extracted with boiling water. The crucible is then lifted out and thoroughly washed, the solution boiled down to about 150 c.c., filtered to get rid of the iron, lead and nickel (from crucible) oxides, etc., the filter washed with hot water and the solution acidified with acetic acid. This acid solution, which should be colorless, is titrated boiling with a standard solution of lead acetate. The indicator is the same (tannic acid on spot plate) as that employed in the molybdate estimation of lead, and the titration is conducted in exactly the same manner except that the end point is indicated when the brown color can no longer be obtained.

The molybdic acid formed during fusion is precipitated in the boiling solution in accordance with the equation:

$$Pb(C_2H_3O_2)_2 + Na_2MoO_4 = Na_2(C_2H_2O_2)_2 + PbMoO_4$$

Volume of lead acetate solution required for titration × standard of same = weight of molybdenum in ore taken for assay. Therefore, the calculation is: Standard × number of c.c. lead acetate solution required ÷ weight of ore taken × 100 = per cent. of molybdenum in ore.

Should the ore be high in silica and iron it will frequently be found that the solution comes through of a green color, probably due to finely divided ferrous sulphide which has escaped oxidation owing to an insufficiency of sodium peroxide. On prolonged boiling this comes down as ferric hydrate. To overcome this difficulty it is necessary first, to fuse the ore with caustic soda (10 grams Na OH per gram of ore). The caustic soda is fused to a pasty mass, and the ore, mixed with 3 grams of sodium peroxide, is carefully added in small quantities at a time. When the assay has completely melted another 3 grams of sodium peroxide are added cautiously and the fusion is then conducted as before.

The following solutions are required:

Standard Lead Acetate Solution—This is prepared by dissolving 25 grams of lead acetate in water, a small quantity of acetic acid is added, and the solution is then made up a liter. 1 c.c. of this solution = (approximately) 0.01365 gram lead or 0.00633 gram molybdenum.

Standard Ammonium Molybdate Solution—This is used to standardize the solution of lead acetate, and is prepared by dissolving 10 grams of finely powered ammonium molybdate (not white on outside) in water. If required, a little ammonia is added to clear the solution, and it is then diluted to a liter. 1 c.c. of this solution = (approx.) 0.01056 gram lead.

Tannic Acid Solution—This is used as indicator and should be freshly prepared by dissolving 0.1 gram of tannic acid in 30 c.c. of water.

Standard Solution of Lead Sulphate for Standardizing—0.2 gram of pure lead is dissolved in nitric acid, taken to near dryness, 20 c.c. sulphuric acid added and evaporated on the hot plate until fumes of sulphuric acid are given off. The solution is then cooled, diluted, the lead sulphate allowed to settle, decanted through a filter, and washed twice by decantation. The lead sulphate is dissolved in boiling ammonium acetate, which is poured through the filter into the beaker, to dissolve out any adherent lead sulphate. This solution is titrated boiling with the standard solution of ammonium molybdate, using tannic acid solution on a spot plate as indicator. The end point is reached when a drop of the solution, added to the tannic acid on the spot plate, produces a light brown coloration.

The standard solution of lead acetate is now standardized by titrating it against the ammonium molybdate solution. 50 c.c. ammonium molybdate solution is measured into a flask, acidified with acetic acid, the bulk made up to about 150 c.c., boiled, and titrated boiling with the lead acetate solution. The same indicator is used, and the titration is conducted in the same way as in standardizing the molybdate solution with the exception that the end point is reached when the brown color is discharged.

Assuming that both the lead acetate and the ammonium molybdate are pure, about 40 c.c. of lead acetate solution will be required for titration; 1 c.c. lead acetate solution = 0.01365 gram lead.

The molybdenum value of the lead acetate solution is found by proportion, since, 207 grams of lead = 96 grams of molybdenum and 0.01365 gram of lead = 0.00633 gram of molybdennum, i.e., 1 c.c. of the standard solution of lead acetate is equal to 0.00633 gram of molybdenum.

Lead and Zinc in Algeria

The Société des Mines d' Ouasta et de Mesloula owns two mines in the Constantine department of Algeria, one of which yields calamine, and the other galena.

The Djebel Ouasta mine, 50 km. east of Souk-Ahras, employs 300 men and in 1905 shipped 10,000 tons of calcined calamine. The ore occurs at the contact of Cretaceous limestone and Triassic shales. The deposit is developed by open quarries and by several adits at 40 to 50 m. intervals, with sub levels 20 m. apart. Animals are used for hauling. The calamine is calcined on the spot, yielding a product containing 49 per cent. zinc, and no lead, which is then shipped from Bône for France, Belgium and Germany.

The Djebel Mesloula mine, 5 km. west of Clairfontaine, employs 250 men and in 1905 yielded 800 tons of lead sulphide and carbonate; the output for the present year is expected to be 2500 tons. The ore consists of Cretaceous limestone impregnated with galena so as to carry 10 per cent. lead. The deposit is extremely regular and of large dimensions. Both open and underground workings are maintained. A wet concentrator was put into operation here late in 1905, and its operation has been entirely successful. Extensive construction was required to afford the necessary supply of water. The product is shipped from Bône to European countries. This mine has within two years, become the leading lead producer of Algeria.

The net income from these two mines has enabled the operating company to recover within three years, the 1,500,000 fr. spent in development; this having now been accomplished, future earnings, after allowing for interest and reserves, will be equally divided between the stock contributors and the holders of the company's bonds.

Fire-killed timber is sometimes considered to be practically valueless, but it has been used for railway ties and mine timbers with satisfactory results. According to investigations made in Colorado by the U. S. Forestry Bureau, the ties are as durable as those of green timber, hold spikes well and do not cut under the tie-plates. Some of the ties are from timber burned 35 or 50 years ago. The timber is, of course, well seasoned, and it is expected that its utilization may be a source of profit to the forest reserves.

The Occurrence of Diamonds in the Drift of Some of the Northern States.*

BY DR. ROBERT BELL.

The finding of diamonds in the glacial moraine extending through the northern central States has led to a good deal of speculation as to the locus of their original matrix.

The region in which diamonds have been found extends from southwest Ohio in a northwesterly direction through Indiana, Michigan and Wisconsin, a distance of about 600 miles. If these stones have all been derived from one source they must have taken widely different courses from the parent rock in order to have reached the several localities where they were found. Some writers on this subject have assumed that by platting backward the courses of glacial striæ, the region in which these lines would nearly converge would be the probable locality, and they have arrived at the conclusion that this is somewhere in the Labrador peninsula.

There are a number of reasons for not accepting this conclusion, among which are the following: The striæ appealed to for evidence belong, no doubt, to long separated intervals of the glacial period. Even when we can trace one set of striæ back for a considerable distance, it is found that the drift or till along its path may consist largely of materials which do not occur anywhere upon its course. This is because large quantities of till have been removed from other regions by pre-existing ice-sheets which traveled in one or more different directions. What must have been extensive systems of glaciation, as shown by the composition of the till and by their effects upon the solid rocks, have had their striæ almost entirely obliterated by newer systems running in very different directions. In questions of this kind, great care should be taken to distinguish between the general course of the striæ and mere local groovings, and this does not appear to have been done.

Glacial striæ have nowhere been proved to run in a nearly straight course for such great distances as would be necessary to carry those in question back to an area anywhere near to Hudson bay. The distance from southern Ohio to the nearest point of James (Hudson) bay is over 1000 miles and to northern Labrador fully 2000 miles.

In proceeding from the southern extremity up the east coast of Hudson bay, the course of the ice grooves changes from southwest to west and then to north. The glacial debris, pushed north along the coast, has been carried completely across the western part of Hudson strait, so that if diamonds had existed there they would have been driven in the opposite direction from Ohio instead of toward that State. In Baffinland the striæ run south, curving somewhat to the eastward in approaching Hudson strait, while south of the strait they run northward, curving eastward as they approach that great channel.

On the Canadian shores of Lakes Superior and Huron the glaciation has not always been to the southward. When the basin of Lake Superior was filled with ice it flowed out to the west and east. Along the north shore of Lake Huron the flow at one time was eastward. This is proved by the transportation of the glacial debris, including boulders and pebbles of jasper conglomerate. The most recent sets of striæ, along this shore, however, run southward and southwestward.

The jasper conglomerate occurs only within a limited area at the eastern extremity of Lake Superior and north of the St. Mary river. Owing to this fact and the striking and unique character of the conglomerate itself, which renders it easily recognized, this rock may be selected to trace the course of the materials of the drift from this region. It is met with in the drift all along the north shore of Lake Huron; and from the south side of Georgian bay fragments of it may be traced southward through Ontario into Ohio and westward through Indiana and Michigan to the vicinity of Chicago.

The basin of Lake Superior is situated in a volcanic area which has had its origin in remote geological ages. The volcanic and igneous rocks together with the shales containing carbonaceous matter which are so abundant in the Lake Superior region may well be supposed to furnish materials from which diamonds could be derived, and these may have been carried in nearly the same course as the jasper conglomerate into all the States where diamonds have been found in the drift.

In the Muskoka district on the east side of Georgian bay there is an area of peridotite rocks which cut shales containing considerable percentages of carbonaceous matter, thus reproducing the conditions which obtain at the South African diamond mines. This may be the correct explanation of the origin of some of the diamonds and there may be several centers from which the gems may have been derived.

If the diamonds could have been transported with the drift through the great distance from northwest Labrador, it would still be requisite that some of the rocks in that region should be of such a character as to give promise of yielding diamonds. Instead of this, we know that the whole of that territory consists of the monotonous primitive granitoid gneiss which is peculiarly barren of minerals of any kind beyond its elementary constituents.

Against the theory of the diamonds originating in this region, we have, therefore, the facts that the drift did not move southward except in a part of the intervening regions, that even if it had done so, the distances were too great for any of it to have reached the localities where the diamonds have been found, and that the rocks of the region of supposed origin are most unlikely to have produced diamonds.

*Abstract from advance proofs, subject to revision, of the *Journal* of the Canadian Mining Institute, Vol. IX.

A Pohl-Croasdale Plant

A new 125-ton capacity volatilizing plant, complete with power machinery, has recently been put into commission by the Rigby Mining and Smelting Company at Mayer, Ariz. It is the first attempt to employ the Pohl-Croasdale volatilizing process on a commercial scale.

This process, which has been undergoing an experiment for several years, is briefly as follows: Ore is crushed to 20-mesh by the usual methods of dry-crushing plants, mixing the crushed ore with salt and exposing it to a chloridizing roast in an oxidizing atmosphere of 1000 deg. C. The metals—gold, silver, copper and lead—which are volatilized are cooled by contact with sheet-metal flues, precipitated as fine dust and given further treatment for the recovery of the valuable products sought.

The plant is arranged on the unit basis, each unit independent of the others and consisting of a furnace, a set of collecting chambers and cooling flues, a blower with connecting pipes, condensing chamber and a bag house. These furnaces are not equipped with stacks and all draft is provided in the vacuum created by the blowers. Gases are drawn into the condensing chambers and bag house while the flue dust or precipitate is taken to the filter house and treated in leaching tanks for separation of its several constituents.

The power equipment consists of three Allis-Chalmers girder-frame engines, two 14x36 in. and one 12x30 in., operating under 100 lb. steam pressure, from three internal corrugated furnace boilers. The chief members of the crushing equipment are the following: Blake crusher, 20x10 in.; a set each of 36x14-in. and 16x10-in. Reliance belted rolls; a 60x36-in. x 10-ft. taper hexagon screen; a Vezin double sampling machine; a Gates revolving drier, 60x42-in. x 26-ft. with red-brick lining and one 44x36-in. x 18-ft. of the same description; two belt driven feeders.

The fine-grinding plant has an equipment of three sets of 30x14-in. and one set of 20x12-in. Reliance belted rolls.

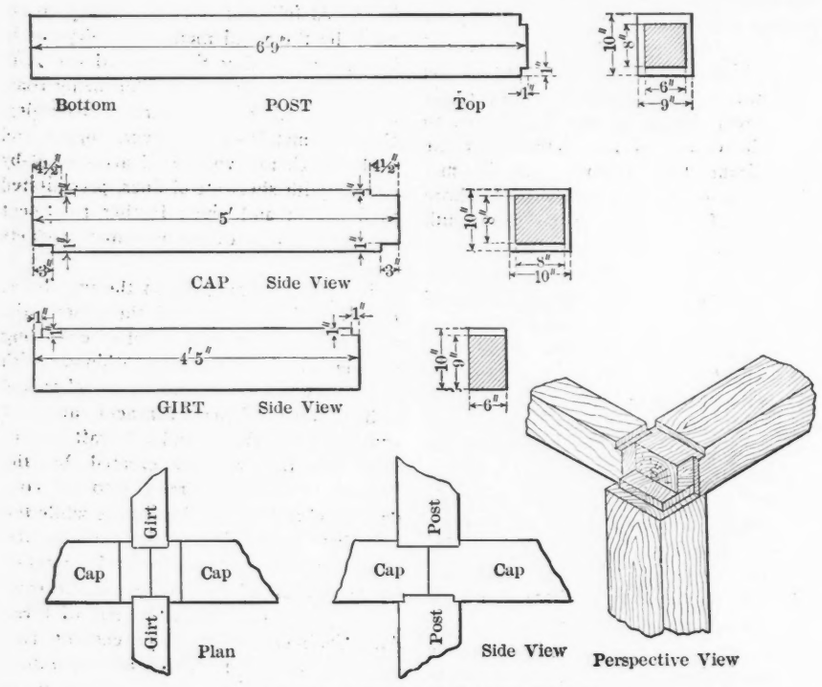
The Baltimore & Ohio Railroad carried 70 per cent. of the coal mined in Maryland last year. The tonnage for this road was 4,309,071. The total coal mined in the Cumberland region during 1905 was 6,226,284 tons. Of this amount, 814,687 tons were either consumed locally or used at the mines.

SQUARE-SET TIMBERING AT BINGHAM, UTAH

A New Method of Framing

BY CLAUDE T. RICE

At present square-set timbering is mainly used in mining the orebodies at Bingham Cañon, Utah. As the orebodies are mainly replacement deposits in the limestone along mineralizing fissures, the walls of the orebodies are generally strong except where the limestone has been shattered by faulting. Because of this strength of wall complete filling of the stopes with waste, such as is the practice at Butte, Mont., where in some of the square-set stopes the filling or "gob" is kept within two floors of the roof of the stope, is not required.



DETAILED SKETCH OF FRAMED TIMBERS

MINING METHODS

Consequently the orebodies of Bingham are mined without much waste filling, thus resembling the open square-set stopes of some of the Leadville mines where the ores also occur in limestone. Whenever a stope shows signs of a "taking weight" a few square-sets are lagged and waste is dumped into this pen, forming a waste-filled bulkhead which helps materially to steady the stope. These "pen" bulkheads work so satisfactorily that I failed to see any wooden bulkheads such as are used in some of the Boston & Montana mines at Butte.

The chutes are simply plank-lagged square-sets with occasional offsets to break the fall. Owing to the softness of these sulphide ores there is no excessive amount of cutting of the lining of the chutes and consequently neither "bricked" chutes nor the open staggered chutes which characterized the open square-sets stopes of the Homestake mine, at Lead, S. D., are necessary. Two-inch planks are used for floors in the stopes. Owing to the strength of the ore and the little tendency it has to scale off, the roof sets of the stope generally do not have to be lagged, another feature which makes the timbering and mining cost in Bingham Cañon square-set stopes much less than at Butte, Montana.

THE SQUARE SET SYSTEM

However, the mine managers at Bingham have not been quite satisfied with these advantages, but have designed, in order to save timber, a specially framed square-set, which, at least as far as my experience indicates, is peculiar to these mines. This system was first used at the Highland Boy mine of the Utah Consolidated and has later been adopted at the near-by Boston Consolidated mine. It has proved so satisfactory that the same framing of square-sets is used at the Cactus mine at Newhouse, Utah, which like the Boston Consolidated is under the control of Samuel Newhouse.

On the Comstock Lode the original square-sets were framed, as designed by Philip Deidesheimer, with the horns of the posts butting against those of the posts below. This framing is still retained in the few square-sets used at present on the Comstock. Whether the downward pressure there is greater than the side pressure, as the framing would indicate, I do not know, but I could not help noticing this feature of the framing of the original square-sets which to me at least is unique; for although I have worked in many mines, and visited many more, in which square-set timbering is used, I have not seen elsewhere this feature of butting the posts against each other.

PECULIARITIES OF THE BINGHAM PRACTICE

At Bingham Cañon the sets are designed to offer the greatest resistance to side pressure and so the horns of the caps are caused to butt against each other, the cap being 10x10 in. square. In this butting of the caps there is nothing unusual, but in the posts we have the unique feature of a piece rectangular in section instead of square, the post being 10 in. wide in the direction of the girts and 9 in. wide cap-ways, thus saving an inch in the cross-section of the posts. Moreover, the posts have a bottom and a top end for they are "bald' at the bottom and have only a 1-in. horn on top. In consequence of this framing of the post the top mortise made up by the assembling of the caps and girts differs from the bottom mortise, and so there is a top side and bottom side to the caps and girts. This at first confuses the green timber man used to caps without a bottom or top side, but of course this is no valid objection to this square-set. Naturally, it is necessary to have a tenon on the top end of the post on which to rest the caps and girts. As the bottom of the post rests on the caps and girts it does not need to be framed, but it seems to me that it would be just as well to have the top and the bottom ends of the posts similarly framed with horns, for then there would be no such complicated arrangement of framing as the present design demands in the caps and girts. True, that would cause an extra pass of the post in the framer but it would avoid the special framing of a cap only on the top side of the girt. If the similar framing of both ends of the post were adopted the girt would be a plain 6x10-in. timber resembling the girt used by F. A. Heinze at the Cora-Rock Island mine at Butte, Mont., where (if my memory be correct) the girts are plain 8x10-in. and the posts are 10x10-in. with horns on both ends, and the caps are 10x10-in. butting up against one another.

CRITICISM OF THE SYSTEM

This making of the girt only 6x10 in. in cross-section appears to be a step in the right direction, for the purpose of the girt or tie, or as it is better called in some camps, the brace, is mainly to resist the side movement of the caps and is not to resist any great inward pressure

in the stope as is the function of the cap. Consequently the girt does not have to be as strong as the cap. In my opinion it is a waste of timber to make the girts equal in cross-section to the caps.

Another feature that strikes me as worthy of consideration is the fact that although the vertical distance in the clear between the caps and the posts is 6 ft. 5 in., the distance in the clear cap-ways and girt-ways in the sets is only a little over 4 ft. It might be possible to increase this distance and effect still more economy in the timbering without endangering the stope, but this last matter of course is a point for men well acquainted with the ground to decide and undoubtedly it has been given much thought by the Highland Boy management which is noted for its high efficiency. I mentioned the point only because of the striking difference in these dimensions, which the managements of these mines have thought necessary. The only drawback to the girt being as narrow as 6 in. is the ease with which a floor can be torn up by a heavy blast in the stope, unless the floor is tightly wedged in place, for the floor has only a 3-in hold when laid cap-ways. But this of course is a very small drawback.

All these timbers are framed at the mills in Oregon and Washington, and are shipped ready to go into the stopes.

The arrangement of the sets is shown in the accompanying drawing.

Owing to the fact that the dimensions were scaled off the timbers themselves and not taken from a drawing, there may be some slight mistakes (even ½ in.) in some of the dimensions, but the dimensions of the sets are in the main correct.

Diamond and Bort Mining in Brazil

In the September number of *Popular Science Monthly*, H. W. Furniss, formerly American consul to Bahia, outlines the diamond-mining industry of Brazil. While the total output of Brazil is comparatively insignificant, the quality of its stones is unsurpassed. The principal productive localities are Goyaz, Matto Grosso, Minas Geraes and Bahia; but in the latter two only have diamonds been mined to any extent.

Diamonds were first found in Brazil in 1729, and were sent to Portugal. The quality of Brazilian diamonds varies with the locality; those from Minas Geraes are of well assorted quality, those from Salobro are of the prized white and blue-white colors, while the other Bahia stones are more inclined to be off-colored. Many Bahia diamonds, have a thin coat of surface color, which gives a bad appearance to the stone. This color may be removed by a skilful workman by heating the stones red hot, and pouring on a chemical which consumes the coating with a loss in weight of about 1 per cent. The majority of Brazilian diamonds weigh less than one carat, but the average weight is about two carats.

Black diamonds, or borts, are found in close association with the gems, but only in Bahia. The average weight of these borts is much higher than that of the gem stones, and they usually occur in the proportion of about three carbons to one diamond by weight, while good-quality carbon is worth more per carat than the rough gem stone.

The original matrix of the bort and diamond appears to be a conglomerate of recent geological date. The decomposition of this rock yields the stones, which are recovered in the rich valleys, Most of the mining is done by individual natives, *garimpeiros*, who work either for themselves or on shares with the claim owner. Very few owners hire workmen. The diamond miners are almost exclusively negroes, or a mixed race, living in near-by towns or in caves near the working places.

Practically all the successful mining is still done by antiquated methods which require but little outlay of capital. A short-handled hoe, a crowbar, a shovel, a hook on a pole, a small wooden basin, *parimbe*, for carrying the gravel and a wooden *batea* for washing, some kind of a sieve, and occasionally a hammer and a drill are all the apparatus required.

The diamond-bearing gravel, *cascalho*, is obtained by removing surface soil, or by drifting underground, or by diving into the streams. The *cascalho* is washed by throwing it into ditches of running water, and stirring it up with a hoe. The concentrate is accumulated for a week, when it is thoroughly concentrated in *bateas* until only the carbons remain. A strong man can concentrate and pick over 1 cu.yd. of *cascalho* per day, if conditions are favorable. In Bahia a little machinery has been erected for this work, but it has not been successful. The diamond-bearing lands of Bahia are owned by the State, and are leased as small claims, or in large parcels to companies who desire to work them. About all of the known areas capable of work by machinery have already been occupied.

For reducing Bolivian tin ores, crushers, stamps, and ball and Huntington mills are employed, and occasionally rolls, while the concentration is effected on Wilfley and other tables, and in Cornish round buddles and revolving tables, the old rectangular hand buddles with a broom being still to some extent also employed.

In metallurgical construction it often may be found cheapest to use steel I-beams for girders supporting tanks, etc., and timber for posts. The posts should set on a cast-iron base plate and should be provided with cast-iron caps.

Manganese in Mysore, India

A new deposit of manganese which promises to be an important source of supply is being opened up in Mysore State, India. The properties belong to the Mysore Manganese Company, whose office is at Bangalore. They are situated 20 miles northwest of Shimoga station on the Southern Mahratta Railway, which station is 340 miles from the railways' terminal port at Mormugoa. The distance from the deposit to the railway is covered partly by ordinary road, but the four miles nearest the mine are in dense jungle, through which a rough road has been cut. The ground is now being surveyed for a branch line from the railway.

Development has been conducted with unusual rapidity. It was only in August, 1905, that the deposit was discovered by W. T. Hamilton Holmes, who was conducting a prospecting expedition with manganese in view. By the end of 1905 mining was in full swing and between March and August of the current year 20,000 tons were shipped to the coast and 25,000 tons additional made ready for immediate shipment.

On the surface the ore occurs in nodules and boulders cemented together with a form of laterite clay. These vary in size from an inch in diameter to several tons in weight. This deposit extends over an area of several thousand square yards, as far as has yet been ascertained. At one point a well defined lode of high-grade ore has been opened up. The ore is very compact, crystalline, and hard, with a bright metallic fracture. Its analysis, after drying, gives 55.69 manganese; 2.98 iron; 0.53 silica; 0.015 phosphorus; with traces of sulphur and copper. Ore of this grade is now being shipped at the rate of 5000 tons a month. The surface deposit of nodules and boulders is also being exploited and three grades of ore are being obtained:

No. 1 grade, 53.72 manganese and 5.55 iron; No. 2 grade, 43.29 manganese and 11.79 iron; No. 3 grade, 32.76 manganese and 14.28 iron. The silica and phosphorus are about 1 and 0.05 per cent. respectively, in all three grades, and are sufficiently low to bring the ore into favor. It is as yet too early to give any exact details of the extent of the deposit or of its geological occurrence.

Operations are handicapped by the long and difficult transit. The ore is carried in native carts to the railway at a rate of six rupees per ton, and the railway charge, including loading into the steamer, is another six rupees per ton. There are 500 carts and 1000 bullocks in use in hauling the ore to the railway. Labor is plentiful and the work appears congenial. There is in fact a superabundant population which in periods of scarcity becomes a burden to the State, so that this new source of employment is welcomed by all concerned.

The Lawrence - Oliver Skip

BY FRANK OLIVER*

The capacity of this skip is 27 cu.ft., the dead weight being 600 lb. The body of skip is built of 3/16-in. steel, while the bottom is of ¼ in., with a false bottom of 1½-in. wood, covered with No. 8 steel. The yoke is made of ¾x3-in. Norway iron, which carries the entire weight, no weight being on the axle.

The idea was Willis Lawrence's (superintendent Telegraph Hill mine, Amador county, Cal.), and my part was the mechanical construction and putting into operation. The skip is doing excellent work and facilitates the handling of a large tonnage when combined with pockets or bins on the various levels, which I have at the Florence mine. In handling about one ton to the load from the 350-ft. level I develop about 30 h.p. on my electric hoist. The skip is designed for vertical shafts and is entirely automatic. The construction is clearly shown in the accompanying engravings.

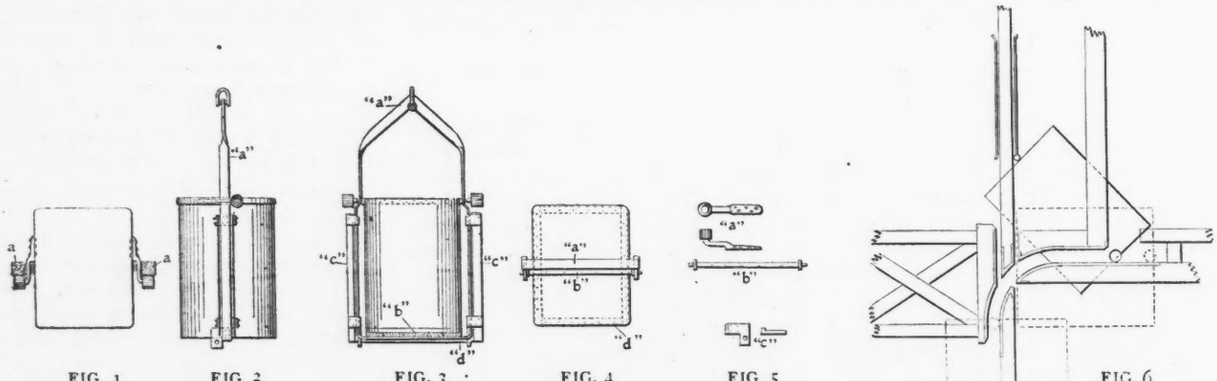


FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5 FIG. 6

THE LAWRENCE-OLIVER SKIP

In the accompanying drawing, Fig. 1 is a plan and Fig. 2 a side elevation; *a, a* are the guides. Fig. 3 is a side elevation, *a* being the bail, of Norway iron; *b* the false bottom, and *c* the steel slipper. Fig. 4 shows the bottom, *a* being the yoke and *b* the axle, and *d* the angle iron. Fig. 5 shows some details of the skip; *a* is the roller bracket, *b* the axle and *c* the axle bearing. Fig. 6 is the automatic pumping device, the plain and dotted lines showing the skip in its successive positions as it passes to the dump.

According to a recent consular report the prices of manufactured lead products in Great Britain have reached a price higher than since the Franco-German war. Red lead now stands at $101 a ton, but white lead is not quite so high in proportion. Sheet lead is $99.78 per ton and pig lead $92.46. It is expected that the high prices will give a new lease of life to the English lead-mining industry.

*Superintendent Florence-Goldfield Mining Company, Goldfield, Nevada.

Aboriginal Mining in Mexico

BY F. J. H. MERRILL*

For our information as to aboriginal mining in Mexico we are chiefly indebted to the early Spanish historians, Clavigero and Lorenzana; and to the industry of Alexander von Humboldt, who took pains to verify many items of historic record. Long before the arrival of the Spaniards (in 1519) the natives of Mexico, like those of Peru, understood the use of some of the metals. It appears certain that they did not content themselves with those which were found in the native state, on the surface of the ground near the outcrop of veins, or in the beds of streams and in ravines carved by torrents. It seems rather that they conducted underground work in exploiting veins; that they knew how to cut drifts and sink shafts, and that they had tools fit to cut rock. Cortez tells us that in the great market place of Tenochtitlan there were sold gold, silver, copper, lead and tin.

The inhabitants of Tzapoteca and Mixtecapan, two provinces now in the State of Oaxaca, separated gold by washing alluvial sands. These people paid their tribute in two ways: either by putting the gold dust into little sacks of leather or little baskets of fine rushes, or by casting the metal into bars. These bars, similar to those found today in commerce, are shown in the ancient Mexican paintings. According to Clavigero, in the time of Montezuma the natives were working veins of silver at Tasco, and those which traverse the mountains of Tzunpanco. In all the great cities of Anahuac vases were made of gold and silver and the Spaniards admired greatly the work of the Mexican goldsmiths, among whom the more celebrated were at Adcapozalco and Cholula.

When Montezuma credulously assumed the arrival of the white-faced and bearded men to be the accomplishment of the prophecy of Quetzalcoatl, and forced the Aztec nobles to offer homage to the King of Spain, precious metal valued at $162,000 was brought to Cortez.

Before the conquest, the Aztecs obtained lead and tin from the veins of Tasco and Izmiquilpan. Cinnabar, which furnished them red paint, came to them from the mines of Chilapan.

Of all the metals, copper was that which was most commonly used in the mechanic arts. It took the place, to a certain extent, of iron and steel. Arms, hatchets, chisels and all other tools were made from copper from the mountains of Zacatatlan and Cohuixco. These Mexican tools of copper were nearly as efficient as tools of steel, for the work they had to do; this efficiency was attained by alloying the copper with tin, and hardening the alloy by hammering. A Peruvian chisel, brought to Europe by Humboldt and analyzed for him, contained 94 per cent. copper and 6 per cent. tin; its specific gravity was 8.815. Humboldt remarks that many early European bronze implements contained a small amount of iron. A Gallic hatchet yielded on analysis: 87 per cent. copper, 9 per cent. tin and 3 per cent. iron. These alloys could be softened by heating to a red heat, and plunging into water, they were hardened by hammering.

It is not known whether the Mexicans mined oxidized ores in which tin and copper were mingled, or whether the mineral oxide of tin was added to the molten copper. The cutting tools of the Mexicans were partly of bronze, and partly of obsidian (itztli). This substance was the object of extensive exploitation, of which traces may still be seen in the Cerro de las Navajas, near the village of Atotonilco el Grande.

Several of the metals were used as money by the aborigines, and in the great market of Tenochtitlan all kinds of goods were sold by exchanging them for gold dust enclosed in quills of aquatic birds. The quills selected were transparent so that the size of the grains of gold might been seen. In several provinces, pieces of copper, in the form of a Roman T, were used as coin. Cortez relates that having sought to cast cannon in Mexico, and having sent agents to find mines of copper

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and tin, he ascertained that near Tasco the natives used, in their exchanges, pieces of cast tin as small as the smallest coins of Spain.

Such are the imperfect data which the early historians have given us concerning the use of gold, silver, copper, tin, and the ore of mercury. From this it may be seen that the Europeans in the first years of their occupation had only to follow in the foot-steps of the aborigines, in working the deposits of the useful and precious metals.

A Silver Vein under Clear Lake, Cobalt

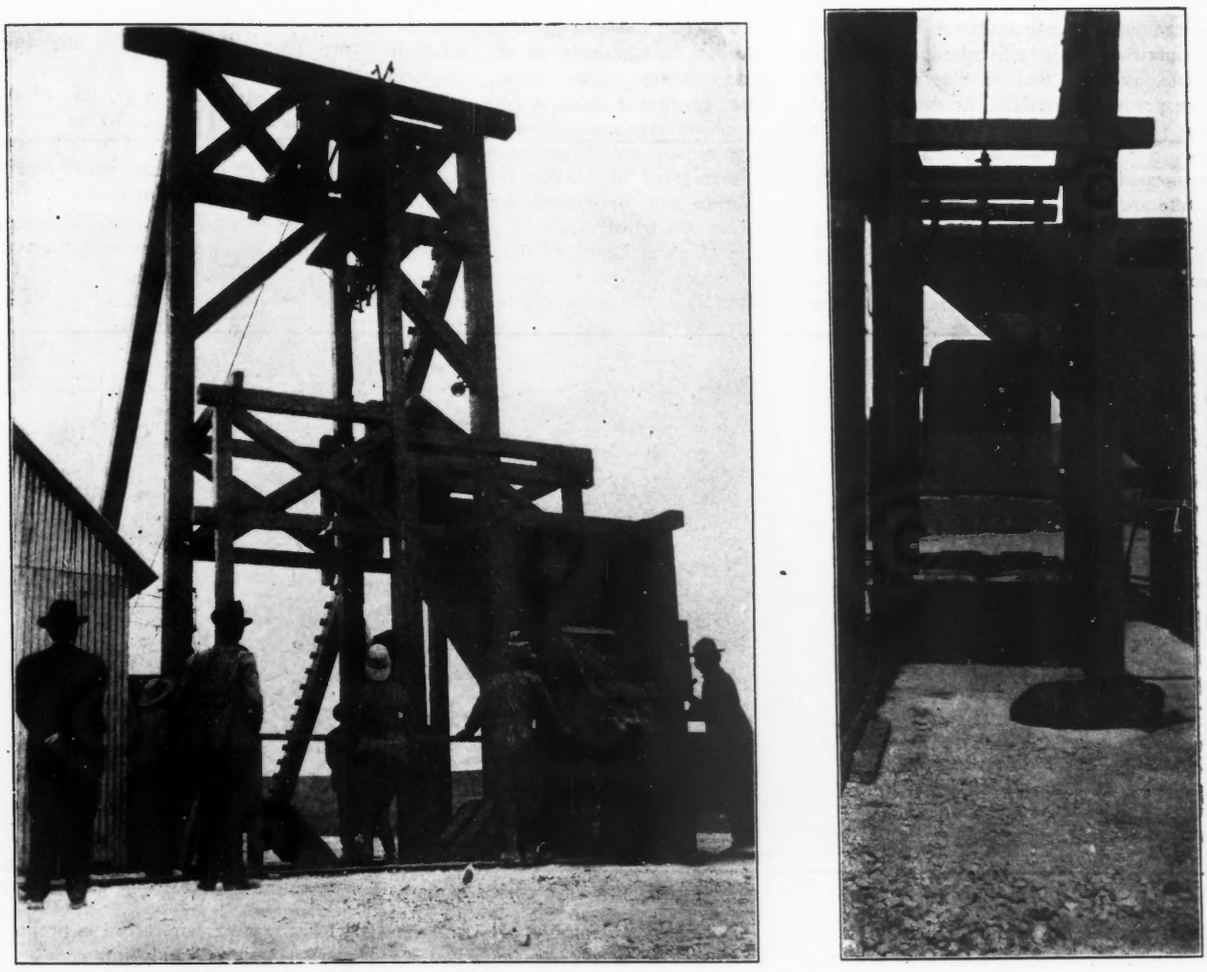
BY J. J. BELL

The discovery of native silver, by means of diamond-drill prospecting, under the water of Clear lake, west of Cobalt, has attracted considerable attention, and was referred to in the JOURNAL, Aug. 4, 1906. The discovery was made on the property of the Clear Lake Mining Company, which owns land on both sides, as well as the mineral right in the area covered by the lake.

On the south shore of the lake, a shaft has been sunk to a depth of about 45 ft., being located some 200 ft. distant from the prospect hole. It is interesting to note that there is a marked resemblance between the ore found here and that obtained from the Silver Islet mine, Thunder bay, Lake Superior, which was first noted when the ore, in the present shaft, was encountered at a depth of about 20 feet.

On the property to the north of the lake, now owned by the Clear Lake Mining Company, but formerly known as the W. R. Smyth claim, a number of test shafts, or pits, were sunk, which have proven the existence of a net-work of veins. One of these shafts, known as No. 4, has struck a cross-vein, which joins the main vein about 100 ft. north of the shore of the lake. The shaft known as No. 8 has reached a depth of 36 ft., and both native silver and argentite have been found. The walls of the vein are well defined and its contents strongly mineralized. Besides the original discovery, noted above, there are two other localities on the Clear Lake company's property, where native silver has been found in paying quantities. A steam hoisting plant, together with a drill for prospecting, have been installed on the property and development work is being carried on. Several other companies and syndicates in the vicinity of Clear lake have acquired properties and developing them.

The discovery of the silver-bearing vein was made by Major J. R. Gordon, who had charge of the drilling operations in the lake, and later, by a system of trenching, proved the existence of at least eight cross-veins. The work of developing the property is also being directed by Major Gordon, who has had considerable mining experience in South Africa, Mexico, and in the Western States.



LAWRENCE-OLIVER SKIP AS INSTALLED AT FLORENCE MINE, GOLDFIELD, NEVADA

Tin in the Carolinas

Tin occurs along a narrow belt extending northeastward from the center of Cherokee county, S. C., across Cleveland and Gaston counties to the center of Lincoln county, N. C. Tin is present, in exceedingly irregular pegmatite dikes, as cassiterite, which occurs only as an original constituent of the pegmatite. This mineral is not evenly distributed through the dikes, but is generally segregated or concentrated along certain lines. The ore-bodies thus formed generally pitch at a considerable angle and are of small cross section, but extend indefinitely along the pitch. They are probably irregular in extent, averaging 5 per cent. black tin.

THE COPPER DEPOSITS OF VIRGINIA*

Describing the Character and Occurrence of Ores, with Notes on Past Production

BY THOMAS L. WATSON†

The existence of copper ores in Virginia has been known since the early settlements in the State, and while many attempts have been made to mine the ores, not until recent years have they been produced in paying quantities. The ores of copper have wide distribution over the State, although there are at present but few producing mines. The distribution of the principal copper deposits is given in the accompanying map. The known geographic areas of these ores in the State are:

I. The Piedmont region. (a) The Virgilina district, which includes Halifax county, Virginia, and Person and Granville counties, North Carolina. (b) The deposits near Keysville, in Charlotte county; those near New Canton, Arvonia and Dillwyn, in Buckingham county; and those on or near Southwest mountain in Albermarle county.

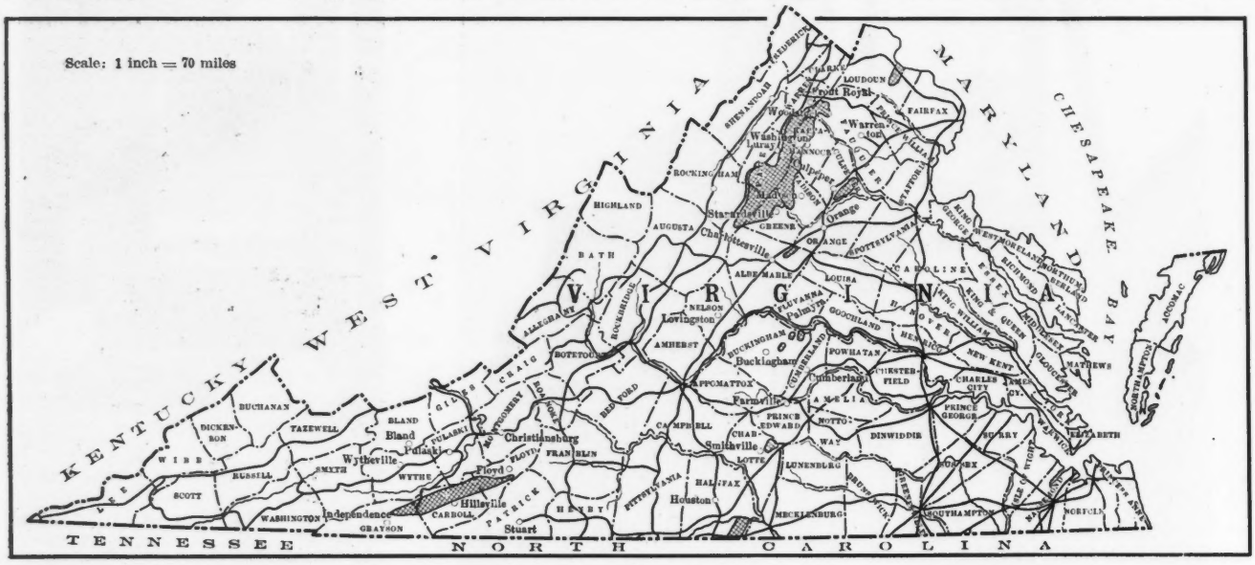
II. The Blue Ridge region, which includes the deposits from near Front Royal, southward, and embracing parts of Warren, Fauquier, Rappahannock, Madison, Page and Greene counties.

III. The Southwest Virginia region, which includes the "Gossan Lead" of the Floyd-Carroll-Grayson counties plateau.

IV. The Triassic area, in which are the deposits near Leesburg and Drakeville, in Loudoun and Culpeper counties.

The copper ores are confined geologically to the crystalline rocks of the Piedmont and Blue Ridge regions, and to the red shale-sandstone series of the Triassic areas. The ores in the Virgilina district and a part of those to the northeast, near Keysville, in Charlotte county, occur in quartz fissure veins which intersect masses of altered volcanic rock, andesite, of pre-Cambrian age. Those of the Blue Ridge region are disseminated through, and segregated in, basaltic flows of pre-Cambrian age, designated, by Keith, as the Catoctin schist.

The "Gossan Lead" of the Floyd Carroll-Grayson plateau is apparently a mineralized faulted zone in crystalline schists of doubtful age, probably pre-Cambrian in part.



MAP OF VIRGINIA SHOWING COPPER DEPOSITS

THE VIRGILINA DISTRICT

This district is situated about 47 miles east of Danville, on the Atlantic and Danville division of the Southern Railway. The mines thus far developed are located upon a low, flat-topped ridge, and are confined to a rectangular area of approximately 2½ by 8 miles extending in a north and south direction.

The country rock is schist derived from an original volcanic rock, or andesite. The veins, which are more or less parallel, have a course of north 5 deg. by 10 deg. east, and overlap at the ends. They cross, in part, the lines of foliation of the inclosing rock, and in part are parallel to it. Developments show that copper occurs in almost all of the veins, which are lenticular bodies of quartz, being connected and forming, in certain cases, outcroppings of more or less uniformity.

The workable ores consist of copper glance and bornite, in quartz, while cuprite and malachite occur as alteration products of the sulphides. Native copper is occasionally found, and at times the ores carry very appreciable amounts of both gold and silver, particularly the latter.

Prospecting has been carried on in the district in a more or less desultory way since the opening of the Gillis mine in 1856, but it remained practically unexplored until 1897. From 1898 to the present time, however, active prospecting has been in progress and large sums of money have been spent in opening up the veins. Upon larger veins shafts have been sunk to a depth of more than 300 ft. and have several thousand feet of levels.

The mines of the two largest companies are equipped with concentrating mills, from which both high-grade ores and concentrates have been shipped. This district has made a fair record in production from an eastern standpoint.

THE KEYSVILLE AREA

Several copper-ore prospects have been worked in the vicinity of Keysville in the northeast corner of Charlotte county. The nearest one, 2½ miles southwest of Keysville, comprises a shaft and several open pits sunk in a belt of sericite schist. The foliation of the schist shows a northeast-southwest strike, and a dip of about 80 deg. southeast. The ore is green carbonate, malachite, associated with quartz stringers and lenses, which conform to the foliation of the inclosing schist. The openings had been abandoned, when visited in July, and very litle ore was in evidence.

The second prospect, located about 6 miles southwest of Keysville, and known as the McNeny mine was being worked in July, 1906. The first opening, a shaft about 60

*The unpublished report on the Virginia copper deposits, prepared by W. H. Weed and Thomas L. Watson for the Virginia Survey, has been freely drawn on in the preparation of parts of this paper.

†Geologist in charge, Virginia Geological Survey.

ft. deep, was made 12 years ago, and is about ¼ of a mile east of the Weaver shaft (see Fig. 2), which was being opened up during July of the present year. Some work was done in 1905, and again resumed in March, 1906. The present shaft is sunk on an incline of 30 deg. to the southeast, following closely the dip of the lines of foliation of the rock, and in July had reached a depth of about 100 ft.

The copper-bearing rock is identical, lithologically, with that of the Virgilina district, lying a short distance to the southwest, and is, accordingly, an altered volcanic rock, or andesite. It is thinly schistose, and otherwise much altered by epidotization. So far as developments have gone, the quartz masses carrying the ore conform to the foliations of the inclosing altered volcanic rock. The quartz bodies

THE WEAVER SHAFT AND DUMP, MCNENY COPPER MINE

are, apparently, not so large as those in the Virgilina district, but the character of the ore, its occurrence and associations are similar to those of the Virgilina district. Gray glance (chalcocite) and bornite, with some green carbonate, malachite, make up the ore. Glance is probably more abundant than bornite. Neither pyrite nor chalcopyrite was observed. Lean ore, occurring as impregnations in the altered volcanic rock is sometimes observed next to the quartz masses.

THE BUCKINGHAM COUNTY DEPOSITS

Copper ores have been prospected at three localities in the northeastern part of Buckingham county; namely, near New Canton, Arvonia and Dillwyn. None of these localities has as yet proven productive, although the prospects are reasonably encouraging, especially at Anaconda, which is 5½ miles northwest of Dillwyn.

Beginning at a point ¾ of a mile south of New Canton, and extending for a distance of nearly one mile along a southwesterly course, a number of openings, principally shafts, have been sunk. The most extensive workings are on the Johnson place, formerly known as the Staples mine, where the main shaft has reached a depth of 265 ft. with a total length of 1000 ft. or more of drifts, run as levels from the shaft.

The country rock is mica schist, partly chlorite, and usually more or less garnetiferous. The foliation has a general strike of north by 20 deg. east, and a dip that is very nearly vertical. At the McKenna shaft the ore is largely pyrite, containing some intermingled chalcopyrite, which occurs principally as thin lenses interspersed within the schist as impregnations, while thread-like stringers of ore occasionally cut across the foliation of the rock. The mineralized zone varies from 6 to 10 ft. wide, and is composed, in part, of very thinly laminated, white saccharoidal quartz schist, with scales of white sericite occurring along the parting planes. The ore lenses and stringers vary in thickness from a fraction of an inch up to 2 feet.

At the Johnson shaft, 150 yards southwest from the McKenna shaft, pyrrhotite is associated with pyrite and chalcopyrite, and, in places, glassy crystalline grains and larger pieces of quartz, often more or less rounded, are incorporated in the ore. Garnet is also occasionally found associated with ore. Further, at the Johnson shaft, the ore is associated with a hard and fine-grained, dark-greenish gray, massive rock, resembling an altered igneous type. The ore is reported to be both gold and silver bearing.

The United States Mineral Company has recently done some development work, with promising results, at Anaconda, formerly known as Eldridge mill, situated 5½ miles northwest of Dillwyn, and 4 miles west of Johnson. Pay rock has been taken from a 60-ft. shaft sunk in this neighborhood. The copper-bearing rock is a fine-grained, dark green, eruptive rock, which has been greatly altered by pressure, and the development of chlorite and epidote being not unlike that of the Virgilina district. Crystals of red garnet are not uncommon in the rock. The ore is cupriferous pyrite, and occurs principally in quartz masses, which usually conform with, but at times cut across the foliations of the enclosing eruptive rock. The epidote areas are sometimes mineralized, and not infrequently the eruptive rock is impregnated with mineral. Some secondary green carbonate, malachite probably derived from the sulphide, occurs.

THE ALBEMARLE COUNTY DEPOSITS

The copper deposits on Southwest mountain, in Albemarle county, have not been worked for some years, and will not, therefore, be considered in this connection.

THE BLUE RIDGE DISTRICT

This district is located in the northern part of Virginia, and has been prospected over parts of Warren, Fauquier, Rappahannock, Madison, Page and Greene counties. In colonial times attempts were made to extract the metal, but not until 1854-56 was the work begun on an extensive scale. At the beginning of the Civil War, operations were suspended and the properties were idle, until within the past 12 years, when attempts to work the ore were again renewed. In 1905 six companies, and a few private individuals, were engaged in development work, which was, however, largely of a superficial character. The Virgilina Consolidated Copper Company's mine, 5 miles southeast of Luray, in Page county, is developed by a shaft 300 ft. deep; however, the usual depth reached in the workings over the district does not exceed 90 ft., while only a few of them approximate this depth.

The copper ores of this district are confined to old basaltic lava flows of pre-Cambrian age. The basaltic rock is dense and dark colored, being more or less altered, and in places schistose. Two varieties are readily discernible; namely, a lower diabase sheet, and an upper basaltic sheet; both are altered, and the upper one largely epidotized.

The ores consist chiefly of cuprite and native copper, with small quantities of azurite and malachite and still smaller amounts of the sulphides, bornite and chalcopyrite. The native copper often occurs as nucleal masses surrounded by cuprite. The ore occurs along crevices and joint planes, in small irregular-shaped lenses of quartz, and as disseminated grains, through the more epidotized portions of the basalt. Further, it occurs where the rocks are fractured and epidotized.

From the character of the ore and its mode of occurrence, it would seem that the Blue Ridge deposit was probably formed by a local concentration of material (probably minute particles of cupriferous pyrite or chalcopyrite) which was leached out of the local copper-rich portions of the igneous rock. It represents, therefore, a product of superficial alteration.

THE SOUTHWEST VIRGINIA DISTRICT
(GOSSAN LEAD)

The southwest Virginia district comprises the counties of Floyd, Carroll and Grayson, which form a part of the eroded Blue Ridge upland, and is referred to as the Floyd-Carroll-Grayson plateau. The area was actively prospected in the early 50's, and the rich, secondary copper ores found beneath the gossan were boxed and shipped to Baltimore. During the period 1854-5, there were eight producing mines on the "Gossan Lead," and the total amount of ore shipped for the six months from January, 1855, to July, 1855, was 1,454,363 lb. The ore averaged about 25 per cent. copper and at that time the metal was worth 26c. per pound.

The "Gossan Lead" lies in the crystalline schists, and its strike conforms very closely to that of the inclosing rocks. The vein is traceable for a distance of 18 miles, and from one end to the other are old test pits whose dumps show the typical gossan ore. The wall rocks of the "Lead" consist largely of highly lustrous, sericite schist. To the southeast, on the hanging-wall side of the vein, the rocks are, throughout most of the course of the vein, ordinary mica schists, cut by dikes of diorite. The foot-wall rock appears to belong to a different series, and is in part at least similar to the Ocoee rocks of the southern Appalachians. The dip of the vein is from 45 to 60 deg.

The vein consists essentially of pyrrhotite interspersed with disseminated particles and stringers of chalcopyrite. The vein content is not solid ore from wall to wall, but rather a series of layers, partly of pure pyrrhotite admixed with some micaceous material, an altered form of the country rock. In the openings of the Pulaski Mining Company on Chestnut creek, at the southwest end of the "Lead," masses of schist project into the veins while, in place, much of the vein is of coarse biotite-schist, impregnated with chalcopyrite and interlaminated masses of pyrrhotite, with or without chalcopyrite admixed.

The vein varies in width from 22 ft. to perhaps 100 ft. A diamond-drill hole was put down to a depth of 524 ft. on the vein, at the Betty Baker mine, proving the deposit to a depth of 734 ft. below the outcrop. The strike of the vein varies in accordance with that of the country rock; at Betty Baker it is north 35 deg. east, and shows various deviations from this, when traced southward, reaching as much as north 60 deg. east, in places. Folding and faulting is of common occurrence, while at the Betty Baker mine a horizontal displacement of 62 ft. was measured, close to the point where the wagon road crosses the ledge. The dip varies somewhat, but averages about 45 deg. Marked variations in the dip of the vein and that of the inclosing schists occurs in places.

The gangue materials consist of calcite, muscovite, and biotite, while hornblende garnet, feldspar and quartz occur in considerable quantities in places.

Secondary enrichment, which proved so marked a feature of these mines, and led to their development in the early 50's, may be observed in several of the recent workings. The gossan has a depth of from 20 to 60 ft., averaging a greater depth on the hilltops than in the ravines. Beneath the gossan there is usually from 1 to 6 ft. of the secondary copper ores, comprising near the top more or less carbonate or oxide, and very rarely a little native copper, while farther down, on top of the unaltered sulphides, there is from a few inches up to 6 or even 8 ft. of soft black ore, the so called "smut ore" of the miners, consisting mainly of secondary chalcocite.

So far in the mining operations, the amount of chalcopyrite has decreased with depth. The percentage of copper in the ores obtained from these mines is reckoned at 0.6 to 1 per cent., which will not permit the working of the vein for copper alone. The future value of the "Gossan Lead," apparently, lies mainly in its unworked iron ores and in the utilization of the magnetic pyrite for acid making. There is a probability, however, that ore-shoots carrying 3 to 6 per cent. copper may be found, when the vein is developed. The fact that all parts of the "Gossan Lead" are cupriferous, as shown by the early black-copper workings, as well as all the primary sulphide ores discovered, makes it not at all improbable that in its known extent of 18 miles, there are places where it is locally above the average in coper content. Moreover, the development of the primary sulphide ore has been confined to only three places, namely, Betty, Baker, Cranberry, and Chestnut Ridge.

THE TRIASSIC AREA

The red sandstones and shales of the Triassic formation contain sparsely disseminated copper compounds, but, as a rule, too generally diffused to be profitably worked. Attempts were made in the early part of the last century to mine the ores in Loudoun and Culpeper counties.

LOUISA AND PRINCE WILLIAM COUNTIES

The pyrite deposits, so extensively developed and worked near Mineral and Dumfries in Louisa and Prince William counties, respectively, contain more or less copper in the form of chalcopyrite. In the early history of mining at Arminius and prior to the mining of pyrite, the property was worked for copper, but the total production was probably not large. The ores mined represented the enrichments in the mineralized zone just beneath the gossan. The copper content of the pyrite ore is small and, in recent years, practically no attention has been given to saving the copper in mining the pyrite. Usually the mine waters contain copper which is recovered at several of the larger mines by precipitation, by means of scrap iron. These properties are, however, operated for pyrite alone, the small amount of included copper ore not being sufficient to interfere seriously with the use to which the pyrite is put, nor would it pay to separate the copper ore from the pyrite.

Zinc Concentration in Australia

BY EDWARD WALKER

Authoritative figures have been given by A. L. Queneau to the Zinc Corporation, as to the possibilities of concentration by the Potter flotation process. After a great number of tests, the final one treated 1300 tons of tailings and yielded 348 tons of concentrates, assaying 44 per cent. zinc, 8 per cent. lead and 8 oz. silver. The recovery was 81 per cent. of the zinc, 55 per cent. of the lead and 55 per cent. of the silver contained in the 1300 tons of tailings. These concentrates were further treated by mechanical separation, producing zinc concentrates containing 50 per cent. zinc, 43 per cent. lead and 8 oz. silver per ton. These second zinc concentrates consisted of about 88 per cent. of the first concentrates; and the remaining 12 per cent. consists of lead concentrates running 45 per cent. lead, 10 per cent. zinc and 20 oz. silver per ton. Mr. Queneau adds that with certain improvements in detail he can increase the extraction of all three metals by another 5 to 10 per cent. and expresses himself as highly pleased with the results of the experiments. The Zinc Corporation has in construction two concentrating plants for the zinc tailings, one at the British Broken Hill Proprietary dumps, which should be in operation by the end of this year, and the other to treat the tailings at Block 14 south and Block 10, which will be finished later on.

Norwegian Iron Ore

A large part of the Südvaranger iron-ore deposits have been sold to a Scandinavian company capitalized at $1,350,000, with additional bonded indebtedness of the same amount. The ore of these mines carries only 35 to 38 per cent. iron, but this will be concentrated to 65 or 68 per cent. by magnetic separation; the process will be that of the Swedish engineer Gröndal.

Norway has other important iron-ore deposits, particularly in the Nordland district. Those at Hatfjelddalen have just changed owners. Development of the Dunderland Iron Ore Company's mines is progressing and they will soon begin shipping at the rate of 750,000 tons per year.

The production of copper in the Ural in 1905 was 222,674 poods, or 3536 long tons. This is a decrease of 44,650 poods from the previous year.

COLLIERY HOISTS

The Design and Efficiency of Winding Engines

BY F. ERNEST BRACKETT*

In connection with a proposed colliery hoist, it recently became necessary to collect and digest information upon that important subject. As it required considerable research and study to get the subject into some kind of order, it has been thought useful to publish the essential results. The investigation was carried on especially with reference to that type of hoist which was suitable to the work in hand, and was principally concerned with the size of the hoisting engine and the capacity of the plant.

HOISTING-ENGINE FORMULAS.

The engine to which the following formulas refer is of the simple first-motion, double-cylinder, non-condensing type, with cylindrical drums. Two cages are employed, one ascending and one descending simultaneously. The plant is without any device whatever to equalize the varying pull of the rope. All hoisting is done from the same level. The cranks are as usual set at right angles with one another.

Cut-off—When starting with one side on a dead center, it must be possible to admit steam behind the piston on the other side. As this piston is, neglecting angularity, at half stroke, the cut-off at starting can evidently not occur earlier than that point. As Percy describes a hoisting engine built with a fixed cut-off at half stroke, which had to be changed to a fixed cut-off at some later point before it became fully controllable, it would seem that the cut-off in practice must occur considerably later than half stroke.

The Movement of the cage during winding can be divided into three periods, viz. (1) Acceleration. (2) Maximum velocity. (3) Retardation. The period of acceleration requires the most power, and must therefore be principally studied in determining the size of the engine. At the end of this period the power is reduced to the unbalanced load, plus the friction, in order to maintain a constant speed. Where the rope is unbalanced by a tail rope or other device, it is doubtful if any more than an approximately constant speed can be attained, unless a governor is employed. The reduction in power seems often to take place automatically by the rise in back pressure in the cylinders, and by a probable increase in the amount of friction, both of which are due to the increased speed. Sometimes a governor is applied to confine the speed below a certain limit, or the steam may be throttled, or the point of cut-off changed by hand. Some engines are fitted with an automatic cut-off gear, which reduces the cut-off after the period of acceleration is finished, thus effecting considerable economy in fuel. During the period of retardation steam is usually shut off or reduced, and the counter force necessary to bring the cage to rest is supplied by brakes.

Notation—Let a = acceleration of cage in ft. per sec. per sec; b = time of banking or caging in seconds; c = diameter of cylinder in inches; d = diameter of cylindrical drum in feet; e = mean pull of hoisting drum in feet; e = mean pull of hoisting engine in pounds; f = a factor; g = acceleration of gravity = 32.2; h = mean hoisting speed in feet per second; i = mean effective pressure ÷ initial pressure; j = daily capacity of plant in number of cages delivered; k = a coefficient to allow for friction; l = length of stroke in feet; m = moving mass in units of mass, n = number of revolutions per minute; o = feet passed over during acceleration; p = initial pressure in pounds per square inch; q = piston speed in feet per minute; r = stroke ÷ diameter; s = depth of shaft between landings in feet; t = total time of winding in seconds; t' = time of acceleration in seconds; t'' = time of maximum speed in seconds; u = weight of coal per cage in pounds; v = maximum cage velocity in feet per second; w = unbalanced weight at starting in pounds = $u + y$; x = weight of one cage in pounds; y = total weight of rope in pounds; z = weight of cars in one cage in pounds.

The minimum available pull of the hoisting engines at starting occurs nearly enough for all practical purposes, when one crank is on a dead center. We may therefore write:

$$\text{Minimum pull} = k\,\frac{\pi\, c^2\, p l}{4\, d} \qquad (1)$$

To find the mean pull throughout any revolution we have recourse to the equation of work.

Hence:

$$e\,\pi\, d = 4\, k\, i\,\frac{\pi\, c^2}{4}\, p l.$$

Whence:

$$e = k\, i\,\frac{c^2\, p l}{d}. \qquad (2)$$

The maximum pull which a hoisting engine can exert occurs when both cranks are at an angle of 45 deg., with the vertical and initial pressure is behind both pistons. Evidently:

$$\text{Maximum pull} = k\,\frac{\sqrt{2}\,\pi\, c^2\, p l}{4\, d} \qquad (3)$$

To lift the unbalanced weight at the beginning of the wind the minimum pull must be greater than w or;

$$k\,\frac{\pi\, c^2\, p l}{4\, d} \text{ is greater than } w. \qquad (4)$$

To lift the total weight of rope and loaded cage the minimum pull must be greater than this total weight. Hoisting engines are often designed to fulfil this condition, to provide against that possible contingency, although its fulfilment is not essential. While the loaded cage is being hoisted above its keeps on top, preparatory to being dropped on them, the lower cage is usually already on its steps. It might, therefore, be argued that the engine should be able to lift the loaded cage less the weight of the rope. Still this seems to be disputable because the cage is being brought to rest by the brakes, and it can probably be brought to rest high enough above the keeps to permit them to close in any event. It is, of course, absolutely necessary that the engine be able to lift the weight of the cage and empties, less the rope, off of the keeps before descending. As the first of these three conditions necessarily involves the other two, we will write:

$$k\,\frac{\pi\, c^2\, p l}{4\, d} \text{ is greater than } u + x + y + z. \qquad (5)$$

To provide for the accomplishment of the journey in the specified time the mean pull of the engine must exceed the unbalanced load by an amount sufficient to produce the required acceleration. To find the acceleration we have

$$t' = \frac{v}{a} \qquad o = \frac{v^2}{2\, a}.$$

Assuming the time and distance utilized in retardation equal to those of acceleration, we have

$$t'' = \frac{s - 2\, o}{v} = \frac{s}{v} - \frac{v}{a}$$

And:

$$t = 2\, t' + t'' = \frac{2\, v}{a} + \frac{s}{v} - \frac{v}{a} = \frac{v^2 + a\, s}{a\, v}.$$

But:

$$h = \frac{s}{t} = \frac{s\, a\, v}{v^2 + a\, s}.$$

Whence:

$$a = \frac{v^2\, h}{s\,(v - h)}. \qquad (6)$$

The force necessary to produce that acceleration is

$$m\, a = \frac{m\, v^2\, h}{s\,(v - h)},$$

which quantity must be equal to, or less than, the excess of the mean pull over the unbalanced load at the beginning of the wind. Or,

$$k\, i\,\frac{c^2\, p l}{d} = w + m\, a. \qquad (7)$$

The unbalanced load decreases as the cage rises; but by considering it constant, as above, an error is committed on the side of safety.

Value of m—The acceleration force is considered as applied along the line of the ropes. This produces translation of the ropes, cages and contents, and rotation of the drums, sheaves, etc. The value of m is therefore equal to the sum of the masses of the translating parts, plus such parts of the masses of the rotating parts as may be considered concentrated along

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the center of the rope. When I is the moment of inertia in terms of the mass of a rotating body about the center of rotation, and L the perpendicular distance of its center of rotation from the moving force (which, for example, will be the radius of the sheaves for the sheaves and the shaft on which they turn), it can be shown that the part of the mass to be considered is $I \div L^2$. Hence:

$$m = \Sigma m' + \Sigma \frac{I}{L^2},$$

where $\Sigma m'$ is the total translating weight in pounds $\div g$.

Where I is in terms of the weight in pounds, it can be reduced to mass by dividing by 32.2. Where necessary an approximate value for $\Sigma \frac{I}{L^2}$ can be found by dividing the rotating masses by two. The masses of the reciprocating parts of the engine are not considered, as they theoretically return all the energy to the crank pin at the end of the stroke, which they take from it at the beginning of the stroke.

The acceleration must not exceed the acceleration of gravity, because one of the ropes will slack. To be absolutely safe against this we may write: (maximum pull — least unbalanced load) $\div m$ must not exceed g. Or,

$$\frac{\sqrt{k \pi c^2 p l}}{4 d m} - \frac{(u - y)}{m}$$

is less than g. (8)

As we have assumed the retardation equal to the acceleration, the cages need not be checked too rapidly, but to provide practically that this can not be done by application of the brakes is a more difficult matter.

The fundamental hoisting-engine equation—In order to provide a basis for comparison and for convenience we may write:

$$\frac{\pi c^2 p l}{4 d} = f w, \qquad (9)$$

where f is a factor to provide for friction, acceleration, indicator factor and contingencies. To fulfil equations (4), (5), (7), (8), we have

f greater than $\frac{1}{k}$; (10)

f greater than

$$\frac{u + x + y + z}{k (u + y)}; \qquad (11)$$

f equal to or greater than

$$\frac{\pi}{4 k i}\left[1 + \frac{m a}{w}\right]; \qquad (12)$$

f less than

$$\frac{1}{\sqrt{i k}}\left[\frac{m g + u - y}{u + y}\right]. \qquad (13)$$

The fulfilment of conditions (11) or (12) will usually fill the other conditions.

Three accessory equations are usually found useful in proportioning the principal dimensions of the hoisting engine. They are:

$$\pi d n = 60 h; \qquad (14)$$

$$2 l n = q; \qquad (15)$$

$$12 l = r c. \qquad (16)$$

Their derivation is self evident.

Problem and solution—In equations (9), (14), (15) and (16) w and h constitute the hoisting problem. The value of f will have been settled upon from formulas (10), (11), (12) or (13). The values of three of the four quantities $p r q n$ must be assumed in harmony with current practice, before the problem becomes determinate. The values of $c l d$, and one of the above four letters, constitute the solution of the problem.

NUMERICAL DATA ON HOISTING ENGINES.

A great deal of data relative to hoisting plants was examined with the following net results:

The initial pressure (p) should not be far from the boiler pressure in well designed plants. This is usually between 60 and 90 lb. per square inch. A pressure of 150 lb. is sometimes used for stationary engines, and many locomotives work under 200 pounds.

The mean cage speed (h) varies from 20 to 40 ft. per second.

Maximum cage speeds (v) run as high as 65 ft. per second.

The accleration of the cage (a) varies from 2 to 6 ft. per second per second. Very few data on this were obtained.

Mean piston speeds (q) run from 360 to 500 ft. per minute.

Maximum piston speeds run as high as 700 ft. per minute.

Mean number of revolutions (n) runs from 25 to 85 revolutions per minute, the higher speeds as a rule belonging to the smaller engines.

The ratio of stroke to diameter (r) varies from 1.60 to 2.25.

Drums should not be of less diameter than that given for the required rope by the manufacturer's tables. The advantages of a larger drum are increased life of rope and less angularity of rope at the sheaves. The disadvantages of a large drum are its cost, weight and the space it occupies. The largest engine in the writer's notes has a drum 25 ft. in diameter and cylinders 40 in. diameter by 7 ft. stroke.

The factor f varies from 1.5 to 3.5.

The coefficient k varies from 0.75 to 0.85.

Value of i—The indicator factor depends greatly upon the design of the engine, but principally upon the point of cut off. The following are approximate values for rough use, although they are not intended to dispense with the usual steam-engine calculations. They refer to non-condensing engines.

Initial pressure above atmosphere		70	140
for ⅛ cut off	$i =$	.27	.36
¼ cut off	$i =$	.49	.56
½ cut off	$i =$	.76	.81
¾ cut off	$i =$	.89	.93
Full stroke	$i =$	.93	.96

As the cut off at starting must be later than half stroke the value of i as used in the formulas must be between 0.76 and 0.96 approximately.

Study of a colliery hoist—Data on Denaby colliery hoist, England. (From "Mining," by Lupton.)

Description of engine	Horizontal high pressure: non-condensing: cylindrical drums.
Number of cylinders	Two.
Diameter of cylinders	40 inch = c.
Length of stroke	6 ft. = l.
Pressure of steam	Max. in cylinders, 42 lb. = p. Gage about 45 lb.
Maximum velocity of piston	700 ft. per minute.
Area of steam port	About 80 sq.in. The same port serves for steam and exhaust.
Mean velocity of piston	360 ft. per minute = q.
Diameter of drum	18 ft. = d.
Revolutions per journey	23¾.
Mean revolutions per minute	30 = n.
Weight of drum and fly-wheel	73,000 lb. (about).
Weight of shaft	17,000 lb. (about).
Total weight of moving parts, including load, etc., moving at diameter of 18 ft. All weights at a greater or lesser diameter reduced to their value at said diameter	80,000 lb. = factor of energy for any given velocity = 2490 units of mass = m.
Total weight of moving parts, including rope, pulleys, coal, drums and engines	About 158,000 lb.
Description of ropes	Round; one iron, one steel.
Weight per fathom	Iron, 29 lb.: steel, 23 lb.
Weight of cage	Iron cage, 5376 lb. = x.
Weight of tubs (four)	About 2130 lb. = z.
Weight of coal	4480 lb. = u.
Mean speed of cage in shaft	28 2 ft. per second = h.
Maximum speed of cage in shaft	51.3 ft per second = v.
Depth of pit	1351 feet = s.
Time occupied by each journey	47 seconds = t.
Time occupied in landing	23 seconds = b.
Foot-pounds of power exerted by engine each journey.	12,000,000.
Foot-pounds of useful effect or duty each journey	6,300,000.
Ratio of gross to effective power	100 to 53.
Ratio of maximum pressure to dead load at commencement	100 to 50.*
Maximum indicated horse-power	950

From this we find;

Average value of

$$y = \frac{1351}{6} \times \frac{29 + 23\frac{3}{4}}{2} = 5854 \text{ lb.}$$

$$w = u + y = 10{,}334 \text{ lb.}$$

*The writer does not understand this. It would apparently make f—2. Perhaps a standard boiler pressure was used in figuring this, while the experiment was conducted with a boiler pressure lower than that for which the plant was designed.

$$f = \frac{\pi c^2 p l}{4 d w} = 1.70.$$

Theoretical acceleration

$$a = \frac{v^2 h}{s(v-h)} = 2.38 \text{ ft. per second per second.}$$

The value of $k\ i$ can be found by the aid of formula No. (12).

$$f = \frac{\pi}{4 k i}\left[1 + \frac{m}{w} a\right],$$

whence

$$ki = \frac{\pi}{4f}\left[1 + \frac{m}{w} a\right] = 0.728.$$

As i could hardly have been greater than 0.90, k could hardly have been less than 0.81.

CAGING AND OUTPUT.

Data were collected both on authority and by observation on times of caging and capacity of hoisting plants. These data have been carefully compared and digested. The folowing are the conclusions reached. The capacity given is that which may reasonably be expected throughout a run of several hours' duration ,provided that no delays, by reason of shifting cars, shortage of coal or hoisting men occur.

Manner of caging—Some small collieries have tracks at one side of the shaft only, thus the car or the cage must be removed before another is put in its place. The most convenient and rapid arrangements have graded tracks back and front of the shaft, so that the movements of the two cars can be carried on simultaneously. Some collieries employ a mechanical device, such as a steam ram, back of the shaft to accomplish the change of cars. While this machinery may decrease the labor of caging it does not appear materially to decrease the time of banking. Machinery below ground to change the cars, except in the case of multiple-deck cages, does not seem to be in use; probably on account of want of room, by reason of the track arrangements usually necessary there.

Grading the cage—Although it does not appear to be customary in this country to build the track on the cage on a permanent grade, so as to facilitate the movement of cars, there seems to be no valid reason for not doing so, provided the car is so placed when on its catches as to avoid bringing any lateral pressure on the guides, by reason of the center of gravity being out of the plane of the center of the guides. Cages with tracks graded sufficiently to start the cars are in use in England.

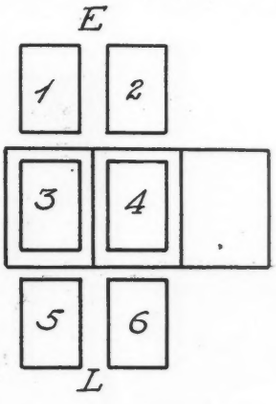
The use of keeps or landing fans, while usual, does not seem to be universal. In fact we find records of large hoists where they have been entirely dispensed with, thus doing away with strains due to slack in the rope and shock in dropping the cages on them. Those keeps, which do not require the lifting of the cage before they can be released, effect a considerable saving of time over those that do.

Single-deck cages for one car—Provided that the tracks are properly graded (not necessarily the tracks on the cage), and that the movements of the car entering and the car leaving the cage are simultaneous, the change can be accomplished in 8 seconds, either by hand unless the cars are too large to be handled, or by machinery. This is, therefore, the value of b for this particular arrangement.

Self-dumping cages—About 15 seconds are required betwen winds to dump the cage and car.

Multiple-deck cages can be discharged one deck at a time by moving the cage after each change, until the next deck becomes level with the landing. This shifting of the decks can be accomplished in about 3 seconds. To bank a two-deck cage will, therefore, require $8+3+8=19$ seconds; a three-deck cage 30 seconds; and so on. In round numbers we may say 10 seconds per deck. With this method of caging, conical drums cannot be conveniently used because the displacements of the cages above and below ground are not equal.

Sometimes all decks are changed at once by means of auxiliary cages in front and behind each compartment of the shaft.



PLAN OF HOISTING SHAFT

In the figure, which is a plan of a hoisting shaft, 3 and 4 are the main hoisting cages, and 1, 2, 5 and 6 the auxiliary cages. Each auxiliary cage has the same number of decks as one of the main cages. These auxiliary cages have a vertical movement, sufficient to land all three decks on the main landing, and are so connected together mechanically that while 1 and 5 are rising 2 and 6 are dropping, and *vice versa*. E represents the "empty side" of the shaft and L the "loaded side." When the main cage (3) has been hoisted up so that the lower deck is even with the main landing, the auxiliaries 1 and 5 will have their decks opposite the decks of 3, and No. 1 will be full of empties. All the loaded cars on No. 3 are now moved to 5, while at the same time the empties in No. 1 take their places on No. 3, which is then ready to descend. During the hoisting, cages 5 and 1 are lowered and 5 discharges each deck, as it comes opposite the main landing. While these are being lowered 2 and 6 are raised, each deck of No. 2 receiving its empty. When 4 arrives, 2 is full of empties and 6 is ready to receive loads, and so on. The reason for hoisting 3 to 4 to their upper positions in unloading is because the weight of the coal in the auxiliary cages is always descending, thus furnishing a certain amount of energy, which is usually utilized by some suitable mechanical contrivance, in moving or helping to move the auxiliaries. For the same reason the auxiliaries at the shaft bottom are at their lowest position when the main cage arrives. The time of discharging the main cages need not exceed the time of decking a single-deck cage. In the first 8 seconds after landing No. 3 the lower car is run through No. 5, while No. 2 receives an empty on its upper deck. During the next 11 seconds No. 5 discharges its next deck, and No. 2 receives its next empty and so on. If the cages had three decks the auxiliaries would have finished their work ready to receive No. 4 at the end of 30 seconds from the time of landing No. 3, or 22 seconds after the beginning of the wind. It will, therefore, be apparent that no increase in capacity can be gained by decreasing the time of winding below 22 seconds. Providing, therefore, that the time of decking the auxiliary cages does not interfere with the winding, the time of decking a multiple-deck cage, fitted with auxiliaries, is 8 seconds.

More than one car per deck—The time of landing, where each deck is occupied by more than one car, is not materially increased above the time of banking, if each deck held only one car.

Output—The daily capacity of hoist, as figured by the preceding data, must be considered as the greatest possible capacity. To make allowance for delays due to shortage of coal, hoisting men, etc., this greatest capacity should be multiplied by three-quarters. Or:

$$j = 0.75\ \frac{36{,}000}{b+t} \qquad (17)$$

when j is the capacity, in cages, for a ten-hour day.

Comparisons—It is an evident and generally admitted fact that the self-dumping cage requires less labor at the top of the shaft than does a hoist ,fitted with rigid, single-deck cages, for a single car. Thus for a moderate output of say 2 cars per minute the self-dumping cage would require only one dumper on top, where the rigid cage would require at least one man in front and one behind the shaft. But it is also evident that the rigid cage has the advantage in capacity, though in most cases this difference in capacity would not compensate the difference in labor. It would seem, therefore, that the self-dumping cage should only be abandoned when it is unable to give the required output. Self-dumping cages are often objected to as being complicated and dangerous, but practice shows these fears to be largely exaggerated.

When one-car cages are insufficient to

obtain the output, multiple-deck cages, or more than one car per deck, must be used. By placing more than one car on the deck the size and initial cost of the shaft is much increased, excepting of course when the cars are very small, and the larger area of the shaft is necessary for other purposes. Where the shaft is of any considerable depth this cost will more than counterbalance the introduction of auxiliaries. It would seem that the cheapest and most flexible way of providing for an increase in output lies in so arranging the plant that multiple-deck cages can be introduced when required. The increased weight of the hoist can be provided for by arranging for a substantial increase in the boiler pressure, and leaving room for more boilers.

A MODERN COAL-MINING TOWN

A Coal-Mining Town with Modern Arrangements for Sanitation and Comfort of Employees

BY F. W. PARSONS

The Zeigler Coal Company in southern Illinois, controlled by Joseph Leiter, of Chicago, is one of the latest examples of coal-mining operations in America. No expense has been spared in equipping both the mine and surface plant with modern machinery. In addition to this, the management has succeeded in planning and constructing a mining town that ranks far above the average coal camp in its uniform and comfortable arrangement. In building the town of Zeigler, the operating company selected a location excellent so far as its sanitary advantages and convenient situation are concerned.

The Illinois Central Railroad, as well as the St. Louis, Iron Mountain & Southern, have branches extending to the mines at Zeigler. Besides these transportation facilities, Mr. Leiter has built the Chicago.

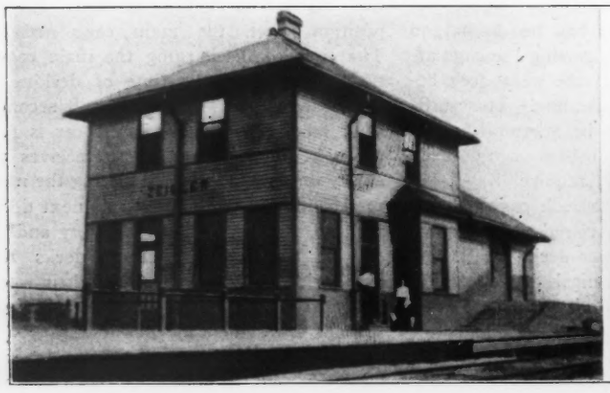


FIG. 1. ILLINOIS CENTRAL R. R. STATION

FIG. 2. THE TOWN OF ZEIGLER, ILL.

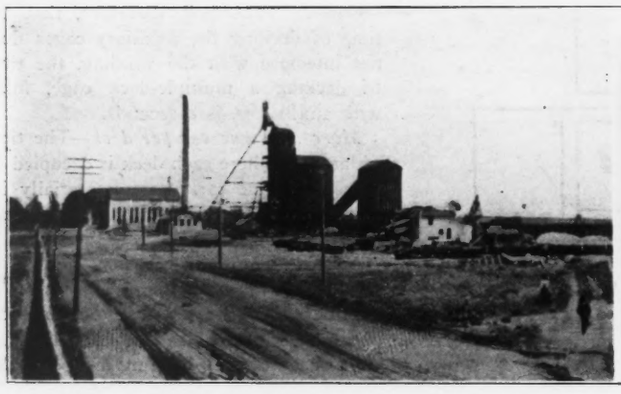


FIG. 3. TIPPLE AND POWER-HOUSE

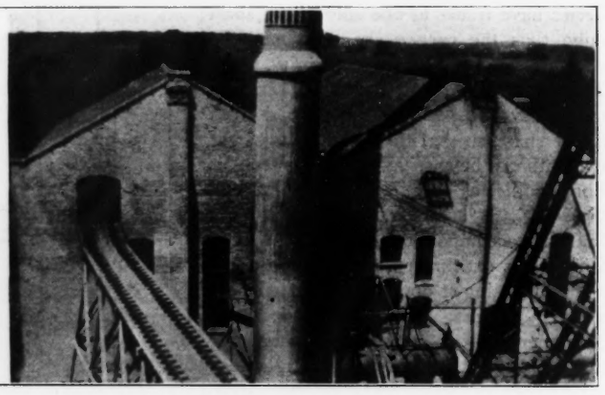


FIG. 4. POWER-HOUSE

FIG. 5. MINER'S HOUSE

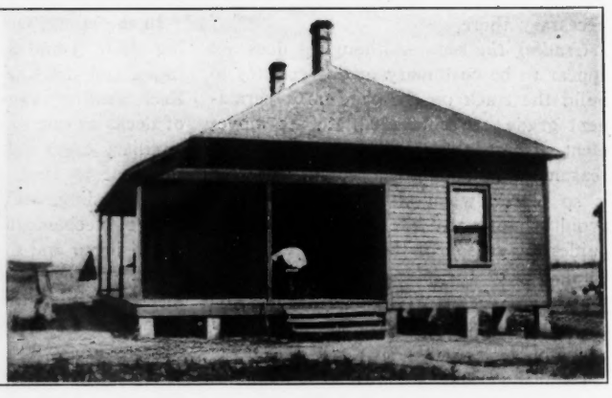


FIG. 6. MODEL MINER'S HOUSE

Zeigler & Gulf Railway, which operates from Christopher to Shaft No. 2, a distance of nearly 12 miles. Another branch of this road is being constructed, to West Frankfort, Ill., a distance of 6 miles. At this point, it is proposed to make a connection with the Chicago & Eastern Illinois Railroad. At present, the Chicago, Zeigler & Gulf Railway connects with the Illinois Central and the St. Louis Valley railroads.

The miners' houses at Zeigler are not all built alike, but differ in size and detail. Two types of houses are shown in Figs. 5 and 6. Large windows, brick foundations, ample porch room and plenty of space around the houses are found in all cases. The miners are generally cleanly around their homes which practice is encouraged by the company officials. The homes of the superintendent and chief engineer, shown in Fig. 12, are a little more elaborate than the other houses.

In Figs. 9 and 10 are shown the inside and outside of the company hospital. This building, built by the Zeigler Coal Company for the service of its employees, has a staff consisting of two physicians and two nurses. The arrangement and equipment of this hospital are of the most approved type.

Figs. 3 and 4 show the tipple and powerhouse. The former is considerably more than 100 ft. high. This extreme hight is attained because of the method of screening, which is done entirely by gravity. It was thought that if the tipple was built high and the coal dumped at such an elevation, gravity screens could be installed instead of shaker screens, preventing any considerable breakage in the coal. This plan has been fairly successful. Fig. 4 shows the boiler-house with part of this steel tipple construction. The track at the left of picture is for hauling coal to the bins that feed the boilers. One main stack carries off all the gases and provides draft for the boilers.

In Fig. 8 is shown the public school, while Fig. 7 gives a view of the system of department stores owned and managed directly by the coal company. All of these stores are in a way operated independently of each other. Arranged from left to right, the stores are, furniture, hardware,

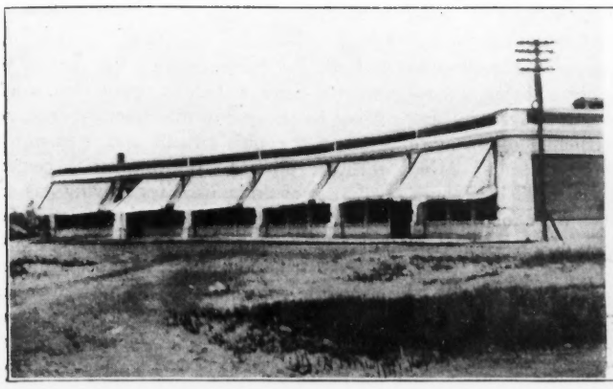


FIG. 7. COMPANY DEPARTMENT STORES

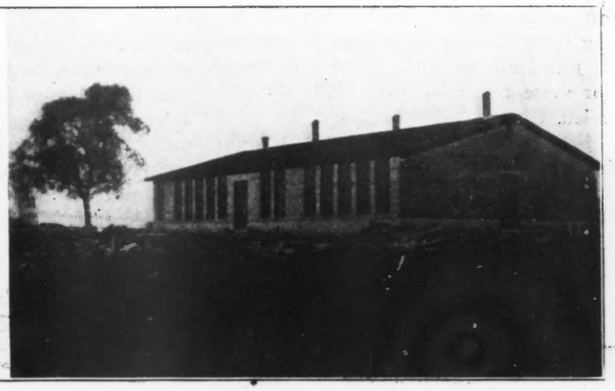


FIG. 8. SCHOOL HOUSE

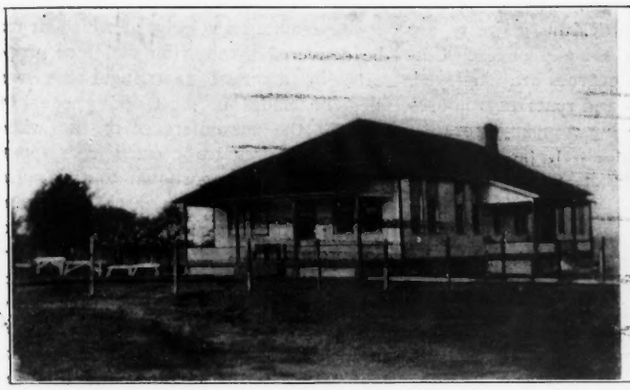


FIG. 10. COMPANY HOSPITAL

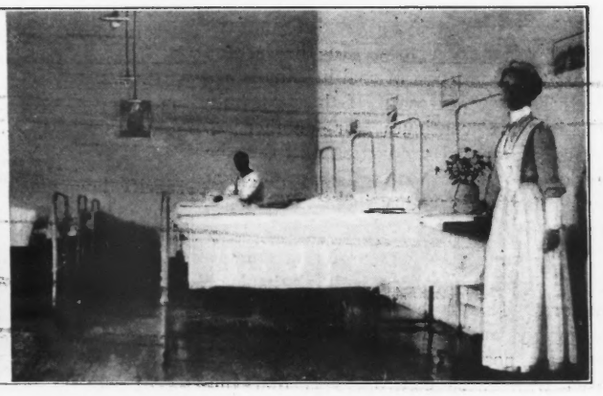


FIG. 9. A WARD IN HOSPITAL

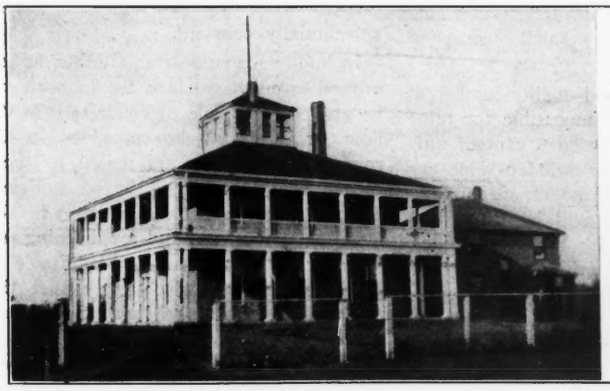


FIG. 11. OFFICE BUILDING, DINING ROOM AND CLUB

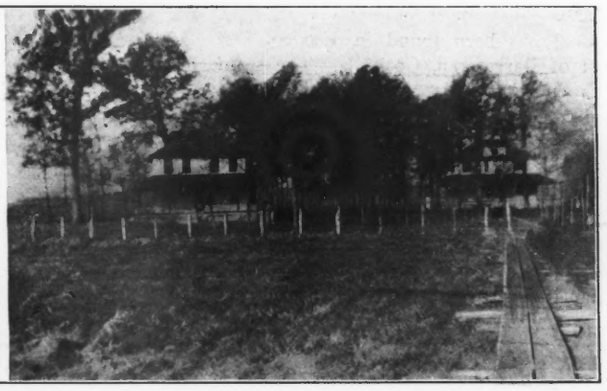


FIG. 12. SUPERINTENDENT'S AND CHIEF ENGINEER'S HOUSES

clothing, dry goods, groceries and last of all is the butcher shop with a large refrigerating plant in the rear. All ice used by the company is manufactured on the premises. In like manner the electricity used in Zeigler for lighting purposes is generated at the company's plant.

The company offices are contained in the large building shown in Fig. 11, in which building are also the private rooms of Joseph Leiter. A club room and dining room for officials and guests are also in this building, while spare bed rooms for those remaining over night are provided.

Few coal companies in America today have made more liberal provision for the comfort and happiness of their employees than are provided by the Zeigler Coal Company in this southern Illinois camp.

Colliery Notes

In order to prevent breakage of the coal by too quick a discharge, revolving tipples should be designed to give a slow forward motion and a quick return.

Illinois produced and sold $39,754,000 worth of coal in 1905. In the last 25 years the production of coal in Illinois has increased 519 per cent. If the same rate of increase continues for another 25 years, the annual production will then be 135,000,000 short tons. The production in the last 10 years has increased 113 per cent.

Many mine managers prefer to employ large liquid controllers with all haulage motors. This type permits accelerating uniformly and without jerks. Another property possessed by induction motors used with these controllers is that the speed of the motor may be reduced far below that obtainable with a steam engine, or any other form of drive.

Coal has been found in Mexico, just east of Barroteran, Coahuila. The seam was encountered at a depth of 260 ft., and consists of two layers of clean coal, 5 ft. thick, and separated by 2 ft. of soft material. Calculations based on borings estimate 120,000,000 tons of coal in reserve. These deposits are in the same range of hills in which the Esperanza mines are located.

Japan has a coal area of about 6000 square miles, and is now producing at the rate of 10,000,000 tons per year. The coal-mining industry in Japan is not likely to advance materially in succeeding years, but on the other hand, the output will probably decrease, as the available territory is limited. China and India will replace Japan as the chief coal-producing countries in the Orient.

In order to secure the greatest efficiency from burning soft coal, it is necessary that the particles of gas distilled from the coal, as well as the water-gas made by decomposing its moisture, be brought into contact with sufficient hot air to burn it. The mixing of the gas and air should take place at such a distance from the heating surfaces of the boiler that they do not become cooled below the temperature of ignition before the combustion takes place.

The idea that steel mine cars are not practicable in mines where the coal contains sulphur is disproved by the results obtained in several such mines. In one instance, steel cars have served 25 years in workings where the coal is high in sulphur, the deterioration in the steel plate due to sulphur drippings being inconsiderable. Steel cars give greater capacity, and such construction offers more resistance to shocks and accidents. Mine cars made of steel plate have been built to hold from 40 to 110 cu.ft. of coal.

The largest coal operator in Mexico is the Mexican Coal and Coke Company, an American corporation capitalized at $2,000,000 gold, with headquarters at Las Esperanzas. The product of this company is sold not only in Mexico, but large quantities are shipped to the foundries in Texas and the copper smelters in Arizona. Of the 3000 men employed at the mines and ovens of the company, the majority are Mexican, although some Japanese, Chinese and American negroes are employed. The company owns and rents 1250 houses besides operating a big company store.

In caring for mules it is impossible to specify how much feed should be given. This cannot even be wholly regulated by the size or weight of the mule, as some require more than others. It should be observed whether the mule cleans up his feed each day, and in this way the proper amount can be determined. Corn is fattening, while oats make muscle; so if speed and hard work are desired, too much corn must not be fed. A feed consisting of 60 per cent. cracked corn and 40 per cent. oats is considered excellent. Once or twice a week a small quantity of bran may be fed.

The scarcity of good quality lumber at present is making it impossible for mine managers to secure wooden cars of sufficient durability. The wooden mine car is constantly growing poorer in quality, and the average life will be much less than that indicated by figures obtained from the cars in use prior to the age of steel. Repairs will be more often necessary, and the cars will be unavailable more frequently. Some managers continue to buy wooden cars from habit and false economy, when, if the matter was carefully considered, the decision would probably favor the purchase and use of steel mine cars.

The coalfields of India are estimated to cover 35,000 square miles, and are located chiefly in Bengal. The output in 1905 was 7,762,779 tons, of which 93 per cent. came from Bengal. The coal of India is bituminous, and very closely resembles some of our western coals. One operator stated that it costs 55c. to mine, screen and load a ton of coal on the railroad cars. Such coal brings from $2.10 to $4.50 per ton in Calcutta, according to the quantity in which it is purchased. Coolies are employed as miners, and many women work as laborers around the mines. The miners in India are not as strong or as industrious as European and American miners.

In recent years much has been said about generating electricity at the pit's mouth, and transmitting it to various industrial centers. In this connection, would it not be cheaper to manufacture producer gas at the pit's mouth and transmit it through pipes to the industrial centers where it could be used for driving gas engines for generating electricity and also for heating purposes and furnace work? The distribution must not be confused with the transmission of power. For the former it is agreed that there is no agent to compare with electricity. For the latter purpose it is suggested that recent improvements have made it more economical to employ producer gas and piping than electricity and cables.

The maximum velocity at which air may be delivered through an outlet of proper area by a cased centrifugal fan with straight blades is substantially equal to that of the circumference of the wheel, while the pressure created corresponds thereto, being proportional to the square of the velocity. This area, commonly known as the capacity area, depends upon the proportions of the wheel, but in general ventilating practice is approximately equal to one-third of the diameter in inches multiplied by the width at the rim in inches. It is usually much less than that of the regular outlet in the casing. If the capacity area be reduced, the volume and power will be proportionately decreased while the pressure will remain substantially constant.

In building a mine stable either underground or on the surface, the floors should be graded and made of concrete. On the floors, rails should be embedded in the concrete and cross bars nailed to these rails. The rails should be of sufficient hight to permit a space of about 3 in. for the circulation of air, and for draining and flooding the floor. It is also advisable in building a mine stable to see that the mangers are not more than 38 in. high and 24 in. wide, so the mule will not strike his breast when eating. The manger should be slanting, and have a 2- or 3-in. opening at the bottom to allow waste from the hay to slide down into the stalls. The water troughs can be of wood or steel, preferably the latter, and should be built in the partitions separating the stalls, thus accommodating two mules. All the water boxes should be fed from a common pipe, and each trough should have an overflow or drain pipe to prevent flooding.

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Contents

Results from Modern Coal Camps

The article in this issue describing the modern coal camp at Zeigler, Illinois, presents a subject that has recently occupied the minds of the managers of coal-mining companies. A tendency to provide more desirable houses for the miners employed is now evident. This disposition on the part of some operators has resulted in the building of model towns at many mines. The lot of the miners is none too pleasant at its best, and the dangers and hardships to which they are exposed certainly entitle them to comfortable surroundings.

Advanced ideas regarding the construction of model coal camps are now being put to practical use in many States. The old idea of building 50 or 100 small houses all exactly alike, and each painted the same color, is no longer the rule among up-to-date operators. There was some reason, years ago, for a cattle owner to brand all cows with his own trade mark; but as mine houses cannot run away or be easily stolen, the same reason does not apply nor does it justify a whole camp painted red or blue, and a constant offense to the eye.

The controlling interest in one large coal company in Colorado has forbidden this ugly similarity in constructing the coal camps. A competent architect is regularly employed by this company, and when a new camp is to be started, a number of houses are designed. Some are three, some four, and others probably five rooms. The architect is limited as to the cost of each style of house and must carefully estimate and plan his houses so that the cost prescribed for each style is not exceeded. In the four-room houses, for instance, the amount of lumber used will be practically the same in each dwelling, but one house will be made to look different from another by addition or different arrangement of a porch, bay-window, gable, or wing. Each house is then painted some color so that a certain individuality is given to the camp and still a harmonious blending of shades is secured. Such a scheme does not entail any considerable increase in cost and does beautify a camp immeasurably.

Children raised in tenements surrounded by filth cannot be expected to be clean. Nor will miners housed in a dirty row of company houses, with no attractions in the evening other than those found at the saloon, be sober and contented. If mine managers would think more of providing some legitimate amusement for the employees in the evening, they would get considerably better results from their laborers and fewer brawls and fights would occur. Every mine superintendent should not only encourage cleanliness and order about the miners' houses, but should absolutely demand that each family keep its yard and outside surroundings in a presentable condition. In one instance, the incentive used to secure this is a money reward to the family having the best kept home. Money spent to secure such a result will be returned many times over in the better, more intelligent labor that will be secured.

Idleness in the evenings creates mischief and dissatisfaction, just as dirty, uninviting homes breed surly discontent. Contented men are much more likely to be steady and competent workers.

The Metal Markets in October

The metal markets during the month of October continued to show the same characteristics of strong demand and high prices which have marked them for some months past.

Lead remained steady during the month, the wholesale price for desilverized having remained at 5.75c., New York. There has been some selling of spot lots and special deliveries at higher prices; perhaps more than in September. So large a share of the trade is controlled by the American Smelting and Refining Company, however, that that company is able to keep a steady price, at which the great bulk of the business is done.

The demand for zinc was fairly steady throughout the month. A little dullness was reported at one time, but it was not serious enough to affect prices appreciably. Supplies have been taken up as they were offered, without difficulty, and the quotations at the close of the month were 6.30c. New York and 6.15c. St. Louis, against 6.20c. and 6.05c. at its opening. The price of zinc ore did not vary very greatly, assay basis—60 per cent. zinc—ore averaging $41.50 per ton in the Joplin market the first week in the month, and $42.50 in the last. There is still a moderate upward tendency.

It may be noted that the foreign mar-

kets for both lead and spelter have been very strong. Lead sold during the month as high as £19 10s. for soft Spanish in London, and spelter at £28 15s. for good ordinaries; these prices being equal to 4.18c. and 6.16c., respectively.

Tin has followed the London position closely. Supplies, while larger than last year, have not increased more than the demand and are still closely controlled, apparently. The fluctuations were not great; the price in New York has not been below 42, nor above 44c. during the month.

The minor metals—nickel, quicksilver and platinum—have remained steady. Platinum continues at the high level of $33 per ounce; that is, an ounce of platinum is worth about 1.6 oz. of gold. Antimony is also high, notwithstanding rather heavy imports.

Silver has continued to advance steadily, opening the month at 68⅜c., New York, and 31 11/16d. London; and closing at 70⅛c. and 32⅜d. The demand from the East continues large, as does also that for use in the arts. These have been helped by purchases for the French and United States mints. It has been remarked that the price paid by our own mint is usually a fraction above the market quotations; but it must be remembered that the price is made delivered at the mint specified. Most of the silver bought so far, for subsidiary coinage, has gone to Denver or New Orleans.

The Course of Copper

The underlying conditions of demand and supply in the copper market remain really about the same as we described them a month ago. There has been, however, something like a runaway market during the month. Consumers apparently became anxious about their supplies, and wished to secure themselves, regardless of cost. They succeeded in bidding up prices against themselves, and a heavy business was done, on rising prices, both for home consumption and for export. The New York quotations, which opened on Oct. 1 at an average of 20¼c. for Lake and 19¾c. for electrolytic, advanced until 22 to 22¾c. was quoted for Lake and 21¼ to 22¼c. for electrolytic, the market having rather a wide range. In London the bulls had everything their own way, spot standard selling at one time as high as £102 15s. In the closing week of the month there was a quieter feeling, consumers being fairly well supplied, at least well enough to satisfy them. Prices, however, remained at a high level, 22 to 22½c., and 21½ to 22c. being quoted in New York for Lake and electrolytic, respectively. Considerable sales are said to have been made for February delivery at 22c. for electrolytic delivered in London. The London price of standard receded about £4 from the highest, but with no backwardation in futures.

To find a parallel to the present prices, we have to go back nearly seventeen years, to January, 1880. So far as it is possible to predict, a high price, probably over 20c., seems probable for some time to come. The remarkable point in the present situation is that the prices do not seem so far to have checked consumption at all. With regard to this, and to the future, we can add little to what was said in this column a month ago.

The high price of the metal has given rise to a strong speculation in the stocks of copper companies. As often happens in the stock markets this movement has not shown much discrimination, the greatest advances having been in the shares of companies which are not yet producers. There has been some reflection of the market in dividends. Amalgamated Copper increased its quarterly payment from $1.75 to $2, a cautious advance. Abroad, however, Rio Tinto has declared a dividend of 50 per cent. on its ordinary shares for the first half of the year. This was entirely the result of the advance in price, its production having been about the same as last year.

Iron and Steel

For the larger part of October, the iron and steel markets showed a heavy business. In pig iron there was considerable excitement, buyers seemingly having decided that there was nothing to be gained by waiting. This feeling resulted in rather a rush for material and sharp advances in price. In the third week bessemer and basic pig for November delivery sold at $21 per ton at furnaces in the Mahoning and Shenango valleys, and No. 2 foundry at $19, Birmingham. Iron for delivery in the second quarter of 1907, however, sold at $1.50 or $2 below these figures. It must be remembered that, so far as steel-making pig is concerned, the proportion bought from merchant furnaces is not large; all the larger steel companies own their own blast furnaces.

In finished material the United States Steel Corporation and several other large companies have resisted any general advance. Nominal quotations continue about the same, where buyers are satisfied to wait their turn. Where any special delivery is required, and the material must be had, premiums are charged, which amount practically to advances in price.

An important point in the outlook for the coming year is the probable cost of raw material. Coke has advanced materially, and some consumers are now making contracts in the Connellsville region for a year ahead, which has not generally been the practice there. The Hill ore-land leases are by the way of establishing higher prices for Lake ores. It is quite probable that the recent advance in pig iron will not more than cover the increase in cost of ore and coke to the merchant furnaces; to say nothing of labor, an advance in which is altogether possible.

The Coal Trade in October

The coal trade in the West during the past month has been principally a struggle to get cars at the mines. This situation has not yet produced any marked scarcity at consuming centers, but it has had a tendency to raise prices at several points. It has also embarrassed the Lake trade, and made shippers doubtful of their ability to fill their contracts in the Northwest before navigation closes. The distribution of cars is not only insufficient, but also irregular, so that it is difficult for mine operators to gage their work. Many mines cannot store much coal, so that frequent suspensions of work are the general order.

In the East there has been less complaint of car shortage, though transportation has been rather slow. The demand for steam coal is good everywhere, but manufacturers are not in a hurry to put in winter stocks. In the far New England ports, which are closed by ice in winter, there has been the usual fall demand, which has put some life into the coasting trade. The anthracite trade, which relies largely upon domestic demand, has been dull, owing chiefly to the continued mild weather.

Cyanide Poisoning

BY H. L. BROWN

Some notes on difficulties encountered by the poisoning of cattle with KCn contained in discharged residues from a cyanide plant in the Southwest may be of interest to other members of the profession engaged in cyaniding. This plant is one of 50 tons capacity crushing in a 5-lb. solution, concentrating and classifying into sands, which go direct to leaching vats, and slimes, which are treated by decantation.

The final wash-water from the sand vats titrated from 0.2 to 0.4 lb. KCn per ton. The final solution washed out with the slimes carried never more than 0.7 lb., and as both slimes and sands were sluiced out, the amount per ton of water would be very small, so small that it could only be detected qualitatively. Notwithstanding, we had considerable trouble with ranchers who claimed damages for cattle killed by our solutions; some of these claims were absurd, as, on investigating, we would often find the dead animal so far from the creek as never to have reached that spot, if it had been poisoned.

The tailings were sluiced into an arroya which was usually dry, but which, in a short distance, joined a creek which had, for that country, considerable water in it. The major portion of the sands settled before they reached this other stream, and spread out in the narrow cañon till there was a deposit several feet thick, and, owing to the ability of potassium salts to "creep," and the rapid evaporation in that dry climate, the top of these sands would be covered with white patches of potassium and calcium salts which had a fascination for cattle, and speedily a fatal termination for them.

This part of the trouble was eliminated by fencing in the land where the sand settled, but the slimes, being very light, flowed a long distance and seemed to carry the salt with them, not going into solution in the waters of the creek for a long way, and carrying a fatal dose for any animal that drank in the stream while the flow was passing. We placed copperas in the launders carrying the slimes to the creek and, when this was done, had no further trouble, but as damages had been paid for cattle said to be killed by drinking our solution, we naturally got a claim for every cow and horse dying in the neighborhood.

Circumstantial evidence was all against the company, and the only way to prove that the animal did or did not die from the effects of the solutions was by an analysis. Works consulted on the cyanide process gave no idea of the symptoms of poisoning, in fact no information of any assistance, so works on toxicology and medicine were consulted. All these lay great stress on the detection of cyanide by the odor, but I have never been able to detect it in animals I have killed by cyanide for experimental purposes, though the other indications mentioned I have verified.

Blythe's "Toxicology" recommends removing the viscera and brain, examining for odor and confirming by the well known sulphur test for HCn. A slight modification of Blythe's suggestion was used and was very successful. We would have the brains of the animal removed, divide them into two parts, one for ourselves, the other for the claimant, in case he was not disposed to accept our results. The brains were placed in distilled water and allowed to remain 24 hours. This water was decanted off, filtered, and tested by acidifying with HCl, adding $(NH_4)_2S_2$ (made by saturating NH_4OH with H_2S) and to this adding a solution of $FeCl_3$. If cyanide was present the solution would turn a blood-red color, due to ferric sulpho-cyanate, the reactions taking place as follows:

$$KCn + HCl = KCl + HCn.$$

$$HCn + (NH_4)_2S_2 + NH_4OH = NH_4CnS + (NH_4)_2S + H_2O$$

$$NH_4CnS + FeCl_3 = Fe(CnS)_3 + 3NH_4Cl$$

When the brains are taken from an animal that has just died, they will be found so full of blood as to discolor the water they are soaked in, but by simply heating the water the blood will precipitate and leave a perfectly clear solution to work with.

One thing noticed was that the only animals we found to die from cyanide were cows with calf; it never seemed to affect steers, bulls, heifers nor burros—and but one horse—though all were numerous in the country. A cow we discovered, that had evidently been licking the patches of salts on the sand pile and had all the visible symptoms of cyanide poisoning, we saved by promptly forcing it to swallow a couple of quarts of a strong solution of copperas.

I append some notes taken from White's "Materia Medica," which may be of interest.

"HCn can pass through the epidermis and then it paralyzes the terminations of the sensory nerves; thus it acts as a local anesthetic; is quickly absorbed (KCn less rapidly) by the mucous membranes and has the same anesthetic and sedative effect in the mouth and stomach as on the skin.

"Large doses cause instantaneous diastolic arrest. Conclusion from this is that large doses paralyze the heart directly. Toxic doses cause deep insensibility and coma. In man, convulsions rarely seen; in animals, common. With large doses the symptoms usually begin in a few seconds. It is rare for them to be delayed more than two minutes.

"The patient is perfectly insensible, the eyes are fixed and glistening, the limbs flaccid. The respiration is slow, deep and convulsive, the pulse almost imperceptible. After death there may be noticed an odor of HCn about the body, which is very livid. The fingers are clenched, the jaws firmly fixed and there is froth at the mouth. The stomach may be a little reddened.

"Toxic dose, 0.05 to 0.25 grain, which is equal to 0.003 to 0.015 gram."

*Metallurgical engineer, 1258 Grant avenue, Denver, Colorado.

The Smythe Producer

EDITORIAL CORRESPONDENCE

The dstinguishing features of the Smythe gas producer, built by the S. R. Smythe Construction Company, of Pittsburg, Penn., are the open grate and the admission of steam and air together all the time. The same manufacturers now make a self-cleaning, continuous producer, from which the ashes are withdrawn through a water seal at the bottom. The older producer here described rests on the ground, and has walls of sheet iron, with a lining of firebrick. The two sets of cast-iron doors at the bottom are for shifting the grate and removing ashes. The grate consists of 1½-in. square iron bars long enough to reach across from a beam over the front door to a similar beam at the back. Two other beams similar in position extend across front and back 8 in. above the lower ones. To clean out ashes, the blast is stopped, and the doors, which are customarily sealed with sand and clay, are opened. A second set of grate bars is then inserted temporarily across the upper beams to hold up the charge, when the lower bars are removed and the ashes resting on them. The lower ones are then replaced and the charge allowed to settle.

On each side, toward the bottom, is a downwardly expanding duct leading into the ash pit, below the grate. At the top of each is a cylinder covered with a pivoted lid. A steam jet projects downward into this cylinder, bringing the supply of steam for gas making. This induces a flow of air in the same direction, its volume being regulated by swinging the lid across the cylinder.

Coal is fed into the top through a round hopper with a bell, worked by hand lever. Two small holes on opposite sides pass downward through the iron ring around the base of the hopper, to permit the stirring of the charge with long pokers. Each hole is covered with a clap valve, and a small downward jet of steam over each prevents the exit of much gas while the workman is handling the stirring rod. The gas output is led off from the side close to the top through a square duct connecting upwardly with the main.

At the Pennsylvania Tube Works on the north bank of the Monongahela river at Pittsburg, just above the first dam, a battery of 30 of these producers is making gas to supply 17 tube furnaces. They use Second-pool, run-of-mine coal, rich in

gas, and non-coking. The coal is unloaded from the river scows by a clam-shell bucket, hoisted and discharged into one end of a belt conveyor. The coal passes over a screen which removes the slack for use under boilers; when their supply is full, the run-of-mine coal goes to the producer plant. This is arranged in two parallel rows 25 ft. apart. The charging floor of the structure, which is open on the sides, is at the level of the tops of the producer shafts, but the hoppers project 30 in. above the floor. The belt conveyor discharges over a traveling chute onto the charging floor, making a long pile between the rows of hoppers. Charging is done by hand at the rate of 250 bushels, or 9.5 tons per producer per 12 hours. The workmen are constantly stirring the charge to keep the top level and to prevent the formation of blow holes which would obstruct the proper reactions in the body of the coal, and would permit the first formed gases to burn inside the furnace. Ashes are removed once in 48 hours. The firebrick lining has a life of from 5 to 6 years; one producer at this plant has run for 7 years without repairs to the lining.

Instead of corrugated iron for covering the sides of buildings in metallurgical works, it has been found economical to use some form of ready roofing, which is simply felt, dipped in ashphalt and sanded. The use of such material presupposes, of course, that the sides of the building are sheathed with boards.

The Braden Copper Company

Situated about 75 miles south of Valparaiso, and nearly 40 miles east of Rancagua, in Chile, is the property of the Braden Copper Company, the headquarters of which are at 71 Broadway, New York. It is located in the mountain range, which extends nearly the entire length of the country, and while still almost in the experimental stage, enough new development, together with ancient workings, has been done to warrant the belief among the directors that the mine will become a large producer.

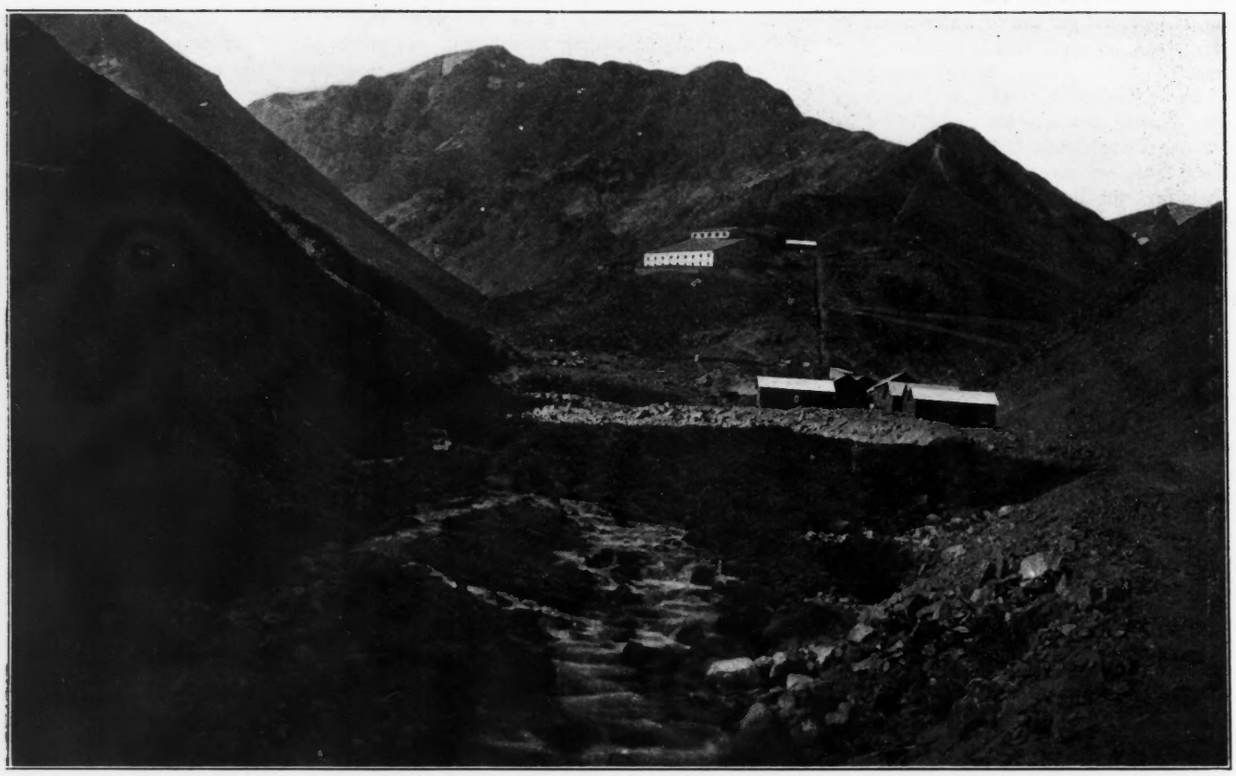
The company holds title to 15 claims, which cover 107 hectares, or 264 acres. The orebody is practically a mountain of fractured diorite and tuff carrying chalcocite, and in some sections masses of metallic copper. Three tunnels from 1000 to 1500 ft. in length have been driven into the formation. The ore is trammed to the entrances, where it is transferred to buckets and sent to the mill, a mile distant, over an aërial tramway.

The mine is 8000 ft. above the sea level. The mill site is 1500 ft. lower, at a place called, by the company, La Junta. It has erected there a 350-ton experimental mill, which will be replaced by a modern steel structure, capable of treating from 2000 to 3000 tons per day. A railroad is to be built from Rancagua to La Junta, a distance of 40 miles and upon its completion, work will begin upon the new mill and the proposed smelter.

Wiliam Braden is general manager, and one of the directors, and it is to his efforts that the present and proposed work is due. Mr. Braden is now in Chile, and R. L. Lloyd, formerly of Cananea, who has been appointed metallurgist for the company, is now on the way thither. Upon their report action will be taken upon the plans for mill and smelter. It is at present impossible to state of what the smelter equipment will consist, but in all probability there will be blast furnaces, reverberatories and converters situated near the mill and at the State road.

The mill tests are showing 10 to 11 per cent. copper, but this is beyond the expectations of the officers. However, they believe that the entire body will average 5 per cent., and with such a large deposit expect to become a producer of no inconsiderable importance. At present the mill is delivering concentrates running from 30 to 35 per cent. copper.

An abundance of water is available for washing and power, and all tramming, mill and smelter work will be performed by electrical power as far as possible. In the accompanying illustration the mine is situated near the left of the moutain in the background. The mill is in the middle of the picture and the houses at La Junta in the foreground.



MINE, MILL AND HOUSES AT LA JUNTA

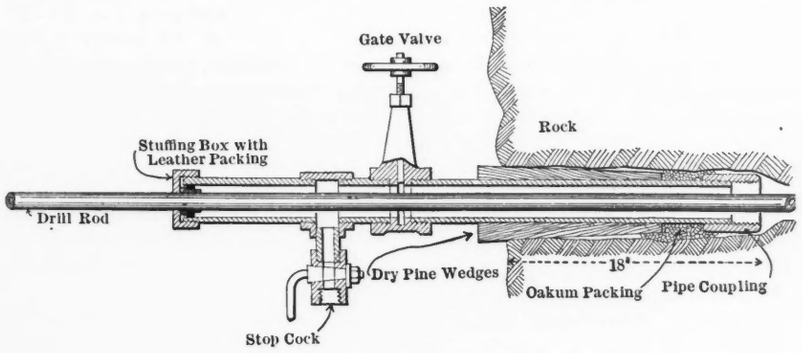
The gas-producing area of western Ohio and Indiana derives its gas from the Trenton limestone. This bed has horizons within which are porous strata, in which are accumulations of salt water, oil and gas.

CORRESPONDENCE

Discussions by Our Readers of Various Topics of Interest

Tapping Water in Mines

Referring to an article in the JOURNAL of Oct. 13, entitled "Tapping Water in Mines," I would state that the method therein described was used successfully in unwatering the Santa Juliana mine at Ocampo, Mexico, in 1892. In place, however, of cementing the tube to the rock, it was first caulked with oakum and then dry pine wedges were driven between the rock and the tube. The tube was of ordinary 2-in. water pipe and was enlarged at the inner end by having an ordinary pipe coupling screwed thereon; this kept it from being forced out of the hole by the pressure of the water when the valve was closed.



ARRANGMENT FOR CONTROLLING FLOW OF WATER

Altogether, 700 ft. depth of water was handled in this way in two stages of 300 ft. each and one of 100 ft. depth.

A shaft was sunk a short distance (about 50 ft.) from the hanging wall of the vein containing the old workings, the extent of which at that time were only known approximately. At 300 ft. below the drain tunnel a permanent pump station was put in and a steam pump installed, after which the drift was carried forward, full size, in the direction of the old workings, with a guide hole always 8 or 10 ft. in advance; a number of pine plugs were kept on hand, with which to stop up the hole when the drill broke through to the water. This it did one day, somewhat unexpectedly. When the drill was withdrawn, a dry pine plug, which nearly filled the hole, was inserted. A somewhat larger one was then driven in and the flow of water stopped. After being left a few days, the inner plug swelled sufficiently to stop the flow and allow the outer plug to be withdrawn. The hole was then enlarged, the pipe and gate valve wedged in, the inside pine plug then bored out, the valve closed and the job completed.

On the two subsequent holes, owing to more accurate measurements obtainable, we were enabled to insert the pipe and gate valve before breaking through to the water, so that very little water entered, as we had it under control as soon as the drill was withdrawn.

The accompanying sketch shows the method applied to a diamond drill, so that the drill may be withdrawn without letting water into the sump. It consists of an extension added to the front of the gate valve, composed of a piece of pipe in which there is a stuffing box packed with leather, also a small stop-cock which may be left open until the water is struck. This is to allow the water and chips to escape while working the diamond drill.

H. A. HORSFALL.

Yonkers, N. Y., Oct. 19, 1906.

The Use of Wood in Smelting

In connection with the very interesting details as to the use of wood fuel in blast-furnaces, given by Mr. Mitchell, in the JOURNAL of Oct. 13, it may be mentioned that H. F. Collins used a mixture of coke and wood at Santa Fé, Chiapas, in 1901. The ore consisted of bricked garnet jig middlings, coarse garnet middlings and selected garnet ore, carrying chalcopyrite and bornite.

Using coke alone, 15 per cent. of the weight of ore smelted was consumed. This was reduced to about 11½ per cent. by substituting wood in sticks; but it was found the proportion of wood to coke should not exceed 25 per cent. to avoid trouble with hot top. Mr. Collins published details in a paper read before the Institution of Mining and Metallurgy in October, 1902, but, contrary to the experience of Mr. Mitchell, at La Dicha, he found the use of wood decreased the weight of matte by 10 per cent, and increased the copper content of same by 4½ per cent. to the very high tenor of 50 per cent.

In 1900 the writer was informed by C. S. Carnaghan, that he was smelting low-grade galena ores at Sombrerete, Zacatecas, using charcoal, 30 per cent. of charge, and that he frequently replaced 20 per cent. of the charcoal with wood chunks, either green or dry.

For the benefit of those of us engaged in smelting where fuel is costly, cannot Mr. Mitchell be persuaded to give further details; such as percentage of wood used to ore; whether better green or dry, etc?

It would be interesting to learn if a larger size of stick, or block could not be used with equally good results.

A. H. BROMLY.

Taxco, Guerrero, Mexico, Oct. 22, 1906.

Volumetric Estimation of Tin

An article by James Darroch and C. A. Meiklejohn on the above subject having been criticized by L. Parry, we forwarded the latter's letter to Mr. Darroch, in order that the criticism and reply might be published together. The two communications follow:

Sir—An article entitled "A Volumetric Method for Tin," by James Darroch and C. A. Meikeljohn, which appeared in your issue of June 23, has just been brought to my notice. This describes a "new" volumetric assay for tin, viz., the ferric-chloride assay. As I have used the method for 12 years, and am responsible for most of the applications of it to the assay of tin materials; and as further it was fully described in my book "The Assay of Tin and Antimony," published 18 months ago, I think your contributors are a little behind the times; of course I take it for granted that they had not seen my book.

L. PARRY.

Huddersfield, England, July 28, 1906.

Sir—My delay in replying to Mr. Parry's letter has been due to difficulty in obtaining a copy of his book (the first edition of which appeared to be out of print, and the second edition not yet off the press). It is needless to say that previously I had not been acquainted with the book.

The article in the JOURNAL does not, nor did it even pretend to, describe a "new volumetric" assay for tin. It is Mr. Parry

himself who calls the method new. The essential part of our method is the means adopted for getting the stannic oxide into solution, and it is here only that novelty is claimed. Mr. Parry reduces with hydrogen or coal gas, a cumbersome and tedious method, which is useless in many regions (e.g., Bolivia). It is quite apparent that Mr. Parry knew nothing of the use of sodium peroxide, as he never once mentioned it in his book; and although he condemns caustic alkalies, it is evident from the context that he does not in the least understand their use. Sodium appears to be quite "new" to Mr. Parry. It effects in five minutes what requires from three to four hours by his method.

The entire absence of filtering also distinguishes our method from those described by Mr. Parry. He has so many methods; each different substance (ore, slag, ashes, etc.) having a separate method (or methods), that it is impossible in a letter even to comment upon them.

No novelty is claimed for the use of ferric chloride, and it would be absurd to do so, as the reaction has long been known and applied in the assay of iron (as almost every one knows). Not only so, but it has been used in the assay of tin ores, as is shown in "Assaying and Metallurgical Analysis," by Rhead & Sexton, published in 1902. It is true that in this case an excess of ferric chloride is added, the reduced ferrous chloride being estimated with bichromate, or the excess of ferric chloride with stannous chloride. The principle, however, is the same. It would appear that Mr. Parry claims a proprietary right to a chemical reaction, a claim which is preposterous, more especially as he did not discover the reaction himself, nor was he even the first to apply it. This he admits in his book, though in his letter he would seem to suggest that he was the first assayer to use the reaction. Mr. Parry's assertions are in part true, but taken as a whole, his letter conveys a distorted view of the facts. JAMES DARROCH.

Pollokshields, Glasgow, Scotland,
Sept. 19, 1906.

According to the London correspondent of the New York *Evening Post*, the interesting discovery is announced at Aljustrel, Portugal, of a bronze tablet recording the decree of Hadrian controlling the management of the Imperial copper and silver mines which were farmed out to individuals and companies under severe regulations. Work must commence within eight months of the lease, and must not be intermitted for more than 10 days, under penalty of forfeiture. Provision was made for Government inspection and for the maintenance of repairs and safe working conditions.

The Mines Department reports the gold output of Queensland for the month of September at 46,300 oz. fine gold, or $957,021 in value.

New Publications

"Die Pumpen." By K. Hartmann and J. O. Knoke. Pp. 636 and 14 plates; illustrated. 6x10 in.; cloth, 18 marks. Berlin, 1906: Julius Springer.

"Mineral Land Surveying." By James Underhill. Pp. 218; illustrated. 5x7½ in.; flexible leather, $3. Denver, 1906: Mining Reporter Publishing Company.

"The Economics of Railroad Construction." By Walter Loring Webb. Pp. 339; illustrated. 6x8 in.; cloth, $2.50. New York, 1906: John Wiley & Sons.

"The Geological Map of Illinois." By Stuart Weller. Illinois State Geological Survey, Bulletin No. 1. Pp. 26. 6x9 in.. cloth. Urbana, Ill.; 1906: University of Illinois.

"Copper Mines, Copper Statistics, Copper Shares and a Reference Book on the Leading Copper Properties." By D. Houston & Co. Pp. 164. 5x8 in.; cloth. New York, 1906: D. Houston & Co.

"Outlines of Practical Sanitation for Students, Physicians and Sanitarians." By Dr. Harvey B. Byshore. Pp. 208; illustrated. 5x8 in.; cloth, $1.25 net. New York, 1906: John Wiley & Sons.

"Geology and Mineral Resources of Mississippi." By A. F. Crider. Bulletin No. 283, U. S. Geological Survey. Pp. 99; illustrated; 6x9 in.; paper. Washington, 1906: Government Printing Office.

"The Petroleum Industry of Southeastern Illinois." By W. S. Blatchley. Illinois State Geological Survey, Bulletin No. 2. Pp. 109; illustrated. 6x9 in.; paper, Urbana, Illinois, 1906: University of Illinois.

"Oil Fields of the Texas-Louisiana Gulf Coastal Plain." By N. M. Fenneman. Bulletin No. 282, U. S. Geological Survey. Pp. 146; illustrated. 6x9 in.; paper. Washington, 1906: Government Printing Office.

"The Rampart Gold Placer Region, Alaska." By L. M. Prindle and Frank L. Hess. Bulletin No. 280, U. S. Geological Survey. Pp. 54; illustrated. 6x9 in., paper. Washington, 1906: Government Printing Office.

"Geology and Coal Resources of the Cape Lisburne Region, Alaska." By Arthur J. Collier. Bulletin No. 278, U. S. Geological Survey. Pp. 54; illustrated. 6x9 in.; paper. Washington, 1906: Government Printing Office.

"The Coals of the Big Sandy Valley, South of Louisa and between Tug Fork and the Headwaters of the North Fork of Kentucky River." By Albert R. Crandall. Kentucky Geological Survey, Bulletin No. 4. Pp. 141; illustrated. 7x11 in.; cloth. Lexington, Ky., 1905: Office of the Survey.

"The Limestone Resources and the Lime Industry in Ohio." By Edward Orton, Jr., and Samuel V. Peppell; and "The Manufacture of Artificial Sand Stone or Sand-Lime Brick." By Samuel V. Peppel, Geological Survey of Ohio, Fourth Series, Bulletins Nos. 4 and 5. Pp. 443; illustrated. 7x10 in.; cloth. Springfield, Illinois, 1906: State Printer.

Questions and Answers

What is the cause of the increase in price of commercial white arsenic during the past year, and what would be the market for a 25 to 32 per cent. Washington ore? A. L. P.

Answer—Early in the year the price of commercial white arsenic held around 10 to 11c. per lb.,. but later the demand fell off, with a consequent reduction in price to 4¾c. This figure some producers found unprofitable and shut down their mines. The demand was thus able to catch up with the supply, and naturally the price rose, until now 7 to 7½c. is realized for spot delivery. It has been claimed by certain dealers that a corner on arsenic exists, but no corroboration of this statement is available.

A Washington ore containing from 25 to 32 per cent. arsenic would be profitable provided it could be laid down at a smelter at a reasonable freight charge. Any charge would have to be multiplied by four in figuring the charge on 25 per cent. arsenic ore, unless there were other metals or minerals of economic value. Hence the charge would have to be low to make such a proposition a paying one. As most of the ore is treated in the West, it might be possible to secure satisfactory terms.

The Washoe smelter at Anaconda, Montana, the Everett smelter at Everett, Washington, and the Mineral Creek Mining and Smelting Company, at Mineral, Lewis county, Washington, are the only producers in this country. Provided white arsenic can be produced in the West at a reasonable figure, it could be marketed in the East at a profit.

Tin Smelting in the United States

In the JOURNAL of April 14, 1906, page 714, I read that there is in the United States a modern tin-smelting works, ready for operation, which has never been operated because of lack of ore supplies.

I shall be obliged for information as to the location of these works, by whom erected, the kind of ore that it was proposed to smelt, the kind of furnace to be used, etc. H. C.

Answer—The smelter was erected by the International Tin Company, in which New York capitalists were interested, and were provided with two well designed reverberatory furnaces. The plan was to import ore from the Malay States, but before the business could be inaugurated, the Government of the Federated Malay States imposed a heavy export duty on tin ore, which made it impossible for the American company to obtain a supply. Why the American company has not at-

tempted to obtain a supply of ore in Bolivia and elsewhere, we are unable to say.

In connection with this subject, a communication from D. A. Wilbur, American consul-general at Singapore, published in *Daily Consular and Trade Reports*, Oct. 8, 1906, is apropos. According to him the Straits Trading Company, the only smelter at Singapore, has a monopoly of the smelting of tin ore at that place, but there are no laws to prevent a foreign concern from erecting a smelting plant, and such a competitive enterprise would be hailed with delight by a large number of miners who are completely under the control of the Straits Trading Company. If the International Tin Company had erected a smelting plant at Singapore, instead of attempting to export the ore to the United States, it would have profited better, and would not have been forced to abandon the project. As soon as that company began to ship ore, the Straits Trading Company brought all its influence to bear upon the Government, claiming that the shipment of ore was taking labor away from the colony. The Government consequently stepped in and imposed a heavy export duty on all tin ore shipped to countries outside of England and the Straits Settlement, thereby driving the International Tin Company from the field.

Abstracts of Official Reports

LAKE SUPERIOR CORPORATION

This corporation is only a holding comcany which owns the stocks of several mining, metallurgical and power enterprises in the vicinity of Sault Ste. Marie. Interest on the securities of these subsidiary organizations brought in $1,102,044 during the year ending June 30, 1906, and miscellaneous receipts raised the total income to $1,138,744. The payment of $489,883 in bond interest and $91,981 for general expenses and taxes, left a net income of $556,880 as compared with $34,802, the income of the previous year.

During the year the important plants of the operating companies were actively employed. Blast furnaces and steel-rail plant, the principal industry, demand the largest share of attention and absorb the greater proportion of financial resources. This branch of the work shows great development and improvement.

The estimated production of 150,000 tons of steel rails for the year was exceeded by about 10,000 tons. The record output of steel rails for a day—1004 tons—and 17,873 tons during August, 1906, show the possibility of the plant and prove the advisability of further capital expenditure on the steel works. The directors would like to provide at the earliest possible date for another blast furnace having a daily output of at least 400 tons. This would nearly double the present production of pig iron, and thereby furnish material adequate for the most advantageous operation of the rail mill. The present blast furnaces operated during the past year made 130,902 tons of pig iron, which is considered a very satisfactory showing.

The construction of two 30-ton open-hearth furnaces has been authorized and their completion is expected early in December, 1906. This extension will make way for the profitable use of a large amount of scrap which has accumulated, and will furnish additional material needed in the rail mill. This new open-hearth plant has been planned with a view to extension.

Less ore was taken out of the Helen mine than during the preceding year. Several causes combined to produce this result, among which may be named labor troubles and a fire which destroyed the apparatus and machine shop, all of which have since been replaced. Development continues. Bodies of pyrites have been found for which a ready market is available at profitable figures.

The Michigan power house has supplied the Carbide company during the year. Unavoidable circumstances have delayed the construction necessary to make the power house secure under the development of the maximum horse-power. Plans have been prepared and it is expected that the necessary work will be under way early next year.

The efficiency of the several plants has been well maintained by a liberal charge for repairs and general maintenance. For the two years ending June 30, 1906, $527,883) has been expended for betterments and extensions to property and plants.

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 the notice of the patent appeared.

Published Week Ended Oct. 23, 1906.

CONVEYER—Francis L. Clark, Pittsburg, Pa., assignor to The Westinghouse Air Brake Company, Pittsburg, Pa. No. 833,774. Filed Aug. 3, 1898.

MIXING MACHINE—William Miles, Jackson, Mich. No. 833,790. Filed June 30,1905.

CONSTRUCTION AND SINKING OF CAISSONS, ETC.—Daniel E. Moran, Mendham, N. J. Nos. 833,791, 833,792. Filed June 22, 1906.

CUTTER HEAD FOR SUCTION DREDGES—John F. Olirich, San Francisco, Cal. No. 833,797. Filed March 6, 1906.

COMPOUND FOR MANUFACTURING ARTIFICIAL FUEL—George D. Platt, Litchfield, Ill., assignor to Frank Burnes and E. M. Boley, St. Louis, Mo. No. 833,801. Filed Dec. 4, 1905.

WATER ELEVATOR—John J. West, Inman, S. C. No. 833,860. Filed Sept. 22, 1905.

VERTICAL RETORT FOR THE DESTRUCTIVE DISTILLATION OF COAL—Harold W. Woodall, Wimborne, and Arthur M. Duckham, Upper Parkstone, England. No. 833,861. Filed Nov. 15, 1905.

ROCK DRILL—Henry Deitz, Denver, Colo., assignor to Anna Theresa Deitz, Denver, Colo. No. 833,875. Filed Jan. 10, 1905.

LEVELING ROD—Willie L. E. Keuffel, Hoboken, N. J., assignor to The Keuffel & Esser Co., Hoboken, N. J. No. 833,880. Filed Jan. 4, 1905.

APPARATUS FOR PRODUCING CEMENT—Rolla C. Carpenter, Ithaca, N. Y. No. 833,918. Filed Oct. 17, 1902.

MAGNESIUM CEMENT AND PROCESS OF MANUFACTURING SAME—Wilii Jeroch, Berlin, Germany. No. 833,930. Filed March 19, 1906.

RECOVERY OF VALUABLE GASES IN THE SULPHITE PROCESS — Einar Morterud, Christiania, Norway. No. 833,936. Filed Jan. 8, 1906.

APPARATUS FOR EXTRACTING GOLD—Joseph A. Comer, Los Angeles, Cal. No. 833,999. Filed Jan. 2, 1904.

MINING CAR—Ethan I. Dodds, Pullman, Ill., assignor to The Pullman Company, Chicago, Ill. No. 834,003. Filed June 24, 1905.

CENTRIFUGAL SEPARATOR—John J. Berrigan, East Orange, N. J., assignor to Francis J. Arend, New York, N. Y., and John Bernstrom, Stockholm, Sweden. No. 834,043. Filed March 1, 1904.

LEACHING TANK — Christopher Voelker, Helena, Mont. No. 834,088. Filed March 6, 1906.

DUMPING CAR—William W. Wallace, Knoxville, Tenn. Nos. 834,090, 834,091. Filed Feb. 26, 1906.

ALLOY—George F. Allen, Granite City, Ill., assignor to Edward R. Hoyt, New York, N. Y. No. 834,099. Filed Sept. 19, 1906.

GAS GENERATOR—Grove Cothran, Chicago, Ill., assignor to Chicago Title and Trust Company, trustee. No. 834,109. Filed July 6, 1905.

MAGNETIC ORE SEPARATOR AND CLASSIFIER—Guy H. Waring, Webb City, Mo. No. 834,175. Filed Nov. 16, 1905.

PNEUMATIC HAMMER—Charles T. Carnahan, Denver, Colo. No. 834,187. Filed March 9, 1906.

BRIQUET-MAKING PRESS—Richard Martin, Oakland, Cal. No. 834,215. Filed Jan. 22, 1906.

APPARATUS FOR SEPARATING METALS FROM ORES—Richard K. Evans, London, England, assignor to The Cyanide Vacuum Filter Company, Limited, London, England. No. 834,233. Filed Dec. 29, 1904.

GREAT BRITAIN

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

Published Week Ended Oct. 13, 1906.

EMERGENCY VENTILATOR—B. H. Thwaite, London. An installation of pipes in mines, containing supplies of air or oxygen under pressure, which come into operation after explosions and on other suitable occasions, with the object of supplying a breathable atmosphere to the miners. No. 18,491 of 1905.

LAMP FILAMENT — Vereinigte Electricitates Alj., Budapest, Austria. A method of removing carbon from filaments of tungsten or molybdenum, produced in the electric furnace, and intended for use in electric lamps. Nos. 20,175, 20,175A of 1905.

ORE-REDUCTION PROCESS — J. Asbeck, Krautscheid, Germany. In the process for reducing lead and silver from sulphides by immersion in a bath of fused chloride of zinc and sodium, adding zinc oxide or lead oxide to the bath, in case copper and iron sulphides are present with the other sulphides, with the object of preventing the iron and copper being deposited with the lead and silver. No. 23,408 of 1905.

AGGLOMERATING FINE IRON ORE — F. Heberlein, London. For the purpose of agglomerating fine iron ores, mixing with coal in a furnace such as the inventor's "lime roasting of galena" furnace, igniting and subjecting to the action of a blast of compressed air. No. 26,277 of 1905.

SLUDGE REMOVER—J. Eisner, Dortmund, Germany. In coal washers, devices for removing the fine coal and the muddy matters from the washing water. No. 26,475 of 1906.

TAILING ELEVATOR—F. W. Payne, Dunedin, N. Z. Improved arrangement of trays for elevating tailings from gold dredges and removing them to a distance. No. 4188 of 1906.

COAL WASHER—T. E. House, Wegan. An improved form of coal-washing apparatus. No. 5932 of 1906.

SAFETY CATCH—W. Thornber, Johannesburg, S. A. Improved methods of helping a falling cage to catch on to the guide ropes in case the hauling rope breaks. No. 6585 of 1906.

Personal.

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

John B. Farish is at present in New York.

R. A. Parker is examining mines in southwestern Colorado.

F. Aug. Heinze is looking over his Utah copper mines and smelter.

W. B. Devereux, Jr., has returned to New York from Kendall, Montana.

Hudson H. Nicholson has returned to Chicago from a trip to Goldfield, Nevada.

R. B. Watson, of New York, is inspecting mines in the Cananea district, Mexico.

J. P. Harvey is superintendent of the Furnace Creek mine in Inyo county, California.

Prof. B. Sadtler, of Denver, is at present on a professional trip to Guadelajara, Mexico.

Alexander N. Allison is superintendent of the Annie Laurie mine at Kimberly, Utah.

Gilbert T. Roote has returned to San Francisco from examining mines in Trinity county, California.

Mark R. Lamb, recently appointed consulting engineer to Chas. Butters & Co., has gone to South Dakota.

Newton W. Emmens has been appointed manager for the Broadview mine, Trout Lake, British Columbia.

Frank H. Probert has returned to Los Angeles, Cal., from an extended trip through the Guadalupe y Calvo district of Chihuahua, Mexico.

Theo. B. Comstock is engaged in extensive investigations in southern California, Mexico, and Nevada in the interest of Los Angeles clients.

Frederick W. Hoar, of Tombstone, Arizona, has just returned to that place from Mexico, where he has been examining several mines for Eastern people.

Archibald C. Dickson, mica specialist, is at present managing the mines of the Dickson-Irwin (Kodarma) Mica Mining Syndicate, in Hazaribagh district in India.

Dr. Franklin R. Carpenter is at present investigating sulphur deposits in Utah, and copper mines in California, and expects to be absent from Denver about three weeks.

J. Nelson Nevius, of Hermosillo, Sonora, Mexico, is dangerously ill of typhoid fever at St. Joseph's hospital at Nogales, Arizona. His many friends will hope for an early improvement.

Arthur C. Terrill, for about a year past superintendent of the Doctor-Jack Pot mine at Cripple Creek, Colo., has been appointed head of the Department of Mining in the University of Oregon, at Eugene, Oregon.

W. W. Adams, mining engineer, who went to Butte, Mont., from San Francisco after the earthquake in the latter, is inspecting the property of the Butte & Arizona Company in the Huachuca mountains of Arizona.

Obituary

Benjamin Howard Warren, at one time vice-president of the Westinghouse Electric and Manufacturing Company, and more recently president of the Allis-Chalmers Company, died suddenly at the Hotel Collingwood, New York, Oct. 19, from cerebral apoplexy, aged 57 years. He was a retired engineer officer of the United States Navy, and was a member of the Engineers', University and Lawyers' clubs of New York, of the American Society of Mechanical Engineers and other organizations. Within the past year he had engaged in business as consulting engineer, New York, in partnership with A. M. Mattice, a lifelong associate in the navy and in business. Mr. Warren leaves a widow, two daughters and a son.

Societies and Technical Schools

Massachussetts Institute of Technology—Dr. Andrew Fleming West, dean of the Graduate School of Princeton University and since 1883 professor of Latin, has been selected to succeed Dr. Pritchett as president of the Massachusetts Institute of Technology. Dr. West is 53 years of age, a native of Allegheny, Penn., and a graduate of Princeton in the class of 1874. He holds the degrees of doctor of literature from Oxford University, doctor of philosophy from Princeton and doctor of laws from Lafayette College.

Western Association of Technical Chemists and Metallurgists—The Board of Control has accepted the invitation of the Utah section to hold the second annual general meeting in Salt Lake City during the latter part of December, probably in the inter-holiday season.

Announcement is made that the members may arrange to attend this meeting, which promises to be one of unusual interest and importance. More complete announcements concerning program, railroad rates, hotel accommodations, entertainment, etc., will be given later.

California State Miners' Association—It has been decided by the directors to hold the annual meeting and convention of this California miners' association, Dec. 3 to 6, in San Francisco. A number of professional papers are being prepared by different members, which are to be read before the convention. The proceedings of last year's meeting have been published in a pamphlet of 150 pages. The original pamphlet was in the press at the time of the great fire, and was destroyed, with all the plates, illustrations, etc. Secretary E. J. Ensign states that he is given to expect quite a large attendance at the coming convention.

Industrial

L. F. Beers has taken charge of the Detroit office of the Buffalo Forge Company, succeeding H. M. Brightman, who is now connected with the Terry Bending Engineering and Construction Company, of Grand Rapids, Michigan.

Robert W. Hunt & Co., engineers, Chicago, have been appointed consulting, designing and constructing engineers for the new municipal electric-lighting plant for the city of Milwaukee, by Chas. J. Poetsch, city engineer. This appointment has been unanimously confirmed by the City Council.

Powell & Colne, 11 Broadway, New York, agents for the Tropenas converter steel process, have closed contracts with the Massachusetts Steel Casting Company, Everett, Mass., for an additional converter; the Penn Steel Casting and Machine Company, Chester, Penn., for two converters; and the Duquesne Steel Foundry Company, Coraopolis, Penn., for one converter and its equipment.

The Hendrie & Bolthoff Manufacturing and Supply Company has just closed contracts for the exclusive sales agency of the King screen. This screen is the invention of Howard G. King, formerly superintendent of the Colorado Zinc Works, of Denver. The screen has been in practical use for about a year. It has proved such a success that Mr. King has resigned his position at the zinc plant and will hereafter devote his time to the manufacture of this screen.

The Marysville & Nevada Water and Power Company, which has expended about $100,000 on its properties in Yuba and Nevada counties, is preparing to develop them. It has purchased the land and water rights along the North Yuba and Bear rivers, and has driven a tunnel that will be used to convey the water from a dam below Alabama bar to a ditch that will carry it to Bullard's bar. Powerhouses will be located at Alabama bar, Bullard's bar and Dry creek that will have a combined capacity of 41,886 h.p. The company will develop three large water rights by building dams to divert the water into canals.

The Helderberg Cement Company, whose plant is situated at Howe's Cave, N. Y., about 30 miles south of Albany on the Delaware & Hudson road has begun active preparations to enlarge its output of portland cement and to add extensively to the present properties. The additional power required will be produced by means of a 1500-kw. Allis-Chalmers steam-turbine generator unit, the order for which was recently placed through Thos. E. Murray, consulting engineer, New York. The new unit will conform to the Allis-Chalmers standard designs for both

turbine and alternator, the latter being wound for 440 volts, 60 cycles, 3 phase and to operate at a speed of 1800 r.p.m., under a steam pressure of 150 lb. at 28 in. vacuum. A Tomlinson jet condenser, with auxiliary air pump and accessories, will also be furnished.

Definite plans have been made by the Carnegie Steel Company for large extensions to the Duquesne works, for which the finance committee of the United States Steel Corporation has granted an appropriation of more than $9,000,000. These extensions include the building of two blast furnaces, 22x90 ft., each to have a monthly capacity of 14,500 tons. Six blowing engines will be installed for these furnaces, four of which will be gas and two steam. Eighteen 60-ton basic open-hearth steel furnaces will also be built, of which six will be extensions to the present open-hearth plant, while the other 12 will be located on the site now partially occupied by the bessemer steel plant, which will be abandoned. There will also be built one 16-in. bar mill, and the present 10-in. mill at the Monessen works will be removed to Duquesne.

Negotiations have been concluded by which the Cherry Valley Iron Company, Pittsburg, will pass into the control of a new corporation, the United Iron and Steel Company, headed by A. W. Thompson, formerly president of the Republic Iron and Steel Company, and now largely interested in the Inland Steel Company, Chicago. The Cherry Valley Company owns 200 coke ovens and a blast furnace at Leetonia, Ohio, with modern equipment, which is turning out about 350 tons of iron per day; also the Fannie furnace, at West Middlesex, Penn., which has recently been remodeled, and is making 300 tons of iron per day. The company is the owner of ore properties on the Mesabi range, having about 12,000,000 tons of ore in sight, of which about one-third is bessemer; also 700 acres of coking lands in Fayette county, Penn.; also large shares in limestone properties and ore-carrying interests.

Trade Catalogs

Receipt is acknowledged of the following trade catalogs and circulars:

Nernst Lamp Company, Pittsburg, Pa. Lux; Pp. 16, illustrated; paper, 2x4 in. October, 1906.

Buffalo Forge Company, Buffalo, N. Y. Buffalo Blacksmiths' Tools; Pp. 4, illustrated; paper, 10x12 in. 1906.

United States Steel Piling Company, Chicago, Ill. Steel Sheet Piling; Pp. 24, illustrated; paper, 5x8 in. 1906.

Chicago Pneumatic Tool Company, Chicago, Ill. Some Users of Air Compressors; Pp. 30; paper, 3x10 in. 1906.

Goodman Manufacturing Company, Chicago, Ill. Electrical Mining, September, 1906; Pp. 16, illustrated; paper, 6x8 in.

C. W. Hunt Company, West New Brighton, N. Y. Catalog 067, Electric Hoists; Pp. 16, illustrated; paper, 3x5 in. 1906.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio. Catalog, section A, engineering work; Pp. 12, illustrated; paper, 10x12 in. 1906.

Carlin Machinery and Supply Company, Allegheny, Pa. Gas or Gasolene Hoisting Engines and Power Trench Pump; Pp. 4, illustrated; paper, 6x18 in. 1906.

C. H. Shaw Pneumatic Tool Company, Denver, Colo. Shaw Eclipse Air Hammer, Rock Drill and Rock Drill Sharpener; Pp. 40, illustrated; paper, 4x6 in. 1906.

Rockwell Engineering Company, New York City. Rockwell's Heating Machines for Annealing, Hardening, Tempering, Coloring, etc.; Pp. 8, illustrated; paper, 6x8 in. 1906.

Hendrie & Bolthoff Manufacturing and Supply Company, Denver, Colo. The Dorr Classifier; Pp. 8, illustrated; paper, 8x5 in. 1906. Also the Card Concentrator; Pp. 55, illustrated; paper, 8x5 in. 1906.

Sprague Electric Company, New York City. Bulletin No. 219, Round Type, Direct Current Motors; Pp. 24, illustrated; paper, 8x10 in.; 1906. Also, Electric Motors for Driving Ventilating Fans and Blowers; Pp. 16; illustrated; paper, 3x5 in.; 1906.

Fort Wayne Electric Works, Fort Wayne, Ind. Bulletin Nos. 1082, 1083, 1084 and 1085, treating respectively of multiple alternating current arc lighting systems; types M A and M induction motors; standard switchboard panels for multiphase generators; and integrating switchboard wattmeters. Illustrated, 8x10 in. 1906.

Construction News

Ophir, Utah—The Cliff Mining Company proposes to put in a concentrating plant as soon as tests of its ore, now in progress, are completed.

Yerington, Nevada—The Nevada Douglas Copper Company, operating at Yerington, Nev., will soon place an order for heavy mine equipment. W. C. Orem, of Salt Lake City, Utah, is manager.

Butte, Montana—The Amazon-Butte Copper Company, Charles Mattison, of the Forbis block, Butte, Mont., secretary, is preparing to equip its mines with hoisting and other machinery.

Silver Star, Montana—The Green Campbell Consolidated Gold Mining Company, operating a mill and mining property near Silver Star, Madison county, Mont., is figuring on installing machine drills in its mines. E. B. Howell, Silver Bow block, Butte, is manager of the property and president of the company.

Special Correspondence

San Francisco Oct. 24

The old Guadalupe quicksilver mines at Santa Clara have been reopened and considerable work is being done there. It is reported that new deposits of ore have recently been found, and there are 75 men employed in getting it out. The ore now being worked is on the south side of the cañon, some distance from the main building. The mine had been closed for some time until recently.

The well known Tightner mine, near Alleghany, Sierra county, is making a wonderful record for very rich pockets. On one day a shot threw down about $15,000 worth of ore; the next day another shot gave $25,000 more; and on the following day still another single blast loosened ore carrying between $45,000 and $50,000 in gold. There have been a number of pockets found in the mine previously, but none so valuable as those recently found. The mine is near the boundary line between Sierra and Yuba counties.

The Helena Gold Mining Company, of Callahans, Siskiyou county, has been compelled to shut down for the present on account of lack of help and the impossibility of securing any. The same thing has happened in the case of the Lassen Company at Hayden Hill and in several other instances.

The Walker River Indian Reservation is to be thrown open to prospectors on Oct. 29 and many hundreds of men are awaiting the event on its borders. This reservation is in Esmeralda and Lyon counties in the western part of Nevada and contains upward of 600,000 acres of land. It has been known for many years that much valuable mineral territory would be available when the reservation became public land. It is now thought that many persons have secretly examined the region and know exactly where to make locations when they can do so publicly. This has aroused the animosity of others less fortunate and some little trouble is expected when the entering rush begins. The Indians on the reservation will not be permitted to locate any mineral land, allotment having already been made to them.

The magnesite deposit in Riverside county did not show so much mineral as expected. L. M. Johnson and C. L. Martin were assured of the truth of the assertion of W. S. Withers that the deposit on the Johnson ranch held 50,000 tons of magnesite, so they bought a two-thirds interest on a purchase price of $20,000. Johnson and Martin paid Withers $1000 down, June 19, and a deed conveying two-thirds of the ranch was placed by the latter in escrow in the State Bank and Trust Company, to be delivered to the buyers when they paid the balance of the purchase price. Since then, the plaintiffs allege, they have

discovered that instead of 50,000 tons the ranch will not yield more than 5000 tons of magnesite, and for that reason they ask the Superior Court to rescind the contract and order Withers to give them back their money. This is the mine which was heralded as the only magnesite deposit in the United States, those interested apparently not knowing of 20 or 30 deposits in the upper part of the State, several of which have been worked for years.

A fire at Keswick, the smelter town of the Mountain Copper Company, Shasta county, destroyed many buildings on Oct. 22. Most of the structures were uninsured and it is not probable that they will be rebuilt, unless the Mountain Copper people resume operations at the place.

The new smelter camp on the north bank of Pitt river, east of the mouth of the McCloud, Shasta county, has been named Heroult, in honor of the French metallurgist whose process of treating iron ore is to be tested by the 25-ton smelter to be erected at that point. The plans have all been drawn, but actual work on the smelting plant itself has not yet been commenced.

The strike of native silver at Cima, San Diego county, near the depot of the Los Angeles & Salt Lake road, was an accidental one as far as that metal was concerned, for the two men who found it were at work on what they believed to be a copper proposition. The excitement over silver has had an effect on Calico, in San Bernardino county, and many old abandoned claims have been re-located within the past few weeks. At one time, many years ago, this was a large and flourishing camp. Of late years the mines have all been closed down, though a few men have been "chloriding" in the old properties. The larger mines were patented and not open to relocation, but on numbers of smaller ones held by possession title only, no assessment work has been done for years.

A stampede has been started to the Avawatz mountains in San Bernardino county, by a recent gold strike, and some hundreds of prospectors have gone there, many of them not suitably prepared for the prevailing conditions in that region.

Some hundreds of prospectors are now camped and at work in the desert sections of Inyo, Riverside, San Bernardino, Kern and San Diego counties in this State. Recent strikes in different places have drawn these men to the desert regions. Some of them are grub-staked and others work on their own account. Two new railroads are partially completed through the desert sections, making available mineral lands hitherto of little or no value.

The Green Mountain copper mines in Mariposa county, near the Madera county line, have been bonded to the Guggenheims, who, it is announced, will do at once certain development work to prove the worth of the properties.

The Hercules Mining Company, of Burke, Idaho, has contracted with the Selby Smelting and Lead Company, of San Francisco, to ship all its ores except 200 tons monthly to the Selby works. The contract is for a period of seven years. The smelter is to receive $8 per ton for treating the ore and is to maintain a freight rate of $7 per ton from the mine to the works.

The Bonanza King Mining Company, of Trinity county, has its new 20-stamp mill ready to run, but the stamps have not yet begun to drop. It has, however, already decided to double the capacity of the plant and excavating for the additional stamps is being done. Between 250 and 300 men are at work in and about the mines. The aërial tramway and power-house have been completed.

Salt Lake City Oct. 27

The Utah & Eastern Copper Company, operating a mine and smelter in Washington county, Utah, is mining and treating about 40 tons of ore daily. The smelter is equipped with two furnaces, but only one of them is in operation at the present time. The output of this company has been somewhat handicapped this year owing to the heavy floods of last spring destroying roads. The mine is about 40 miles from Acoma, the nearest shipping point on the line of the San Pedro, Los Angeles & Salt Lake railroad. A traction engine is used over a distance of about 14 miles. C. H. Doolittle, Herald building, Salt Lake, is manager.

The directors elected at the late annual meeting of the Bingham & New Haven Mining Company have organized with L. E. Stoddard, president; E. B. Critchlow, vice-president; T. W. Farnham, secretary and treasurer; who, with F. F. Brewster and E. G. Stoddard, are directors. C. H. Doolittle is manager. The company is having some concentration tests conducted with the view of building a mill in the near future.

The Markham Gulch Milling Company has been organized and ground has been broken for the construction of a concentrating mill in Bingham which is to have capacity for treatment of 200 tons of ore per day from the Utah Apex and Utah Development companies' mines.

There is some talk of a consolidation being affected between the Standard Copper and the New England Gold and Copper companies in Bingham. However, nothing definite has been determined.

Late developments in the Eagle & Blue Bell mine in the Tintic district, one of the units of the Bingham Consolidated Mining and Smelting company, are said to be important. An orebody about 30 ft. in width has been opened on the 1000-ft. level. Thirteen cars of ore were shipped from this portion of the mine last week.

The Utah Copper Company has 600 men engaged in mill construction at Garfield. The installation of equipment in the first section is in progress and work on the second section of the building is well under way. Structural material has begun to arrive.

The Black Dolly Fireclay company has been organized here to develop a fireclay property near Pleasant Grove, Utah county. The organizers are Heber A. and Israel Cole, of Pleasant Grove, F. A. Cole, of Sandy, and Harry S. Harper, of Salt Lake.

The Colorado Mining Company has purchased the Success mining claim in the Tintic district. It is an adjoining property.

The management of the Cliff Mining Company, at Ophir, Utah, is making some concentration tests at the plant of the General Engineering Company, at Salt Lake, with the view of erecting a mill in the near future. The company also has a tramway under construction which will be about a mile in length, and will convey ore from the mine down to the town of Ophir.

The main line of the new Western Pacific Railroad, now building to the Pacific coast, will pass within about 30 miles of the Gold Hill mine in the Clifton district, Deep Creek. A branch line will be built to the Gold Hill, which is owned by the Western Utah Copper Company.

Denver Oct. 26

The Federal Government is evidently in earnest in the investigation of the Denver coal trust and of the coal-land frauds in the West. Elmer E. Thomas, of Omaha, attorney for the Interstate Commerce Commission, is at present here, Commissioner C. A. Prouty having returned to Washington. A large amount of evidence is being secured, and among the witnesses called by the Government was Chief Justice Cyrus Beard, of Wyoming. From present indications the Union Pacific Coal Company will lose a good deal of its land, especially in Sweetwater county, Wyoming.

A continuous fall of snow for three days has crippled the mining industry and other branches of business during the past week and the output for this month will consequently show a marked decrease. The roads in several districts are almost impassable, and in consequence of very cold weather a large number of air and steam pipes, besides water-supply pipes, froze. Further trouble was caused by a scarcity of coal, as such weather as we have just experienced is very rare here, and the winter supply of fuel has not been stored yet. The effect of the storm, which has been succeeded by melting weather, will also be serious on account of the seepage water flowing in many shafts.

In the Summit county placer-mining districts the operations up to last week were continued later into the season than usual, in consequence of the mild weather preceding the severe storm of the past few days.

A matte smelter of 60 tons daily capacity, costing in the neighborhood of $30,000, will be built by the Evergreen Gold and Copper Mining Company in Gilpin county, and work will be started at once so that operations may begin in the spring.

Scranton Oct. 29

Many breakers in the anthracite region were seriously damaged by the gale which, for a few moments, swept over the region on the night of Oct. 27. Four breakers are placed out of business. The Redham breaker, of the Jermyn company, at Old Forge, was destroyed, the machinery being thrown out of place, while the structure is wrecked. The Ontario breaker, of the Scranton Coal Company, at Peckville, is also a wreck, and must be rebuilt. The Exeter breaker, of the Lehigh Valley Coal Company, in Pittston, was also destroyed, and will have to be rebuilt. The Forty Fort breaker, of the Temple Iron Company, was damaged to the extent of about $2000, and operations must be suspended until repairs are made. Five stacks attached to the Cayuga breaker, of the Lackawanna Company, in Scranton, were blown down, while there was scarcely a breaker in the Lackawanna and Wyoming valleys, in an exposed position, which was not damaged more or less.

W. A. Lathrop, formerly of the Lehigh Coal Company, at present connected with the Webster Coal Company, will, it is said, succeed W. A. Reilly as president of the Lehigh Coal and Navigation Company.

The assessors of Shamokin and adjoining townships, in Schuylkill county, held a joint meeting, Oct. 26, and decided to make $200 per acre the minimum assessment on worked-out coal lands, and $500 per acre the minimum on unworked coal land.

At the next annual convention of mine workers, an effort is to be made to adopt a rule against the closing of the mines on the day of the funeral of a miner killed by accident. Last year 644 lives were lost in the anthracite coalfields, and the average loss of wages in each case due to the stoppage of work, as a mark of respect, was about $1500. It is proposed that in lieu of the stoppage that each miner donate one-half day's wages to the afflicted family, which would amount to about $750 to each family, on the average. The movement was started in the anthracite region.

London Oct. 20

It is not to be wondered at that the Rio Tinto Company has been able to pay a dividend at the rate of 100 per cent. per annum for the first six months of the current year. The dividends for the completed years 1904 and 1905 were at the rates of 70 and 80 per cent., respectively, and there is every prospect that the complete dividend for 1906 will be even higher than 100 per cent. Under the present control and management the dividend paid by Rio Tinto depends almost entirely on the market price of copper. As the price is not likely to fall, owing to the demand keeping well ahead of the supply, it is easy to predict the course of Rio Tintos. It is of interest to note that the shipments of sulphur ore are increasing to America and Germany, but decreasing to England. This is accounted for chiefly by the acquisition and development of other pyrites deposits in Spain, on the part of the United Alkali Company and other large consumers.

Another of the old cost-book companies in Cornwall is being turned into a limited company. This is the Wheal Kitty & Penhalls, Ltd., situated at St. Agnes. Wheal Kitty has been worked for 50 years and on the whole yielded profits, though it was never quite so well known as the West Kitty, adjoining. The Penhalls mine is less developed. About two years ago J. H. Collins settled once more in Cornwall, having faith that there were still some sunny days for his country. He acquired the two mines and worked on them privately with the idea of further investigating them and putting them in shape. The time has now come when he can definitely recommend the expenditure of a considerable sum on enlarging and deepening the main shaft, to open out the various lodes so as to permit of increasing the output, and to provide rock drills and other machinery. At the present time 1400 tons a month are being brought to surface and treated, and it is intended to double this output. In order to provide the money he has sold the property to a new limited company as mentioned, and his supporters are subscribing £20,000 for the purposes described. The average contents of the ore over a period of 50 years have run at 56 lb. of black tin per ton. Toward the latter end of the time the contents were not more than 33 lb. per ton, and it is not expected that these figures will be much exceeded, for the present at any rate.

At the beginning of the present year I mentioned the flotation of the Mitterberg Copper Company, which was formed to take over an old established copper property and smelter in the Austrian Tyrol. The English owners have now been in possession for over six months, and during this period the output of copper has been 55 metric tons per month, working with the old smelter. A new smelter will be in operation by the new year, capable of producing 200 tons per month. The proved and probable ore is estimated at 850,000 tons containing just under 3 per cent. copper and "possible ore" is also a valuable asset. At the time of flotation, arrangements were made with the bank connected with the former local owners to guarantee £40,000 in debentures; but the profits earned by the smelter have been sufficient to pay most of the contemplated expenses, and hardly any of these debentures have been issued. The company is, therefore, in a very satisfactory position.

The Caucasus Copper Company is getting on slowly with the construction of its 500-ton magnetic concentrating plant. The chief cause of delay has been the impossibility of obtaining supplies of structural material and machinery in Russia, due to the industrial strikes everywhere. In fact, most of the material has had to be obtained from England, and to add to the worry and expense the company has had to pay a heavy import duty on it. It is hoped that the plant, or at least part of it, will be ready by January, and the complete plant should not be delayed longer than March. In the meantime, the debt of the company is piling up. In addition to £500,000 in ordinary shares, there are loans of a mortgage nature amounting to £367,000, and another £100,000 is being borrowed to provide further supplies of cash. It is not unlikely that additional capital will be required later on, but that remains to be seen. The orebodies have been exposed, and large quantities are ready for stoping, and the company already owns smelters. The question is how the magnetic concentration of the copper ores will work out in practice. The results of the first few months' work will be awaited by metallurgists with great interest.

Johannesburg Sept. 24

The prolonged dry season has at last been broken. There was a heavy rain in Johannesburg last week, and the dams of the Central Rand were much benefited by the water. On the East Rand also good rains have fallen, but on the West Rand no rains have yet come. It is curious how local the rainfall in this country is. There are spots here and there which the rain seems to pass over.

Several of the smaller mines have been buying water for some months past. There are one or two huge dams on the Rand, which are able to supply many of the mines, when the smaller dams run dry. Buying water is a heavy item with the smaller mines. One property, making a profit of about £4500 per month, has been paying £400 monthly for water during the dry season.

The idea of amalgamation seems to be spreading. The latest scheme is the consolidation of the four deep levels, south of the Simmer & Jack Proprietary—namely, the South Rose Deep, South Geldenhuis Deep, Rand Victoria Mines and Rand Victoria East—into one large company. H. H. Webb, consulting engineer for the Consolidated Gold Fields, recommends that the new company start off with a 400-stamp mill, and gradually work up to 600 stamps. This is one of the biggest amalgamation schemes yet undertaken on the Rand. At a special general meeting of shareholders to be held Nov. 16, the proposition will be discussed.

General Mining News

ARIZONA

PIMA COUNTY

Omega Copper Company—President L. Zeckendorf informs us that this company is now on the producing list, and is making daily shipments of ore to the Helvetia and El Paso smelters.

YAVAPAI COUNTY

Prescott—A large amount of ore is now being shipped from this point to Phœnix to be exhibited at the Territorial Fair to be held there next month; a very good display of this county's mineral resources will be made there.

Arizona Smelting Company—This company, at Humboldt, has given out the information that it will add another blast furnace to its present equipment, as its present capacity is too small to handle the ore that at present is being shipped to its plant. The output of this company for the month of October will be over 600,000 lb. of copper, and it is estimated that in November 1,000,000 lb. will be reached.

Yaeger Cañon Copper Company—This company, of Prescott, owns the Yaeger mine in the Black Hills district, four miles southwest from Jerome. Its workings have now attained a depth of 1200 ft. on the incline, and a vertical depth of about 800 ft. No ore of any value was encountered in the upper workings, but as depth was gained the orebodies improved in both quantity and quality. In the lowest working there is at present 5 ft. of solid chalcocite, besides several feet of milling ore of a good grade. The development of this mine has proven conclusively that orebodies exist on the west slope of the hills, but that they lie much deeper than on the Jerome side.

ARKANSAS

LOGAN COUNTY

Spot Cash—This coal mine, near Paris, has been sold by Johns Brothers to the Wichita Coal and Material Company, of Wichita, Kan. That company proposes extending the workings and increasing the output.

CALIFORNIA

AMADOR COUNTY

Bunker Hill Mining Company—This company at Amador City has declared its first dividend, the amount being 2c. per share. The new hoisting works designed will not be put up until next spring.

Lucas—For this mine (formerly the Tripp) an air compressor has been provided to run machine drills. F. C. Hammond is manager.

BUTTE COUNTY

Golden Bonanza—The company operating this mine near Merrimac will build a new mill in the spring.

CALAVERAS COUNTY

Easzy Bird—Large quantities of sulphurets from this mine at Mokelumne hill are being shipped to the Selby smelter at the bay shore. The sulphurets carry from $50 to $60 per ton in gold. Twenty stamps are to be added to the present 10-stamp mill of the Outlook Mining Company.

Benson Mining Company—At this mine, near Angels, a wide vein of $16 rock was recently discovered at the end of a 100-ft. crosscut from the main shaft.

INYO COUNTY

Slate Mountain Gold Mining Company—This company has started a gang of men developing its group of claims in Death valley, under Superintendent Geo. W. Shepi.

HUMBOLDT COUNTY

Fernlead—F. H. Elder has made in the East satisfactory arrangements for the developments of this property at Orleans Bar.

LOS ANGELES COUNTY

Big Horn—E. E. Fenner, owner of this property at Shoemaker, recently closed down work, expecting a Chicago company to take possession. They did not come to time, however, and the old force of men has gone to work again on the mine.

MARIPOSA COUNTY

Warnock—Maine & Henderson, who are working this claim at Arkansaw Flat, took from a pocket last week $500, and $1300 this week.

MONO COUNTY

Masonic District—Outside capital is investing in some of the good properties of this district, and with the completion of good roads much is expected from the mining.

MONTEREY COUNTY

Beach Mining—The ocean beach below Watsonville, on Monterey bay, is being mined by C. A. Peer and others who have put in a newly invented machine of 15 tons daily capacity, operated by water obtained by pumping from a well to a large tank. A 5-h.p. electrical engine runs a centrifugal pump to supply the water.

NEVADA COUNTY

Rosa—C. L. Crane has a crew of men at work on this mine near Sweetland. Several shafts are being sunk on a wide ledge.

Phelan Shady Creek Mine—At this gravel mine, work has been suspended for a season, after satisfactory results. The mine has been operated by a hydraulic lift.

Sultana Mining Company—The new 20-stamp mill of this mine is ready for operation. Ore is being hoisted from the Prescott Hill shaft, and rock will be hauled to the mill from the Orleans and Green Mountain mines.

PLACER COUNTY

Imperial—This company is now working 100 men. It also owns the Eagle Bar and has recently purchased the Little American from Geo. McAuly; Wm. Duffy is superintendent.

PLUMAS COUNTY

Eclipse—This mine, near Pilot Peak, has been bought by men who will fit it up for operation at once. It is a hydraulic mine and two giants will be used. It is on Poormans creek, which in early days paid very handsomely. The purchasers are H. Stanisluski, of the Yale hydraulic mine, B. C., and W. W. Olds of Olinghouse, Nevada.

SAN BERNARDINO COUNTY

Ivanpah Mammoth Mining Company—The shaft in which the men are now at work is now 100 ft. deep. The vein matter is 8 ft. wide, of which 6 ft. is ore.

SAN DIEGO COUNTY

Silver—Native silver has been found at Cima Station, on the San Pedro, Los Angeles & Salt Lake Railroad, and considerable excitement has ensued in the locality.

SHASTA COUNTY

Quartz Hill—This mine, in Buckeye district, A. C. Halter, manager, is to be opened on a large scale, the fluxing ore being needed at the Mammoth smelter.

Copper—A new copper district is being established near Whiskeytown, a short distance from Stella on the Redding & Weaverville stage road. A large orebody has been discovered.

SISKIYOU COUNTY

Overton—A fine body of high-grade ore is being developed in this group at Russian creek. It was found in the lower tunnels.

McKinley—This group on Humbug creek, 12 miles from Yreka, is to be reopened by Milwaukee capitalists. A. L. Hayes is in charge.

TRINITY COUNTY

Fairview—Ore has been struck in the lower tunnel of this mine near Minersville. Chas. Doebler is superintendent and has 20 men at work.

Golden Jubilee—A new and larger plant is to be built for this property at Coffee. A new body of ore was uncovered this summer.

Globe—At this mine, Dedrick, five tunnels have been run, opening a large orebody. There are 27 claims in the group owned by the company. Robt. A. Skinner is superintendent.

COLORADO

LAKE COUNTY—LEADVILLE

Thatcher—This district, Ball mountain, head of California gulch, has received considerable attention during the summer, with the result that several properties have become shippers. The last one to be added to the list is the Thatcher, situated 600 ft. south of the Mountain Lion and double

that distance from the Sunday. The property is under lease to John Dwyer and associates, who sunk the shaft a little over 100 ft., started drifting to the north and, after driving 100 ft. from the shaft, encountered a vein of ore 7 ft. wide running high in lead. Dwyer states that he is not in a position at present to give out the exact values, but says that the ore is similar to that found in the Sunday and the values about the same. The vein is well defined and inclosed within good walls.

Weldon—This property, lower Carbonate hill, after being closed down for a number of years on account of disagreement between the owners as to how it should be worked, will resume soon, all differences having been settled. The property has a record of having shipped heavily of a good grade of ore taken from the first contact, and in this part of the mine ore still remains. With the opening of the large body of ore in the Coronado and Penrose in the lower zone, the owners of the Weldon will sink to the sulphide zone with the hope of catching the Penrose shoot, as it trends in that direction.

Coronado—The result of the drill work and work by hand from the drift connecting the Penrose and Coronado has opened a large body of sulphides to the west of the fault in the neighborhood of East Seventh street. The Coronado oreshoot in the lower contact was opened to the east of the fault, and it is the general opinion that the new oreshoot to the west is a continuation of the one to the east. The vein dips rapidly to the west, proving that nearly all of the large bodies in the lower zone in the down-town section continue toward the Arkansas river. The extent of the new find is not given out officially, nor will it be until the ground is thoroughly opened. After being closed down for two weeks to repair machinery and the shaft, the Coronado has resumed work with a full force of men, and is outputting in the neighborhood of 350 tons daily.

Twin Lakes District—The Sunnyside, situated in Golden gulch, Mt. Elbert, and claimed to be the extension of the Gordon-Tiger, during the week opened a good body of ore in the lower tunnel. The tunnel has been driven 390 ft. and at the 150-ft. mark a vein from 18 to 60 in. wide and averaging well was opened; at the 390-ft. mark another body was opened that gave good returns. At this point a crosscut drift was started to penetrate a large porphyry dike and when the opposite side of the dike was reached, a body of ore 4 ft. wide was disclosed; in this vein there is a streak 9 in. wide carrying high values in gold. Work will be continued on the property during the winter.

Evening Star—Pearl Brothers have secured a lease on No. 5 shaft of this property, Carbonate hill, and are engaged in cleaning it out and doing necessary repair work. When this is completed the breaking of manganese ore will start and the product will be sent to the steel works at Pueblo. The upper Waterloo shaft, belonging to the same company, is employing 20 men and shipping 50 tons daily of a good grade of argentiferous iron.

Badger Shaft—This shaft of the Triangle Mining Company, Adelaide Park, is encountering some difficulty in unwatering. When the last 100 ft. were reached it was found that the shaft was full of old timbers and to such an extent that they jammed, making it impossible to get the water column down. An attempt was made to break the jam by blasting it, but this complicated matters instead of relieving the situation. Other methods will be adopted to get the water column down to the bottom so that the pumps can resume work.

Wolcott Dump—James Heffernan has secured a lease on the dump from the Midas Mining Company, down-town section, and has started with a force of men to sort the dump over. When the property was last worked, several years ago, considerable ore was thrown over the dump as not being of high enough grade to stand the treatment charge. With the present price of silver and the reduction of the smelting charges the greater portion of the dump will be made to pay. A considerable portion of the dump will be sent to a mill and concentrated.

SUMMIT COUNTY

Swan River Placer—The consummation of this deal will mean much to the county in general and to Breckenridge in particular. This deal was started by Ben Stanley Revett, who placed an option on the old American Placer Company's holdings with a syndicate of New York and London capitalists. For five months, three drilling machines have been constantly employed in systematically testing the ground, the work being carried on under the supervision of Mr. Tuttle, a California placer mine operator, at a cost of something near $30,000. J. Parke Channing, of New York, then came out and having spent sufficient time on the property to make a thorough examination of the ground and investigate the results of the drilling tests, sent in his report, on the strength of which the option has been lifted. It is proposed to work this tract with four dredges similar in construction to that which is now being worked by Mr. Revett in French gulch. It is reported that two new drilling machines will be ordered and drills at once put to work on the Lambing placer property near the two-mile bridge below Breckenridge, and if this ground proves nearly as good as it is reported to be, this property will be consolidated with the Swan River Placer.

IDAHO

SHOSHONE COUNTY

Success—At this mine the plant for separating zinc ore was recently started up. The work will be experimental for some time; it is expected that the finished product will range between 42 and 46 per cent. When the mill has been fully tested and settles down to regular work, the capacity will be about 400 tons a month.

ILLINOIS

SAINT CLAIR COUNTY

Dutch Hill—This coal mine at New Athens has been sold to W. H. Howey, of St. Louis. The property includes 280 acres of land. The mine is to be enlarged to a capacity of 600 tons a day. At present it is producing about 200 tons daily.

INDIANA

VIGO COUNTY

Resher Coal Mining Company—This company has incorporated with headquarters in Terre Haute. The company proposes to do a general coal-mining business in Indiana. Jno. H., J. C., and Wm. W. Resher are directors.

PIKE COUNTY

Central Indiana Coal Mining Company—This company has filed articles of incorporation with a capital of $50,000. It has secured a large tract of coal land near Muren and will sink several shafts at once. The company's offices will be in Muren. L. N. and J. C. Muren and W. P. Schlegel are directors.

SULLIVAN COUNTY

A. H. Whilsett Coal Mining Company—This company has incorporated to open up coal mines near Shelburn. The home office will be in Shelburn. A. H. White, R. C. Whilsett and W. H. Ford are directors.

KENTUCKY

It is reported that J. W. Camden has completed negotiations for the sale of over 350,000 acres of land in Eastern Kentucky to a syndicate represented by A. B. Chisholm, of Duluth, Minn. A large part of the land is within the boundaries of the Elk Horn coal field.

KNOTT COUNTY

A tract of 4000 acres has been sold to George Warren, of Franklin, Ohio, who is making arrangements to open a mine.

MICHIGAN

HOUGHTON COUNTY—COPPER

Arcadian—Engineer Herman Fesing is now engaged in surveying lines from the most recent disclosures of the Kearsarge amygdaloid bed on the Caldwell, Rhode Island, Tecumseh and Franklin Junior properties, to ascertain the approximate strike of the lode across the Arcadian. Some years ago the Arcadian conducted extensive diamond-drill explorations, but when work was discontinued 1200 ft. of ground remained unexplored. Robert Shields, Hancock, Mich., is superintendent.

Centennial—Production will show a considerable increase this month as a better grade of rock is being forwarded to the stamp mill, and shipments have been enlarged since the extra head went into commission. The bottom levels north from No. 1 shaft are exceptionally rich in copper.

Osceola Consolidated—After the shafts had been sealed one week, the fire in the North Kearsarge branch was extinguished, and work has been progressing normally in No. 3 shaft since. Additional forces will be employed and every effort made to make up the shortage in output occasioned by the shutdown. The damage in No. 1 shaft, in which the fire occurred, is being repaired. The two lower levels in both Nos. 1 and 3 shafts have concrete stringers for skiproads, and concrete was being introduced as extensively as possible before the fire. But there was a great deal of filling necessary in some of the old workings through which No. 1 shaft was sunk, and even if the wooden stringers were all burned, wood will have to be put in again to a considerable extent, because the filled rock has not had time to settle solidly enough to provide a proper bedding for the concrete.

Tamarack—After several months' delay it is now possible to work without difficulty in No. 2 shaft, which was closed down last January because of a fire underground. The ground in the vicinity of No. 2 shaft is subject to enormous strain, caused by extensive undermining, and this has thrown the shaft out of plumb. When the shaft was closed two years ago for re-timbering, special provisions to remedy the crushing were provided by having the shaft in the rock extra large, while a timber shaft is constructed inside of this and is held by means of lateral braces. As the ground moves, these bracings are adjusted to keep the timber shaft straight. No. 1 shaft is still idle. It is unsafe to send men underground, as the fire still lingers there, so that gas and smoke are thick. The shaft itself is separated from the zone of the fire by long crosscuts which are not timbered, and therefore it is impossible for the fire to reach it.

KEWEENAW COUNTY—COPPER

Allouez—Sinking in No. 1 shaft has been resumed below the seventh level and the lode continues to carry excellent copper values. The bottom levels of No. 1 shaft are opening good ground and production this month will reflect the improvement. Since the extra head at the Centennial mill went into commission the Allouez has been steadily increasing its rock shipments and this month's production will be considerably larger than September's. Captain James Chynoweth is superintendent, address Calumet, Michigan.

ONTONAGON COUNTY—COPPER

Chicago, Milwaukee & St. Paul Railroad—Work on the extension southwest from Ontonagon is retarded by scarcity of labor, 500 men being needed by the contractors. It is expected, nevertheless, that the line will be completed before severe winter weather sets in.

MISSOURI

JASPER COUNTY

Chew & Co.—Tom Chew and associates, owners of a lease on 40 acres of the Harper land, northwest of Joplin, have their shaft down 150 ft., and are installing a larger derrick, boiler, pump and steam hoist, and within a few weeks will begin making regular turn-ins. The first prospect work done on the land was about a year ago, when Chew & Co. put down three drill holes and found ore in each of them. The St. Paul Mining Company, owning a lease adjoining the Chew lease put down three drill holes and also found ore in all of them, and at the same level. Other drill holes have been put down, and much development work done, which shows the entire 40 acres to be pretty thoroughly mineralized. Both companies' headquarters are in Joplin.

Granby Mining and Smelting Company—This company, the largest owner of mining leases in this district, instructed its local representative, Mr. Stephens, to throw open a large tract of land owned by it just north of North Heights, in the city of Joplin, to prospectors at a royalty of 10 per cent. on both lead and zinc ores. The general rule of leasing in this district here tofore has been at a royalty of 20 to 25 per cent. on zinc ore, and from 30 to 50 per cent. on lead ore. The throwing open of this tract of land by the Granby at so low a royalty will cause great activity in that locality. The land in question was mined for shallow lead about 25 years ago, when lead was selling at $6 to $10 per thousand.

Sucker Flat—Colonel O'Neill, of Webb city, who recently secured a lease on what is known as the old Sucker Flat lease, in the south limits of Webb City, is installing two 12-inch pumps. This lease was thoroughly mined at a shallow depth several years ago, but it will now be drained, and a lower run of ore will be looked for.

Thomas C. Mining Company—This company, with offices in Joplin, which recently became interested in a lease on the Four Hundred Prospecting Company's lease of the Schifferdecker land, situated southeast of Duenweg, has completed a shaft and is now taking out ore. This lease was drilled some time ago, as were several others on this same land, and good run-of-ore was discovered by nearly all of the different companies. The Thomas C. is the first one to get its shaft down to the ore. This is new land, and in a new mining district, and supports the belief that the great orebody underlying Jasper county extends through to Granby, in Newton county, about 25 miles southeast. The development work at the mine is under the supervision of John Malang, of Joplin.

MONTANA

BUTTE DISTRICT

An official of one of the large copper producing companies of Butte has figured out the prospective copper production in the Butte district for 1906. He estimates the total at a little less than 300,000,000 lb., dividing it as follows: Amalgamated plants, in which is treated North Butte, Red Metal, La France Copper, Pittsburg & Montana and the ores of smaller companies in Butte, together with ores from outside points, 280,000,000 lb.; Original or Clark, 15,000,000 lb. This estimate is based upon the output to date. During the first six months of the year the production through the Washoe and Great Falls plants aggregated about 139,244,000 lb., and that of Original about 7,000,000 lb. During August the Original made 1,342,600 lb. and in September 1,161,000 lb. During September four of the large ore producers in the district were closed, which reduced the output fully 51,000 tons.

Anaconda—Neversweat, a large producer of the Anaconda, is closed on account of the breaking of the main shaft of the hoisting engine, the result of settling ground. The company expects to resume ore extraction about Nov. 4. All other mines of Anaconda are in operation. Mountain Consolidated and Clear Grit, worked jointly, are giving up 600 tons of ore a day. Both were closed during September and part of this month.

Boston & Montana—This company will begin sinking a 2000-ft. shaft on the Badger State claim about Nov. 1. Through this opening it will develop the Badger State and Auraria, which adjoin claims owned by North Butte. The company expects to begin using its new four-compartment shaft on the Leonard shortly.

Butte & Bacorn—Development work is progressing rapidly, two of the three shafts having attained a depth of more than 400 ft. This company is financed by Pittsburg men, who placed in the treasury $400,000 with which to pay for the ground and carry on development. To this has been added considerable money from the sale of stock to outsiders. The country will be crosscut at a depth of 500 ft. in one shaft and 600 in another. The property is managed by Fred W. Bacorn, whose office is in the Silver Bow block, Butte. If copper ore is struck, each shaft will be equipped with larger machinery.

Davis-Daly Estates Mining Company—This company, with offices at 110 N. Wyoming street, Butte, and C. H. Palmer, manager, is working in five places, at three of which it is sinking shafts, unwatering an old shaft at another and driving a long crosscut at the other. The latter is going south from the 1800-ft. station of the Original mine. The face

is in about 800 ft. No ore has been extracted from any of the openings.

North Butte—This company is sinking its main shaft from the 1600 to the 1800, and when the work is finished it will crosscut the Jessie and Edith May veins north, eventually extending the opening through the Berlin group. The output from the 1600 and intermediate levels is between 1000 and 1100 tons a day. The company has exposed an immense tonnage in both veins, the aggregate length of stoping ground being about 6000 ft. A crosscut is heading for Berlin ground, where the company expects to open another commercial vein. Its skip chutes on the 1600 will not be finished until November.

NEVADA

ESMERALDA COUNTY—GOLDFIELD

Piute Reservation—The Walker Lake reservation will be thrown open to the public, Oct. 29. It is estimated that upward of 4000 prospectors are now camped upon the borders of this territory waiting for the opening at noon of the 29th. The hills around Walker lake are known to be rich in gold, silver and copper ledges, and it is believed valuable mines will now be discovered. The reservation contains upward of 600,000 acres. Each Indian buck will be allotted 20 acres of the choicest agricultural land, $250 in money, and farming implements. The Indians will not be allowed to take up any of the mineral land.

Hayes-Monnette—A phenomenal shipment was made this week from the Mohawk mine, at Goldfield, when one carload of ore valued at $1,000,000 was sent to the smelters from the Hayes-Monnette lease. The car had a capacity of 50 tons, which means an average value of $10 to the pound.

Frances-Mohawk—This lease has been averaging 150 tons of ore per day during the past week. The new 50-h.p. hoist has not yet arrived, but is being shipped into camp by express at 12c. per lb. In the meantime the drift is being extended to the 280-ft. level on the shoot to connect with the winze which has been sunk from the level above.

Mohawk—All the old leases on this property are now shipping heavily, and the later ones are cutting into the best of ore, and are installing the most modern machinery. At present $120,000 worth of ore is being shipped from this mine every day. As most of the leases will expire on Jan. 1, 1907, the company is making extensive preparations to mine the property when they obtain possession. They are now putting down the biggest shaft in the district. Connections have been made with several of the workings of the leasing companies, and the shaft is being pushed to a depth of 500 ft. Stations and drifts will be run every 100 feet.

Silver Pick—At present, six leases are being operated on this ground at Goldfield, and all of them are striving to attain the depth where they believe they will encounter the rich leads of the adjoining Mohawk. On some of the leases this week black sulphides and free gold were evident.

Florence—Two leases have recently broken into ore on the Florence ground, that seems to be of the same character and grade as the famous Reilly ore. Ore has been opened in a dozen places on the Lindsay lease, and in one stope there is a 6-ft. vein that averages $1044 clear across. Preparations are being made to sink to the 375-ft. level, and a large electric hoist will be installed immediately.

LYON COUNTY

Nevada-Rockland—This company has ordered two centripact screens from the Traylor Engineering Company, New York, for its mill at Wabuska.

WHITE PINE COUNTY

Giroux Consolidated Mines Company—This company has closed a contract with the Traylor Engineering Company for the erection complete of a 500-ton concentrating plant to be built on a rush order for the mines at Ely. This plant is only the first unit of what is contemplated. Other units of similar size will be added as rapidly as their construction can be provided for until the company has in constant operation a plant capable of handling 6000 tons of ore per day. The mines have been so far developed that their ability to keep a mill of this capacity supplied with ore is certain. The ore is well adapted to concentration. It carries an average of 3 per cent. copper with gold and silver values of $2 a ton. It concentrates at a rate of about 10 or 12 tons into one. In addition to this concentrating plant, the Traylor Engineering Company has recently completed for the Giroux company a 250-ton copper-matting plant which is now ready for operation and only awaiting the completion of the railroad to the mines to be put into commission. The track is already laid, and the road will soon be open for business.

NEW MEXICO

SIERRA COUNTY

Victoria Chief Copper Mining Company—This company, at Engle, has ordered of the Traylor Enginering Company, New York, a complete drilling plant, consisting of a 10x10-in. compressor, a 32-h.p. gasolene engine, three drills, two tunnel columns, and all the necessary tools and accessories.

OREGON

LANE COUNTY—BOHEMIA DISTRICT

Combination—Clarke & Hopkins, who have a bond on this mine, are putting in a saw mill. The first work after the mining cabins and mill house are provided for will be cutting lumber for a flume and a waste weir. The people have some good ore blocked out in this mine.

Vesuvius—Manager F. J. Hard is getting the mill in shape for a steady winter's run. Much free-milling ore has been blocked out, and is ready for the mill. The Vesuvius mill is a modern 10-stamp, and in good running order. Mr. Hard also has a complete electric-lighting plant at the mine.

Hiawatha—Steady development work is in progress at this mine, and A. Johnson, the superintendent, is getting ready for winter.

North Fairview—Work is being done under the superintendent, Holderman, and the mine has put in a good winter force of men.

Le Roy—The stockholders of this company held the annual meeting in Cottage Grove, Oct. 11. The old board of directors were re-elected: J. L. Le Roy, Dr. L. W. Brown, C. O. Tobey, W. A. Wann, R. M. Veatch and Henry Veatch. The board elected J. L. Le Roy. president; R. M. Veatch, vice-president; Henry Veatch, secretary and treasurer. A new contract has been made for a long tunnel, which will tap the large ledge at considerable depth.

Bohemia Mine Owners' Association—The third annual meeting of the association was held Oct. 12, at Bohemia. The following officers were elected for the ensuing year: Geo. O. Knowles, president; Warren B. Hartley, vice-president; Frank McIntyre, secretary; Godfrey Graber, treasurer. The following board of directors was elected: W. H. Shane, Frank Flusher, J. S. Brund, Chas. Gettys and A. P. Churchill.

PENNSYLVANIA

ANTHRACITE COAL

Delaware, Lackawanna & Western—After a search of two months a diamond-drill bit has been found in the Brisbin mine of the Lackawanna Company. The drill was being used in boring through a solid wall of coal into an adjoining vein, when it became detached and fell through a crevice in the workings. Six men have been at work for two months searching for it. The bit was valued at $1000.

Lehigh & Wilkes-Barre Coal Company—At the Hollenback shaft, of this company in Wilkes-Barre, 647 cars of coal were hoisted in nine hours, breaking all previous records at this shaft. Each car weighs 3½ tons, and the shaft is 1117 ft. deep.

Plymouth Coal Company—Operations have been suspended at No. 12 colliery, of the Plymouth Coal Company, in Plymouth, Penn., so that improvements may be made to the breaker. Two pockets are to be built.

BITUMINOUS COAL

By an explosion in the mine of the Cambria Steel Company at Johnstown, Oct. 24, seven men are reported dead and two painfully burned. The explosion is thought to have been caused by the igni-

tion of gas in setting off a blast. Most of the victims are foreigners. The explosion took place in heading No. 29, a considerable distance from the ill-fated Klondike section, where 114 men lost their lives over four years ago. All the men when found had their safety lamps in proper trim, showing that the accident could not have been caused by neglect in that direction. No damage was done to the workings and the mine was running as usual on the following day.

Pittsburg Coal Company—This company's statement for the nine months ended Sept. 30 shows production as below, in short tons:

	1905.	1906.	Changes.
Coal mined.....	10,281,500	13,439,639	I. 3,158,139
Coke made.....	241,578	318,828	I. 77,250

The income account this year shows earnings of $3,714,409, an increase of $1,394,101, or 60.1 per cent., over last year. Charges were: Depletion of coal lands, $557,465; depreciation of plant and equipment, $871,545; interest on bonds, $878,792; total, $2,307,802. This leaves a surplus of $1,408,607 for the nine months.

Somerset Coal Company—This company has begun work on the opening of the Jenner coalfield near Boswell, in Somerset county. Contracts have been awarded for the engines for the central power plant, which will be located at Boswell. Two mines are to be operated, but the power for both will be supplied from one station. The operations will be extended later so as to provide for five shafts, and the present plans are drawn with a view to increasing the size of the power plant and accessories as occasion demands. The Somerset Coal Company is controlled by the Consolidation Coal Company.

TEXAS

BURNETT COUNTY

An examination has been made of the marble deposit on the Bolmes place, near the town of Burnett, by Dr. Wm. B. Phillips. The marble is of fine quality and well situated for working. Arrangements will be made to open a quarry.

WEST VIRGINIA

A Cleveland, Ohio, syndicate, represented by F. M. Osborn and J. R. Nutt, has purchased a tract of about 28,000 acres in Raleigh and Wyoming counties, and is making arrangements to open at least one mine. The land can be connected by short branches with the Chesapeake & Ohio, and also with the new Deepwater & Tidewater road.

HARRISON COUNTY

A sale of 4000 acres of coal land belonging to the Jackson estate has been made to C. T. Conaway, of Fairmont, W. Va. The land is not far from the Baltimore & Ohio road, and is said to be the last body of coal lands in that section which has not been secured by some mining interest.

TUCKER COUNTY

A part of the Blackwater Manor tract, about 500 acres, has been sold to an Eastern syndicate, represented by Mr. Douglas. The purchasers are making arrangements to open a coal mine at an early date.

Foreign Mining News

CANADA

BRITISH COLUMBIA—VANCOUVER ISLAND

Tyee Copper Company—This company reports that its smelter, at Duncans station, ran 14 days in September, and treated 1892 tons of Tyee ore, giving a return, after deducting freight and treatment charges, of $29,082; an average of $15.37 per ton.

ONTARIO—COBALT DISTRICT

Right-of-Way—A force of 15 men is at work, and five veins have been located, including the two opposite La Rose, which were in dispute between that company and the Government. Underneath these, at a depth of 20 ft., a new vein has been discovered, carrying free silver; it has been followed for 75 feet. Another vein adjoins the Silver Queen location.

Coal Trade Review

NEW YORK, Oct. 31

The coal trade in the East continues quiet and uneventful. Continued mild weather keeps the anthracite trade quiet, so far as domestic trade is concerned. The demand for steam sizes of anthracite is improving. This is also apparent in the bituminous market, steam coal selling well. The coastwise trade is hampered by short supply of vessels and by stormy weather.

In the West the transportation question is serious. Delays on the railroads, short and irregular supply of cars are the rule. Many mines are able to work only part time, and all are suffering to some extent. There is no present prospect of any improvement in conditions.

COAL TRAFFIC NOTES

Shipments of coal and coke originating on the Pennsylvania Railroad Company's lines east of Pittsburg for the year to Oct. 20 were as follows, in short tons:

	1905.	1906.	Changes.
Anthracite.....	3,647,170	3,518 659	D. 128,511
Bituminous.....	23,619 364	25.542 786	I. 1,923 422
Coke.....	8,847,101	10,114,8 2	I 1,267,721
Total.....	36,113,635	39,176.267	I. 3,062,632

The total increase was 8.5 per cent. The traffic this year shows an average of 133,707 tons a day. Bituminous coal furnished 65.2 per cent. of the total; coke, 25.8; anthracite, 9 per cent.

Coal receipts at St. Louis, as reported by the St. Louis Coal Traffic Association, for the eight months ending Aug. 31 were 3,596,780 tons in 1905, and 4,695,870 tons in 1906; an increase of 1,099,090 tons, or 30.6 per cent., this year.

Shipments of Broad Top coal over the Huntingdon & Broad Top Railroad for the week ending Oct. 20 were 19,268 tons; for the year to Oct. 20 they were 622,377 tons.

Shipments of Nova Scotia coal, by companies, for the nine months ending Sept. 30 are reported as below:

	1905.	1906.	Changes.
Dominion Coal....	2,123,157	2,426,474	I. 303,317
N. S. Steel.....	372,099	480,141	I. 108,042
Cumberland	294,730	212,491	D. 82,239
Acadia	189,084	191,268	I. 2,184
Inverness	94 702	140,070	I. 45,368
Intercolonial	139,419	209,946	I. 70,527
Total.....	3,213,191	3,660.390	I. 447,199

The total increase this year was 13.9 per cent. Only one company showed a loss in tonnage.

Shipments of coal by water from the chief Atlantic ports are given by the Bureau of Statistics as below, for the eight months ending Aug. 31:

	Anthracite.	Bituminous.	Total.
New York.....	8,892,636	6,551,687	15,444,323
Philadelphia...	1,136 630	2,482,872	3,619,502
Baltimore.....	146,350	2,110,654	2,257,004
Newport News..	..... .	1,941,575	1,941,575
Norfolk	.....	1,551,688	1,551,688
Total.....	10,175,616	14,638,476	24,814,092
Total, 1905....	11 230,250	13,432 096	24,662,346

New York includes all the New York harbor shipping points.

New York Oct. 31

ANTHRACITE

The anthracite market has not yet attained any strong basis, and probably will not do so until permanent cold weather. Demand is fair, and with this, on account of shortage of cars, many companies find that they have all they can do to keep up. The small sizes are particularly active, but their price has not yet been affected. Broken coal shows the strongest inquiry, but egg and stove are also in strong demand. A recent storm in the anthracite district destroyed a number of washeries, so that the output of this kind of coal is slightly restricted.

Prices remain at $4.75 for broken and $5 for egg, stove and chestnut; for steam sizes, $2.80@3 for pea; $2.25@2.50 for buckwheat; $1.45@1.50 for rice; $1.30@1.35 for barley; all f.o.b. New York harbor shipping points.

BITUMINOUS

There is slightly more activity in the Atlantic seaboard bituminous trade, but this is largely attributable to the shortage of cars, which has made full coal shipments impossible. The feature of last week has been the scarcity of vessels for coastwise shipments, caused by the high winds that have prevailed for the last two weeks. At present there are accumulations of coal at all shipping ports on account of this lack of boats; these accumulations, on the other hand, have still further reduced the available supply of cars, so that the supply of coal coming forward is correspondingly curtailed.

The Far East is taking on more coal than previously, although this is hampered by the same lack of boats; all balances

now remaining on shoal-water contracts will have to pay freights well in advance of the usual ones. The Sound shows a strong demand although the supply in this district is reported plentiful. Trade in New York harbor is quiet and prices remain unchanged, at $2.60@2.70 for good grades of steam coal down to $2.30@2.40 for gas slack, f.o.b. New York harbor shipping points.

Transportation from mines to tide is fairly good, but cars are rarely supplied in excess of one-half the requirements. Rates on coastwise transportation have advanced by about 5c. per ton and are now quoted at: Philadelphia to Boston, Salem and Portland, 70@75c.; to the Sound, 60c.; to Lynn, 85c.; Newburyport, 90c.; to Portsmouth, 75@80c.; to Bangor 85@90c.; and to Gardiner, 90@95c.; and towages.

Birmingham Oct. 29

The only interruption in the coal production in this State is the railroad car shortage. Large consumers are sending representatives to the district to look after prompt shipments of their coal. The orders on hand or in sight warrant the assertion that the mines will be kept busy for many months to come. The labor situation is but little improved over a month ago. Foreigners are still being brought to the district and being put to work in the coal mines.

Coke is not at all plentiful and prices are strong. The demand will keep up just as long as the iron market is as strong as it is at present.

Chicago Oct. 29

In general terms the local wholesale coal market may be said to be improving steadily. The demand for Western bituminous, the great source of supply for industrial purposes, is increasing with the coming of cool weather, and the car shortage prevents the serious slumps in the market that occurred periodically previous to the shortage. Supplies, however, are plentiful and for some kinds of coal prices are low—fine coals notably. Prepared sizes of Western bituminous, especially domestic coals, are in good demand and prices are fair and firm. Eastern coals, which have been handicapped in the last few weeks by the lack of cars, are coming forward more plentifully; but agents say the supply is not equal to prompt filling of orders.

Many Illinois mines are reported working not more than half time, on account of the lack of cars. Lump and egg sizes from the mines of Illinois and Indiana bring $2.25@2.85; run-of-mine, $1.75@2.25, and screenings $1@1.50.

Hocking, which has been very scarce and high-priced, is coming in more freely, but continues to bring $3.30 for run-of-mine and $3.65 for lump. Smokeless is quoted at $3.40 for run-of-mine and $4.30 for lump and egg, for New River and Pocahontas, with other grades 25c. less, and prices apparently firm. Youghiogheny and Pittsburg are scarce and very firm, the former selling at $3.40 for three-quarter and the latter at $3.30 for three-quarter.

Anthracite is not yet selling in such quantity as to remove the apprehensions of dealers about a congestion of traffic and inability to fill orders satisfactorily with the coming of really cold weather, but the demand is improving. All sizes are plentiful except chestnut.

Cleveland Oct. 30

The coal trade in this territory is governed almost entirely by the car situation. This has been so serious that the price of all sorts of fuel has been advancing steadily. Mine-run steam coal has run up to $1.50 at mine for Ohio and about $1.25 at mine for Pennsylvania, the difference in freight rate accounting for the variation in price. This has brought about a difference in the price of slack also. Ohio is about $1.25 at mine, while Pennsylvania slack is selling at 90c.@$1 a ton at mine.

The lake coal situation is in bad shape. The poor distribution of cars in this territory continues, and is now complicated by a serious shortage. This is cutting down the movement of coal up the lakes and resulted yesterday in many boats starting for the head of the lakes with only a half cargo, because they could not wait for further receipts. Most of these boats are under contract to move coal and it is now considered entirely possible that neither lake boats nor shippers will be able to fill contracts before the season is over. This possibility has been threatening for some time, although there were hopes of some relief. Lake rates have not changed in any particular.

The coke situation is exceptionally strong and the demand through this territory is growing. The car shortage has the greatest influence. The best grades of 72-hour foundry coke are now selling at $3.75 at the oven and furnace coke is selling at $3.25@3.50 at the oven. Higher prices are obtained for foundry coke held by speculators who are able to make quick shipment.

Pittsburg Oct. 30

Coal—Production is regulated by the supply of railroad cars which is getting worse instead of better. The Pittsburg Coal Company got about 60 per cent. of its requirements but the general average in the entire Pittsburg district did not exceed 50 per cent. of the cars needed. There will not be any relief until the lake shipping season closes, which will make more cars available, unless weather conditions interfere or the threatened strike of switchmen materializes. The demand is heavy and prices remain about the same on the basis of $1.35@1.55 a ton for mine-run coal at mine. Slack has advanced to $1 a ton. The river mines continue in full operation and there will be a large shipment to lower ports on the next good rise in the rivers. A few tons got out last week, but the total shipments did not reach 1,000,000 bushels.

Connellsville Coke—Contracts for coke for delivery through 1907 continue to be made and at higher prices than have been quoted. The United States Steel Corporation is still in the market and, it was learned today, made an offer to an independent interest for its entire output for the year at $3 a ton, but the offer was promptly rejected. Sales of furnace coke for deliveries through the year have been made at $3.25 and a number of contracts have been closed at $3.15. For delivery this year furnace coke is quoted at $3@3.25 and foundry at $3.75@4. For next year foundry is quoted at $3.50@3.75. The production in the Connellsville region for the week, according to the *Courier*, amounted to 281,025 tons and the shipments aggregated 14,858 cars distributed as follows: To Pittsburg, 5088 cars; to points west of Pittsburg, 8543 cars; to points east of Connellsville, 1227 cars.

Foreign Coal Trade

Oct. 31

Imports of fuel into France for the eight months ending Aug. 31 were, in metric tons:

	1905.	1906.	Changes.
Coal	6,553,450	9,432,130	I. 2,878 680
Coke	1,061,140	1,526,850	I. 465,710
Briquets	258,8.0	359,750	I. 100,930
Total	7,873,410	11,318,730	I. 3,445,320

Imports of coal were chiefly from Great Britain; of coke from Germany. Exports from France for the eight months were:

	1905.	1906.	Changes.
Coal	1 041,850	877,760	D. 164,090
Coke	145,070	108,540	D. 36,530
Briquets	67,940	81,770	I. 13,830
Total	1,254,860	1,068,070	D. 186,790

The changes this year were due chiefly to the smaller production following the Courrières troubles.

Iron Trade Review

New York, Oct. 31

A renewed demand for pig iron has been the chief feature of the past week. Some consumers, apparently, have underestimated their requirements, while others complain that furnaces are behind in their deliveries, and that they are in urgent need of iron. Prices have gone up for any sort of near delivery, and are very irregular, depending largely upon the time when deliveries can be made. Imports are quite probable.

Demand for finished material also continues strong. In addition to railroad and bridge orders, the Lake ship yards are calling for a good deal of material, and new building projects are still coming forward. Many of the latter will have to hold over for a while, on account of the difficulty in getting material.

United States Steel Corporation—This company's preliminary statement shows earnings for the September quarter and the nine months ending Sept. 30 as follows:

	1905.	1906.	Changes.
Third quarter.	$31,240,582	$38,114,624	I. $6,874,042
Nine months..	84,571,594	114,874,147	I. 30,302,553

The directors declared Oct. 30, dividends of 1¾ per cent. on the preferred and 0½ per cent. on the common stock, the same as for the previous quarter. The income account for the quarter, condensed, is as follows:

Net earnings	$38,114,624
Sinking funds, sub. Cos	$578,053
Depreciation and reserve	6,055 859
Interest and sinking fund	6,936,963
Total charges	$13,570,875
Net balance	$24,543,749
Dividend, preferred stock	$6.304,919
Dividend, common stock	2,541,512
Total dividends	$8.846,431
Balance, surplus	$15,697,318

From this surplus special appropriations for improvements, additions to property, etc., were made, amounting to $12,000,000, leaving net surplus for the quarter $3,697,318. Unfilled orders on the books Sept. 30 reached a total of 7,936,884 tons; which compares with 6,809,589 tons on June 30, and 7,605,086 tons on Jan. 1 of this year.

Birmingham Oct. 29

Pig-iron prices are almost up to a top-notch mark, spot iron selling at $20 per ton, No. 2 soft with a few sales being made. Iron for delivery during the first three months of the coming year is bringing $17.50@18 per ton, while for the first half of the year the price is $17 per ton, No. 2 foundry, against $13 per ton in July last. There is much caution displayed by the furnace companies in their acceptance of business for delivery next year on account of the aggregate sales already made, no expectations being held of an increase in the probable make. Shipments of the product are still being held down on account of the railroad-car shortage.

Chicago Oct. 29

Prices of pig iron continue to advance and the chief interest of furnace agents is in obtaining enough iron to supply the demand for the immediate future. With a shortening of the visible supply, Northern iron, for deliveries in the next three months especially, has become a speculative commodity, while Southern is by no means an easy material to obtain. The demand of local melters continues to be chiefly for quick-delivery lots, but contract orders are also increasing in number and aggregate tonnage, making a very strong market. Added to the need of many melters for quick-delivery iron is the difficulty of getting shipments; the car scarcity seriously affects the trade, with the result that users of iron who look far ahead are placing larger orders for deliveries in the second and third quarters of 1907.

For deliveries this year Southern rules about $19.50 Birmingham ($23.40 Chicago) and Northern $24. These prices are subject to considerable variation, and deliveries next year bring 50c.@$1 less. The present trade is chiefly in small lots, but these are numerous.

Cleveland Oct. 30

Iron Ore—While shippers are still refusing to make sales of ore for 1907, it is generally understood the prices have been agreed upon tacitly as follows, f.o.b. Lake Erie ports for base analysis: Old Range bessemer $5; Mesabi bessemer $4.75; Old Range non-bessemer $4.25; Mesabi non-bessemer $4. The movement for October is estimated to exceed 4,500,000 tons, against 4,270,000 tons for the corresponding month a year ago. This assures a total movement for this year of over 36,000,000 tons.

Pig Iron—Some sales of foundry iron for spot shipment have been made on the basis of $23 at the furnace for No. 2 Northern and $20 Birmingham for No. 2 Southern. To the latter price is added $4.10 to make up the Cleveland price. Spot sales generally are made, however, at $22.50 at the furnace for No. 2. First-half material is now sold at $21 in the Valleys. The basic market is exceptionally strong, many of the furnaces being out of the market. There is a heavy inquiry for this material and the price is $19@19.50 in the Valley for first-half delivery, while spot iron is selling at $21 in the Valleys.

Finished Material—This week the price of sheets was advanced $1 on blue annealed and $2 on other grades. Many of the mills are getting far behind on their orders, and there is heavier buying out of stock, on which prices have advanced. Steel is also higher and some sales of forging billets have been made at $40 a ton at mill, although good orders bring only $37@38 at mill. Four new boats have been ordered on the lakes recently, increasing the demand for plates and shapes, and strengthening an already strong situation. The new boats go into the package freight trade. Premium prices of $2 to $3 a ton are paid for quick delivery on these materials. Bar iron is higher, being influenced by high scrap prices and good stiff buying. Bar steel is in short supply.

New York Oct. 31

Pig Iron—The market has been active and a further demand is pressing, which has caused rather irregular prices. Consumers are complaining of delay in deliveries on contracts. Some spot lots have been sold at considerable premiums; it is reported that as high as $26 has been paid for No. 2 foundry, New England delivery. The range of prices below is rather wide, of necessity; the higher figure is for November delivery, the lower for the second quarter of next year.

Current quotations for pig iron are for New York or parallel delivery:

Northern:	
No. 1 X foundry	$25.50@$24
No. 2 X foundry	21.50@23
No. 2 plain	21@22.50
Forge pig	19@20
Southern:	
No. 1 foundry	22@23.50
No. 2 foundry	21.50@23
No. 3 foundry	21@21.50
No. 4 foundry	19.50@21
No. 1 soft	22@23.50
No. 2 soft	21.50@23
Gray forge	17.75@19
Basic pig:	
Northern	19.50@20
Virginia	20@21
Alabama	20@20.50

City or local deliveries are not included in prices, which are for large lots, on docks or cars.

Bars—Bars are strong at 1.795c. tidewater, for common iron, while refined has sold for 1.845c. Steel bars are quoted at 1.645@1.745c., according to size and conditions of orders. Store trade is steady at 2.50c. delivered.

Philadelphia Oct. 31

Pig Iron—The critical condition in the pig-iron market is daily becoming more aggravated and the statements received today from various representatives of manufacturing and buying interests leave the actual situation in a foggy atmosphere. It is probably more difficult to make a conscientious and actual market report today than for years. There is everywhere an apparent feeling of apprehension by both makers and buyers and the scramble for iron continues and all purchases appear to be made for actual and pressing requirements rather than of speculative account or for future undetermined requirements. Material is being contracted for abroad and shipments are already arriving. Prices are crowding up in an alarming way and it is useless to write anything in the way of prediction. Quotations for No. 1 X foundry may be given at $24; No. 2 X at $22.75; No. 2 plain $22.25; standard forge $19.50; basic $20.50; malleable $23.

Steel Billets—Steel billets are being taken as fast as the makers will accept orders at about $33 and forging billets have in some instances commanded $40.

Bars—It is the opinion that there will be a general advance. Considerable steel has been selling at what is regarded as a low price, compared with other mill products.

Scrap—Scrap has slightly advanced within a few days and a number of new buyers have appeared on the market. Quotations for No. 1 steel scrap are $18.50; machinery scrap $19; railroad scrap $22.50; best yard scrap $20 and old rails are nominally $26.50 per ton.

Pittsburg Oct. 30

The feature of the iron and steel market was the advance by the leading inter-

est of prices of sheets and tin-plate. Announcement of an increase was expected two months ago, but the United States Steel Corporation strictly maintained its policy of continuing old prices in order to preserve a stable market. A break from this policy was made when light rails were advanced, and this was followed by two weeks ago by an advance of $4 a ton in the price of merchant pipe. In anticipation of an advance heavy orders for sheets and tin-plate were placed during the past month, and it was believed buying would stop if prices were increased. Independent interests received many large inquiries for the first half and did not care to turn down the business while waiting for the leading producer to establish new prices. Many orders were booked for the first quarter at the old rates, but for all tin-plate business for second quarter an advance of 15c. a box was asked, but this price was guaranteed against a decline. It is understood the American Sheet and Tin-Plate Company had booked a large tonnage for the rest of this year and for the first quarter, when on Thursday, Oct. 25, it ordered an advance of $2 a ton on black and galvanized sheets, $1 a ton on blue annealed, and on painted and galvanized corrugated roofing 10 and 5c. a square, and tin-plate 15c. a box. The advance established prices as follows: Black sheets, 2.60c. and galvanized 3.65c. for No. 28 gage; blue annealed sheets, 2.60c., and galvanized 3.65c. for No. 28 gage; blue annealed sheets, 1.80c. for 10 gage; painted corrugated roofing, $1.85 a square for No. 28 gage, 2½-in. corrugations; galvanized corrugated roofing, $3.15 a square for No. 28 gage. The independents at once adopted these prices, and are quoting them for any delivery on all new business. On large and desirable orders the price of tin-plate is shaded 5c. a box. For prompt delivery, premiums of from $1 to $2 a ton are known to have been paid for sheets. The production of both sheets and tin-plate this year will break all records. In the past two years there were large stocks of tin-plate on hand on July 1, but this year, although the production in the first half was greater than in the previous years, the stocks in the warehouses were light.

There is some talk of an early advance in steel bars, but it is not likely, as some of the mills that took independent action a few weeks ago and quoted $2 a ton above the established price are willing to take good orders for next year at the old rate of 1.50c. Steel-bar mills are from eight to ten weeks behind in deliveries and specifications on old contracts are very heavy. Iron bars are remarkably strong, and easily command 1.60@1.65c. delivered Pittsburg.

Pig Iron—Several large sales of bessemer and basic pig iron were closed today for delivery in the second quarter of next year, and negotiations have opened for the third quarter. Sales today aggregated 25,000 tons. Two lots of bessemer, one of 9000 tons and the other of 2000 tons, were sold at $22, Valley furnaces, or $22.85, Pittsburg. Another sale of 6000 tons of bessemer was made at $21.50, Valley, or $22.35, Pittsburg. The sales of basic were at $21 and over at Valley furnaces. Prices for third-quarter iron have been practically established at $21 for bessemer and $20 for basic, f.o.b. Valley furnaces. Negotiations for several large lots now on may be closed this week.

Steel—There is no change in the situation, and billets continue scarce, bessemer being quoted nominally at $28@29, and open-hearth at $29@30. Sheet-bars are firm at $30, but premiums of from $1 to $2 a ton have been paid. Plates remain at 1.60c., and merchant bars at 1.50c.

Sheets—The demand is heavy, and the new prices effective October 25 are strictly observed on all new business. Black sheets are quoted at 2.60c., and galvanized at 3.65 for No. 28 gage.

Ferro-Manganese—The market took an upward turn this week, and prompt ferro is quoted at $84@85 per ton.

Chemicals

NEW YORK, Oct. 30

Copper Sulphate—The demand continues strong and the market holds firm. There seems to be a slightly better supply, but this has in no way effected the price which holds at $7 per 100 lb. in car-load lots and $7.25@7.50 for less, depending upon terms of shipment, quantity, etc.

Nitrate of Soda—There is nothing new to report concerning the situation and this is likely to be the case for the remainder of this year.

The market is firm and prices remain without change from last week's quotations at $2.60@2.62½.

China Clay—There seems to be a scarcity of good domestic grades of china clay and importers are doing practically all the local business. Domestic clay brings from $8 up with the foreign article quoted at from $11@18 per long ton, ex. dock, New York.

Sulphur—Exports of sulphur from Sicily in August were 23,952 tons, of which 5934 tons were to the United States. For the eight months ending Aug. 31 the statement is as follows, in tons of 1030 kg., which are used in the brimstone trade:

	1905.	1906.	Changes.
Exports.....	338,623	312,849	D. 25,774
Stocks, Sept. 1....	383,027	452,038	I. 69,011

Messrs. Emil Fog & Sons write from Messina, under date of Oct. 1, as follows: "The differences arising from the interpretation of the new law have not been quite settled yet. The board of managers of the Consorzio, instead of merchants, consists of lawyers, who are inclined to quibble about minor points rather than to smooth over difficulties. Their refusal to recognize the grievances of the sulphur industry caused quite an excitement at Catania; the strikers compelled all the sulphur mills and refineries to close, the railway cars carrying brimstone were left untouched at the station and all shipments were impeded. Should the Government consent to reduce quotations at Catania to a level with Girgenti, there is sure to be trouble at Girgenti, and the dilemma will continue. All these vexations and troubles certainly do not encourage trade. Exports to the United States have not been officially interdicted, but as the permit of the Consorzio Obbligatorio is required for the customs to allow shipment. it has practically the power of preventing or suspending shipments at any moment. So far the permission may still be obtained, which evidently means that the negotiation with Mr. Frasch has not yet led to an issue. Free stocks being now exhausted, shippers are obliged to pay the prices of the Consorzio, which has again slightly raised quotations. Statistics show an important increase of stocks, owing to the falling off of exports to the United States. Money is still plentiful, but the accumulating stocks will require large capital. Should not some means be found to increase consumption, any capital whatever will prove insufficient to sustain an artificial position."

Metal Market

New York, Oct. 31.

Gold and Silver Exports and Imports.
At all United States Ports in September and year.

Metal.	Exports.	Imports.	Excess.
Gold:			
Sept. 1906..	$2,278,922	$31,419,932	Imp. $29,141,010
" 1905 .	1,412,904	5,543 692	" 4,130,788
Year 1906..	35,790,962	111,764.911	" 75,973,949
" 1905..	42,677.921	30,339,602	Exp. 12,338,319
Silver:			
Sept. 1906..	3,594,311	3,253,586	" 340,725
" 1905 ..	5,527,459	3,840.005	" 1,687,454
Year 1906 ..	45,441,339	32 985,096	" 12,456,243
" 1905 ..	39,443,210	24,506,998	" 14,936,212

These statements cover the total movement of gold and silver to and from the United States. These figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Movement, New York.
For week ending Oct. 27 and years from Jan. 1.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$ 50.000	$1,766,972	$ 645,995	$ 63,562
1906.....	6,022,183	92,208,039	44,651,975	1,849,210
1905.....	34,425,278	10,380,977	29,006,228	3,796,466
1904.....	76,474,103	5,337,535	31,112,395	877,661

Exports of gold for the week were to Mexico; of silver, chiefly to London. Imports of gold were from Great Britain and Germany: of silver, from Mexico and the West Indies.

Gold came in last week to a considerable amount, but no more has been taken abroad. The import movement has come to an end for the present.

The statement of the New York banks —including all the banks represented in the Clearing House—for the week ending Oct. 27, gives the following totals, comparisons being made with the corresponding week of 1905:

	1905.	1906.
Loans and discounts..	$1,041,819,400	$1,062,333,200
Deposits.....	1,042,092,300	1,034,698,100
Circulation.....	54,890,100	46,724,600
Specie.....	196,059,200	194,349,600
Legal tenders.....	76,894,800	69,998,600
Total reserve.....	$272,954,000	$264,348,200
Legal requirements....	260,253,075	258,674,525
Surplus reserve.....	$12,430,925	$ 5,673,675

Changes for the week this year were decreases of $20,025,300 in loans, $27,634,500 in deposits, $6,046,100 in specie, $1,389,800 in legal tenders, $252,900 in circulation and $527,275 in surplus reserve.

The following table shows the specie holding, in dollars, of the leading banks of the world:

	Gold.	Silver.	Total.
New York.....	.....	.....	$194,349,600
England.....	$142,146,320	.....	142,146,320
France.....	564,164,190	$205,365,680	770,529,870
Germany.....	145,250,000	48,415,000	193,665,000
Spain.....	76,545,000	120,940,000	197,485,000
Netherlands....	27,651,500	27,807,500	55,459,000
Belgium.....	16,886,665	8,443,335	25,330,000
Italy.....	150,860,000	18,695,000	179,555,000
Russia.....	558,150,000	24,830,000	583,020,000
Austria.	233,890,000	58,965,000	292,855,000
Sweden.....	19,385,000	.....	19,385,000

The returns of the associated banks of New York are of date Oct. 27, and the others, Oct. 26. 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.

Exports of silver from London to the East are given by Messrs. Pixley & Abell's circular as follows, for the year to Oct. 18:

	1905.	1906.	Changes.
India.....	£ 4,835,921	£ 12,937,796	I. £ 8,101,875
China.....	784,246	430,700	D. 353,546
Straits..	38,299	1,750	D. 36,549
Total.....	£ 5,658,466	£ 13,370,246	I. £ 7,711,780

Imports for the week were £10,000 from the West Indies and £183,000 from New York, a total of £193,000. Exports were £221,000 in bars, and £79,000 in Mexican dollars to India; £300,000 in all.

Indian exchange is steady, and the Council bills offered in London were taken at an average of 16.03d. per rupee. Shipments of silver to India have been moderate in amount.

Prices of Foreign Coins

	Bid.	Asked.
Mexican dollars.....	$0.54	$0.55
Peruvian soles and Chilean.....	0.49¼	0.50¾
Victoria sovereigns.....	4.85½	4.87½
Twenty francs.	3.87	3.91
Spanish 25 pesetas...	4.78	4.80

SILVER AND STERLING EXCHANGE.

Oct.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Oct.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
25	4.8585	69⅞	32¼	29	4.8550	70⅝	32 9/16
26	4.8585	70⅛	32 7/16	30	4.8560	70¼	32 7/16
27	4.8565	70⅛	32 9/16	31	4.8560	70¼	32 7/16

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Other Metals

Daily Prices of Metals in New York.

October.	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.
25	22 @22½	21½ @22	97 7/16	43¼	5.75	6.25 @6.30	6.10 @6.15
26	22 @22½	21⅝ @22	97¼	42¾	5.75	6.25 @6.30	6.10 @6.15
27	22 @21⅞	21½ @22	.....	42¾	5.75	6.25 @6.30	6.10 @6.15
29	22 @22½	21 5/16 @22	97¾	42¼	5.75	6.25 @6.30	6.10 @6.15
30	22 @22½	21 5/16 @22	98 1/16	42½	5.75	6.25 @6.30	6.10 @6.15
31	22 @22½	21 5/16 @22	97⅛	42¼	5.75	6.25 @6.30	6.10 @6.15

London quotations are per long ton (2240 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 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting & Refining Co. for near-by shipments of desliverized lead in 50-ton lots, or larger orders. The quotations on spelter are for ordinary western brands; special brands command a premium.

Copper—Consumers both in this country and in Europe have shown no interest in the market during the last week, and such business as has been reported is of a retail character. The market closes nominal at 22@22½ for Lake copper; 21 5/16@22c. for electrolytic in ingots, cakes and wirebars.

The business in casting copper has been as light as in other grades, with an average of 21@21¼c. for ordinary brands.

The standard quotations in London have been fluctuating within narrow limits, but generally speaking the tendency has been downward. The close is easy at £97 2s. 6d. for spot, £97 17s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £100@101; best selected, £103@104; strong sheets, £107 @108.

Copper Sheets—On Oct. 11 the manufacturers of sheet copper again advanced their prices 2c. per lb., bringing the base price up to 27c. per lb. This price is subject to change without notice.

Tin—The decline in the market has made further progress, our prices following closely the lead established in London, where quotations at the close stand at £192 12s. 6d. for spot, £194 2s. 6d. for three months.

Prices here are correspondingly lower and business has been done at 42@42¼ depending upon deliveries.

Lead—The market is unchanged at 5.75 New York.

There has been a rather severe break in London, prices at one time breaking to £19, but at the close the tone is steadier at £19 2s. 6d. for Spanish lead, £19 5s. for English lead.

Spelter—There has been no change in the tone of this market which continues steady at 6.10@6.15 St. Louis, 6.25@6.30 New York. Both galvanizers and brass manufacturers report a very heavy consumption.

The London market, in sympathy with other metals, has weakened and closes considerably lower at £27 15s. for good ordinaries, £28 for specials.

Zinc Sheets—The price of zinc sheets was raised 15c. on Oct. 25. It is now $7.90 per 100 lb. (less discount of 8 per cent.) f.o.b. cars at Lasalle and Peru, in 600-lb. case for gages No. 9 to 22, both inclusive; widths from 32 to 60 in., both inclusive; the lengths from 84 to 96 in. both inclusive. The freight rate to New York is 27.5c. per 100 lb. The base price for sheet zinc has varied little this year; the highest was $8 on Jan. 6, the lowest $7.65 on May 18.

Antimony—The market remains firm, with demand strong and supply limited. Ordinary brands are bringing 24@24½c., and specials 25@26c.

Nickel—Quotations for large lots, New York or other parallel delivery, as made by the chief producer, are 45@50c. per lb. for large orders, according to size of order and terms. For small lots, 50@65c. is charged.

Platinum—The price continues $33 per oz. unmanufactured, while $25@27 is paid for scrap metal.

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

	Per Lb.
Bismuth.....	$1.50@1 60
Cadmium, 99.5% f. o. b. Hamburg....	1.40@1.46
Chromium, pure (N. Y.).....	80c.
Copper, red oxide	50c.
Ferro-Chrome (70).....	13c.
Ferro-Chrome (7-9% carbon, per lb. Cr.)	9@9½c.
Ferro-Chrome (1% C. for ea. 10% Cr.)	11c.
Ferro-Chrome (60-64% Cr., 3-4% C....	14c.
Ferro-Chrome (60-70% Cr., 1% C. or less)	38c.
Ferro-Molybdenum (50%).....	1.10
Ferro-Titanium (20%).....	85c.
Ferro-Tungsten (37%).....	33c.
Ferro-Vanadium (25-50%, per lb. vanadium contents)	$7.20@7.50
Magnesium, pure (N. Y.).....	1.50
Manganese, pure 98@99% N. Y.....	75c.
Manganese—Copper (30%@70%) N.Y.	45c.
Molybdenum (98@99%, N. Y.).....	$1.75
Phosphorus, foreign red (f. o. b. N.Y.)	90c.
Phosphorus, American yellow (f.o.b. Niagara Falls).....	42c.
Tungsten (best) pound lots.....	1.00
Ferro-Silicon (50%) spot. Ex ship Atlantic ports.....	$98@100 ton.

Variations in price depend chiefly on size and conditions of orders.

Quicksilver—This metal remains steady, with no material changes. The New York quotation is $40.50@42 per flask of 75 lb., according to size and conditions of order. San Francisco quotations are $39@40 per flask for home orders, and $37@38 for export. The London price is £7 per flask, with £6 18s. 9d. named by jobbers.

Aluminum—The chief producer gives list prices for ton lots and over as follows: No. 1, over 99 per cent. pure, 36c. per lb.; No. 2, over 90 per cent., 34c. Small lots

are from 1 to 3c. higher. Granulated metal is 2c. per lb. over price of ingots; rods, 1c. per lb. over ingots. Rolled sheets are 45c. per lb. up, according to size.

Cadmium—Paul Speier writes from Breslau, Germany, that there is a better demand for metallic cadmium. Quotations for metal, guaranteed 99½ per cent. pure, are 1300@1350 marks per 100 kg., boxed and delivered at Hamburg. This is equal to $1.40@1.46 per pound.

Wisconsin Ore Market

PLATTEVILLE, Oct. 27

Prices continue satisfactory to all concerned. A rather remarkable fact in the ore situation is that the largest producers are selling their ore in the face of what appears to be a strong market; this shows a healthy condition of affairs existing between buyers and producers.

Lead and drybone remain at last week's figures, as does also sulphur.

The camps of the Platteville district loaded ore for the week as follows:

Camps.	Zinc, Lb.	Lead, Lb.	Sulphur, Lb.
Platteville	339,115	.....	.....
Highland	749,390	88,310	.....
Linden	345,560	.....	.....
Cuba City	177,000	.....	.....
Mineral Point	123,420	.....	.....
Buncombe & Hazel Green	117,200	.....	.....
Rewey	61,000	.....	.....
Livingston	60 000	.....	.....
Benton	50,000	.....	.....
Galena	46,000	.....	.....
Total for week	2,068,685	88,310	.....
Year to Oct. 27	63,192,846	3,015,900	3,453,910

Everything possible is being done to protect the miners and mill-men during the cold weather. Change-houses are being provided with steam heat, and more comfortable arrangements are being made for the employees. All this should tend toward a maintenance of the present tonnage of ore production if not an increase. A portion of the tonnage reported this week really belongs in last week's report.

Missouri Ore Market

JOPLIN, Oct. 27.

The highest price paid for zinc was $48 per ton, on an assay basis of $42 to $45 per ton of 60 per cent. zinc. The average price for all grades is $42.36.

The highest price paid for lead was $83.50, medium grades $80 to $82, and the average price, all grades, $79.88.

During the past two weeks nearly every ton of reserve stock in the district has been purchased, the price advancing on some ore $2 per ton in ten days. Aside from the unusually heavy shipment—there being but one heavier during the year—there are over 6000 tons of ore in the bins, nearly all of which has been purchased. the Mineral Point Zinc Company came into the market for a large proportion of the stock for the new works at Depau, Illinois.

Lead prices quieted down with the recession of the local smelters from the activity of the past two weeks, leaving the St. Louis Smelting and Refining Company the field for 50 to 70 per cent. of the output.

Following are the shipments of zinc and lead from the various camps of the district for the week ending today:

	Zinc, lb.	Lead, lb.	Value.
Joplin	3,507,890	311,840	$ 89,647
Webb City-Carterville	2,676,010	781,600	88,798
Galena-Empire	2,097,430	172,560	50,948
Duenweg	903,540	150,410	25,442
Aurora	1,003,660	32,280	19,334
Alba	763,530	.....	17,561
Neck City	679,830	.....	15,636
Prosperity	161.520	134,830	8,865
Oronogo	391.980	.....	8,496
Spurgeon	329,030	55,200	7,909
Granby	420,000	35,000	7,550
Badger	270,070	4,290	6,249
Cave Springs	256,620	.....	5,389
Sherwood	221.570	11,800	5,239
Zincite	144 390	930	3,141
Carthage	89,800	.....	2,065
Sarcoxie	53,760	.....	1.155
Totals	13,970,630	1,690,740	$363,424
43 weeks	458,011,300	64,526,770	$12,369,833

Zinc value, the week, $295,884; 43 weeks, $9,887,591.
Lead value, the week, 67,540; 43 weeks, 2,482,242.

The following table shows the average monthly prices of zinc and lead ores in Joplin, by months; the average for zinc being based on the prices of assay basis ores carrying 60 per cent. zinc.

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	44.63	April	58.00	75.13
May	43.31	40.51	May	58.27	78.40
June	40.75	43.83	June	57.80	80.96
July	43.00	43.25	July	58.00	74.31
August	48.83	43.56	August	58.00	75.36
September	46.75	42.58	September	63.50	79.64
October	47.60	41.55	October	63.86	79.84
November	49.55	....	November	68.67	....
December	49.00	....	December	76.25	....

Mining Stocks

NEW YORK, Oct. 30

The trading during the week was dull, and almost entirely professional. Reactions of the previous week are replaced by slow recovery, but the whole market is lifeless.

Closing prices were as follows: Amalgamated, $110¾; American Smelting common, $154¼; Colorado Fuel and Iron, $51¾; National Lead, $74⅛; Republic Iron and Steel, $35¼; U. S. Steel common, $47½; preferred, $106¾.

On the curb there was considerable trading, but the net change in prices for the week was, as a rule, very slight. Nipissing mines, which has created such a stir recently, continued its pyrotechnic display again. It is reported that an option on 400,000 shares of stock at $25 per share is to be taken up by the Guggenheims, and this has caused an advance during the week from $25 to $29, followed by a sudden jump of $4¼ to $33¼ today. This stock has been the most sensational of any for a long time.

Closing prices for other leading stocks were as follows; British Columbia, $13⅜; Butte Coalition, $37; Cumberland Ely, $12⅝; El Rayo, $7; Gold Hill, $4½; McKinley-Darragh-Savage, $3⅜; Nevada Utah, $4¼ per share.

Boston Oct. 30

The metal shares have lapsed into a period of inertia and prices as a rule are below those of a week ago. The rank and file believe that prices have not seen their highest and that an active speculative period is ahead in these issues. Politics, at present, are occupying attention and the local market is following the lead of the New York list and taking a rest, pending the election in the various States, particularly New York. Profit-taking has been apparent, but it has not weakened the position of affairs. Amalgamated is off a trifle over $2 to $110.50 ex-dividend. Old Dominion, after touching $66.75, reacted to $61.37½. The former is its record price.

Shannon Copper rose $1.50 to $17.50 in anticipation of a dividend. The directors declared an initial dividend of 50c., but did not stipulate whether it was quarterly or not, although friends say that this rate can be maintained and as much more can be placed to the surplus. N. L. Amster and Wm. A. Paine were elected directors, taking places caused by the resignations of present directors. The stock reacted to $15.75 today. Trinity rose $2.25 to $12.25, reacting to $11.50 from this. President Lawson came out over his signature allowing that arrangements had been made for treating the company's ores by the American Smelting people at the Balakalala smelter satisfactory to the former. Calumet & Arizona spurted $11.75 to $150 per share on news that the directors had increased the quarterly dividend rate to $4 per share, although $5 was clipped from the price today. North Butte, which ran off $2 to $110, recovered to $112.75 today on reports that an increased dividend might be looked for next time. The Keweenaw Copper Company has purchased 2000 acres of additional mineral land and will increase its capital 18,000 additional shares. Directors J. A. Coram and E. L. White have purchased 21,000 shares of Mexico Consolidated mining stock from Director J. T. Judd at $12.50 per share. The latter stock touched $14 on the curb.

San Francisco Oct. 25

Trading in the Comstocks has been fair, though prices close rather easier than a week ago. There has been no special decline, however. The Tonopah stocks have been steady, but rather quiet. In the Goldfields there was a reaction early in the week, with partial recovery at the close. The chief excitement was in the Bullfrogs, for which a strong buying demand developed, advancing prices.

Oil-stock trading continues to improve, though it can hardly be called active yet.

STOCK QUOTATIONS

NEW YORK — Week Oct. 27.

Name of Company.	High	Low	Clg.	Sales
Amalgamated*	114⅞	109⅝	111¼	511,730
Anaconda	275	265½	269⅝	91,000
British Col. Copper	13¾	12⅞	13¼	26,600
Butte Coalition	38½	36	37¼	8,550
Cum. Ely Mining	13½	11⅝	12½	12,900
Greene Gold	2	1¾	2	1,295
Greene Gold & Silver	2	1⅜	1⅜	3,950
Guanajuato	5	4⅞	5	1,000
Micmac	6⅞	5⅞	6⅜	56,700
Mines Co. of Am	1⅜	1⅜	1⅜	9,200
Mitchell Mining	5⅞	5½	5½	43,335
Mont. Sho. Con. (New)	14½	14	14½	2,300
Nev. Utah M. & S.	4¾	4¼	4¾	5,600
Nipissing Mines	29	22	28	207,000
Tennessee Copper	47⅛	45⅛	46⅜	3,050
Union Copper	1	⅞	1/16	3,250
Utah Apex	8¼	8	8	700

NEW YORK INDUSTRIALS.

Am. Smelting & Ref.	156⅜	152¾	154⅛	115,450
Am. Smelt. & Ref., Pf.	118	116½	116½	1,940
Bethlehem Steel	19	17½	18	500
Colo. Fuel & Iron	54¾	50¾	51¼	34,550
Federal M. & S., Pf.*	98	96	97	1,310
Inter. Salt*	38	37	38	495
National Lead	76¾	74	74¼	9,550
National Lead, Pf	103½	102½	103	450
Pittsburg Coal	16⅞	16	16⅞	1,000
Republic I. & S.	36¾	34¾	35¾	9,100
Republic I. & S., Pf.	98	96	96¾	1,300
Sloss-Sheffield	72½	71	72	1,900
Tenn. C. & I.	158½	155	155	300
U. S. Red. & Ref	31	31	31	200
U. S. Steel	47⅞	45⅝	47½	570,650
U. S. Steel, Pf.	106⅝	105⅜	106½	48,320
Va. Car. Chem	38¼	36⅜	37½	3,400

BOSTON — Oct. 27

Adventure	7¼	6¼	6¾	880
Allouez	40	38	38	3,237
Atlantic	17½	15¾	15½	2,070
Bingham	33¾	32	33	4,418
Boston Consolidated	33½	32	32¼	5,875
Calumet & Arizona	140¾	136	140¾	1,100
Calumet & Hecla	850	840	850	40
Centennial	30	27	29	10,027
Copper Range	81	79	80	7,178
Daly-West	19¾	19	19¾	2,491
Franklin	23¼	22	22¾	4,213
Granby	14	13¾	13½	513
Greene Consolidated	25⅞	24⅞	25	10,107
Isle Royal	26½	23	24¾	12,778
Mass	9	8⅛	8½	885
Michigan	17¾	16⅝	17½	4,787
Mohawk	69	65	67	1,541
Mont. Coal & Coke new	2½	2	2	5,940
Nevada	22¼	20	20	4,696
North Butte	112¾	110	111¼	4,680
Old Dominion	66¾	55½	61¾	45,103
Osceola	126	123	124	2,786
Parrot	27⅜	26	27	710
Quincy	103	102	102	242
Rhode Island	5½	4¾	4¾	950
Shannon	17¼	15	16½	47,343
Tamarack	103	100	100	76
Tecumseh	16	14¾	15	1,858
Trinity	12	9½	11½	12,569
United Copper, com.	66	†63	†66	3,915
U. S. Oil	10¼	10	10	330
U. S. Smg. & Ref.	†65⅝	†60¼	†63¾	13,876
U. S. Smg. & Ref., pfd.	†46	†44½	†45¾	13,391
Utah Copper	67¼	65¼	65⅞	5,308
Victoria	7	6½	6⅞	480
Winona	12⅛	10¾	11¼	5,491
Wolverine	156	152	152	143
Wyandotte	1⅞	1⅛	1⅝	230

*Ex. Div. †Ex. Rights.

These stocks, not elsewhere quoted, had the following range of prices during the week: (New York) Am. Agri. Chem., 25; Comstock, .20; Davis-Daly Est., 13¼—12½; Gold Hill, 5—4⅜; Gugg. Exp., 315—312; Rich. Eureka, 7¾; Standard Oil, 599¾—595¾. (Boston) Ahmeek, 110—100; Am. Zinc, 14½—12; Arcadian, 6½—5½; Ariz. Com'l, 38—37; Black Mt., 10—9; Cananea, 26—23½; East Butte, 11¼; Keweenaw, 12—11; Majestic, 4¼—4; Raven, .80—.75; Shawmut, 1½; Superior Cop., 16¼; Superior & Pitts., 26½—24¼; Troy, 3¼—3.

PHILADELPHIA — Oct. 27

Name of Company.	High	Low	Clg.	Sales.
American Cement	9⅛	9⅛	9⅛	6,052
Cambria Steel	38	37⅛	37⅜	1,744
General Asphalt	8	7⅛	8	....
Penn. Steel, pd.	107½	106	107½	....
Philadelphia Co.	49¾	49¾	49¾	7
Tonopah Mining	20¾	20¼	20¼	2,330

PITTSBURG — Oct. 27

Crucible Steel	12¼	11¾	11¾	685
Crucible Steel, Pf.	78¾	77¼	77¾	1,399
Harbison-Walker Ref.	13½	13	13⅛	260
Ohio Tonopah	.27	.25	.26	4,150
Tonopah Ext.	6	5⅝	5¾	765

COLORADO SPRINGS — Oct. 27

Name of Company.	High	Low	Clg	Sales
Acacia	13	12⅞	12⅞	11,000
C. C. Con.	8¼	7¾	7¾	15 000
Dante	5⅞	5¼	5¾	15,000
Doctor Jack Pot	8¾	8¼	8¼	....
Elkton	53	50½	50½	22,000
El Paso	51	47	47½	13,800
Findley	60	51	53	40,000
Gold Dollar	8⅛	7	7	....
Gold Sovereign	6⅝	6¼	6¼	....
Isabella	22½	21	22	8,450
Jennie Sample	8½	8	8	....
Mary McKinney	75½	66	75½	....
Pharmacist	5¾	5¼	5¾	24,000
Portland	1.35	1.35	1.35	4,400
Vindicator	95	94	94	....
Work	24¾	21¼	21¾	76,000

SAN FRANCISCO — Oct. 25

Name of Company.	High	Low	Clg	Sales
Best & Belcher	1.00	1.00	1.00	100
Caledonia	.39	.36	.36	1,200
Challar	.13	.12	.12	2,500
Con. Cal. & Va	.83	.77	.77	7,050
Crown Point	.15	.12	.15	2,500
Gould & Curry	.20	.19	.19	3,200
Hale & Norcross	1.10	.95	.95	600
Mexican	.95	.87	.87	2,940
Ophir	3.00	2.80	2.85	1,850
Overman	.10	.09	.09	700
Potosi	.13	.12	.13	500
Savage	1.15	.95	.95	2,350
Sierra Nevada	.58	.50	.52	10,750
Bullfrog Mining	.46	.42	.46	22,100
Diamondfield B B. Con.	.37	.35	.35	12,600
Goldfield of Nevada	.80	.67	.71	42,500
Jim Butler	1.55	1.40	1.42	27,560
Jumping Jack	.60	.49	.54	31,500
Kendall	.62	.52	.59	4,500
MacNamara	.83	.77	.82	19,600
Manhattan Dexter	.54	.50	.50	6,200
North Star	.50	.46	.47	25,975
Original Bullfrog	.16	.14	.14	7,500
Tonopah Belmont	7.12	6.37	6.37	5,800

Tonopah Stocks — Oct. 31.

(Revised by Weir Bros. & Co., New York)

	High.	Low.	Last.
Tonopah Mine of Nevada	20.25	20.00	20.25
Tonopah Montana	4.20	4.12½	4.20
Tonopah Extension	7.37½	7.25	7.37½
Tonopah Midway	2.33	2.27	2.30
Tonopah West End Cons	2.40	2.30	2.35
Goldfield Mining Co.	.92	.89	.90
Jumbo Mining	4.00	3.60	4.00
Red Top	3.55	3.15	3.55
Sandstorm	.78	.75	.76
Montgomery Shoshone Cons	15.75	15.50	15.75

St. Louis — Oct. 27.

Adams, $0.40 — $0.25; American Nettle, $0.08—$0.06; Center Creek, $2.30—$2.00; Central Coal and Coke, $53.25—$62.75; Central Coke and Coke, pfd., $80.00—$79.00; Central Oil, $60.00—$55.00; Columbia, $4.00—$3.80; Con. Coal, $26.00——$24.00; Doe Run, $15.00—$14.00; Granite Bimetallic, $0.20—$0.16; St. Joe, $14.50—$13.50.

LONDON. *(By Cable.*)* Oct. 31.

Dolores, £1 13s. 9d.; Stratton's Independence, £0 3s. 9d.; Camp Bird, £1 7s. 6d.; Esperanza, £2 11s. 3d.; Tomboy, £1 8s. 9d.; El Oro, £1 7s. 6d.; Oroville, £1 1s. 6d.; Somera, £0 7s. 6d.; Utah, Apex, £1 13s. 1½d.; Ariz. Copper, pref., £3 15s. 0d.; Ariz. Copper, def., £3 12s. 3d.

*Furnished by Hayden, Stone & Co., New York.

New Dividends

Company.	Payable.	Rate.	Amt.
Amalgamated Copper	Nov. 26	$2.00	$3,100,000
Alaska Mines Securities	Nov. 10	0.15	.....
Alaska Mexican	Oct. 29	0.30	54,000
Alaska Treadwell	Oct. 29	1.50	300,000
Calumet and Arizona	Nov.	4.00	800 000
Le Roi No. 2	Oct. 8	0.48	57,600
New Century Lead & Zinc	Nov. 1	0.01	3,000
Rio Tinto	Nov. 1	12.00	4,500,000
Rio Tinto, pfd.	Nov. 1	0.60	195,000
Shannon Copper	Dec. 20	0.50	150.000
U. S. Steel, com.	Dec. 31	0.50	2,541,512
U. S. Steel, pfd.	Nov. 30	1.75	6,304,919

Assessments

Company.	Delinq.	Sale.	Amt.
Alpha Con., Nev.	Nov. 9	Nov. 30	$0.05
Confidence, Nev	Nov. 7	Nov. 28	0.20
Con. California & Va	Nov 12	Dec. 3	0.25
Union Con., Nev.	Nov. 7	Dec. 3	0.10
Utah, Nev.	Nov. 5	Nov. 26	0.05
Yellow Jacket	Oct. 5	Nov. 5	0.10

Monthly Average Prices of Metals

SILVER.

Month.	New York. 1905.	New York. 1906.	London. 1905.	London. 1906.
January	60.690	65.288	27.930	30.113
February	61.023	66.108	28.047	30.464
March	58.046	64.597	26.794	29.854
April	56.600	64.765	26.108	29.984
May	57.832	66.976	26.664	30.968
June	58.428	65.394	26.910	30.185
July	58.915	65.105	27.163	30.113
August	60.259	65.949	27.822	30.529
September	61.695	67.927	28.528	31.483
October	62.034	69.523	28.637	32.148
November	63.849	.....	29.493	.....
December	64.850	.	29.977	.
Year	60.352	.	27.839	.

The New York prices are in cents per fine ounces; the London quotation is in pence per standard ounce, 0.925 fine.

COPPER.

	New York. Electrolytic. 1905.	New York. Electrolytic. 1906.	New York. Lake. 1905.	New York. Lake. 1906.	London. 1905.	London. 1906.
Jan.	15.008	18.310	15.128	18.419	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	18.375	15.045	18 688	67.017	84.793
May.	14.627	18.457	14.820	18.724	64.875	84.867
June.	14.673	18.442	14.813	18.719	65.881	83.994
July.	14.888	18.190	15.005	18.585	66.887	81.167
Aug.	15.664	18.380	15.725	18.706	69.830	83.864
Sept.	15.965	19.033	15.978	19.328	69.667	87.831
Oct.	16.279	21.203	16.332	21.722	71.406	97.269
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 2240 lb., standard copper.

TIN IN NEW YORK.

Month.	1905.	1906.	Month.	1905.	1906.
Jan.	29.325	36.390	July	31.760	37.275
Feb.	29.262	36.403	August	32.866	40.606
March	29.523	36.662	Sept	32.095	40.516
April	30.525	38.900	Oct	32.481	42.852
May	30.049	43.313	Nov	33.443	.....
June	30.329	39.260	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	5.750
Feb.	4.450	5.464	Aug.	4.665	5.750
March.	4.470	5.350	Sept.	4.850	5.750
April.	4.500	5.404	Oct.	4.850	5.750
May.	4.500	5.685	Nov.	5.200	.....
June.	4.500	5.750	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; April, £15,959; May, £16,725; June, £16,813; July, £16,525; August, £17,109; September, £18,266; October, £19,350.

SPELTER.

Month.	New York. 1905.	New York. 1906.	St. Louis. 1905.	St. Louis. 1906.	London. 1905.	London. 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	6.078	5.667	5.931	23.813	25.781
May.	5.434	5.997	5.284	5.846	23.594	27.000
June.	5.190	6.096	5.040	5 948	23.875	27.728
July.	5.396	6.006	5.247	5.856	23.938	26.800
Aug.	5.706	6.027	5.556	5.878	24.675	26.938
Sept.	5.887	6.216	5.737	6.056	26.375	27.563
Oct.	6.087	6.222	5.934	6 070	28.225	28.075
Nov.	6.145	.....	5.984	.....	28.500	.....
Dec.	6.522	.....	6.374	.....	28.719	.....
Year.	5.822	.....	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 (2240 lb.) good ordinary brands.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

ABRASIVES—		
Bort, good drill quality, carat		$85.00
Carborundum, f.o.b. Niagara Falls, powd	lb.	.08
Grains	"	.10@.17
Corundum	"	.07@.10
Crushed Steel, f.o.b. Pittsburg	"	.05¾@.06
Emery, in kegs: Turkish flour	"	.02
Grains	"	.04@.05½
Naxos flour	"	.02
Grains	"	.04@.05
Chester flour	"	.01¾
Grains	"	.03½@.04½
Peekskill, f.o.b. Easton, Pa., flour	"	.01½@.01¾
Grains, in kegs	"	.02½@.02¾
Garnet, per quality	sh ton	25.00@35.00
Pumice Stone, Am. Powd. 100 lb.		1.60@2.00
Italian, powdered	"	.01¼@.01½
Lump, per quality	"	.03@.20
Rottenstone, ground	"	.02½@.03½
Lump, per quality	"	.05@.25
Rouge, per quality	"	.06@.30
Steel Emery, f.o.b. Pittsburg	"	.07½@.07¾
ACIDS—		
Acetic 28%	lb.	.02½
Boric	"	.10@.11
Hydrofluoric, 30%	"	.02¾@.03½
" 48%	"	.06
" 60%	"	.10@.10½
Hydrochloric acid, 20°, per lb		1.25@1.50
Nitric acid, 38°	per lb.	4.25@4 62½c.
Sulphuric acid, 50°, bulk, per ton		$12 up.
60°, 100 lb. in carboys		.90@1.12½
60°, bulk, ton		18.00@20.00
66°, 100 lb. in carboys		1.00@1.25
66°, bulk, ton		20.00@22.00
Oxalic	"	.07½@.07¾
ALCOHOL—Grain	gal.	2.46½
Refined wood, 95@97%	"	.70@.75
ALUM—Lump	100 lb.	$1.75
Ground	"	1.85
Chrome Alum	lb.	.03¼@.03½
ALUMINUM—Sulphate, com'l.	"	1.25@1.60
AMMONIA—24 deg.	lb.	.04¾@.05½
" 26 "	"	.05@.05¾
AMMONIUM—		
Bromide	lb.	.23
Carbonate	"	.07¾@.08¼
Muriate grain	"	.5⅞@..06¾
Lump	"	.09½@.09¾
Sulphate, 100 lb		3.12½@3.25
Sulphocyanide com.	"	.30
" " chem. pure	"	.40
ANTIMONY—needle, lb		.17@.19
ARSENIC—White (nominal)	"	.07½@.08
Red	"	.06½@.06¾
ASPHALTUM—		
Barbadoes	per ton.	40.00@80.00
West Indies	"	20.00@60.00
Egyptian	lb.	.06@.07
Gilsonite, Utah ordinary	per ton.	50.00
Trinidad	"	30.00@40.00
California	"	20.00@30.00
BARIUM—		
Carb. Lump, 80@90%	sh. ton.	30.00@35.00
Powdered 80@90%	lb.	.02@.02½
Chloride com'l	ton.	34.00
Nitrate, powdered, in casks	lb.	.06
Sulphate (Blanc Fixe)	"	.02¼
BARYTES—		
Am. Ground	sh. ton.	14.00@21.00
Floated	"	15.00@21.00
Foreign floated	"	21.00
White	"	21.00
BISMUTH—Sub-nitrate	lb.	1.50
BLEACHING POWDER—35%,	100 lb.	1.30@1.50
BLUE STONE—(copper sulphate), carload, per 100 lb		7.00
BONE ASH	lb.	.02½@.02½
BORAX	"	.07½@.08
CALCIUM—Acetate, gray	"	2.35@2.40
Acetate, brown	"	1.60@1.65
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton.	65.00
Chloride, f.o.b. N. Y.	"	13.00@15.00
CEMENT—		
Portland, Am. 500 lb.	bbl.	1.55@1.60
Foreign	"	2.25@2.50
"Rosendale," 300 lb.	"	.85
(in sacks)		.65
Slag cement	"	.75@1.25
CHROME ORE—		
New Caledonia 50% ex. ship N. Y.	per lg. ton	17.00@19.75
Bricks, f.o.b. Pittsburg, M.	"	175.00
CLAY, CHINA—Am. common ex-dock, N. Y.	"	8.00 up.
Foreign	"	11.00@18.00
COBALT—Oxide	lb.	2.50
COPPERAS—Bulk	100 lb.	$0.47½
In bbls	"	.57½@.70
In bags	"	.52½@.65
CRYOLITE	lb.	.06½
FELDSPAR—Ground best	sh. ton.	15.00@20.00
Common		12.00@14.00
FIRE BRICK.		
American	per M.	30.00@40.00
Imported	"	35.00@45.00
St. Louis No. 1	"	16.00
" No. 2	"	14.00
Extra	"	20.00@23.00
FIRE CLAY.		
St. Louis mill	per ton	2.50
FLUORSPAR—		
Domestic f.o.b. shipping port:		
Lump	sh. ton.	8.00@10.00
Ground	"	11.50@13.50
Gravel	"	4.25@4.50
Foreign crude ex. dock		8.00@10.00
FULLER'S EARTH—Lump	100 lb.	.80@.85
Powdered	"	.85@1.25
GRAPHITE—		
American, ore, common	lb.	.01@.10
Artificial	"	.06
Ceylon, common pulv	"	.02½@.03½
Best, pulverized	"	.04@.08
German, com. pulv	"	.01½@.01½
Best, pulverized	"	.01½@.02
Italian, pulverized	"	.01@.02
GYPSUM—		
Fertilizer	"	7.00
Rock	lg. ton.	4.00
INFUSORIAL EARTH—		
Ground Am. best	"	39.00
French	"	56.00
German	"	56.00@59.00
LEAD—Acetate (sugar of)	lb.	.07½
Nitrate, com'l	"	.07½@.08
MAGNESITE—Greece.		
Crude (95%)	lg. ton.	7.00@8.00
Calcined	sh. ton.	30.00@35.00
Bricks, domes, per qual. f.o.b. Pittsburg	M.	160@200
MAGNESIUM—		
Chloride, com'l	lb.	.01@.01½
Sulphate (Epsom salt)	100 lb.	.90@1.25
MANGANESE—		
Crude powdered:		
70@75% binoxide	lb.	.02
75@85% binoxide	"	.02½
85@90% binoxide	"	.04
90@95% binoxide	"	.05½
Ore, 80%-85%	sh. ton.	27.00@35.00
MARBLE—Flour	sh. ton.	8.00@8.50
MINERAL WOOL—		
Slag, ordinary	"	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
MONAZITE SAND—		
Guar. 97%, with 5% Thorium oxide, nominal	lb.	.08 and up.
NICKEL—		
Oxide, crude, lb. (77⅞) for fine metal contained		.47
Sulphate, single	lb,	.18@.24
" double	"	.11½@.14
NITRATE OF SODA—100 lb. 96% for 1906		2.60@2.62½
95% for 1907		2.60@2.62½
95% for 1908		2.45@2.50
96% is 7½c higher per 100 lb.		
OZOKERITE—best	lb.	.15
PAINTS AND COLORS—		
Litharge, Am. powdered	"	.07½@.07⅔
English glassmakers'	"	.08½@.08½
Lithopone	"	.03⅔@.07
Metallic, brown	sh. ton.	19.00
Red	"	16.00
Ocher, Am. common	"	8.50@9.00
Best	"	16.00
Dutch, washed	lb.	.02½@.03
French, washed	"	.01½@.02½
Paris green, pure, bulk	"	.21@.23
Red lead, American	"	.07½@.07⅔
Foreign	"	.08½@.08⅔
Turpentine, spirits	gal.	.69½@.70
White lead, Am., dry	lb.	.06⅔@.06½
American, in oil	"	.07@.07⅔
Foreign, in oil	"	.09⅝@.10
Zinc white, Am. extra dry	"	.05⅔@.05½
Foreign, red seal, dry	"	.07½@.07⅔
Green seal, dry	"	.07½@.08½
PHOSPHATES—Acid	.65@67½c per unit	
*Fla., hard rock		7.00@7.50
land pebble 68%		4.75@5.00
†Tenn., 78@80%		5.50@6.00
78%		5.25
75%		4.75@5.00
68@72%		4.00
‡So. Car. land rock		4.00
" " river rock		3.75
POTASSIUM—		
Bicarbonate crystal	lb.	$0.08½
Powdered or granulated	"	.09
Bichromate, Am	"	.08½@.08¾
Scotch	"	.11
Bromide		.16
Carbonate (80@85%)	"	.03½@.03½
Caustic, ordinary	"	.04½
Elect. (90%)	"	.05½
Chloride (muriate), 100 lb.		1.90
Chlorate, powdered	"	.09½
Crystals	"	09½
Cyanide (98@99%)	"	.18@.19
Kainite, long ton, bulk, 8.50; bags, 9.50.		
Permanganate	lb.	.09½
Prussiate, yellow	"	.16½@.17
Red	"	.33
Sulphate	100 lb.	2.18½@2.21½
PYRITE—		
Domestic, non-arsenical, furnace size	per unit	11@11½c.
Domestic, non-arsenical, fines, per unit		9@10½c.
Imported non-arsenical, furnace size, per unit		13c.
Imported, arsenical, furnace size, per unit		12@12½c.
Imported fines, arsenical, per unit.		8½@9c.
" " non-arsenical, per unit		10½@11c.
Pyrite prices are per unit of sulphur. An allowance of 25c. per ton is made when delivered in lump form.		
SALT—N. Y. com. fine 280 lb. bbl.		.72@1.18
N. Y. agricultural	sh. ton.	3@4.40
SALTPETER—Crude	100 lb.	4.00
Refined, crystals	"	5.25@5.50
SILICA—		
Ground quartz, ord'ry	sh. ton	10.00@15.00
Silex	"	30.00@40.00
Lump Quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Nitrate, crystals	oz.	.43½
SODIUM—		
Acetate	lb.	.05
"Alkali," per 100 lb., 58%		.78½@.87½
Bicarb. soda, per lb		1.25@1.50c.
Soda, caustic, per 100 lb., 60%		1.85@2.00
" " powdered		.02¾@.03
Salt cake, per 100 lb		.70@.85
Soda, monohydrate, per lb		1½c.
Bichromate	lb.	.06½@.06¾
Bromide	"	.16
Chlorate, com'l	"	.09
Cyanide, ("100% KCN")	"	.18@.19
Hyposulphite, Am	"	1.35@1.50c.
German	"	1.60@1.70
Phosphate	100 lb.	1.90 up
Prussiate	"	.09½@.10¼
Sal soda, f.o.b. works	100 lb.	.65
Foreign, f.o.b. N. Y.	"	.90
Silicate, com'l	100 lb.	.75@1.00
Sulphate, com'l, (Glauber's salt)	100 lb.	.41@.45
" " calcined		.65@.85
STRONTIUM—Nitrate	lb.	.08 up
SULPHUR—		
Louisiana (prime) to New York, Boston or Portland	ton	20.00
To Philadelphia or Baltimore	"	20.50
Roll	100 lb.	1.85@2.15
Flour	" "	2.00@2.40
Flowers, sublimed	" "	2.20@2.60
TERRA ALBA—French & Eng.	100 lb.	.85@1.00
TALC—Domestic	sh. ton.	15.00@20.00
French, best	"	20.00@25.00
Italian, best	"	35.00@40.00
TIN—Bi-chloride, 50%	lb.	.12¼ up
Crystals	"	.26 up
Oxide, lb		.44
URANIUM—Oxide	"	3.50
ZINC—Metallic ch. pure	"	.15
Chloride solution, com'l	"	.02½@.03
Chloride, granular	"	.04⅛@4¼
Dust	"	.06
Sulphate	"	.02½@.02¾

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

Note—These quotations are for wholesale lots in New York, unless otherwise specified, and are generally subject to the usual trade discounts. Readers of THE ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

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	$1,428,381	July 1906	$ .30
Alaska Treadwell,g.	Al'ka	5,000,000	200,000	25	8,735,000	July 1906	1.00
Alaska United, g.	Al'ka	1,000,000	180,200	5	216,240	July 1906	0.30
Amalgamated, c.	Mont	155,000,000	1,530,879	100	44,461,272	Nov. 1906	2 00
Am.Sm.&Ref.,com.	U. S.	50,000,000	500,000	100	8,500,000	Oct. 1906	1.75
Am. Sm. & Ref. pf.	U. S	50,000,000	500,000	100	22,581,553	Oct. 1906	1.75
Am. Smelters, pf. A	U. S.	17,000,000	170,000	100	920,000	Sept. 1906	1 50
Am. Smelters. pf. B	U. S.	30,000,000	300,000	100	1,875,000	Sept. 1906	1.25
Anaconda,c.	Mont	30,000,000	1,200,000	25	30,650,000	Oct. 1906	1.50
Annie Laurie, g.	Utah	5,000,000	25,000	100	465,061	July 1905	.50
Arizona, c.	Ariz	3,775,000	3,682,520	.....	6,182,361	Apr. 1906	.05
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
Beck Tunnel, g.s.l.	Utah	1,000,000	1 000,000	1	155,000	Aug. 1906	.02½
Bingham & N.H.,c.g	Utah	2,000,000	226,000	5	22,600	sept. 1906	.10
Boston & Montana.	Mont	3 750,000	150,000	25	47,875,000	Nov. 1906	12.00
Bull,Beck.&Cham.g	Utah	1,000,000	100,000	10	2,518,400	Oct. 1906	.10
Bunker Hill & Sull.	Ida	3,000,000	300 000	10	7,326,000	Oct. 1906	.60
Butte & Boston, c.	Mont	2 500,000	200,000	25	1,800,000	Feb. 1904	1.00
Butte Coalition, c.s.	Mont	15,000,000	1,000,000	15	400,000	Sept. 1906	.40
Calumet & Arizonac	Ariz	2 500,000	200,000	10	5,200,000	Sept. 1906	3.50
Calumet & Hecla,c.	Mich	2,500,000	100,000	25	96,350,000	sept. 1906	20.00
Camp Bird, g., s.	Colo	5,500,000	820,000	5	3,382,500	Feb. 1906	.24
Carisa, c.g.	Utah	500,000	500,000	1	45,000	Sept. 1906	.01
Central Eureka, g.	Cal	400,000	398,425	1	778,921	Mar. 1906	.07
Combi'tion Co.G'f'd	Nevada	400,000	320,000	1	688,000	Sept. 1906	.15
Con. Mercur, g.	Utah	1,000,000	1,000,000	1	1,180,000	Sept. 1906	.02½
Continental, z. l.	Mo	550,000	22,000	25	154 000	Apr. 1906	.50
Copper Range Con.	Mich	38,500,000	383.781	100	3,023,772	Oct. 1906	1.50
Creede United, g.	Colo	2,000,000	1,625,000	1	214 053	July 1906	.00½
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	5,391,000	sept. 1906	.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
Doctor Jack Pot.	Colo	3,000,000	3,000,000	1	268,000	July 1906	.00½
Doe Run, l.	Mo	10,000,000	59,062	100	933,010	May 1906	.50
Elkton Con., g.	Colo	3.000,000	2,500,000	1	1,681.960	Sept. 1906	.00½
El Paso, g.	Colo	2,500,000	2,450,000	1	1,022,750	June 1906	.01
Fed. Sm., com.	Idaho	10,000,000	60,000	100	1,448,750	Sept. 1906	4.00
Federal Sm., pf.	Idaho	20,000,000	120,000	100	2,231,250	Sept. 1906	1.75
Findley, g.	Colo	1,250,000	1,250,000	1	325,000	Aug. 1906	.01
Frances-Mohawk,g	Nevada	1,000,000	1,000 000	1	50,000	Oct. 1906	.05
Gemini-Keystone	Utah	500,000	5,000	100	1,850,000	July 1906	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	1,101,250	July 1906	.06
Gwin Mine, Dev., g.	Cal	1,000,000	100,000	10	35,000	Mar. 1906	.25
Hecla, s. l.	Idaho	250,000	1,000,000	0.25	780,000	Sept. 1906	.02
Homestake, g.	S. D	21,840,000	218,400	100	15,097,750	Oct. 1906	.50
HornSilver,g.s.c.z.l	Utah	10,000 000	400,000	25	5,502,000	Sept. 1906	.05
Inter'l Nickel, pf.	N. Y.	12,000,000	87,415	100	393,368	Nov. 1906	1.50
Iron Silver	Colo	10,000,000	500,000	20	3,800,000	Oct. 1906	.20
Jamison, g.	Cal	3,900 000	390,000	10	247,270	July 1906	.03
Jerry Johnson.	Cal	2,500,000	2,500,000	1	61,700	Apr. 1906	.03
Kendall, g.	Mont	2,500,000	500 000	5	630,000	July 1906	.03
Liberty Bell,g. s.	Colo	700,000	130,551	5	110,857	Jan. 1906	.15
Lightner, g.	Cal	125,000	102,255	1	295,694	Aug. 1905	.05
Mammoth, g. s. l.	Utah	10,000 000	400,000	25	2,080.000	Oct. 1906	.05
Mary McKinney, g.	Colo	1,500,000	1,304,252	1	723,509	Oct. 1906	.06
Mohawk, c.	Mich	2,500,000	100,000	25	500,000	July 1906	3.00
Mont. Ore Purch.	Mont	2,500,000	80,833	25	6,608,119	Apr. 1906	10.00
Monument, g.	Colo	300,000	300,000	1	27,124	Apr. 1905	.01
New Century, z., l.	Mo	300,000	303,000	1	211,500	Nov. 1906	.01
New Idria, q.	Cal	500.000	100,000	5	860,000	Oct. 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	2,600,000	Sept. 1906	2.00
North Star, g.	Cal	2,500,000	250,000	10	1,186,989	Sept. 1906	.20
Northern Light,g s.	Utah	2,000,000	400,000	5	20,000	Feb. 1904	.05
Old Dominion Cop.	Ariz	7,500,000	281,589	25	280,843	May 1906	.50
Old Gold	Colo	2,101,150	2,101,150	1	10,506	Mar. 1906	.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	5,785,700	July 1906	6.00
Parrot, c,s.	Mont	2,300,000	229,850	10	6,577,800	Sept. 1906	.25
Pennsylvania, g.	Cal	5,150,000	51,500	100	284,925	July 1905	.10
Platteville, l. z.	Wis.	20,000	500	40	89,500	Oct. 1905	10.00
Portland, g.	Colo	3,000,000	3,000,000	1	7,417,086	Oct. 1906	.05
Quicksilver, pf.	Cal	4,500,000	43,000	100	1,931,411	May 1903	.50
Quincy, c.	Mich	2,500,000	100,000	25	16,220.000	Sept. 1906	2.50
Rob Roy, z.	Mo	15,000	15,000	1	9,600	May 1906	.03
Rocco Homest'k,l.s.	Nevada	300,000	300,000	1	112,000	Dec. 1905	.02
Sacramento, g, q.	Utah	5,000,000	1,000,000	1	240,000	Oct. 1906	.00½
Salvator, g. s. l.	Utah	200 000	200,000	1	6,500	Aug. 1904	.01
St. Joseph, l.	Mo	20,000,000	1,000 000	10	4,658,357	June 1906	.15
Silver Hill, g s	Nevada	108,000	108 000	1	59,400	Feb. 1906	.05
Silver King, g. s. l.	Utah	3.000,000	150,000	20	10 325,000	Oct. 1906	.33½
Shannon, c.	Ariz	3,000,000	300,000	10	150 000	Dec. 1906	.50
Snowstorm, s. l.	Ida	1,500,000	1,500,000	1	90,000	Oct 1906	.06
Spearfish, g.	S. D	1,500,000	1,500,000	1	165.500	Jan. 1905	.01½
Standard Con., g. s.	Cal	2,000,000	178,394	10	4,204,933	Oct. 1906	.15
Stratton'sIndepend	Colo	5,500,000	1,000,007	5	4,895,865	Apr. 1906	.12½
Tamarack, c.	Mich	1,500,000	60,000	5	9,000,000	July 1906	2.00
Tennessee, c.	Tenn	5,000,000	175,000	25	875,000	July 1906	1.25
Tomboy, g s	Colo	1,750,000	300,000	5	900.000	June 1906	.48
Tonopah of Nev.	Nevada	1,000,000	1,000,000	1	2 300,000	Oct. 1906	.35
Tonopah Belmont	Nevada	2,000,000	1,295,007	1	129,500	June 1906	.10
Tonopah Ext'nsion	Nevada	1,000,000	928,433	1	278,530	Apr. 1906	.15
Tonopah Midway	Nevada	1,000,000	1,000,000	1	250,000	Oct. 1906	.05
Uncle Sam, g.s.l.	Utah	500,000	500.000	1	130 000	Oct. 1906	.01
United Cop. com.	Mont	75,000,000	450,000	100	3,600,000	Oct. 1906	1.75
United, c. pf.	Mont	5 000,000	50 000	100	1,350,000	Nov. 1905	3.00
United, z. l., com.	Mo	500,000	92,400	5	27,450	Oct. 1903	.05
United, z. l., pf.	Mo	500,000	19,556	25	228,124	July 1906	.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
Un.States,pf.g.s.c.l*	Utah	37.500,000	750,000	50	1,968,750	Oct. 1906	.87½
U.S. Red. & Ref. Pf.	Colo	4,000.000	39,458	100	828,618	Oct. 1906	1.50
Utah, g.	Utah	1,000.000	100,000	10	235,000	Oct 1906	.05
Utah Con., c.	Utah	1.500,000	300,000	5	5,136,000	July 1906	2.50
Victoria, Utah	Utah	250,000	250,000	1	57,000	July 1906	.04
Vindicator Con., g.	Colo	1,500,000	1,500,000	1	1,470,000	July 1906	.03
Wolverine, c.	Mich	1,500,000	60,000	25	3,450,000	Oct. 1906	9.00
Work, g.	Colo	1,500,000	1,500,000	1	45,000	Oct. 1906	.01
Yankee Con.	Utah	500,000	500.000	1	112 500	June 1906	.02½

*Previous to consolidation $1,436,250 were divided.

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	181,530	100	6,831,280	Oct. 1906	3.00
American Cement	Pa.	2,000,000	200,000	10	948,000	July 1906	.30
American Coal	Md	1,500,000	50,000	25	1,820,000	Sept. 1906	1.25
Associated Oil	Cal.	21,000,000	21,000,000	1	630,000	Aug. 1905	.01½
Bethlehem Steel, pf.	Pa.	15,000,000	150,000	100	900.000	Nov. 1906	.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	7,650,000	Oct 1906	1.00
Caribou Oil	Cal.	100.000	80,000	1	56,000	July 1905	.07
Central C & C., com.	Mo	5,125,000	51,250	100	1,768,125	July 1906	1.50
Central C. & C., pf.	Mo	1,875,000	18,750	100	1,218,750	July 1906	1.25
Central Oil	W. Va.	1,500,000	60,000	25	182,500	May 1904	.25
Claremont Oil	Cal.	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	8,442,900	Oct. 1906	1.50
Crucible Steel, pf.	Pa.	25,000,000	250,000	100	1 000,000	Sept. 1906	1.50
Empire S. & I., pf.	N. J	5,000,000	25,000	100	562,500	July 1906	1.50
Fairmont Coal	W. Va.	12,000,000	120,000	100	840,000	Feb. 1906	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	1,596,919	Sept. 1906	2.00
General Chem., pf.	U. S.	12,500,000	100,000	100	4,225,178	Oct. 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
International Salt		30,000,000	182,280	100	744,780	Sept 1906	1.00
Jeff. & Cl'f C. & I., com	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	825,500	Aug. 1906	2.50
Kern River Oil	Cal.	2,000,000	20,000	100	39,500	May 1905	.13
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	1,442,560	June 1906	4.00
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, com.	N. Y.	15,000,000	149,054	100	1,639,594	Oct. 1906	1.00
National Lead, pf.	N. Y.	15,000,000	149,040	100	15,540,868	Sept. 1906	1.75
Nat'l Steel & Wire,pf.	N. Y.	5,000,000	25,778	100	631,561	May 1906	1.75
New Central Coal	Md.	1,000,000	50,000	20	330,000	Nov. 1906	.40
New River Coal, pfd.	W. Va.	4,000,000	3,761,700	100	564,255	Nov. 1906	1.50
Pacific Coast Borax	Cal.	2,000,000	19,000	100	2,086,500	Aug. 1905	1.00
Peerless Oil	Cal.	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	7,026,995	Nov. 1906	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	415,000	Nov. 1906	1.50
Republic I. & S., pfd.	Ill.	25,000,000	204,169	100	2,805,648	Oct. 1906	3.75
Sloss-Sheffield, com.	Ala.	7,500,000	75,000	100	750,250	Oct. 1906	2.50
Sloss-Sheffield, pf.	Ala.	20,000,000	67,000	100	2,976,250	Oct. 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	309,585,000	Sept. 1906	6.00
Tenn. C. & I., com.	Tenn.	22,553,600	225,536	100	2,680,889	Nov. 1906	1.00
Tenn. C. & I., pf.	Tenn.	248,000	2,480	100	375,130	Nov. 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 National Gas.	Pa.	9,000,000	90,000	100	1,260,000	Apr. 1905	2.00
U. S. SteelCorp.,cm.	U. S.	550,000,000	5,083,025	100	58,444,003	Oct. 1906	1.00
U. S. Steel Corp., pf.	U. S.	360,281,100	3,603,141	100	62,234,470	Aug. 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.	20,000,000	180,000	100	11,100,869	Oct. 1906	2.00
Westmoreland Coal	Pa.	3,000,000	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 McKin'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
Consolidated M & S.	B. C.	5,500,000	46,988	100	352,410	Nov. 1906	2.50
Copiapo, c.	Chile	1,125,000	112,500	10	3,000,900	Oct. 1904	1.20½
Crow's Nest Pass	B. C.	3,500,000	140,000	25	1,581,148	Apr. 1906	.62½
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	1,020,535	July 1905	13.65
El Oro, g. s.	Mex	5,750,000	1,080,000	5	2,708,800	July 1904	.18
Esperanza, s. g.	Mex	2,275,000	455,000	5	4,373,849	Oct, 1906	2.52
Granby Con.	B. C.	15,000,000	1,350,000	10	1,348,630	Sept. 1906	.30
Greene Con., copper.	Mex	8,640,000	864,000	10	5,468,600	Nov. 1906	.40
Greene Con., gold.	Mex	5,000,000	500,000	10	300,000	July 1905	.20
Guanajuato	Mex	3,000,000	540,000	5	74,250	Oct. 1906	.07½
Guggenheim Expl.	Mex	17,000,000	105,000	100	2,572,500	Oct. 1906	1.75
LeRoi No. 2, g.	B. C.	3,000,000	120,000	25	687,600	Oct. 1906	.48
Mexican Coal & Coke	Mex	5,000,000	50,000	100	600,000	Dec. 1905	3.00
Mex. Con. M. & S. Co.	Mex		240,000		360,000	Oct. 1906	.50
Mines Co. of Am.	Mex	2,000,000	2,000,000	1	2,355,000	Oct. 1906	.01½
N. Y. & Hond. Ros.	C. A.	1,500,000	150,000	10	2,137,500	Aug. 1906	.20
Nipissing, S. Co.	Ont	6,000,000	1,200,000	5	480,000	Oct. 1906	.25
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	49,703	100	788,600	Nov. 1904	2.00
N. S. St. & Coal, pf.	N. S.	1,030,000	10,300	100	329,600	July 1906	2.00
Penoles*	Mex	250,000	2,500	100	7,763,375	June 1906	20.00
Platanillo	Mex	500,000	206,989	1	5,580	Sept. 1906	.00½
Reco, g. s. l.	B. C.	1,000,000	958,000	1	327,082	Apr. 1906	.02
Slocan Star	B. C.	500,000	500,000	1	575,000	Dec. 1904	.05
St. Eugene Con.	B. C.	3,500,000	3,202,000	1	402,120	Oct. 1905	.02
Tezuitlan Copper	Mex	1,000,000	10,000	100		Oct. 1906	2.00
Tilt Cove, c.	N. F.	1,000,000	89,000	2	21,360	Jan. 1905	.48
Tyee, c.	B. C.	940,000	180,000	5	136,800	Dec. 1904	.24

*Mexican Currency.

THE MINING INDEX.

The editors of this paper read all the important publications of the world that relate to mining and the treatment of minerals. This index is published as a reference for all interested and to make it impossible for readers of the ENGINEERING AND MINING JOURNAL to miss any important article published anywhere.

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ALUMINUM

1107—ALUMINUM—Melting Aluminum and Its Alloys. W. J. May. (Mechan. Wld., Oct. 5, 1906.) Mentions the difficulties met with in melting aluminum and its alloys, and states how they may be overcome. 20c.

ANTIMONY

1108—ANALYTICAL METHOD—Antimony in Babbitt and Type Metals. H. Yockey. (Jl. Amer. Chem. Soc'y, Oct., 1906.) A proposed method for the determination of antimony and its alloys. 60c.

1109—PRODUCTION of Antimony in 1905. C. C. Schnatterback. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 9 pp.) Gives statistics of the production, imports, consumption and prices of antimony in 1905. 20c.

ARSENIC

1110—PARIS GREEN—The Constitution of Paris Green and Its Homologues. S. Avery. (Jl. Amer. Chem. Soc'y, Sept., 1906; 8½ pp.) A chemical discussion of the composition of paris green and other analogous compounds. 60c.

1111—PRODUCTION of Arsenic in 1905. C. C. Schnatterback. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 5 pp.) Deals with the occurrence, production, prices, and uses of arsenic in the United States and other countries in 1905. 20c.

ASBESTOS

1112—ASBESTOS—The Production of Asbestos in 1905. G. O. Smith. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 6 pp.) Discusses the occurrence, uses and production of asbestos in the United States in 1905, and gives prices. 20c.

BAUXITE

1113—INDIA—Laterite in Mysore. E. W. Wethereil. (Mysore Geol. Dept., Memoirs, Vol. III, Part 1; 27 pp.) Describes the origin of this aluminum ore and outlines its occurrence in India.

BISMUTH

1114—PRODUCTION of Bismuth in 1905. C. C. Schnatterback. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 5 pp.) Review of the production, imports, consumption and uses of bismuth in 1905. 20c.

BORAX

1115—BORAX MINING in California. D. A. Willey. (Eng. & Mg. Jl., Oct. 6, 1906.) General notes on the conditions of the borax industry in the State. 20c.

CLAYS

1116—CLAY-WORKING INDUSTRIES—Statistics of the Clay-Working Industries in the United States in 1905. J. Middleton. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 62 pp.) Gives statistics of the production and value of different clay products in the various states of the Union.

1117—TEXAS—The Clays of Texas. H. Ries. (Bi-monthly Bull., Amer. Inst. Mg. Engrs., Sept., 1906; 39 pp.) Describes in detail the clay resources of southeastern Texas.

COAL AND COKE

1118—ACCIDENTS in Coal Mines. (Sci. & Art of Mg., Aug. 11, 25, Sept. 8, 22, Oct. 6, 1906.) Points out some directions in which the safety of miners could be better secured by legislative action. 80c.

1119—BITUMINOUS COAL—Combustion of Soft Coal. W. R. Van Northwick. (Indus. Wld., Oct. 20, 1906; 2½ pp.) Describes some of the mechanical appliances for burning soft coal automatically. 20c.

1120—CAR DUMP—A Revolvable Car Dump. E. Ramsay. (Eng. & Mg. Jl., Oct. 20, 1906; 3½ pp.) Describes an equipment designed for the dumping of coal trips of any number of cars at one operation, and without disconnecting the hoisting rope. 20c.

1121—CLASSIFICATION OF COALS—S. W. Parr. (Jl. Amer. Chem. Soc'y, Oct., 1906; 7½ pp.) A proposed new classification for coals, in which the scientific and industrial aspects of coal are given about equal weight. The classification depends upon the ratio between volatile carbon unassociated with hydrogen to the total amount of carbon yielded by analysis. 60c.

1122—COAL ANALYSIS—C. Cochran. (Jl. Elec., Power & Gas, Sept. 15, 1906.) A discussion of the limitations of the standard coal analysis when applied to certain kinds of lignite. 20c.

1123—COAL TESTING—How Should Steam Coal Be Purchased? Wm. M. Booth. (Eng. Rec., Sept. 22, 1906.) An argument in favor of basing coal purchases on the chemical composition. 20c.

1124—COAL TESTING—The Testing of Coal. A. Bement. (Paper read before the Western Soc'y of Engrs., Oct. 3, 1906.) Points out the necessity for improving methods of coal testing, and suggests certain lines along which the research work should proceed. 20c.

1125—COAL WASHING—Kohlen-Separation und Wäsche der Zeche Mansfeld. S. H. Nienaber. (Bergbau, Oct. 11, 1906; 3 pp.) Describes the jigs and other apparatus used in washing coal at this mine. 40c.

1126—COAL WASHING—Neuerungen in Separations- und Waschеanlagen für Kohle. (Metallurgie, Sept. 22, 1906; 5 pp.) Describes and illustrates the coal washing plant at the Anna mine of Westphalia. 40c.

1127—COKE—Attaque des Cokes par l'Acide Carbonique. L. Lévêque. (Bull. Soc. de l'Industrie minérale, T. V, II livr., 1906; 18 pp.) Discusses the results of experiments on the absorption of carbon dioxide by different brands of coke.

1128—COKE OVENS—Ueber Koksofenanlagen, System Koppers. Herbst. (Glückauf, Oct. 6, 1906; 7½ pp.) Illustrated description of the Koppers by-product coke ovens. 40c.

1129—CONSOLIDATION of Five Large Coal Mines. J. Leggett Pultz. (Eng. & Mg. Jl., Oct. 6, 1906; 2½ pp.) Describes a number of coal mines in Westmoreland Co., Pa. 20c.

1130—ELECTRIC POWER—Electric Installation at the Bowhill Coal Company's Cardenden Pits. (Coll. Guard., Oct. 12, 1906.) Describes the entire electric plant at this colliery. 20c.

1131—ELECTRIC POWER—Electrical Installation at the Wilhelmina Mine, Heerlen, Holland. W. Philippi. (Electrician, Oct. 12, 1906.) Abstract from *Elektrotechnische Zeitschrift*, Aug. 30, 1906, describing the entire electrical plant at this Dutch coal mine, including centrifugal pump, hoisting engine, and ventilating fans. 20c.

1132—EXPLOSIVE ROCK AND COAL. (Mines & Min., Oct., 1906.) Discussion of the probable explanation for the explosive decrepitation of the walls of mine workings. 20c.

1133—FIRE DAMP—Notes on the Detection and Estimation of Inflammable Gases in Mines by Means of Flame Caps. Chas. Latham. (Trans., Mg. Inst. of Scotland, Vol. XXVIII, Part 5; 11 pp.) Discussion by various members of the Institute of the above paper, previously indexed.

1134—FIRE DAMP—The McCutcheon Gas-Detector. R. McLaren. Trans., Mg. Inst. of Scotland, Vol. XXVIII, Part 5; 9 pp.) Describes the apparatus and the method of employing it to discover the presence of dangerous gases in mines.

1135—FRANCE—Note au Sujet des Recherches Exécutées Depuis 1896 pour Reconnaitre l'Extension Méridionale Bassin Houiller du Pas-de-Calais. E. Cuvelette. (Bull., Soc. de l'Industrie minérale, T. V., II livr., 1906; 46 pp. and 1 map.) Outlines the geology and the exploration work recently done in this French coal field. Illustrated.

1136—FUEL ANALYSIS—Fuel, Water and Gas Analysis for Steam Users. J. B. C. Kershaw. (Elec. Rev., Sept. 8, 15, 22, 29 and Oct. 6, 1906; 17 pp.) Elementary discussion of the origin of carbonaceous fuels; states the theory for deriving the calorific value of a fuel from its ultimate analysis, and methods of applying the test results. 80c.

1137—FUELS AND COMBUSTION. S. A. Moss. (Power, Oct. and Nov., 1906; 5½ pp.) A discussion of the chemistry involved in the burning of fuels, with notes on the practical points of the subject. 40c.

1138—GEOLOGIC SURVEY WORK on Coal during 1905. M. R. Campbell. (U. S. Geol. Surv., Bull. No. 285, 1906; 7½ pp.) Enumerates the work done by the U. S. Geological Survey during 1905 on the subject of coal.

1139—GERMANY—Das flözführende Steinkohlengebirge in der Bochumer Mulde zwischen Dortmund und Camen. H. Meyer. (Glückauf, Sept. 8, 1906; 16½ pp.) Describes the geology as affecting mining operations in this coal field, the principal feature of which is the intensity and frequency of faulting. 60c.

1140—HAULAGE—The Rateau Exhaust Steam Driven Five-phase Haulage Plant at Hucknall Colliery. W. Maurice. (I. & C. Tr. Rev., Sept. 14, 1906.) Paper read before the Midland Counties Instn. of Engrs., discussing the construction, operation and cost of this large haulage engine. 20c.

1141—HOISTING—Etude pour Déterminer le Choix a Faire entre la Machine d'Extraction a Vapeur et la Machine Electrique pour Deux Nouveaux Sièges d'Extraction. A. Chastel. (Bull. Soc. de l'Industrie minérale, T. V, II livr., 1906; 34 pp.) Compares the operating expenses and other features of a steam and electric hoisting plant at neighboring French collieries.

1142—HOISTING-PLANT—Die elektrische betriebene Hauptschachtfördermaschine der Compagnie des Mines de Houille de Ligny-les-Aire. Ing. Damm. (Glückauf, Sept. 15, 1906; 14 pp.) Describes in detail and illustrates the construction of the steel head frame and the nature and operation of the electrically driven Koepe hoisting plant which is mounted on top of the frame. 60c.

1143—LIGNITE—Les Bassins Lignitifères et Houillers des Montagnes Rocheuses. E. A. Ritter. (Annales des Mines, T. X, 7 livr. of 1906; 79 pp.) Discusses the occurrence of lignitic coals in the Rocky Mountain region, giving analyses of numerous samples from various localities.

1144—LIGNITE BRIQUETS. E. Waller and H. S. Renaud. (Eng. & Mg. Jl., Oct. 6, 1906; 3 pp.) A description of the plant and operations involved in the manufacture of lignite briquets, with a statement of the cost. 20c.

1145—LIGNITE COALS of North Dakota. F. A. Wilder. (Econ. Geol., July-Aug., 1906; 7 pp.) Describes the stratigraphy of this district, and gives analyses and thermal tests on many samples of the lignite. 60c.

1146—LOW GRADE FUEL—Notes on the Utilization of Poor Coals and Slack. D. B. Dowling. (Jl. Can. Mg. Inst., Part of Vol. IX, advance copy; 6½ pp.) Shows a way in which the inferior coals of Canada may be made useful through the agency of the gas producer.

1147—LOW GRADE FUEL—The Burning of Cheap Fuels. (Elec. Wld., Oct. 6, 1906; 3 pp.) Continuation of article previously indexed, describing plans for burning cheap fuels in boiler and other furnaces, with special reference to the M'Clave system. 20c.

1148—LOW GRADE FUEL—The Burning of Washer Slate and Coke Braize. C. G. Atwater. (Elec. Wld., Oct. 6, 1906; 2½ pp.)

Describes the boiler equipmeut designed to burn these kinds of iow grade fuel. 20c.

1149—MARYLAND—Mining in the George's Creek Coalfield. F. W. Parsons. (Eng. & Mg. Jl., Oct. 13, 1906; 4½ pp.) An illustrated description of several of the Consolidated Coal Co.'s miues in the George's Creek district. 20c.

1150—MECHANICAL ENGINEERING OF COLLIERIES. T. C. Futers. (Coll. Guard., Aug. 17, 24, 31, Sept. 7, 14, 21, 28, Oct. 5 and 12, 1906.) Continuation of lengthy serial, dealing with heapsteads, screening and washing plants. $1.60.

1151—MINING METHOD—Die Zsyltaler Gruben der Salgó-Tarjaner Steinkohlen-Bergbau-Aktiengesellschaft. J. Adreics and A. Blascheck. (Oest. Zeit. f. Berg- u. Hüttenw., Sept. 8, 15, 22, 29 and Oct. 6, 1906; 24½ pp.) Describes and illustrates the method of mining a thick, steeply pitching coal seam with almost complete removal of the coal. Also describes the geological features of the district and the stratigraphy of the coal bearing measures. $1.60.

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1159—STORAGE—The Storage of Coal by Submergence in Salt Water. W. H. Bechler. (Proc. U. S. Nav. Inst., Vol. XXXII, No. 2.) Reports the conclusions of a test by Navy officials on the advantage of storing coal in sea water.

1160—WINDING ENGINES—The Steam Consumption of Modern Winding Engines. (Engineer, Lond., Oct. 12, 1906.) Describes a large hoisting plant at a colliery in Nottingham, England, with the results of tests upon its working efficiency. 20c.

COBALT

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1218—NEVADA AND CALIFORNIA—Notes on Ore Deposits of Southwestern Nevada and Eastern California. S. H. Ball. (U. S. Geol. Surv., Bull. No. 285, 1906; 20½ pp.) A general description of the geology and ore deposits of southern Nevada, with a map of the district, showing the location of the new camps.

1219—NEW MEXICO—A Reconnaissance of the Mineral Deposits of New Mexico. W. Lindgren and L. C. Graton. (U. S. Geol. Surv., Bull. No. 285; 13 pp.) Statement of the topography, geology and mineral resources (except coal) of New Mexico.

1220—NEW MEXICO—The Cooney District, New Mexico. B. Graham. (Eng. & Mg. Jl., Oct. 20, 1906). Describes the geology and mining development of this New Mexico district. 20c.

1221—NOVA SCOTIA—Gold Lodes of Nova Scotia. H. J. Baron. (Mg. Rep., Sept. 20, 1906). Describes the geology and the occurrence of gold ore in the vicinity of Halifax, N. S.

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1231—RECOVERY OF GOLD—Treatment of the Precipitate and Manipulation of the Tilting Furnaces at the Redjang Lebong Mine, Sumatra. S. J. Truscott. (Instn. of Mg. & Met., Bull. No. 25, Oct. 11, 1906; 5 pp.) Describes a method of recovering gold from zinc precipitate at this mine.

1232—SIBERIA—Gold Mining in Western Siberia. L. Tovey. (Eng. & Mg. Jl., Sept. 29, 1906; 4 pp.) Describes several of the mines and mills of Western Siberia which are developing gold lodes; placer mining is still predominant, but quartz mining is making rapid progress. 20c.

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1236—WASHINGTON—Free Milling Gold District of Whatcom County, Washington. Slate Creek. (N. W. Mg. Jl., Aug., 1906; 3½ pp.) Describes some of the features of the Slate Creek district in northern Washington. 20c.

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1238—WESTERN AUSTRALIA—The Auriferous Deposits and Mines of Menzies, North Coolgardie Goldfield. H. P. Woodward. (W. A. Geol. Surv., Bull. No. 22, Perth, 1906; 92 pp. with 2 maps and 6 plates of sections). Describes the geology and the occurrence of ore, together with details of the mining operations in this Western Australia goldfield.

GRAPHITE

1239—PRODUCTION of Graphite in 1905. Geo. O. Smith. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 7 pp.) Gives data on the occurrence, uses, production and consumption of graphite in the United States in 1905.

GYPSUM

1240—ENGLAND—Gypsum and Its Occurrence in the Dove Valley. T. T. Wynne. (Paper before the Instn. of Mg. Engrs., Sept. 12, 1906). Describes the occurrence of gypsum in England and methods adopted for working the deposits. 20c.

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1250—CARBON IN STEEL—A New Colorimeter for the Determination of Carbon in Steel. C. H. White. (Bi-monthly Bull., Amer. Inst. Mg. Engrs., Sept., 1906; 6 pp.) Describes a piece of apparatus for assisting in the colorimetric determination of carbon in iron and steel.

1251—CAST IRON—Some Notes on the Chemistry of Cast Iron. (Ir. Tr. Rev., Oct. 18, 1906; 3 pp.) Paper read before the Brit. Fdymen's Assn., Aug., 1906, discussing the influence of the usual impurities in cast iron when present in varying amounts. 20c.

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1254—ELECTRIC FURNACE Methods of Iron and Steel Production. J. B. C. Kershaw. (Iron Tr. Rev., Sept. 27, 1906; 2½ pp.) Continuation of serial previously indexed, dealing with the construction and operation of the Kjellin furnace. 20c.

1255—ELECTRIC FURNACE—The Gin Electric Steel Furnace. F. C. Perkins. (Mg. Wld., Oct. 20, 1906). Describes the latest type of this furnace, in which some of the objections to the earlier types have been overcome. 20c.

1256—ELECTRIC FURNACES—L'Electro-Metallurgie de l'Acier. J. Thiheau. (Rev. univ. des Mines, Aug., 1906; 17 pp.) Describes and discusses the various types of electric furnaces used for making steel. $1.00.

1257—ELECTRIC POWER—Electricity in Steel Works. (Iron & Coal Tr. Rev., Oct. 12, 1906; 3 pp.) Describes the installation of electric motors for different purposes at several large steel works, with a discussion of their advantages. 40c.

1258—ELECTROLYTIC IRON—Studien über die Elektrolytische Abscheidung des Eisens aus den Wässerigen Lösungen Seines Chlorürs und Sulfates. A. Ryss and A. Bogomolny. (Zeit. f. Elektrochemie, Sept. 14, 1906; 6½ pp.) Results of experiments on the electrolytic precipitation of iron from solutions, under varying conditions of current density and concentration of solution. 40c.

1259—HEAT TREATMENT of Steels Containing Fifty and Eighty Hundredths Per Cent. of Carbon. C. E. Corson. (Bimonthly Bull., Amer. Inst. Mg. Engrs., Sept., 1906; 17½ pp.) Review of experiments on the physical and microscopical properties of steels under different heat treatments.

1260—HIGH CARBON STEELS—On the Heat Treatment of Some High Carbon Steels. Wm. Campbell. (Jl. Amer. Chem. Soc'y, Oct., 1906; 23½ pp.) Review of experiments on the influence of different heat

treatments upon the physical properties of various kinds of hard steels. 60c.

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1263—IRON ORE—Analysis of "Iron Shale" from Coon Mountain, Arizona. O. C. Farrington. (Amer. Jl. of Scl., Oct., 1906; 6 pp.) Notes on the occurrence of iron ore containing nickel and having about the same composition as the Diablo meteorite. 60c.

1264—IRON ORES of the Western United States and British Columbia. C. K. Leith. (U. S. Geol. Surv., Bull. No. 285, 1906; 6½ pp.) Enumerates the occurrences of iron ores in Washington, Wyoming, Colorado and British Columbia. 20c.

1265—KENTUCKY—Origin and Occurrence of Certain Iron Ores of Northeastern Kentucky. W. C. Phalen. (Econ. Geol., July-Aug., 1906; 14 pp.) Describes the occurrence of iron ores, with their analyses, and proposes a probable origin for them. 60c.

1266—LAKE SUPERIOR—The Chapin Mine—Its Record and Prospects. (Iron Tr. Rev., Sept. 27, 1906). Describes the plant and the method of mining at the Chapin mine. 20c.

1267—MINNESOTA—History and Methods of the Soudan Mine. (Iron Tr. Rev., Sept. 27, 1906). Describes the plant and method of mining at the Soudan mine. 20c.

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1269 — NICKEL-MANGANESE-STEEL—Eisen-Nickel-Mangan-Kohlenstoff-Legierungen. (Stahl u. Eisen, Oct. 1, 1906; 7 pp.) Continuation of article previously indexed, discussing the physical, chemical, mechanical and electrical properties of nickel-manganese steel. 40c.

1270—NOMENCLATURE—Uniform Nomenclature of Iron and Steel. (Iron & Coal Tr. Rev., Oct. 12, 1906). A series of definitions of terms commonly used in the iron and steel industry, with an argument for their adoption. 20c.

1271—NORWAY—Sundry Geological Problems. G. Henriksen. (Can. Mg. Rev., Oct., 1906; 3½ pp.) A further study of the iron ore deposits in Sydvaranger, Norway. 40c.

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1273—PUDDLING FURNACES—Der Flammofenbetrieb in amerikanischen Giessereien. V. Portisch. (Stahl u. Eisen, Oct. 1, 1906; 6 pp.) Describes and illustrates a number of types of gas-burning reverberatory puddling furnaces. 40c.

1274—RAILS—Comparison of American and Foreign Rail-Specifications, With a Proposed Standard Specification to Cover American Rails Rolled for Export. A. L. Colby. (Bi-monthly Bull. American Inst. Mg. Engrs., Sept., 1906; 51½ pp.) A comparison of the process of manufacturing, chemical constituents and physical properties of British and American rails.

1275—SPAIN—The Iron Ore Supplies of the Asturias. (Iron & Coal Tr. Rev., Sept. 28, 1906). Describes the iron ore resources of this district, and outlines the development that it has undergone. 20c.

1276—STEEL INGOTS—Segregation in Steel Ingots. J. E. Stead. (Paper read before Section G of the Brit. Assn. for the Advancement of Science, Aug., 1906.) A discussion of the segregation of carbon in ingot steel, with the reasons for it and the bad results due to it. 20c.

1277—STEEL PLANT—The Scullin-Gallagher Iron and Steel Company. (Iron Age, Oct. 4, 1906; 4½ pp.) Describes the new plant and apparatus of this iron and steel company in St. Louis. 20c.

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1279—TESTING—Methods of Testing Metals by Alternate Strains and Thermic Treatment of Steels to Increase Their Resistance. J. E. Howard. (Eng. Rec., Sept. 22, 1906.) Discussion before the Brussels Congress of International Assn. for Testing Materials, of the strength of different kinds of steel, subjected to different treatments and tested in different ways. 20c.

1280—VANADIUM STEELS—Der Einfluss des Vanadiums auf Eisen und Stahl. P. Pütz. (Metallurgie, Sept. 22 and Oct. 8, 1906; 9 pp.) Gives results of tests on the mechanical properties of nickel and vanadium steels of various composition, and a study of the cooling curves of steel containing various proportions of vanadium. 60c.

1281—WALES—Geschichte der Eisenindustrie in Wales. L. Beck. (Stahl u. Eisen, Sept. 15, 1906; 8½ pp.) Conclusion of serial previously indexed, reviewing the present condition of the iron industry in Wales. 60c.

LEAD

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1283—LEAD AND ZINC ORES in 1905. H. Foster Bain. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 18 pp.) See "Zinc."

1284—LEAD INDUSTRY—Relation of Mining and Smelting Between Mexico and the United States. J. W. Malcolmson. (Paper read before the Amer. Mg. Congress, Nov., 1905; 4 pp.) Outlines the state of the lead industry of the United States as influenced by the importation of lead ores from Mexico.

1285—LIME ROASTING of Galena. W. R. Ingalls. (Bi-monthly Bull., Amer. Inst. of Mg. Engrs., Sept., 1906; 19 pp.) A discussion of the several conflicting claims for the use of lime or gypsum in the reduction of lead ores.

1286—ONTARIO LEAD DEPOSIT. J. Volney Lewis. (Econ. Geol., July-Aug., 1906; 5 pp.) Describes the geology and the occurrence of lead ore in central Hastings Co., Ontario. 60c.

1287—SMELTING—The New Smelting. A. W. Dyer. (Can. Mg. Rev., Oct.; 1906.) Describes the operation of the Huntington-Heberlein process at the Hall Mines' smelter, at Nelson, B. C. 40c.

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1289—ANALYSIS—Konstanten in der Mineralschmieröl-Analyse. R. Kissling. (Chem.-Zeit., Sept. 26, 1906.) Gives methods for testing petroleums and tabulates some of the physical properties of a number of oils from different parts of the world. 40c.

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1294—PERSIA—The Petroleum Deposits of Persia. H. Hoeffer. (Pet. Rev., Sept. 29, 1906.) Describes the geological distribution of oil in Persia. 20c.

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1298—DIAMONDS—Report on the Voorspoed Diamond Mine, South Africa. Dr. Merensky. (So. Afr. Mines, Sept. 8, 1906.) Describes the geology and development of this district 20 miles north of Kroonstad, South Africa. 20c.

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1300—PRODUCTION of Sulphur and Pyrite in 1905. E. C. Eckel. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 11 pp.) See "Sulphur."

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1301—TEXAS—Prospects of the Quicksilver Industry in Texas. W. B. Phillips. (Mg. Wld., Oct. 13, 1906.) Brings up to date the information on the condition of quicksilver mining in Texas. 20c.

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1304—THORIUM—Die Thoriumindustrie. C. R. Bohm. (Chem.-Industrie, Sept. and Oct., 1906; 23 pp.) A review of the commercial conditions governing the supply of monazite and other thorium minerals, of the technical methods for recovering thorium from its ore, and purifying it, and of the processes by which it is utilized.

1305—THORIUM MINERALS. S. Fry. (Aus. Mg. Stand., Aug. 29, 1906.) Describes the appearance and occurrence of thorium minerals, and gives tests for determining them. 40c.

1306—URANIUM AND VANADIUM—Determination of Uranium and Vanadium. A. N. Finn. (Jl. Amer. Chem. Soc'y, Oct., 1906; 3 pp.) A comparison of various titration methods suggested for the determination of these rare metals in carnotite. 60c.

1307—URANIUM AND VANADIUM—Ueber die Behandlung der Uran-Vanadiummetalle und ein Verfahren zur Elektrolytischen Darstellung von Vanadium und Dessen Legierungen. M. Gin. (Elektrochemische-Zeit., Sept., 1906; 3 pp.) Describes the metallurgical treatment of uranium and vanadium ores, and outlines an analytical method for the separation of the two metals. 60c.

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1309—STONE INDUSTRY in 1905. E. C. Eckel. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 53 pp.) Gives statistics and other data of the production, exports and imports of granite, sandstone, marble and limestone in the United States in 1905. 20c.

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1311—PRODUCTION of Sulphur and Pyrite in 1905. E. C. Eckel. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 11 pp.) Gives statistics of the production and trade in sulphur and pyrite in the United States and foreign countries in 1905 and previous years. 20c.

TIN

1312—MALAY STATES—The Tin Deposits of the Kinta Valley, Federated Malay States. W. R. Rumbold. (Bi-monthly Bull., Amer. Inst. Mg. Engrs., Sept., 1906; 10½ pp.) Describes the geology and the occurrence of the ore at this locality in the Malay Peninsula.

1313—MALAY TIN FIELDS. R. Stokes. (Mg. Wld., Oct. 6, 1906.) Continuation of article previously indexed, describing the present condition of the tin mining industry in this district. 20c.

1314—SOUTH AFRICA—The Bushveld Tin Fields. (So. Afr. Mines, Aug. 25, 1906.) Describes the geology and the occurrence of tin ore and gravel in South Africa. 20c.

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1315—ANALYTICAL METHOD—The Determination of Tungstic Acid in Wolframite Ores and Concentrates. H. F. Watts. (Western Chem. & Met., July, 1906.) Method for the determination of tungsten in its ores. 60c.

ZINC

1316—METALLURGICAL VESSELS—Composite Metallurgical Vessels. A. L. Quenean. (Eng. & Mg. Jl., Oct. 13, 1906; 2¼ pp.) Describes an ingenious method of producing zinc retorts of greater durability with the ordinary apparatus usually employed. 20c.

1317—STANDARD CELL—The Cadmium Standard Cell. Geo. A. Hulett. (Phys. Rev., Aug., 1906; 17 pp.) Describes the construction of the standard cell and gives results of its operation.

1318—WISCONSIN—Zinc and Lead Mining in Wiscousin. A. A. Hoskin. (Mg. Rep., Oct. 4, 1906.) General historical outline of the field, with notes on its peculiarities. 20c.

1319—ZINC ANALYSIS—Industrial Analysis of Zinc. Hollard and Bertiaux. (Mg. Jl., Oct. 6, 1906.) Translation from *Bulletin de la Societe d'Encouragement pour l'Industrie Nationale*, July, 1906, describing a method for analyzing zinc, and determining the usual impurities. 20c.

1320—ZINC AND LEAD ORES in 1905. H. Foster Bain. (Extract from Mineral Resources of the U. S., Calendar Year 1905; 18 pp.) Gives statistics of the production of these ores, with notes on their composition. 20c.

1321—ZINC INDUSTRY of the Rocky Mountain Region. W. G. Swart. (Paper read before the Amer. Mg. Cong., Nov., 1905; 5 pp.) A review of the condition of the zinc ore industry of the Rocky mountains. 20c.

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1323—ARIZONA—Sketch of the Geology and Ore Deposits of the Cochise. Mining District, Cochise County, Arizona. L. O. Kellogg. (Econ. Geology, July-Aug., 1906; 8 pp.) Describes the geology and ore resources of the district. 60c.

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1325—COLORADO—A Peculiar Occurrence of Native Mercury, Free Gold and Telluride Minerals near Trimble Springs, Durango, Colorado. A. Lakes. (Mg. Rep., Oct. 18, 1906.) Describes the geological and mineralogical occurrence of an unusual mixture of metals. 20c.

1326—COLORADO—Undeveloped Empire of Middle Park, Colo. E. A. Ritter. (Mg. Wld., Sept. 22, 1906.) Describes the features of this portion of Colorado, which will be opened by the new Moffat railroad. 20c,

1327—DEFINITIONS—Useful Definitions. S. F. Emmons. (Mg. & Sci. Pr., Sept. 22, 1906.) A valuable glossary in which all the terms most used in mining geology are carefully defined. 20c.

1328—ECONOMIC GEOLOGY and Mineral Deposits. F. C. Nicholas. (Mg. Wld., Oct. 20, 1906.) Second instalment of serial previously indexed, discussing the principles controlling the deposition of ore. 20c.

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1330—ILLINOIS—The Geological Map of Illinois. S. Weller. (Ill. State Geol. Surv., Bull. No. 1; 26 pp.) A geologic map of the State, accompanied by explanatory notes.

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1332—MISSISSIPPI—Geology and Mineral Resources of Mississippi. A. F. Crider. (U. S. Geol. Surv., Bull. No. 283, 1906; 99 pp.) General description of the geology of Mississippi and statement of its few mineral resources.

1333—PERU—La Provincia de Contumaza y sus Asientos Minerales. F. M. Santolalla. (Boletin del Cuerpo de Ingenieros de Minas del Peru, No. 38, 1906; 57 pp.) Describes the geography, geology, mineral resources and the mining development of the Contumaza province of Peru.

1334—POTASSIUM SALTS—Untersuchungen über den Goldgehalt von Gebirgsproben und Solen deutscher Salzlagerstätten. K. Friedrich. (Metallurgie, Sept. 22, 1906; 4 pp.) Gives results of analyses of certain German natural salts, in which minute quantities of gold were discovered. 40c.

1335 — SECONDARY ENRICHMENT—Experiments on the Solution, Transportation and Deposition of Copper, Silver and Gold. H. N. Stokes. (Econ. Geol., July-Aug., 1906; 7 pp.) Further discussion bearing on secondary enrichment of mineral veins. 60c.

1336—SECONDARY ENRICHMENT. Some of the Reasons Why Metallic Sulphides are Removed from Position of Deposit near Surface, and Redeposited at Greater Depths. E. A. Ritter. (Ores & Metals, Oct. 15, 1906.) A discussion of the chemistry attending the well-known phenomena of secondary enrichment. 20c.

1337—SERPENTINE—An Alteration of Coast Range Serpentine. A. Knopf. (Univ. of Cal., Vol. IV, No. 18, Aug., 1906; 5 pp.) A discussion, founded upon chemical analysis, of the natural decomposition of serpentine. 20c.

1338—SILICATES—Zur Chemie der Silikate. E. Jordis. (Zeit. f. ange. Chemie, Oct. 12, 1906; 4½ pp.) A theoretical discussion of the composition of several rock-forming silicates, together with a system of their analysis. 40c.

1339—SKETCHING the Geological Features of a Mine. A. Lakes. (Mines & Minerals, Oct., 1906.) Notes on the points to be observed in underground geological sketching. 20c.

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MINING—GENERAL

1341—ALASKA—The Mineral Resources of Alaska. A. H. Brooks. (Paper read before the Amer. Mg. Congress, Nov., 1905; 20½ pp.) Outlines the mineral resources of Alaska—mainly gold, coal and copper.

1342—ARIZONA—Kingman, Arizona. (L. A. Mg. Rev., Oct. 13, 1906.) General review of present mining conditions in and around Kingman, Mojave Co., with map showing principal mining districts of the county. 20c.

1343—ARIZONA—The Mines and Mining Districts of the Southwest. W. P. Blake. (Paper read before the Amer. Mg. Congress, Nov., 1905; 8¼ pp.) Historical outline of the development of mining in Arizona.

1344—ASIA MINOR—Die Gewinnung nutzbarer Mineralien in Kleinasien während des Altertums. F. Freise. (Zeit. f. prak. Geologie, Sept., 1906; 7½ pp.) Reviews the ancient mining operations of Asia Minor. 40c.

1345—BLASTING—The Value of Detonating Caps in Blasting. R. L. Oliver. (Eng. & Mg. Jl., Oct. 13, 1906; 4 pp.) Points out the most common errors in the use of blasting powder, and explains how they may be overcome 20c.

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1351—MEXICO—Synopsis of the Mining Industry in Mexico. Compiled by the Asociacion Financiera Internacional. (Paper read before the Amer. Mg. Congress, Nov., 1905; 6½ pp.) A review of the present condition of the mining industry of Mexico, with a statement of its mining laws.

1352—MINE DRAINAGE DISTRICTS. E. L. White. (Paper read before the Amer. Mg. Cong., Nov., 1905; 3 pp.) A statement of the scope of the proposed mine drainage district law in different states.

1353—MINING LAW—Amendments Advisable to the Federal Mining Law. R. S. Morrison. (Paper read before the Amer. Mg. Congress, Nov., 1905; 4½ pp.) Suggests several amendments, which, in the author's opinion, should be made to the Federal mining law.

1354—MINING STOCKS—Assessable vs. Non-assessable Mining Stocks. L. C. Jaquish. (Mg. Wld., Sept. 22, 1906.) A discussion of the relative advantages of these two classes of mining stock. 20c.

1355—NEW MEXICO—Mineral Resources of New Mexico. F. A. Jones. (Paper read before the Amer. Mg. Congress, Nov., 1905; 8½ pp.) Brief outline of the historical development of mining in New Mexico.

1356 — PATENT SURVEYS — Proposed Remedy for Difficulties Arising from Inaccurate Records of Patent Surveys. A. J. Hoskins. (Paper read before the Amer. Mg. Congress, Nov., 1905; 11 pp.) States the reasons for the erroneous maps existing in the Government offices, and discusses the best means of avoiding litigation arising from such inaccuracies.

1357—POTASSIUM SALTS—Ueber den Abbau von Kalisalzlagerstätten in Grösseren Teufen. Kegel. (Glückauf, Oct. 6, 1906; 5 pp.) Describes the German method of mining thick beds of potassium salts, in which the salt is first broken and allowed to remain, supporting the roof until withdrawn. 40c.

1358—RAILWAY TRANSPORTATION—Some of the Relations of Railway Transportation in the United States to Mining and Metallurgy. J. Douglas. (School of Mines Quar., Nov., 1906; 19 pp.) A discussion of the influence of railroads on mining and metallurgical industries. 60c.

1359—SHAFT LINING—An Elliptical Concrete Shaft Lining at Bridgeport, Pennsylvania. (Mines & Minerals, Oct., 1906; 3 pp.) Describes the construction of a concrete mine shaft with detailed costs of the operation. 40c.

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1361—SHAFT SINKING—Wet Sinking in Arizona. R. B. Brinsmade. (Mines & Mg., Oct., 1906.) Outline of the methods used for sinking shafts in certain of the wet districts in Arizona. 20c.

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1363—SURVEYING — Azimuth, Latitude and Time from Polaris and a Southern Star, with Surveyor's Transit. G. O. James. (Jl. Assn. of Eng. Societies, Aug., 1906; 9 pp.) Describes the observations necessary to determine the meridian by this method, together with calculation of results. 40c.

1364—TUNNEL—Gronting a Leaky Tunnel on the Paris, Lyons and Mediterranean Railway. (Eng. News, Oct. 11, 1906.) Explains the method adopted for grouting the sides and top of a tunnel in fractured rock. 20c.

1365—VENTILATION of Boston Subway. H. A. Carson. (Amer. Soc'y of Mechan. Engrs., Proceedings, Oct. 1906; 15 pp.) Describes the plant so successfully used in ventilating the Boston subway tunnel.

ORE DRESSING

1365a — CALCINING FURNACE — Ueber die Thomsensche Trockentrommel, auch Schnelltrockner genannt. C. Blömeke. (Metallurgie, Oct. 8, 1906; 4 pp.) Describes a cylindrical drying and calcining furnace. 40c.

1366 — ELECTRO-STATIC SEPARATION. J. M. McClave. (Western Chem. and Met., July, 1906.) A discussion of the fundamental principles of electro-static separation. 60c.

1367—JIGGING—A Study on the Working of the Water Jig. Gust. G. Bring. (Jernkontorets Annaler, 1906, No. 4. 150 pp.) Report on experiments carried on for determining the laws governing the process of jigging. 80c.

1368 — ORE DRESSING — Removal of Wood in Ore Dressing. A. H. Wethey. (Eng. & Mg. Jl., Oct. 20, 1906.) Describes an apparatus for the removal of waste pieces of wood from the mine product before allowing it to pass through the mill. 20c.

METALLURGY—GENERAL

1369—ALLOYS—The Properties of Alloys. J. F. Buchanan. (Fdy., Oct., 1906; 6 pp.)

Continuation of serial previously indexed, being a discussion and comparison of the different physical properties of many alloys. 20c.

1370—ELECTROCHEMISTRY—Die Elektrochemie in Jahre 1905. H. Borns. (Chem.-Industrie, Sept. and Oct., 1906; 21 pp.) Continuation and conclusion of article previously indexed, reviewing progress in electrochemistry during 1905. 80c.

MINING AND METALLURGICAL MACHINERY

1371—AIR COMPRESSING PLANTS for the North River Tunnels of the Pennsylvania R. R. Frank Richards. (Eng. Rec., Oct. 13, 1906.) Describes the air compressing equipment used in driving the Hudson river tunnels. 20c.

1372—AIR COMPRESSOR—Selection of Proper Air Compressor. J. D. Cone. (Mines & Min., Oct., 1906; 3 pp.) General statement of the considerations governing the selection of an air compressor. 40c.

1373—AIR COMPRESSOR—The Victoria Hydraulic Compressor. A. L. Carnahan. (Mg. Wld., Oct. 6, 1906.) A comparison of the efficiencies of the Taylor hydraulic air compressor with other standard makes. 20c.

1374—BORE HOLE SURVEYING—A New Bore Hole Snrveying Instrument. E. H. V. Melvill. (Jl., So. Afr. Assn. of Engrs., Aug., 1906; 6 pp.) Illustrated description of a new instrument invented by Lewis and Francks for surveying deep bore holes. 60c.

1375—CENTRIFUGAL PUMP—Test of a Two-Stage Centrifugal Pump. (Engineer, Oct. 15, 1906.) Description of methods of testing a Lea-Degen two-stage centrifugal pump, and data of results obtained. 20c.

1376—DEWATERING SCREEN—The Fitzgerald Dewatering Screen. H. J. Baron. (Mg. Rep., Sept. 27, 1906.) Illustrated description of an apparatus which is being used at the Humphreys mill, Creede, Colo., for dewatering the jig tailings before their delivery to the Chilean regrinding mills, and also performs the duty of delivering. 20c.

1377—DRILLS—Electric vs. Air Drills. B. B. Lawrence and B. H. Locke. (Eng. & Mg. Jl., Oct. 6 and 20, 1906.) Discussion of the suitability of electric air drills. 20c.

1378—ELECTRIC AIR DRILL—The Piston Action of the Electric Air Drill. Frank Richards. (Eng. & Mg. Jl., Oct. 13, 1906.) Describes the operation and the advantages of the electric air drill. 20c.

1379—ELECTRIC FURNACE—Its Evolution, Theory and Practice. A. Stansfield. (Can. Engr., Oct., 1906.) Continuation of lengthy serial, previously indexed, dealing with resistors, electrodes and electrode holders. 20c.

1380—ELECTRIC POWER—Bases d'une Théorie Mecanique de l'Electricité. M. Séligmann-Lui. (Annales des Mines, Tome IX, 6 livraison de 1906; 71 pp.) A mathematical research into the nature of electric energy.

1381—ELECTRIC POWER—Die Electrizität im Hüttenwesen. H. Koch. (Oest. Zeit. f. Berg. u. Hüttenw., Sept. 8 and 15, 1906; 6½ pp.) Conclusion of serial previously indexed. 60c.

1382—ELECTRIC POWER—The Application of Electricity to Mining and Milling in the Mining District of Southwest Missouri. G. E. Hayler, Jr. (Lead & Zinc News, Oct. 8, 1906; 3½ pp.) Discusses some of the general features of electric power and compares the cost of electric and steam power at representative mines in the Joplin district. 20c.

1383—ELECTRIC WINDING ENGINES. P. Habets. (Coll. Guard., Sept. 28, 1906.) Translation of paper before the Société de l'Industrie Minérale, being a lengthy review of results obtained from the use of electricity for winding in Europe.

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