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THE ADOPTION at the Indianapolis conference of what is practically the same wage schedule for coal mining as has prevailed in 1901 is a result which was not unexpected. This schedule was originally made a year ago, when times were as good as at present, and such an increase as the miners asked for was not to be expected. In fact, it is hardly probable that they expected it themselves, the increase of 10 per cent being named only as a point or basis for a compromise. The operators, however, were so firmly united against an increase, that the adoption of the old schedule instead of a compromise was the only result, unless the miners' representatives were ready to go into a general strike. The result is not inequitable, however, as the old schedule was a fair one under the existing conditions.



AN IMPORTANT recent development to the industries of New Orleans has been the opening of a through water route from the Alabama coal-fields to the lower Mississippi, which has been effected by the improvement of the Black Warrior tributary of the Tombigbee River and a short canal connecting the Mississippi River with the Gulf through Lake Borgne. The upper part of the Black Warrior flows through the heart of the Alabama coal-field a little to the west of Birmingham. With cheaper coal and the supply of cheap fuel oil afforded by the Beaumont field, which is comparatively near, combined with the excellent facilities for the export trade that New Orleans enjoys, and its excellent railroad connections, the natural resources of the country tributary to that port, including some important minerals, ought soon to show a great increase in their exploitation.



THE LINCOLN MINE at Sutter Creek, California, is one of the Mother Lode mines which has been experimenting with crude California petroleum for fuel instead of pine wood. Mr. E. C. Voorheis, president and superintendent of the company, in his annual report sums up the comparisons between the fuels. They commenced burning oil in June, 1901, putting up a 1,200-barrel redwood storage tank, and connecting it with the boilers by a 4-inch pipe. Bakersfield, Kern County, crude oil was used. From January 1 to July 18, 1901 (6 months and 18 days) there were burned 602 cords of pine wood at \$6 per cord, which equals \$3,612. From July 18, 1901, to January 1, 1902 (5 months and 12 days) there were used 1,460 barrels of oil costing at the mine \$1.50 per barrel, a total cost of \$2,190. The average cost of wood was \$547.27 per month, and the average cost of oil per month was \$405.55, making a saving of \$141.72 per month for the same power. A number of other mines not only on the Mother Lode in Amador, but in other counties are now using California crude oil for fuel. Mr. Voorheis's figures are of interest to other miners throughout the State. In other localities nearer railroad lines, the oil can be delivered cheaper than at Sutter Creek.



THE BOSTON News Bureau unfolds an interesting tale as to the modern American method of floating some mining companies apropos of the Arimex Consolidated Copper Company, which it may be remembered was advertised in an unprecedented manner in

the Eastern newspapers about a year ago. Bankers and brokers in New York, Boston and elsewhere were approached, it is alleged, with the vague hint that there was a Standard Oil underwriting, about which nobody must ask but which, etc., etc. Subscriptions of \$25,000 to \$100,000 were received and acknowledged by receipts stating that the sums advanced were to be used in the promotion of certain mining interests in Arizona and elsewhere. The ground floor promoters bought a lot of mining claims in and about Arizona, transferred them to three companies organized under the laws of New Jersey, which sold out to the Arimex Copper Company, capitalized at \$5,000,000 in 200,000 shares, for \$1,250,000 in cash supplied by the underwriters, who were let in for 100,000 shares at \$12.50 per share. Then the promoters offered 40,000 of the underwriters' shares and 20,000 treasury shares for public subscription at \$25 per share. Had this stock been sold the underwriters would have got back \$1,000,000 of their money and would still have had 60,000 shares costing only a little more than \$4 per share; the company would have had \$500,000 for the development of its property; and the public would have put up \$1,500,000 to see if the scheme was worth anything. However, the public, which we verily believe is learning a thing or two, did not in this instance subscribe at all, as is well known, in spite of the remarkable advertising the scheme received. In the meanwhile the underwriters have been trying to figure out how they were taken in and now are bringing suits to learn if everything was all right, which suits, as the News Bureau puts it, reveal the nature of the cellar and sub-cellar workings with traps and bait arranged by the promoters. The lambs that have been shorn with other copper shears are looking on with a grin.



RECENTLY we mentioned that the shareholders of the English company owning the Welsbach light had become dissatisfied with the management of the directorate and had appointed a committee of business men to examine into the management and advise on improvements and reorganization. This committee criticised the directors' methods very forcibly and, since we mentioned the matter, the shareholders in general meeting have received and adopted their report and practically passed a vote of censure on the directors. They have not so far had the grace to retire, however, but there can be no doubt that they will do so eventually without waiting for a direct vote for their removal. One of the strong points made by the committee is that the company should work hand in hand with the illuminating gas companies and with the new power gas companies. At the present time the illuminating gas companies find great difficulty in maintaining the candle power required by the statutory authorities, owing to the scarcity of cannel coal and the difficulty of finding permanently gaseous hydrocarbons that can be used for enriching. The policy of the committee would be to enter into contracts with these gas companies whereby the latter would undertake to provide all their consumers with burners and mantles at a fixed yearly cost and to supply illuminating gas at a much lower candle power and at a much lower price. This is a policy which certainly deserves attention and no doubt a gas man like Mr. George Livesey

could work out a system on these lines that would pay the gas companies and the Welsbach Company handsomely. The problem as to the permanence of the supply of rare earths still remains and as it is not touched upon by the committee it may be presumed that they do not anticipate any scarcity. From the point of view of shareholders in a company capitalized at several millions of pounds, however, it is desirable to mention this point and to consider that there is always the possibility of the exhaustion of rare products used in manufactures where there is no means of recovering it and of using it over and over again.



THE CARNEGIE INSTITUTION FOR RESEARCH.

In the light of Mr. Carnegie's recent gift of \$10,000,000 for the establishment of an institution for scientific research, it may not be out of place to refer to an editorial article published in the *ENGINEERING AND MINING JOURNAL* in its issue of August 30, 1890, eleven and a half years ago. The article was written by Mr. William Kent, of this city, who was temporarily in charge of the editorial department. It was entitled, "Wanted, A Laboratory for Technical Research." Mr. Kent first called attention to the great improvements then going on in the manufacture of steel and other metals, and to the ignorance with which nearly up to that time all kinds of metallurgical practice had been conducted. As an instance it is cited that ironmakers from the earliest days of pig-iron manufacture had considered that certain brands or grades possessed peculiarly valuable properties, and that certain others were inferior. "Chemical analysis, after years of unsystematic and tentative experiment, gradually revealed that the variations in properties had something to do with the chemical constitution; but only recently has it been experimentally shown, what might long ago have been foreseen, that a mixture of two kinds of inferior iron, such as silver gray and white iron or remelted scrap, in certain proportions definitely determined by analysis, could produce a superior grade of iron, approximating the best charcoal."

The same ignorance existed in regard to fuel economy. Little had been done in the study of different coals for different purposes, or in the effort to improve the methods of burning these coals, such as better forms of furnaces, automatic stockers, gas producers, etc. Recent competition among boiler manufacturers has since then developed much in the matter of steam economy, but all of this has been done independently and consequently at much expense.

In electrical engineering much the same condition existed, and especially was knowledge lacking in that branch which includes electric traction and transmission of power. Many of the problems then unsolved have since been cleared up, but there is still a great deal to be learned. The *JOURNAL* on August 30, 1890, said: "What is needed in all branches of engineering, in order to make our knowledge more exact concerning new metals, materials, machines and processes is a laboratory of technical research of such magnitude that in its experiments on a large scale can be carried on, and, if necessary, for long periods of time. No private enterprise can equip such a laboratory, and it would not be a paying institution in any event. Our government does not seem disposed to do anything in this direction since its failure ten years ago to appropriate money to carry on the investigations of the Iron and Steel Board.

"The only hope, apparently, of the establishment of such a laboratory is that some public-spirited citizen will use his wealth to endow it instead of founding a new college."

The Carnegie Institution offers the long desired opportunity. The general plan, we understand, is to provide facilities for higher research in all branches of science. We sincerely trust that the engineering professions will be given the prominence to which their usefulness in human progress entitles them.



THE METRIC SYSTEM

A SPECIAL COMMITTEE appointed by the venerable Franklin Institute, of Philadelphia, and including in its membership some engineers well known all over the country, has reported the following resolutions for adoption by the Institute:

"Whereas, It is desirable to obtain an international standard of weights and measures, also to simplify and regulate some of our existing standards; and

"Whereas, The Metric System is commendable not only as a suitable International Standard, but also for facility of computation, convenience in memorizing and simplicity of enumeration;

"Resolved, That the Franklin Institute approves of any movement which will promote the universal introduction of the Metric System with the least confusion and expense.

"Resolved, That the National Government should enact such laws as will ensure the adoption of the Metric System of Weights and Measures as the sole standard in its various departments as rapidly as may be consistent with the public service."

The Institute has appointed a meeting for discussion of these resolutions, to be held in its hall in Philadelphia on the evening of February 19. The discussion is not to be limited to members of the Institute, it appears, for invitations have been extended to engineers, business men and others to give their opinion—in person if possible, or in writing, should personal attendance be inconvenient—on the subject. The intention is to secure expressions from all parts of the country and from the classes most interested, on this important point.

Inasmuch as the strongest opposition to the adoption of the metric system has heretofore come from Philadelphia, it is encouraging to find that a committee representing some of the most influential interests in that city should report resolutions taking such a decided stand. It is to be hoped that the committee will be supported, not only by home opinion, but by outside influence; and that decided expressions of approval may be heard.

The position of the *ENGINEERING AND MINING JOURNAL* on this subject has not been doubtful for a long time. Our readers know that we have advocated the adoption of the metric system for many reasons. These have been so often stated that it is not necessary to repeat them here; and moreover, the chief ones are stated with admirable conciseness in the resolutions above. We do not doubt that the weight of opinion will be with the committee and we hope that all those interested will take occasion to express their opinions clearly on this opportunity which the Franklin Institute has made for them.



MARKET CONDITIONS

The condition of the iron market is an unprecedented one. The demand for all sorts of finished material, especially for structural steel continues fully up to the capacity of the mills—in some cases beyond it—and new contracts cannot be placed except for distant deliveries. The United States Steel Corporation has so far resisted successfully the tendency to a sharp rise in prices which a parallel situation would have caused in previous years; and the level of quotations is not high, when all the conditions are taken into account. The raw materials—pig iron and steel billets—are completely covered by contracts over the first half of 1902, and largely into the third and fourth quarters, so that mills which depend on pur-

chased materials are finding it very difficult to arrange for supplies. It has been suggested in some quarters that part of this buying, of pig iron at least, is speculative, but this is somewhat doubtful. The relief to the present pressure—in the absence of such a rise in prices as would serve to check consumption—would seem to be in the importation of foreign material, and it is quite possible that such a movement may take place. We have already noted some buying of German steel billets, and further action of this kind will very likely be taken to relieve the situation.

The blast furnace reports show an increase in the weekly capacity of the furnaces active on February 1. This is largely due to the better condition of railroad transportation and the consequent freer supply of ore and coke at the furnaces. Nearly all the available stacks are now in blast, however, and no large increase in production is possible until some of the new furnaces under construction are completed.

A temporary interruption to deliveries has, however, been caused by the recent storms, which have stopped the railroads in Pennsylvania and Ohio and have caused trouble to many mills and furnaces. These delays, however, will cease with the clearing of the roads and the coming of better weather.

In the metal market the very active buying of copper seems to have passed for the present, consumers probably being supplied for the time. Quotations are firm, however, and only a little weaker. The market, however, is not yet in a settled condition, and there is still a feeling of uncertainty as to the future.

In other metals the lead situation is unchanged, with a fair business at unchanged prices. The large stocks which were referred to in our review on January 4 last, are still overhanging the market. Spelter continues to show a good demand for consumption. This is also the case with tin; the supplies of that metal are sufficient at present. Silver continues dull, notwithstanding a better demand from the East and some European orders for coinage.

The Western coal market continues, as for some weeks past, largely dependent upon railroad transportation. The important news this week is the re-adoption of the current year's schedule of wages for the coming year, at the Indianapolis conference, as referred to elsewhere.



THE IMPROVEMENT OF THE ERIE CANAL.

At the dinner of the West Side Republican Club in New York, January 10, 1902, Mayor Low made some interesting and weighty remarks concerning the "canal problem" in this State. Recognizing, with characteristic candor, the advantages possessed by railroads, in commercial competition with canals, Mr. Low still urges that it is worth while to improve internal waterways, as potential checks upon railroad monopoly.

In this proposition I concur. Mr. Low might, indeed, have gone further, and pointed out that the present competition between canals and railroads does not give a fair indication of their real relative position, because the canals remain what they were when the railroads were in their crude beginnings, with light rim rails, poor roadbeds, small car-loads and low speeds.

How far, then, should our canals be improved, in order to show their maximum capacity for commercial service? The reason is not easily made in detail, but one general, controlling principle concerning it seems to be plain. Namely, whatever can be done to increase and cheapen purely internal transportation by canal, it may be wise to do, but any attempt (except in such special cases as that of the Isthmus canal between the two oceans, to construct deep waterways for seagoing vessels), is folly.

And the reason is very simple. Modern steam-

ships cannot afford to go slow, and they could not possibly go fast through an inland canal. New York need never be afraid that ocean steamers will carry their freight up the Hudson, or through any further channel that could be made for them. It will always pay them to load and discharge here; and if this city will perfect its facilities for the transfer of cargoes, it will always be profited, not injured, by the improvement of facilities for transportation to and from its harbor.

Mayor Low, therefore, was quite right in saying: "If there are any people in the City of New York who think that it is not wisdom for our city to support that measure (namely, the one proposed by Governor Odell in his last message), I hope they will speedily make it known to me, for unless some convincing reason is presented to me very shortly, I propose to show whatever influence I have, as the Mayor of this city, in favor of this plan."

Many years ago, before the Erie Canal was finished, Governor Dewitt Clinton paid to Peter Cooper a considerable sum for the right to use thereon an invention for mechanical transportation. But he was obliged afterward to abandon the idea, because the support of the farmers along the line of the proposed canal had been gained for his great enterprise by promises of profit through the sale of forage and grain, required by the horses and mules which would be used as motive power. Probably the farmers would be more liberal now. At all events, if the canal is to be worth anything, it must be made available for larger loads and cheaper motive power.

R. W. RAYMOND.



THE INSTITUTION OF MINING AND METALLURGY.

The Council of the Institution of Mining and Metallurgy of London has issued a circular giving an authoritative statement of its objects and aims, which was published in our issue of January 18, and upon which some further comment seems appropriate. No doubt its been prompted so to do by the communications in our columns pointing out the confusion of ideas that has prevailed on the subject.

The Council says: "The institution was founded in 1892 for the advancement of the science and practice of mining and metallurgy, and with the particular object of establishing in London, as the natural center, an association which should be international in its interests. Societies previously existing (in England) in connection with mining and metallurgy had been practically limited to the industries of Great Britain and chiefly to iron, steel and coal. The Institution of Mining and Metallurgy takes, on the contrary, metalliferous mining and metallurgy other than that of iron and steel as its special sphere and is therefore chiefly occupied with the vast mining interest outside of the British Isles, which are so largely owned and managed in London as the financial center. An important feature of the Institution is that full membership is not granted unless the applicant be over 30 years of age and can show practical experience of at least five years in a responsible position connected with mining and metallurgy or shall be qualified by recognized scientific attainments. As a consequence its diploma is becoming recognized as having a distinct value. It is believed that the Institution will gradually assume a position which will enable it to exert a direct influence on the standard of professional competency and conduct, such as similar central societies do in other professions."

It is therefore clear that the Institution aims at making its membership some indication of the pro-

fessional standing of the individual, as was originally mentioned by our correspondent, and that the public utterance of the president, Mr. Moreing, when some of its after-dinner methods of oratory have been toned down, correctly voiced the views of the Council. If these aims and objects are carefully and gradually followed up and fostered, there is no doubt that good will be done in weeding out many undesirable adventurers who style themselves mining engineers and who do so much harm to legitimate enterprise in London. We shall from time to time refer to this matter again in connection with the general question of technical and scientific societies.

The Council of the Institution has made another very interesting announcement in connection with the proposed endowment fund. It is felt that the income from subscriptions is not sufficient to meet all the demands on the funds if the many schemes for the advancement of the profession are to be taken in hand. It is, therefore, proposed to raise a large endowment fund, the interest on which shall be used for these objects. Besides the provision of premises, library, prizes, etc., it is proposed to devote portions of the fund to assisting students of the Royal School of Mines to acquire practical training at mines and works abroad. England has always been at a disadvantage in that there are no gold and silver mines and hardly any copper, lead or other metalliferous mines within the kingdom where students can obtain practical instruction, such as is obtainable in America and Germany. The Royal School of Mines is not nowadays looked on with great favor by the mining profession in England, as it gives no practical instruction in mining and metallurgy. The present move by the Institution is an indication of this feeling, and it is also somewhat in the nature of a reflection on the method of conducting the School of Mines. No doubt when the Institution grows stronger, the Council will exert some pressure on the Government to reorganize the School and bring it up to date.



NOTES ON CYANIDE SOLUTIONS.

BY T. LANE CARTER.

The tendency to abbreviate words seems as prevalent in scientific language as in the vocabulary of every day life. Only a few years ago people spoke of "bicycles." This was soon reduced to "cycles," then it was cut to "bikes," and for all I know we will soon speak of our "ikes."

No one on the Rand ever thinks of taking the trouble to say "potassium cyanide solutions," in speaking of the cyanide process for the extraction of gold, but merely says "cyanide solutions." In such a brief article as this, no one can say much about this important topic, but I trust these notes will prove of use to some.

Frequently the cyanide manager comes up in an excited state, with a big bottle of solution, and wants to know the gold contents at once. Some diviners claim that they can tell him, by looking at the solution, but I am not gifted this way. The usual way of assaying this liquid is as follows:

Two liters of solution acidified a little with oxalic acid are taken, and filtered. The filtrate is then evaporated down to a low bulk in a porcelain dish, and then transferred to a leaden dish, with an excess of litharge, and a reducing agent, or about 10 c. c. of lead acetate solution. When evaporated add borax, carbonate of soda, litharge and reducing agent, previously well mixed, and the ashes from incinerating the filter. Melt in a small pot in the usual way. Should the lead button be too large for the cupel, scorify. The requisite amount of silver required for porting is added to the lead button.

Note that in this method no attempt is made to

determine the silver. On the Rand the silver is seldom, if ever, determined.

This process of assaying the solution is accurate, but if you are in a rush in the assay office, you are generally elsewhere when the solution boils to a low point, and when you visit it again, it is probable that the residue has "spitted," or the dish has cracked or broken.

Another objection to the method is that it requires a long time to evaporate 2 liters of solution, and there are occasions when you can ill afford this time.

I find that when the cyanide manager comes rushing up with an important solution, the quickest way to get the results is by the nitrate of silver method. I have made a few comparative tests with the two methods, and find that the nitrate method agrees satisfactorily with the other. As yet I have not had time to make a thorough investigation of the relative results given by the two methods, but I consider the quicksilver nitrate method accurate enough.

If upon inquiry it is found that the solution is strong in cyanide, it is best to add enough H_2SO_4 , so as to obtain a convenient precipitate upon adding the nitrate of silver solution.

The addition of $AgNO_3$ is continued until no curdy precipitate is noticed upon the addition of a drop of $AgNO_3$. Then filter through a strong filter paper; roll up into a small lump, place in a scorifier with a convenient amount of lead, and scorify. Pour the lead button, then cupel, part carefully and weigh the resulting gold residue. Working on the assay ton system, 2,000 c. c. (if two liters were taken) is equal to 68½ A. T.

The beauty of this method is that you can get out four or five important solutions in practically the same time as you do one.

More attention is being paid to the chemical condition of the cyanide solutions than ever before, and in the future it will be watched very carefully as to its alkalinity, so as to save the consumption of cyanide. Experience proves that it pays to take great care in preventing your solutions from becoming foul or contaminated. One of the safest ways to accomplish this is to see that your tailings are always slightly alkaline. For the accomplishment of this either lime or caustic soda are used. If necessary, the lime is fed in with the ore at the stamps. Care has to be exercised when lime is fed at the mill in great quantities, that the tailings do not settle and pack as soon as they enter the tanks, as happened to us lately. Two Kaffirs had to be kept continually on the move in the tank to prevent the sands from settling tight.

As is well known, prussian blue is immediately formed if a cyanide solution strikes acid tailings. Quite a popular rough test with the cyanide shift men is to take a half breaker of water running from the sands and add a few specks of KCN. A blue coloration shows that the sands are still in a bad state. It pays to take plenty of time and get your sands just right before pumping on solution.

The most popular test with cyanide managers for the alkalinity of the sands is with a solution of phenolphthalin, as an indicator, one of the most refined and simple tests of all.

When the proper point is reached, an ounce of NaOH to the ton can be advantageously added to the cyanide solution, and then you can safely pump the solution onto the tailings.

Heretofore the only thing ever asked about the solutions was their strength. In the future many more things will be required, as the amount of oxygen in working solutions, the amount of alkalinity of the solution, etc. As a rule 0.3 per cent is the strongest solution employed here, which comes down after contact with the sands, about 0.24 per cent.

The question is, Can this difference be made less by closely watching the condition of the sands and solutions? On this point there will be differing opinions; and if these notes will call out some expressions from readers they will serve a good purpose.

THE COOS BAY COAL FIELDS.—I.

By CLEVELAND ROCKWELL.

Coos Bay, on the coast of Oregon, lies a few miles north of Cape Arago in about 43° 30' north latitude, and 123° 20' longitude in the county of Coos, of which Coquille City is the county seat. It is a considerable body of water approximately 10 or 11 miles long of variable width and shapes, like the letter A with the apex of the letter to the north. Numerous sloughs or arms project in a general north and south direction through which the tide ebbs and flows to their extreme limits against the high lands, giving a large area or tidal prism for the scouring of the narrow but deep channels within which the water is confined at the last of the ebb current. The shores of the bay are quite abrupt, though small areas of level land lie at intervals along the sloughs. At low-tide great areas of salt marshes, mud, and sand flats are exposed, intersected by narrow channels many of which are of navigable depth. The entrance to the bay lies close against the north side of Cape Gregory at Coos Head and the north side of the entrance is formed by a sandy spit between the bay and the ocean. This spit extends as a wide flat beach of blown and drifting sand-dunes northerly in a grand sweeping curve of twenty miles to the mouth of the Umpqua River. Coos River, a considerable stream draining this part of the Coast Range of mountains, enters the head of the bay opposite the town of Marshfield. Along this river and as far as the tide water flows are many areas of level land in cultivation, devoted generally to the interests of dairy farming and stock raising. The Coquille River, a crooked, erratic stream of many forks, also runs across the southern part of the coal-fields and enters the ocean at the village of Bandon about 25 miles south of Coos Head. This stream drains a great area of the coast mountains, and, like the Coos River, its cañons are cut so deep as to take a large part of its waters from the eastern side of the watershed.

The whole area of the coal-field is traversed in every direction by creeks and sloughs, and along the Coquille are wide swampy bottoms which, owing to the rise and fall of the tides, are capable of being diked and brought under cultivation. The whole country is covered with forest growth and dense underbrush and in many places valuable groves of timber cover many miles of country. About 50 years ago, or just before the first settlements were planted, a great fire swept over a large part of the coast mountains and destroyed incalculable square miles of timber and the whitened trunks, prostrate and standing, are noticeable features of the landscape.

Topographically, as is seen by a general view from any moderate elevation or the study of a contour map, the whole area of the coal-field was a flat or gently sloping sub-marine plain that has been carved by the erosion of rain and running water since the last elevation of the land. The land reaches altitudes of from 500 to 1,000 feet and is much higher on the eastern side of the field.

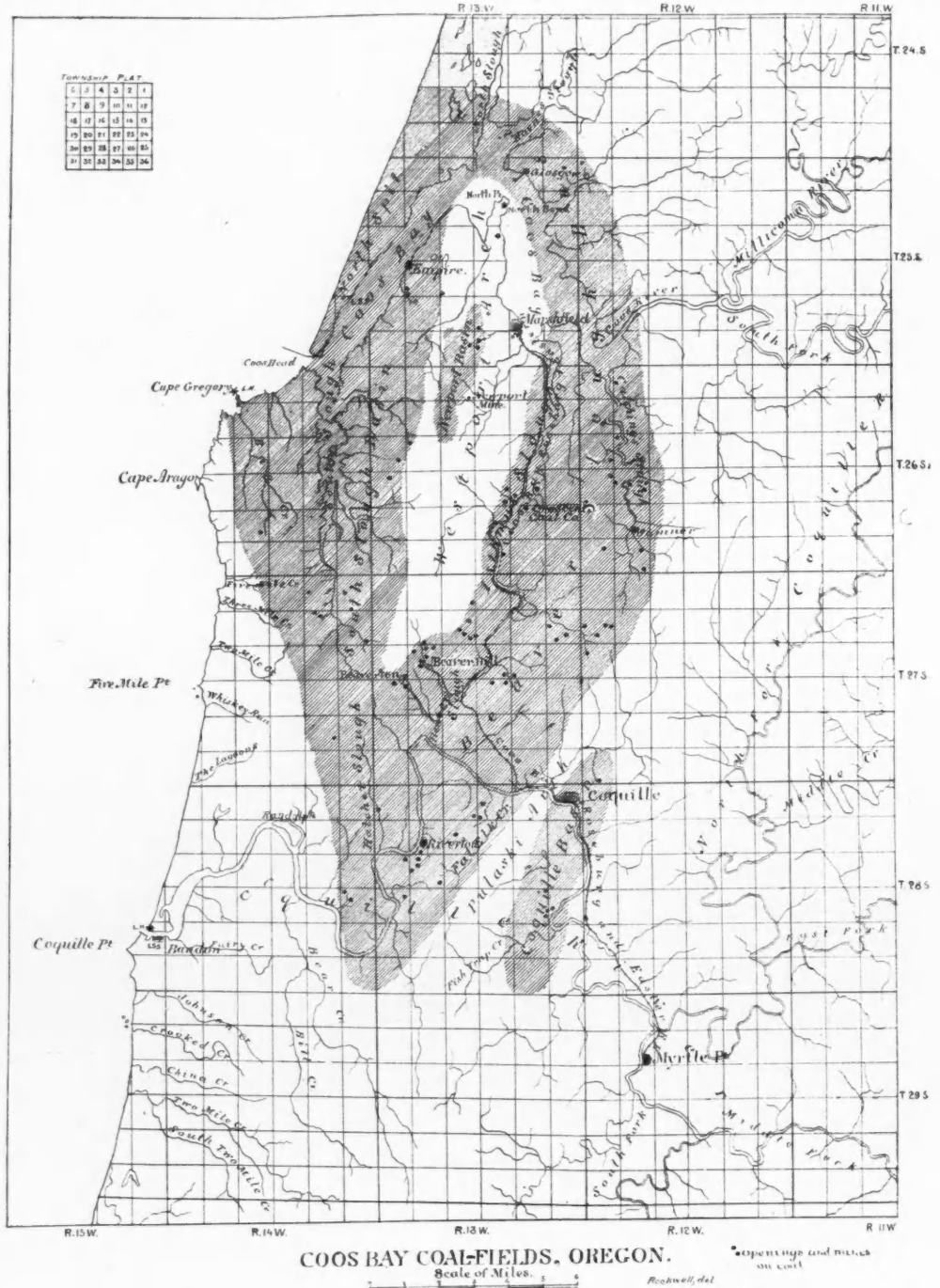
The waters of Coos Bay and the Coquille River are separated by a narrow divide or isthmus between the head of Isthmus Slough and Beaver Slough, the latter running into the Coquille below the town of that name. This divide is but about 8 feet above the sea level. Marshfield, the largest town in the county, with a population of 1,800, is situated on the east side of the peninsula at the mouth of Isthmus Slough. Coquille, the county town, is on the river 25 miles above the mouth, and Myrtle Point lies near the forks of the river 40 miles from the sea. The Coos Bay country is not connected by rail with any outside system of rail transportation and aside from the stage routes over the mountains of the Coast Range, the sea affords the only route for commerce. The Coos Bay, Roseburg & Eastern Railroad has been built from Marshfield to Myrtle Point, a distance of 26 miles. It is of standard gauge and was projected to run to Roseburg in Douglas County where it would connect with the

Southern Pacific system. Trains are run over the road on alternate days.

The entrance to Coos Bay has been improved, under the direction of the War Department by the construction of a jetty on the north side of the entrance. This jetty arrests the encroachment of the sand-spit. Vessels drawing 20 feet can enter and depart at all stages of tide when the sea is not too rough and at high tide vessels of this draft may be carried to Marshfield, and the different shipyards, coal bunkers, and saw mills located at many points.

A lighthouse and fog station are located at Cape Gregory, a short distance south of the entrance, and a life saving station is maintained on the sand spit

and the manufacture of lumber and the shipbuilding industry are prominent. The numerous rivers and water courses afford the most economical transportation of lumber, logs, and spars. The red and yellow fir, tide land spruce and Orford cedar are the most valuable of trees for lumber and are particularly adapted for shipbuilding. Trees are large and many cuts of logs may be taken from one tree without a knot or limb. Structural timber of almost any size and length, together with spars and piles, have been exported from the mills for many years. The Orford cedar, a fine grained white variety that is almost indestructible by time or the influence of moisture, is found in no other part of the



inside the bay. The Custom House is at Empire, a few miles from the bar on the east side of the bay.

The mouth of the Coquille River has also been improved by the construction of jetties and vessel of 12 or 14 feet draft may enter when the sea is not too high. Cargoes of coal and lumber are regularly shipped from the mills and mines at Riverton and other points along the river, whose channel is narrow but of good navigable depth. The same aids to navigation are found at Bandon as at Coos Bay, and a lighthouse and life saving station are maintained by the Government.

The resources of the country occupied by the coal-field aside from the coals themselves are important

world outside of its habitat in Coos and the adjoining county of Curry. The myrtle or laurel, an evergreen hardwood, furnishes a valuable and beautiful yellow veneering for furniture and inside decorative uses as well as for bits and other fittings of vessels where a dense and hard-grained wood is required. Orford cedar makes the most desirable material for decks of vessels and for inside finishing lumber.

Great groves of myrtle grow along the river bottom lands of the Coos and Coquille. Large saw mills are located at many eligible points on the shores of the bay and Coquille River, and a large output of lumber is exported. The shipyards, of which there are several on Coos Bay, are always

occupied by a vessel on the stocks. A great number of schooners, barks and steamers employed in coastwise commerce have been turned out from these yards. Vessels intended for steamers are built, stowed with a cargo of coal or lumber and are towed or proceed under sail to San Francisco, where their steam power is installed.

Coal was discovered at Coos Bay at an early day by the first settlers of the country but development of the mines was at first very slow. Since the year 1855, however, the shipments of coal have been quite regular.

have successfully resisted the assaults of the ocean. The shales and sandstones exhibit strata containing many marine fossil shells and in many strata forming the roof of the several coals, fresh and brackish water fossils are also quite abundant. These sedimentary strata composing the coal measures are proved by the exposures of nature and by drilled holes to reach a total thickness of several thousand feet. The coals were deposited over flat, swampy ground bordering the ocean, but little above sea-level. Gentle oscillations of the land submerged the swamps to a greater or less depth, and deposits of

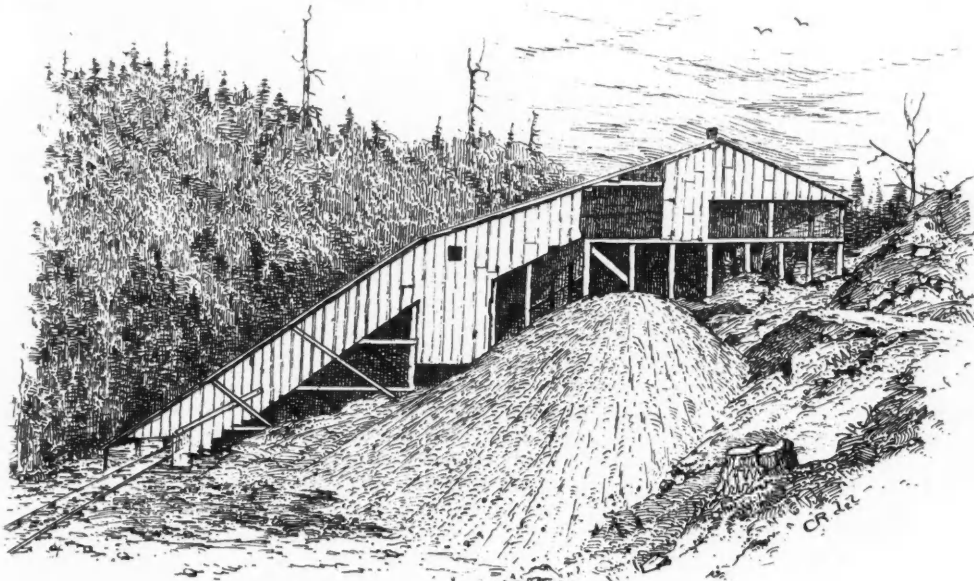
geographical location, topographical and geological characteristics having been thus briefly sketched and the resources connected with other branches of industrial pursuits and development mentioned, there remains to be described the coal measures or coals themselves, and the aspect of their commercial and economical development is to be considered. For convenience of description it may be well to divide the field into four basins—The South Slough basin, the Beaver Slough basin, the Coquille basin and Newport basin.

South Slough extends from the Coos Bay entrance a distance of 8 or 9 miles in a north and south direction. Beaver Slough basin embraces the whole area of the field on its eastern side, while the Coquille basin, as has been said, lies detached from the main field on its southeast side by a narrow strip barren of coal. This Marshfield basin is about 8 miles long by one mile wide, extending from one mile north of the town of Coquille in a southwesterly direction with an area of course of 8 square miles.

The coals of the Coos Bay field may all be properly classed as lignite. Dana's "Minerology" draws a distinction between lignite and brown coal for the reason that the latter does not exhibit the organic woody fibre, and while that feature does not certainly pertain to all the coals in all parts of the field it is a common feature.

THE NEWPORT MINE.

This mine has been opened and worked for a number of years and is the only mine shipping cargoes at this time from Coos Bay. The daily output of the mine is about 200 tons. The old Eastport Mine was opened in this basin as one of the first in the field and was operated continuously from 1855 to 1881, since which time mining has been discontinued. The Newport basin is the most

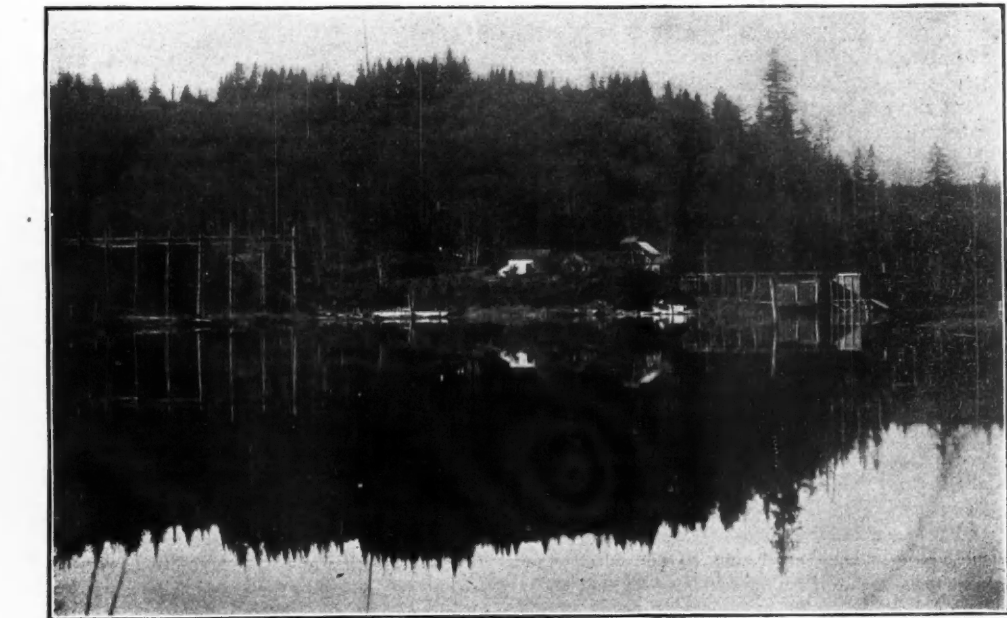


BUNKERS AT TUNNEL, NEWPORT MINE, OREGON.

The coal deposits, though shown by exposure and borings as lying in several basins, may be regarded as occupying one field. The field lies along the coast and under Coos Bay in an elliptical form with a length north and south of about 30 miles and a maximum width of about 12 miles and contains approximately 250 square miles of coal-bearing area. Beginning near Cape Gregory in Sec. 4, T 26, S. R 14 W, it reaches its most northern limit in Sec. 12, T 24, S, R 13 W. The eastern boundary near Sumner is about Sec. 21, T 26S, R 12 W. and the southern end of the field, as far as developed, lies in Sec. 36, T 28 S, R 14 W. It is evident from the geological formation that the northwestern portion of the field dips under the bed of the ocean, as is shown by the exposures and inclination of the strata. In the middle of the field a large area is found generally barren of coal. It is designated geologically as the Westport Arch. Within this area the Pulaski formation, underlying the coal measures, forms a great arch of upheaval on which the coal was either never laid down or from which it has been denuded by erosion. A similar arch called the Pulaski Arch separates the main basin from the Coquille basin in the vicinity of Coquille City. It may be noticed by reference to the map that this arch is less than a mile wide at the point mentioned.

In the northwestern part of the barren area of the Westport Arch and west of the town of Marshfield lies the Newport basin. Its north and south length is about three miles with an average breadth of about a mile, thus containing an area of three square miles. The whole area of country embracing the coal-field is a sedimentary formation and the exposures of igneous rocks, diabase or basalt appear only in patches on the eastern limits of the field.

According to geological reports the coal formation was laid down during the Eocene period and the beginning of the Miocene. Sandstones and shales of both arenaceous and argillaceous characteristics are the prevailing rocks exposed and from the prominent features of the landscape. The shales are always soft and readily yield to the action of rain and running water, but the sandstones are often firm of texture and, in places, massive, as may be seen in the vicinity of Capes Arago and Gregory, where they



TUNNEL OPENING AND DUMPS, CRESCENT COAL COMPANY.

sand and mud covered the swamps, the accumulations gradually reaching the sea level again, and the swamp and coal forming conditions once more prevailed. These movements and parallel conditions prevailed over long periods of time, but finally came to an end with the elevation of the Coast Range of mountains. Under these movements the enormous pressure from the west bent and crumpled the former level strata into wave-like folds, while cracks and faults at right angles to the pressures thrust the strata above or dropped it below. The last general movement was one of subsidence. Deep borings have demonstrated that the principal sloughs and water courses have been cut down by erosion to a depth several hundred feet below the present sea level and since the last period of subsidence have been filled again by sand and marsh mud deposits.

The general description of the coal-field, its

advantageously situated for economical working of any in the coal-field, and where the coals are of low price in the market this means a great deal as a commercial proposition. The coal lies at a suitable height above sea level to afford all the advantages of draining, with a down hill or gravity pull of the cars to the bunkers above the railroad tracks. The strata lie flat or at gentle inclinations of 7° or 8° and the enclosing formations of roof and floor are of sandstones of sufficient firmness to obviate the necessity of timbering and lagging. The only timbering required is in the galleries. The Newport Mine is opened by a tunnel at the lowest part of the basin. A stationary engine near the entrance draws the empty cars into the mine and the loaded cars return from the galleries by gravity. There is but one seam of coal worked in the Newport basin and that is the lowest one; the upper series are not

deemed of sufficient importance to be economically worked. This coal lies in a seam 6 feet thick in three benches separated by two partings of sandy clay, each of which is about 6 inches thick. The deepest working in this mine is about 200 feet above sea level. The main tunnel extends a distance of about 2,000 feet from the bunkers. The mine has been worked continuously, for over three years. It is ventilated by fans and worked by open lamps. In this, as at all the other mines in this field the mining is done in the old-fashioned way with powder, pick and shovel and no coal cutting machinery is employed. The coal is sorted by hand and cleaned in the mine and no washing plant is installed.

From the receiving and screening bunkers at the mouth of the tunnel a narrow gauge railroad transports the loaded cars a distance of three miles to commodious shipping bunkers located on the slough shore a short distance above the town of Marshfield. At the northern end of the present workings a series of faults occurs in a general east and west direction, throwing the coal at one place as much as 50 feet in vertical elevation, and along these faults the strata are considerably broken up and disturbed. From the main tunnel at the bottom of the basin the coal has a very gentle upward inclination of 7° both east and west and before reaching the faults mentioned above there is for some distance about the same upward inclination to the north.

The immense heaps of waste and slack from the mine below the tunnel catch fire through spontaneous combustion and burn slowly and thoroughly throughout the entire mass to a red and clinkery cinder that makes excellent ballast and road material.

The waste in the abandoned galleries of the mine is equally liable to burn in the same way and much care has to be exercised to prevent the spread of fires.

In prospecting for coal at this mine several borings were made which are of interest as showing the characteristics of the formation passed through and section of the strata in this basin. One boring was started in the gulch near the mine bunkers at a point about 100 feet below the level of the Newport coal bed. This hole passed through 300 feet of sandstone and 500 feet of shale without disclosing any coal and thus demonstrates the non-existence of coal 900 feet below the Newport bed. Above that vein there is about 100 feet of sandstone containing a thin bed of coaly shale in which is found a seam of coal about a foot thick. The whole section would thus represent 1,012 feet of sandstone and shale in which is laid down the Newport bed 100 feet below the surface. The portion of the mine south of the present opening was operated for many years but is now practically worked out and mining has been discontinued. The mine is the property of Goodall, Perkins & Co., of the Pacific Coast Steamship Company. They own the vessels used in the coal and produce traffic and practically all the coal is disposed of in the San Francisco market. The bunkers near Marshfield are commodious and capable of holding much more coal than is now being daily mined. A sketch of the bunkers at the mine entrance is given herewith and one also of the bunkers near Marshfield. To Mr. P. Hennessy, the superintendent, I am indebted for information as to the working details of the mine and assistance in my examination. An analysis of the chemical composition of the Newport coal is given below:

No.	Moisture.	Volatile Matter.	Fixed Carbon.	Ash.	Sulphur.
1.	9.78	42.57	44.19	3.46	0.91 Sooty.
2.	11.94	41.48	37.85	8.73	1.32 "
3.	15.45	41.55	34.95	8.05	2.55 Will not coke.
4.	17.27	44.15	32.40	6.18	1.37 "

THE CRESCENT COAL COMPANY.

This corporation owns 1,172 acres of coal-bearing lands in the Beaver Slough basin lying on the east side of Isthmus Slough about five miles above the town of Marshfield, and is energetically engaged in the development of this property. The present tunnel opening is in Sec. 26, T. 26, S. and R. 13, West. A prospecting shaft was sunk at a point about three-fourths of a mile north of the tunnel.

The shaft was started about 30 feet above tide-water a short distance from the shore, and reaches the lowest coal at a depth of 760 feet. Six successive strata of coal were encountered. Four of these veins are of workable size, and perhaps all may be worked. All the seams together form a total thickness of 28 feet of coal in a total thickness of strata of about 500 feet. The strike of the strata on the croppings is approximately north and south with the dip of 12° to the eastward. The thickness of these veins is from 3 to 7½ feet. The shaft passed through marine and fresh water deposits of shale and sandstone, and the partings of the coal seams were a sticky brown clay, locally called fire-clay.

The present mine opening is an adit on the coal with a good draining slope or grade. The mouth of the tunnel is on the croppings about 50 feet above tide-water and quite near the shore. The adit is now in a distance of nearly 500 feet. A stationary engine was being set up near the entrance, but as it is not yet in operation, the hauling is done by mules. A commodious bunker house has been built. The locality is admirably situated with reference to the construction of the proposed washing and screening plant and bunkers, which will be close to the mine entrance and immediately on the shore where vessels can lie and take on cargo. The dip of the coal veins is greater here than at the shaft, being 20°, but with every probability of diminishing dip with depth, as has been shown by other workings close to this. The formation of shales and sandstones is weak, and complete timbering is expected to be found necessary in the workings. Machinery for traction and hoisting, pumping and ventilating, screening and washing will soon be installed. Timber for mine purposes is convenient and abundant, and second-class and refuse lumber for lagging purposes may be cheaply supplied by water carriage from the numerous sawmills in the vicinity. It is expected that by the expiration of another year improvements and developments will have been so far completed as to enable the mine to produce 1,000 tons of coal daily for shipment.

To W. H. Maxwell, the superintendent of the operations, I am indebted for information and assistance in my examination.

AMERICAN COAL TRADE IN FRANCE.—

United States Consul A. M. Thackara at Havre, France, after discussing the opportunities for selling American coal in France, comes to the conclusion that the establishment of a permanent trade in American coal will depend upon:

"1. The establishment of lines of steamers with regular sailing dates, built for carrying large coal cargoes, fitted with up-to-date appliances, and capable of being run under the most economical conditions.

"2. The erection of coal depots fitted with modern labor-saving apparatus for discharging and handling coal.

"3. The creation of a complete organization for selling coal and doing away with all middlemen.

"4. The observance of the commercial customs of the foreign country.

"5. The carrying out of the letter and spirit of all contracts."

UNITED STATES PATENT OFFICE.—

Commissioner of Patents Allen reports that the number of patents issued last year was 27,373, the largest in the history of the department. The issue of certificates of registration of trade marks, prints and labels also reached the unprecedented number of 2,965. Cash receipts of the office during 1901 were \$1,249,108, exceeding those of any previous year by nearly \$100,000. The State whose citizens received the largest number of patents during the year was New York, with 4,098, next in order came Pennsylvania with 2,837, Illinois with 2,430 and Massachusetts with 1,905.

PETROLEUM IN GREECE.

CONSULAR REPORT.

The fact has just been made public that the English Syndicate, which has been endeavoring for some time past to secure the right to develop the supposed oil territory in the Island of Zante, has renewed its negotiations under the new Government. During the previous administration, practically all the arrangements had been completed, and awaited only the ratification of the Chamber of Deputies to go into effect. The recent troubles, however (arising over the proposed translation of the gospels into common Greek, and culminating in the resignation of the entire ministry), shelved the matter for the time being. It is made public now that the tedious process of securing the new ministerial sanction is again under way, and that the agreement is about to be signed.

What this may mean to Greece depends entirely upon whether petroleum is discovered or not. The field is a very old one, dating back of the time of Herodotus, by whom mention of it was made under the term "naphtha," and that part of the island is known as the Deme Naphthalion. The promising section is the southern part, the low, swampy region where the bogs and marshes exude a substance which has every quality of crude petroleum. The region has marked resemblances to the great oil-fields of Russia, near the Black Sea. Peasants have been known to set fire to this naphtha, and it has burned continuously for months. Repeated, but unsuccessful, attempts have been made to find oil in paying quantities, but always by companies or individuals without sufficient means and experience. The English Syndicate, if successful in satisfying the demands of the Greek Government, will spend a large amount of money in developing the territory.

THE BRIMSTONE INDUSTRY IN SICILY.

Foreign trade in 1901 was not as large as in either 1900 or 1899, owing partly to the high prices maintained by the trust, the Anglo-Sicilian Sulphur Company. In 1901 the total exports are reported by Emil Fog & Sons, as below, in long tons, comparison being made with the previous year:

Destination.	1900.	1901.	Changes.
Austria	21,594	18,842	D. 2,752
France	103,647	74,384	D. 29,263
Germany	28,702	23,447	D. 5,255
Greece and Turkey	19,647	21,702	I. 2,055
Holland	18,295	10,858	D. 7,437
Italy	101,073	74,517	D. 26,556
Portugal	10,937	11,335	I. 398
Russia	22,090	15,110	D. 6,980
Scandinavia	22,681	24,485	I. 1,804
United Kingdom	23,973	22,403	D. 1,570
Other Europe	17,158	12,601	D. 4,557
Total, Europe	390,097	309,684	D. 80,413
Australia	1,525	2,040	I. 515
Africa	1,979	2,805	I. 826
Canada	7,478	941	D. 6,537
East Indies	1,360	2,306	I. 946
South America	474	287	D. 187
United States	154,755	140,967	D. 13,788
Grand Totals, tons	557,668	459,030	D. 98,638

The decrease in the 1901 exports is equivalent to 17.7 per cent as compared with the previous year. French shipments decreased 28 per cent, Italy 26 per cent, and the United States 9 per cent. As a result of the decreased exports the stocks in Sicily on December 31 increased 45 per cent, being 321,013 tons in 1901, as against 221,204 tons in 1900. Exports have not kept pace with the production, and the Trust's policy of high prices is curtailing consumption. In fact, many plants that formerly used brimstone exclusively have installed chambers to burn pyrites. This is especially the case with manufacturers of sulphuric acid for fertilizer production.

PORTAGE LAKE SHIP CANAL.—The total traffic passing through the Portage Lake Ship Canal during the year 1901 was 2,114,385 net tons. The leading articles included in this total were 809,673 tons bituminous coal; 102,385 tons anthracite coal; 80,386 tons iron ore; 73,354 tons copper; 13,708 tons pig and manufactured iron; 67,231 tons building stone; 40,983 tons limestone; 14,950 tons sand; and 125,293 barrels salt.

DREDGING FOR FINE GOLD IN IDAHO.

By ROBERT BELL.

In spite of a general impression to the contrary, the successful recovery of fine gold from the Snake River placer beds on a commercial scale, up to 95 per cent of the gross contents of the gravel, has been an accomplished fact for years. The method employed is one of simple gravity concentration of the fine material on burlap tables, after it has been separated from the coarser gravel by passing through a screen-floored sluice box, the gold afterwards being collected from the small residue of concentrates by quicksilver, in a clean-up barrel, a small arrastra-tub or a rocker. This method is simple, efficient and adapted for operations on a large scale, and with careful attention will give high results.

The problem to be solved to make placer mining pay along the broad flat bars of Snake River has not been the saving of the fine gold so much as the handling of a sufficient quantity of the low-grade, gold-bearing gravel to justify the investment of any large amount of capital. The application of the floating dredge to placer gold mining and its skillful

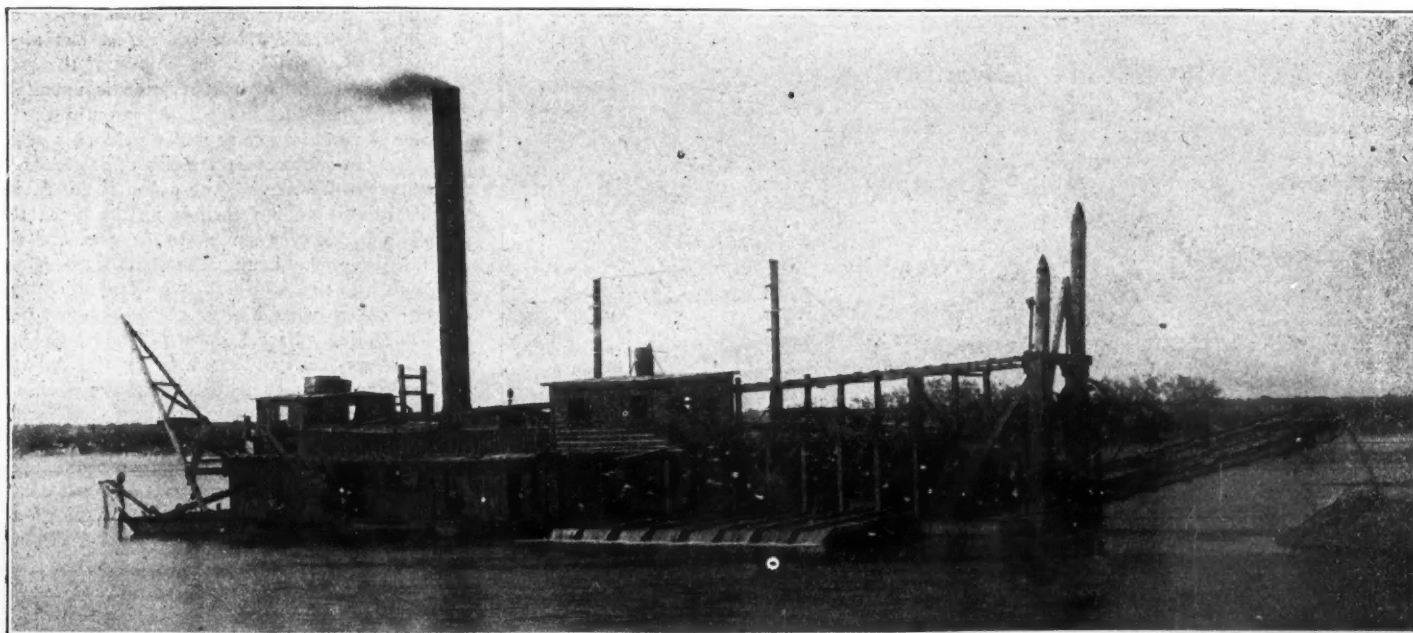
1895 to one of 10-in. diameter, and has been in constant and successful operation during the open season ever since. Minor, but important, changes have been made in the plant right along, looking to the strengthening of the principal wearing parts, efficiency and economy of operation. The hull of this boat is 30 by 90 feet, and draws 3 feet of water, and the dredge has an actual average daily capacity of 2,500 cubic yards. The motive power is supplied by a 125-h. p. vertical compound condensing marine engine, supplied with steam from two return tubular boilers of 75 h. p. each. These boilers are set in brick with a sheet-iron casing, designed especially for dredge work. The pump is designed to handle any size of rock that will pass the nozzle of the suction. It is lined throughout with manganese steel and is very durable.

The gravel is discharged into a stationary sluice 12 feet long, set nearly horizontal in order to check the velocity of the stream of gravel before it passes to the adjoining two lengths of shaking sluice, each 17½ feet long and set at a grade of 1½ inches per foot. These sluices are 5 feet wide and arranged

Wyoming coal, but the company is now experimenting with sage brush, which is grubbed out by horsepower and cut up with a "hog" or bark mill for convenience in handling and firing.

The cost of handling gravel at this plant, including all charges, is 4½ cents per cubic yard. Working in the river bed, most of the gravel being raised from below the water surface, a good deal of the material handled runs from 10 to 20 cents per cubic yard and affords a handsome margin of profit.

An auxiliary steam-tender, 15 by 60 feet and 20 h. p., keeps the dredge supplied with fuel and furnishes the motive power whenever it becomes necessary to move camp. A commodious 22-roomed, double-decked house-boat supplies the plant crew with convenient quarters. The lower deck consists of 12 rooms, including kitchen, dining room, office, store room and eight bed rooms for the crew. The elegantly furnished apartments of the upper deck, which are divided into 10 rooms, are occupied by the manager and his family. Everything about the house-boat is kept clean and orderly, the table well supplied and the crew well cared for in



SWEETSER-BURROUGHS SUCTION DREDGE, SNAKE RIVER, IDAHO.

handling and adaptation to the conditions here met with seem to have solved this difficult problem and to have opened up an extensive field for profitable gold-mining investment.

It is very common to hear the numerous pick-and-shovel operators along the Snake River tell of having large tracts of gravel that will average from 30 cents to \$1 per cubic yard, and, as a matter of fact, such high values do occur, but only as local skim diggings in especially favorable localities. Close investigation will prove that there are few gravel bars along this stream that carry an average value of 30 cents per cubic yard for a depth of over 10 feet; but it is probably not an exaggerated estimate to say that there are billions of cubic yards of gravel along the valley apparently well adapted to dredging that will contain 5 to 15 cents per cubic yard of savable gold, and at these values may be made an important source of profit.

The Sweetser-Burroughs Mining Company was among the first to undertake dredging the Snake River on a large scale. Under the personal supervision of the president and general manager, Mr. George T. Burroughs, Jr., this company built the Sweetser-Burroughs dredge boat in 1894 at a point on Snake River 30 miles southwest of Minidoka, a station on the Oregon Short Line Railway. Plans were made for this boat in the fall of 1893, lumber and machinery ordered during the winter and work commenced on the dredge as early in the spring as weather permitted.

This is a suction dredge and was started with a 6-in. nozzle or intake. The nozzle was changed in

to shake endways with a 3-in. stroke, being driven in opposite directions from the same shaft by eccentrics. The bottoms of these sluices are perforated steel plates, No. 10 gauge, ¼-in. holes, spaced ¾-in. centers. The coarse material from these screen sluices, or grizzlies, then passes to a rubber belt conveyor or stacker, which deposits it sufficiently astern to be away from interference with the operation of the boat.

The fine material, together with the gold, after passing through the shaking screens is discharged into a distributing box, which feeds it evenly to a set of 16 inclined burlap tables with an aggregate surface area of 1,000 square feet, set at right angles to the sluices. These discharge over the side of the boat, as shown in the accompanying cut. This dredge has been so designed that its operation may be continuous and uninterrupted by the necessity of cleaning up, moving anchor lines or changing spuds, etc. The burlaps are taken up at intervals of 6 or 8 hours and washed in a wooden tank, from which the accumulated gold and black sand concentrates are elevated automatically to the amalgamating room; quicksilver is here added, and the gold readily separated by a simple barrel process of amalgamation, after which the amalgam is retorted, melted and run into bars and shipped to the Government Assay Office at Boise, where it brings \$19.40 per oz.

The force required to operate this dredge consists of three men to a shift, who work 8 hours, and the total force employed on the boat, including chief engineer, blacksmith and roustabouts, consist of 13 men for the 24 hours. The fuel used has been

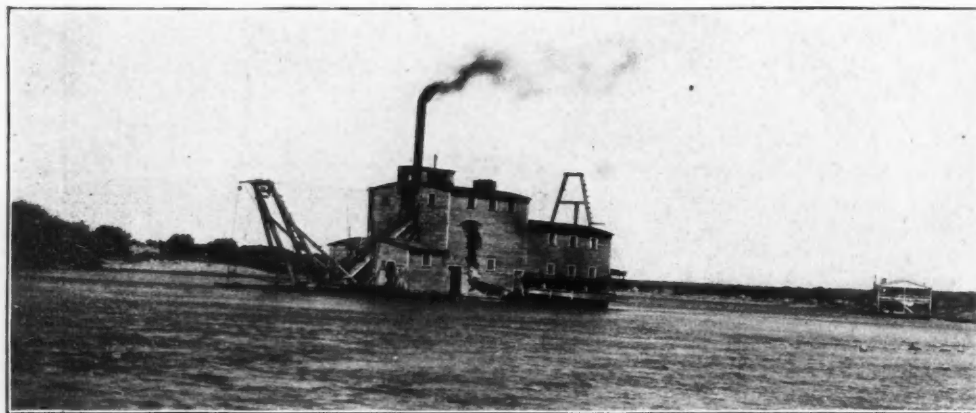
every way. Snake River is 600 feet wide at this point

The successful results accomplished with the Sweetser-Burroughs dredge were such as to induce the company to build a second plant, and the dredge boat *Yale* was built in 1899. This boat, which is at work on the main river, 20 miles southeast of Minidoka, is of the chain elevator bucket type. The digging buckets are of 5 cubic feet capacity, and the boat has shown actual working capacity of 2,000 cubic yards a day over a period of 20 consecutive months, employing the same number of men as are required at the suction dredge. The gold-saving arrangement on this boat is about the same as at the Sweetser-Burroughs dredge. The hull of this boat is 30 by 90 feet, and draws 3 feet of water. The engine and boiler are of 55 and 80 h. p. capacity, respectively, and the fuel used is Wyoming coal, which is laid down at a cost of \$6 per ton.

While the pay gravel at this plant is somewhat richer than that found at the lower boat, the digging conditions are much more severe. The *Yale* is now located on a low-shifting bar made in a short bend of the stream. This particular bar is 3,000 feet long by 350 broad, and the pay gravel extends 6 feet deep. The usual loose free gravel of small well-rounded pebbles prevails here as at other points along the Snake River, but this section of the stream is flanked for miles along its north shore by a high terrace of black basaltic lava. The broken slide boulders from this lava bed, probably through the action of shore ice, have been scattered along the center of the stream and are now found more or less thickly sprinkled throughout the gold-bearing gravel.

These boulders form a serious drawback to the digging capacity of this machine, and are responsible for a considerable loss of time in the operation of the boat, equal to about 4 hours in each 24, besides inflicting an increased strain on the principal wearing parts with a consequent increase in cost of operating, bringing the total average cost of handling gravel at this plant up to 5½ cents per cubic yard. The Yale dredge, like the Sweetser-Burroughs, enjoys the convenience of a commodious house-boat consort, and its shoreward wants are attended to by a little gasoline launch of 6 h. p.

The successes of these two dredging enterprises are not the result of any set plan, but comprehend a good deal of careful and original thought and management on the part of Mr. George T. Burroughs, Jr., the president and general manager of the company, who is a mining and mechanical engineer and has exceptional business tact and inventive ability. Both the plants under his charge carry a number of important mechanical improvements, necessitated by the varying conditions met with that are entirely original. Mr. Burroughs does not



YALE BUCKET ELEVATOR DREDGE, SNAKE RIVER, IDAHO.

believe in overworking his men, and finds that it pays to keep them well housed and fed; he exacts and receives very efficient service in consequence. Those of the crew filling the positions of engineers and pilots work eight-hour shifts, while the roustabouts work ten hours. Each engineer is given a printed blank upon which he is expected to keep an accurate log of the operations of the boat; this includes among other things a record of every stop the machinery makes, and for what cause; also a regular reading of a set of automatic self-registering devices attached to the mooring lines and to a vertical sliding rod or indicator at the bow, which is actuated by a traveling wheel at its lower end. These devices accurately measure the length, depth and width of each cut across the face of the bar, and put beyond question or guess the actual number of cubic yards of gravel handled during the operation of each shift.

Both the plants are lighted by electricity. They are also connected with each other, and with the railroad station at Minidoka by telephone. At the station a special forwarding agent and a good team keep them in close touch with the outside world. Every feature of the business has been systematized down to a fine point, and reflects great credit upon its founder.

The Sweetser-Burroughs Mining Company has set the pace, and under similar competent management the Snake River Valley would seem to offer a field of great possibilities for profitable gold dredging. In the future also the waterfalls and rapids now running to waste along this stream may be taken up and transformed into electric energy.

BLAST FURNACES IN FRANCE.—The close of 1901 finds the production of pig iron in France considerably curtailed as compared with the previous year. On January 1, 1902, 93 furnaces were in blast, compared with 101 on July 1, and 115 on January 1, 1901. The daily capacity on January 1, 1902, was 7,089 tons, as compared with 7,556 tons on July 1, and 8,770 tons on January 1, 1901.

THE MOUNT RAINIER FOREST RESERVE.

The examination of the Mount Rainier Forest Reserve, Washington, together with the Mount Rainier National Park, Washington, by Mr. Fred. G. Plummer, forms part of the report on Forest Reserves, by Mr. Henry Gannett, geographer, in the twenty-first *Annual Report* of the United States Geological Survey now passing through the press, but not yet published.

The Mount Rainier Forest Reserve includes the crest of the Cascade Range, in southern Washington, with its slopes upon the east and the west. Of the total of 2,146,600 acres, 41.4 per cent lies on the eastern slope, and 58.6 per cent on the western slope of the mountains. All of the eastern slope and most of the western slope, 83.6 per cent of the Reserve, are drained by 13 rivers into Columbia River; the remainder is drained by three rivers into Puget Sound. The reserve includes the great volcanic peak of Mount Rainier, 14,526 feet; Mount Adams, another great volcanic cone, 12,470 feet; Goat Mountain, 8,500 feet; and Mount Aix, 7,623 feet. From these heights

the land sinks down to within a few hundred feet of sea level. The bold topography of the reserve is the cause of wide diversities in climatic conditions.

The Davis coal prospect on Summit Creek claims a vein 6 feet wide; and several other coal veins have been prospected. The principal mining for metals is the Summit District just east of Mount Rainier; many claims have been taken up; none were productive at the time of the examination. A number of mineral springs, chiefly soda and iron, are found. All the divides become beautiful parks as they approach the slopes of Mount Rainier; and at least 80 per cent of the areas above 5,000 feet and below the timber line may be classed as mountain meadows.

This region, in respect to its forest cover, is sharply divided into two parts by the crest of the range. Upon the west the forest is that of the Pacific Coast, with very dense undergrowth. It is very heavy up to altitudes of between 3,000 and 4,000 feet, where it begins to thin, and above 6,000 feet it is almost entirely wanting. The forest is composed, in the main, of red fir, with some spruce, hemlock, and cedar. It is heaviest in the valleys and upon the north slopes of the ridges, rather than upon the south slopes. East of the crest of the range the forest is comparatively light and open, with little underbrush, and is composed almost entirely of yellow pine.

SPANISH ANTHRACITE.—The Villaverde de la Pena Coal Mining Company owns six mines on the line from Robla to Valmaseda, covering an area of 2,858 hectares (about 7,000 acres). From four to nine seams are worked, and to a depth of 450 meters, the quantity of workable anthracite is estimated at 30,000,000 tons. The coal is stated to be of excellent quality. The analysis is as follows: water, 4.56 per cent; volatile matter, 3.57; ash, 4.41; fixed carbon, 87.46. Four openings give an output of 1,000 tons per day. The coal is principally exported to France. The company is now taking expert advice as to the position of further openings.

M'KEE CREEK, ATLIN MINING DIVISION, BRITISH COLUMBIA.

By WILLIAM M. BREWER.

This creek empties into Atlin Lake about 12 miles south from the town of Atlin. Its mouth is only a short distance north of the contact between the igneous and sedimentary rocks. Its source is not far distant from the source of Spruce Creek, whence it flows in a southwesterly direction for about 6 miles and from that westerly to the lake. Apparently the lower portion of the creek for a distance of about 3 miles from its mouth follows a channel of comparatively recent formation which carries but little gold. Indications point to the ancient channel having been situated to the south of the present one from the cañon down. Prospecting in this old channel has, according to reliable information gathered by the writer, resulted satisfactorily, and the Atlin Mining Company, which has purchased the creek and bench placer claims for about two miles from the cañon up the creek, propose in the near future to make a thorough test of the ancient bed to determine the advisability of extending their hydraulic operations in that direction.

The bed rock above the cañon has almost the same line of strike as the course of the creek. Its dip is vertical. Its classification is uncertain, until microscopically examined. Apparently the original country rock was composed of chloritic schists and magnesian rocks, with a series of intrusive dikes of fine grained diabase. The cañon is cut through the chloritic schist, but further up the creek the magnesian rocks, very similar to those around the town of Atlin, predominate. The slates or schistose rocks peculiar to the Blue Cañon section of Spruce Creek were not seen on McKee Creek by the writer.

The principal work done on McKee Creek during the season of 1901 has been by the Atlin Mining Company. This company's hydraulic plant has been fully installed since April 3, the water being turned on from the monitors June 15. The plant consists of ditch and flume 2,200 feet long, pipe line 2,500 feet and bedrock flume 500 feet. The pressure box is 280 feet above the creek level. The head of the bedrock flume is set 2 feet below bedrock, which is about 8 feet deep on claim No. 7 below Discovery, where the monitors were working at the time of the writer's visit. The discharge end of the bedrock flume is at the cañon, which affords excellent dumpage, there being a clear drop of 40 feet. The monitors were washing the material down stream. The grade of the creek being from 8 to 12 per cent, and that of the bedrock flume being 4 per cent, through which all the water from the creek as well as from the ditch flows, amounting to about 3,000 miner's inches during most of the season, of which the ditch furnishes 800 miner's inches, makes it possible to wash very large boulders through the flume. Some weighing nearly or quite half a ton passed through the flume, and were dumped into the cañon with but little assistance from "manual labor." Two men constantly employed at the discharge end of the flume are able to keep it clear.

Instead of using block riffles the entire length of the bedrock flume, as is usual, the management of this company uses angle iron in the first 24 feet, and blocks the remaining length.

This company did not start operations in any haphazard manner. The manager, Mr. Featherstonehaugh, had a number of miners prospecting and working for individual owners of the creek claims during the season of 1900. From these men he was enabled to ascertain the value of each claim on the creek above the cañon. This was the lowest point which it was necessary for the company to acquire in order to control future hydraulic mining operations the entire length of the creek.

The average depth to bedrock on this creek is less than on the other creeks in the Atlin District, the most shallow point being on claim No. 17, above Discovery; the average depth to bedrock the entire length of the creek is about 8 feet. The gravel is very coarse, and large boulders of greenstone and granite so plentiful that it would be almost impos-

sible to work to advantage up stream with the monitors, hence the reason for washing down stream. The gold is coarse, and comparatively little fine dust is caught in the sluices by the placer miners, but the clean-up of the bedrock flume at the end of the season will determine what portion of the yield is dust, and what nuggets.

Systematic prospecting of ground above the head of the bed-rock flume has resulted in a yield of as much as \$3 per cubic yard from material on bed-rock, and sometimes the saving has been as high as from \$5 to \$8 per yard.

Several claims above the boundary of the Atlin Mining Company's ground were being worked by placer miners at the time of the writer's visit, who were making satisfactory weekly clean-ups from sluicing.

The conclusions arrived at by the writer after his hurried examination of the present known gold bearing area of the Atlin country are:

1. That there is every indication that the creeks described in the foregoing article will yield good returns for some years to come, if systematically worked by hydraulic mining.

2. That owing to lack of dumpage facilities and insufficient water supply, any attempt made by more than one hydraulic company to work on each creek, except possibly Spruce, will only result in needless litigation and ultimate failure by either one or both companies.

3. That in some isolated instances placer miners will obtain good pay working with ordinary sluice boxes, but because of depth to bed rock, insufficient water supply, and lack of dumpage, Atlin cannot be considered a good "poor man's camp."

The life of the camp depends on the future of the quartz or lode mines, cheap fuel, cheap labor and cheaper transportation facilities. The season is necessarily short, but the winters are not more severe than in many mining camps much farther south. The average elevation is only about 2,500 feet above sea level, the climate is dry and bracing, while the soil is suitable for cultivating vegetables, small fruits, oats and hay. One noticeable feature relative to the length of the season during which placer or hydraulic mining can be carried on, is that it will compare favorably with that in any placer camp north of California.

Black Cub and Brown Cub Mineral Claims.

In returning from the coalfields the writer took the opportunity of visiting these two claims, which are situated at the southeastern limit, so far as at present known of the copper-bearing zone. They are located adjoining each other about 2 miles southeasterly from Dugdale Station 12 miles down the railroad from White Horse, and determine the continuity of the limestone and felsite formations traversed by the channel of Johnson Creek. The outcroppings consist of copper carbonates in garnetiferous felsite. The outcroppings are rarely exposed, because most of the surface is quite level, and covered with soil hiding the geology. But little work has been done, but sufficient, though, to warrant the opinion that the two claims were good prospects with possibilities. In an air line the distance between these and the Copper King group is about 12 miles.

NEW GOLD FIELDS IN FRENCH GUIANA.

United States Consul Moulton, of Demerara, reports, December 18, 1901, that he has been advised by the consular agent at Cayenne that the rich placer gold diggings in the Inini River District of French Guiana are attracting many prospectors to that locality. During October and November last, over 2,000 pounds of gold were brought down to Cayenne, and, according to the agent, other large lots will soon follow. The consul adds that, in view of the greater number of foreigners who may be attracted to the colony, the Government has passed an ordinance requiring passports from such persons before they are permitted to land.

THE ETZATLAN MINING DISTRICT, MEXICO.

By E. B. VON OSDEL.

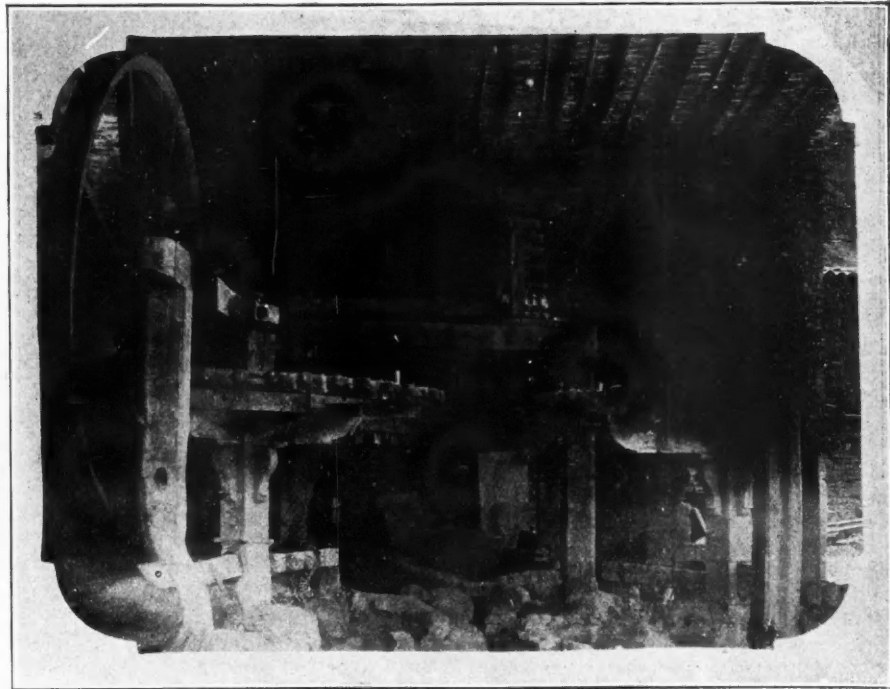
The virtues of Mexico as a mining country have been thoroughly extolled and are well recognized by men of all countries. However, a word concerning a newly developed district may not be out of place.

No one who has traveled over the Mexican Central Railroad through the northern and western parts of the Republic can have failed to notice the lack of prominent peaks or lofty ranges. The mountains seem to be distributed along the plain in small groups here and there and are soon run down as we speed along. With a few exceptions such is the case along the line in the State of Jalisco. Leaving Guadalajara we are carried almost due west in general direction to the junction at La Vega, whence a branch runs north and west for a score of miles, climbs over a range of hills and is at once in a beautiful basin surrounding Magdalena Lake and skirted by hills rich in the metals and filled with large haciendas and fertile ranches. On the southern side of the lake and on the foot of the adjacent hill is the town of Etzatlan, whose municipal records begin with its baptism of blood in 1521.

The ores are found mostly in feldspar with some quartz. Silver as chloride, bromide, sulphide, and in the native wire forms, is abundant. Galenite, cerrusite, bornite, chalcocite, chalcopyrite, sphalerite and native copper are found in large quantities. There are also plentiful deposits of hematite and calcite for flux. For treatment there are many amalgamation arrastras, a few stamp mills, and cyanide and hypsulphite leaching plants, but the prevalent mode of treatment is the patio process.

About five miles from Etzatlan in a southerly direction is the Santo Domingo mine. It has been worked for hundreds of years by various Spanish and Mexican parties, and is now in operation by the Compania Armonia. The rich ore from the mine is sent to smelters, while the medium grade is treated by the patio process in a mill situated half a mile up the nearest gulch from the town.

There are three of the picturesque old Mexican structures near Etzatlan. Two at the edge of town are not in operation. The grounds are laid out as a park with walks set in patterns of different colored stones, with drives and with permanently constructed waterways. There are also several fragmentary



OLD ARRASTRA AT SANTO DOMINGO MILL, ETZATLAN.

For two months the writer was stationed in this village of 7,000 people in connection with a smelting plant and mining interests. The Spaniards and Mexicans have gophered about in the hills for hundreds of years, and their prospect holes and dumps are everywhere over the hillsides. The resources of the country are thus opened up to a certain extent so that American capital, which is rapidly coming in, may get some idea of the wealth to be found here.

Sixty miles north of Etzatlan is the barranca of the Rio Grande de Santiago with the town of Hostotipaquillo lying half way between. From Hostotipaquillo to the river is a district abounding in old silver mines which have been worked on a considerable scale. The veins are hundreds of feet in width, containing enormous quantities of medium grade ore, with stringers of a high grade quality. These mines are always accompanied by enormous dumps of low grade sortings running from 5 to 15 ounces in silver per ton. The ores are mostly of a siliceous character, carrying some manganese, while galena, chalcopyrite and hematite are found in some quantities.

South of an east-and-west line through Etzatlan is a range of hills filled with every sort of ore, but with considerable zinc associated with many of them. Some gold is found in the district, but the values are mostly in silver, copper and lead.

Feldspars abound in the region, while great porphyry dykes and beds of blue conglomerate with fainty dolerites are to be found in extensive masses.

structures for carrying on the process, using arrastras turned by mules for grinding, the settling being done by boys performing a stationary run in the tank of mud. The Santo Domingo mill is situated in a large level plat in the gulch, the grounds being walled in with the building in the central part. Stalls and a yard for the mules occupy the upper end, while the patio settlers and concentrators work in the lower end. In the building is found a disintegrating overshot wheel of huge dimensions and a group of large arrastras. Lately two boilers, an engine, a crusher, a quartz mill and feeder, and two Bartlett tables have been installed. An office and storeroom are in close proximity and a large gateway and bridge lead over the creek. Above the gate are the words, "La Providencia, Julio 10, 1873," and on the building is the inscription, "Diligent in Business, Fervent in Spirit, Serving the Lord," both in English and in Spanish. On the lower side of the main building are settling tanks, assay furnace, storerooms, hand concentrators and quicksilver settlers, which are turned by mules, grouped around the patio.

Only a limited amount of ore can be carried down by the mules from the mine, so that running is intermittent. The crushing is done by a Dodge crusher and Bryan roller quartz mill furnishing a 20-mesh product which is carried out by a stream of water and settled in a series of three tanks. Forty tons of the remaining mud are shoveled out

into a large pancake called a torta and a hot solution containing 150 kilograms of blue vitriol and 2,000 kilograms of salt and about 350 kilograms of mercury are added. The torta is mixed for seven days six hours a day by twenty mules, with the addition from time to time of more mercury in 30 kilogram lots until a batea test shows free mercury. Usually about 500 kilograms mercury are required. When the torta is done it is shoveled into the settlers to remove the mercury and the tailings are settled in a tank to await concentration. About 85 per cent of the silver is recovered in this way and the cost is between \$7 and \$8 per ton Mexican money. With the old arrastra for grinding, the cost was \$11 per ton.

The ore carries 12 to 15 grams in gold and about 920 grams in silver per metric ton. The concen-

creased an average of 2 miles an hour for each succeeding 100 miles. The river has many islands and sand bars, causing the water to divide into numerous channels, somewhat like the Yukon between Fort Hamilton and Circle City.

The lower end of Bates Rapids, 300 miles from the Yukon, where the Chenoa River enters the Tanana, was reached in 3½ days. The destination was a point on the main river 180 miles above the rapids, where the Valdes trail crosses the Tanana; but after ascending 10 miles of shallow water, the boat grounded in 3½ feet, and no channel could be found with water enough to continue. The boat then returned to Chenoa River and steamed up that stream 25 miles, finding at the shallowest points 4 feet of water. A landing was made on a high bank, where plenty of good spruce timber was found for

Range. The Mountain Iron, also a Mesabi mine, shipped 1,058,160 tons. The Chapin, on the Menominee Range, reported 929,701 tons, while the Cleveland-Cliffs on the Marquette Range shipped 874,465 tons. The Adams, a Mesabi mine, reported 829,118 tons and the Mahoning, on the same range, 765,872 tons. The Norrie, on the Gogebic Range, shipped 660,965 tons. The big shippers from the Vermilion were the Pioneer, 678,310 and the Chandler, 627,399 tons.

The total quantity of ore mined on the different ranges from the beginning of work up to the close of 1901 is reported as follows, in long tons:

Marquette	62,847,473
Menominee	37,621,428
Gogebic	34,154,790
Vermilion	16,977,243
Mesabi	40,404,967
Miscellaneous	2,320
Total	192,008,221

The mines having the highest records are the Cleveland-Cliffs, 10,478,233 tons and the Lake Superior, 10,285,094 tons, both on the Marquette Range; the Chapin on the Menominee Range, 10,099,621 tons; the Norrie, on the Gogebic Range, 9,623,135 tons; the Minnesota, 7,178,343 tons and the Chandler, 7,027,830 tons, both on the Vermilion Range; the Mountain Iron, 5,832,745 tons and the Fayal, 5,585,852 tons, both on the Mesabi Range.

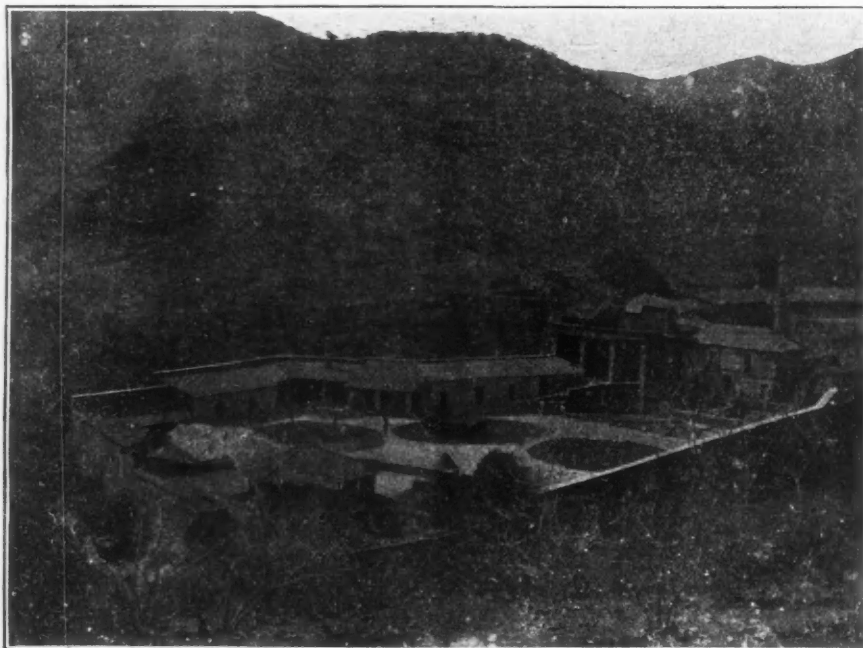
THE FLORIDA PHOSPHATE TRADE.

In the table below, which gives in tons the shipments of Florida phosphates in 1901, it will be seen that Germany, the leading superphosphate manufacturer in the world, imported direct nearly 39 per cent of our exports. A considerable part of the receipts by Holland were also destined to the interior of Germany. Comparatively little low-grade phosphates have gone to Germany, but their exports to the United Kingdom, France and Italy were quite large.

Destination.	Hard Rock.	Pebble and Peace River.	Total.
Australia	4,272	4,272	8,544
Austria	8,014	2,200	10,214
Belgium	55,785	.....	55,785
Denmark	2,721	.....	2,721
France .....	.....	29,577	29,577
Germany	205,515	7,520	213,035
Holland	68,415	.....	68,415
Italy	8,340	26,393	34,733
Japan .....	.....	13,471	13,471
Norway and Sweden	24,211	16,998	41,209
Spain	2,600	.....	2,600
United Kingdom	40,147	32,136	72,283
United States	3,501	187,840	191,341
Total tons	419,249	320,407	739,656
Total, 1900	348,556	266,979	615,535
Changes, 1901	I. 70,693	I. 53,428	I. 124,121

The total increase in 1901 is equal to 20 per cent, due chiefly to the improved foreign trade in high-grade rock. The exports aggregated 548,315 tons, or 74 per cent of the total shipments. As compared with 1900, the exports show an increase of 84,067 tons, or 15 per cent. The largest purchasers of high-grade rock were Germany, Holland, Belgium and Great Britain, the latter country importing quantities for re-shipment to its colonies. Land pebble, of which exports were 113,777 tons, went chiefly to Mediterranean ports, though cargoes went as far east as Japan and Australia. The Peace River pebble, amounting to 187,840 tons, found its largest foreign consumers in Great Britain.

Concerning the domestic shipments, it may be said that comparatively little high-grade rock is consumed here, as our superphosphate factories use low-grade stuff principally because it is cheap and answers their purpose. The pebble carrying from 58 to 73 per cent bone phosphate of lime sells from \$4.25 to \$5 per ton below high-grade rock at Fernandina, Fla. Consequently there has been an increase in the domestic shipments of nearly 20 per cent, the total in 1901 being 187,840 tons, against 151,287 tons in 1900. Of this amount, 159,817 tons were land pebble, which compares with 118,208 tons in 1900, showing an increase of 41,609 tons, or 26 per cent. Peace River pebble, however, shows a falling off of 5,056 tons in 1901. The principal buyers of pebble are fertilizer manufacturers at Baltimore, Md., and Carteret, N. J. The outlook for 1902 is very promising.



PATIO AT SANTO DOMINGO MILL, ETZATLAN, MEXICO.

trates (25 into 1) give 120 grams gold and 2,200 grams silver.

The cost of treatment is distributed about as follows:

20 mules for 7 days	\$25.00
4 men on torta for 7 days	10.10
Helpers	7.00
Mechanical loss of mercury	20.00
Chemical loss of mercury	33.00
Salt, 2 tons, at \$35	70.00
Blue vitriol, 150 kilos, at 8c	12.00
Cost for a torta of 40 tons	\$177.10

The cost per ton of treatment is \$4.43; cost of milling, \$2.20; administration, \$1; making the total cost per ton, \$7.63 Mexican money, equal to \$3.75 American money.

As soon as the two Bartlett tables are in operation a much better grade of concentrates will be secured. Regardless of the latter, the margin over the patio treatment is more than \$20 in Mexican currency.

NAVIGATION OF THE TANANA RIVER, ALASKA.

United States Vice-Consul H. Te Roller, at Dawson City, reports that the steamer *Lavelle Young*, of Portland, Oregon, (506 tons, carrying a cargo of general merchandise of 150 tons and drawing 4 feet of water), entered the Tanana River August 18, 1901. The mouth of the river is about 2 miles wide, and is almost closed by a continuous sand bar. A channel with 4½ feet of water was found, and no difficulty was experienced after passing the entrance. The current runs about 3 miles an hour, and after crossing a wide flat of 3 miles, intersected by numerous sand bars, with 5 feet of water in the channel, the vessel entered a good river running through a comparatively level country. From 5 to 6 feet of water was found on the worst crossings, as the channel ran from one side of the river bottom to the other; after the first 100 miles, the current in-

building purposes, and after a delay of two days the cargo was unloaded and the boat returned to the Yukon.

Sixty miles from the mouth of the Tanana, Baker Creek enters; 20 miles above that point, the Cantitna comes in; 6 miles farther, the Fulvanna River; and 214 miles from that point, the Chenoa River. All of these streams are navigable for small steamers from 50 to 100 miles. Indian camps are found at different points along the main river. The channel, except at the upper end of the river, flows through a wide valley, with snowy mountains in the distance. The *Lavelle Young* is the only boat of any size that has attempted to navigate the Tanana, though small steamers have been engaged for several years in towing logs to the sawmill at Fort Gibbons.

LAKE SUPERIOR IRON ORE.

We have heretofore given the shipments of Lake Superior iron ore by ports for 1901. We have now the complete statement by mines and ranges, which is most carefully compiled each year by the *Cleveland Iron Trade Review*. The statement by ranges for two years past is as follows:

Ranges:	1900.	1901.	Changes.
Marquette	3,457,522	3,254,680	D. 202,842
Menominee	3,261,221	3,605,449	I. 344,228
Gogebic	2,875,295	2,938,155	I. 62,860
Vermilion	1,655,820	1,786,063	I. 130,243
Mesabi	7,809,535	9,004,890	I. 1,195,355
Totals	19,059,393	20,589,237	I. 1,529,844

The Mesabi mines furnished three-quarters of the increase last year. Of the total in 1901 the Mesabi supplied 43.8 per cent; the Menominee, 17.5; the Marquette, 15.8; the Gogebic, 14.2; and the Vermilion, 8.7 per cent.

The largest shipment made by any one mine in 1901 was 1,656,973 tons by the Fayal on the Mesabi

RECENT GEOLOGICAL WORK IN WESTERN PENNSYLVANIA.*

By MARIUS R. CAMPBELL.

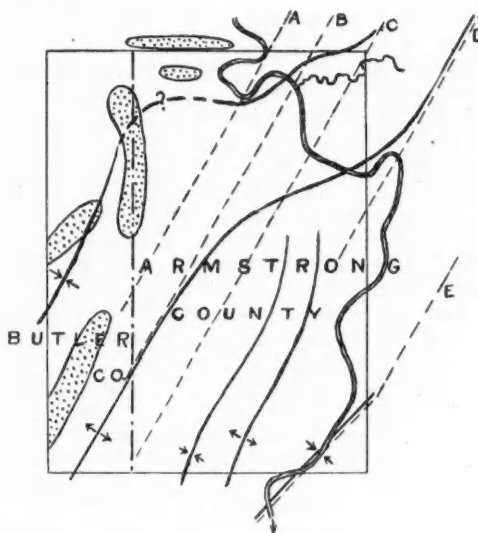
Although two complete geological surveys of the State of Pennsylvania have already been made, the Legislature in 1899 passed an act providing for a third systematic investigation of the mineral resources of the State. This was to include topographic and geologic mapping, and it was to be accomplished through the co-operation of the United States Geological Survey and the State authorities. Under this agreement geologic work has been in progress for the past two years. At the end of the second year it is interesting to review the work already accomplished, and compare it with that of previous years in order to determine whether the improvements have been sufficiently pronounced to justify the great expenditure of money necessary for this last survey. Up to the present time seven fifteen-minute quadrangles, embracing an area of about 1,600 square miles, have been surveyed geologically. This territory lies in the type region of the bituminous coal field, and if satisfactory advances have been made in this old and well known region, it certainly augurs well for future operations in other parts of the field that were undeveloped, and consequently less known at the time of previous surveys.

It is generally admitted that the greatest defect in the work of the second geological survey of Pennsylvania was its lack of adequate base maps upon which to portray the geologic data gathered in the field. Crude county maps were all that were available, and on these maps there was no attempt to show the character of the surface either by means of hachures or by contour lines. Upon such maps it was impossible to locate correctly geologic boundaries. In the majority of cases no great economic value attaches to a geologic boundary, and its exact location is not a vital matter, but in the case of the Pittsburg coal, which constitutes the boundary line between the Conemaugh (Lower Barren) formation and the Monongahela (Upper Productive) formation, the exact position is of the utmost economic importance. At the present time land underlain by the Pittsburg coal sells in the open market for from \$300 to \$1,100 per acre, and a map to be of any value must show the outcrop of this coal practically in its exact position. Through the use of inadequate base maps this outcrop was mapped in places at a distance of 1 mile from its true location. In many places it is from 300 to 900 feet out of its true position and a large number of outcrops have been omitted from the map. In other cases several isolated exposures have been grouped into one large area of coal, thereby showing greater acreage than actually exists. During the present survey close attention was paid to the location of this boundary, and its representation on the map is thought to be within a few feet of its actual position.

The description of sections and of coal exposures are generally accurate in the State reports, and many scores of these were incorporated in the present work without verification. In the matter of geologic structure the reports of the previous survey are not up to the present standard. It is true that the principal structural features were mapped and described, but little attempt was made to work out the minor details which to the coal operators are of the greatest importance. It seems almost unnecessary in a publication of this character to state that such information is of the utmost value to anyone engaged in exploitation of the mineral wealth of the region. If maps giving details of geologic structure had been available during the past decade many thousands of dollars would have been saved in the operating expenses of mines badly located with regard to structure and

to oil and gas operations throughout the productive territory of western Pennsylvania.

In the present survey particular attention has been given to the determination and delineation of geologic structure. This is to be shown on the maps by means of contour lines drawn upon the top or bottom of some important bed. In the southwestern part of the State the floor of the great Pittsburg coal will be so contoured. Data for this purpose have been collected from more than 100 large mines, including all of those belonging to the H. C. Frick Coke Company, the Pittsburg Coal Company, the Monongahela River Consolidated Coal and Coke Company and many smaller operators. Oil and gas well records have been collected and used for this purpose, and where instrumental data could not be secured, the surface outcrops, by means of a comprehensive system of sections, was used to extend the contour lines into unknown territory in the deeper basins.



SKETCH MAP SHOWING AXES OF FOLDS IN KITTANNING-QUADRANGLE.

In the oil and gas fields of the Allegheny Valley similar structural maps will be prepared, except that the Ferriferous limestone will be the stratum contoured instead of the Pittsburg coal. In the State reports it was found difficult to harmonize the occurrence of oil with the geologic structure as then determined. In western Armstrong and eastern Butler counties the axes of the folds were represented by straight, parallel lines extending north 300 east. These were named and mapped as shown in the accompanying sketch. The oil pools then developed lay in an east and west direction, crossing the geologic structures at an angle of about 60°. These facts could not be harmonized, and the result is that oil men in that district maintain that there is no relation between the occurrence of oil and geologic structure, and they have the discordance noted above to support their views.

In the sketch map given herewith the broken lines represent axes located in the previous survey, as follows: A, Brady's Bend syncline; B, Brady's Bend anticline; C, Lawsonham syncline; D, Kellersburg anticline. The solid lines show axes mapped during the present survey. Oil pools are indicated by dotted areas.

During the progress of the present work it was found that the structure is not so regular as that represented on previous maps. The axis of the major anticline does not cross the Allegheny River near Brady's Bend, but curves to the east and coincides with the Kellersburg axis. In a similar manner the Brady's Bend synclinal axis does not cross the river at Bradys' Bend, but trends to the northeast parallel with the stream to near the mouth of Redbank Creek, where it crosses to the north side.

In comparing the position of the various oil pools with the structure as recently determined it

is seen that the pools trending east and west lie on the northern limit of the syncline and their longer diameters are approximately parallel with the axis of the fold. In Butler County the pool which trends north and south apparently occupies the axial line of this syncline after it has bent around the projecting point of the anticline on the east and has about resumed its normal direction.

Thus, while the details of structure have not yet been carefully worked out, from notes taken during the past season, enough is known to say that the true geologic structure of this field is in agreement with the pools of oil and the occurrence of gas, and that a thorough understanding of this structure in the early days of the oil development in this district would have been of inestimable value.

In conclusion, I desire to express my high appreciation of the labors of the geologists who have preceded me in this most interesting field. Their lack of adequate base maps and of a thoroughly comprehensive method is largely responsible for the errors and inaccuracies of the published reports. With the accurately contoured base maps now available better results are expected, and it is the aim of the United States Geological Survey to meet this demand.

The improvements noted above are sufficient to justify a large expenditure of money, and it is to be hoped that the co-operative work will be continued until at least the entire bituminous coal-field shall have been mapped.

TO SAVE FLOOD WATERS IN NEVADA.—

Investigations have been started in Nevada, by the United States Geological Survey, under the charge of Mr. L. H. Taylor, looking to the ultimate storage of the flood waters on the principal streams. On account of the aridity of the climate, agriculture must be carried on by irrigation to be successful. The rivers are the only source of water for this purpose, and owing to their extremely low flow in the critical crop growing period, the territory which can be irrigated is limited. On the other hand, the spring flow of these streams is large, and immense quantities of water run to waste. From measurements taken by the Geological Survey the minimum summer flow of the Humboldt River was shown to be only 7 cubic feet per second, while its spring flow was over 8,000 cubic feet per second. During the last two years the Geological Survey have been investigating the possibilities of impounding the flood waters of the Truckee, Carson, and Humboldt rivers by means of storage reservoirs. The results of these investigations in the basin of the Truckee River have been compiled and will shortly be published; those of the Carson River are now being worked up. The Humboldt River problems are much more complicated, and a beginning only has been made upon them.

MINERAL PRODUCTION OF PORTUGAL.

We are indebted to the Division of Mines in the Ministry of Public Works of Portugal for an official statement of the mineral production of the kingdom for the year 1900.

The output of metals and metallic ores is given as follows, in metric weights: Gold, 2.6 kilograms; gold-antimony concentrates, 75 tons; copper precipitate, 2,948 tons; cupreous iron pyrites, 57,540 tons; antimony ore, 38 tons; iron ore, 19,803 tons; lead ore, 3,620 tons; manganese ore, 1,971 tons; tin ore, 81 tons; wolfram ore, 49 tons; zinc ore, 114 tons.

The production of coal was 24,066 tons. Other minerals included 1,031 tons arsenic ore and 34,533 tons sulphur ore.

At the close of the year there were 461 mining concessions in force, of which 6 were general concessions; 5 for iron and coal; 22 for coal only; and 428 for metallic mines. The total area covered by these concessions is 28,755 hectares.

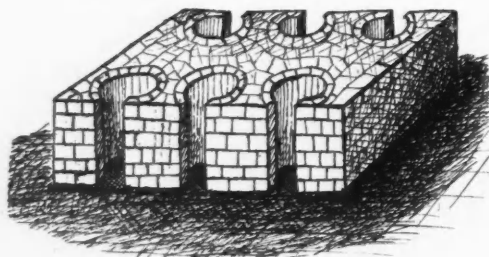
*Read before the Geological Society of Washington, January 8, 1902. Published by permission of the Director of the United States Geological Survey.

ANCIENT COPPER SMELTING IN MEXICO.

By C. W. PRITCHETT.

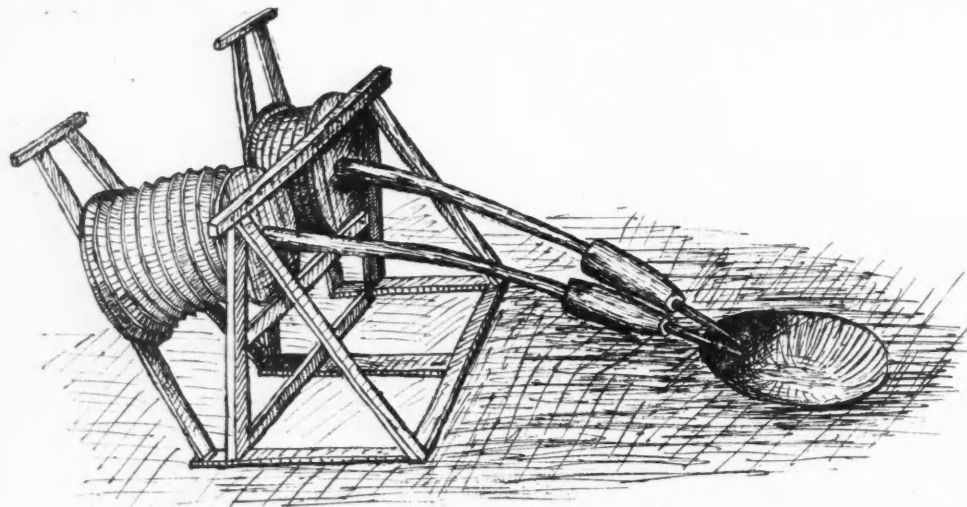
Some years ago while examining the old Inguaran copper mines in the southern part of the State of Michoacan, Mexico, since purchased by a French syndicate, I came across a very interesting example of a crude copper smelting plant, a description of which may be interesting, to show the methods used for several hundred years and still in use in isolated parts of the country to supply the local demand for copper for manufacturing copper pots or "Cascos."

The ore treated in this plant was chalcopyrite from the Inguaran mines and naturally only the richest portions of the deposit were mined. The ore was first subjected to a hand sorting to eliminate rock, iron pyrite and copper pyrite, practically pure. The



OLD MEXICAN ROASTING FURNACE.

remainder was crushed fine on rocks and subjected to a wet concentration in a trough or "canoa" hewn out of a tree trunk. This trough is about 8 feet long, 18 inches wide and 18 inches deep and is tilted up at one end, giving the bottom a grade of about 6 inches in the 8 feet. The trough is partially filled with water mixed with clay to about the consistency of buttermilk and on the upper quarter of the bottom which is not covered by water, about 25 pounds of crushed ore is placed. This ore is carefully wet down and the concentration is effected by splashing the water on to the ore with a flat wooden paddle. It takes about eleven washings to eliminate the iron and gangue and obtain a fairly clean copper



ANCIENT MEXICAN COPPER SMELTER.

concentrate. A great deal of copper is naturally lost.

The picked ore and concentrates are then smelted in the following manner. The whole plant consisted of a roasting furnace and smelting furnace, sketches of which are given as I did not have a camera at the time of my visit. The roaster is built of stones and mud, each stall being about 4 feet high and 3 feet in diameter. There were two sets of stalls. The front of each stall is open. Before charging a stall, the front is built up with loose rock, using the larger rock for the bottom layers and leaving sufficient space between the rocks for air to enter. About 18 inches depth of pine kindling and charcoal are then placed in the bottom and on top of this a layer of

coarse ore, and the stall is filled with alternate layers of ore and charcoal, the top being covered with fine concentrates. The whole is then fired. A pine board is planted in front of each stall and on this is kept a record of the number of times the ore is roasted and the name of the owner. The charge is drawn and recharged 5 or 6 times with fresh fuel and when well roasted it is taken to the smelting furnace (Fig. 2). This consists of a hemispherical hole in the ground about 2.5 feet in diameter and 18 inches deep and two round bellows having their tuyeres leading into the hole. The noses of the tuyeres are made of clay.

The roasted ore is charged as follows: Four green poles are selected, about 8 inches in diameter. These are placed so that their ends meet over the centre of the hole. Charcoal is then placed in the hole till the poles are covered, then successive layers of roasted ore and charcoal are placed on top of this and finally topped with fines. The whole is fired and blast started, and kept up continuously by working each bellows alternately. The ore melts down to slag and matte. The matte is returned to the roasting stall and roasted as before several times and finally returned to the smelting furnace and recharged as before and melted, with the richest slag, to copper. The copper collects in the bottom of the hole in the shape of a segment of a sphere about 10 inches across the base and 5 inches thick. This is at once tested by bending over the edge with a heavy hammer and if it bends without cracking, it goes at once to the kettle maker. These copper ingots are called "planchas" and the peculiar shape is of advantage in the making of copper kettles. The average copper content of the ore used was about 26 per cent and the capacity of the plant was about 100 cargas per month (30,000 pounds). The smelting charge was \$3 per carga of 300 lbs. and the owner claimed to clear about \$1 per carga.

SEMI-CENTENNIAL OF THE SAULT STE. MARIE CANAL.

A movement is on foot to celebrate the fiftieth anniversary of the beginning of work on the Sault Ste. Marie Canal. The contractors who built the

first canal included a number of prominent business men in Michigan and the East, who undertook the work, receiving in payment from the United States 750,000 acres of land in Michigan. Work was begun June 4, 1853. The canal was very thoroughly built, and it is claimed that no other contract with the Government has ever been more fully and honorably carried out. In fact the canal was better built than the law required. Thus the law called for locks 250 by 50 feet, but they were made 350 by 70 feet, and were provided with machinery for opening the gates, which was not specified in the act. The opening of the canal was practically the beginning of traffic on a large scale with the Lake Superior country.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

CONSTRUCTION OF THE WORDS "SALE" OR "TRANSFER" OF MINING PROPERTY.—Where a mining lease provides that it shall terminate on "a sale or transfer" of the property, the word "transfer" as there used relates to a transfer of the title to the property and not to a mere transfer of the right of possession of the same.—*Ober v. Schenck* (65 *Pacific Reporter*, 1073); Supreme Court of Utah.

WHEN LIEN ON MACHINERY OF MINE WILL BE PROTECTED.—Under an option contract for the purchase of a mine, the purchasers were to take possession of the mine and develop it, agreeing not to allow any lien to be placed on same, and to save the owners harmless from all liens, and to surrender it on election not to take the mine. Such purchasers gave a mortgage on personalty—machinery, which they attached to the mine for its development and which was so placed that it could be removed if the option to purchase was not executed. The option was exercised, but the purchasers subsequently forfeited the mine to the owners, who again conveyed it. The mortgage on such personalty was recorded prior to the forfeiture and re-taking of possession by the owners. It was held that such purchasers, being entitled to remove such fixtures as were placed in the mine for the temporary purpose of testing its value had the right to treat it as personalty, and to mortgage it, and on the subsequent forfeiture the owners and their subsequent grantees took the property subject to the mortgage.—*Alberson v. Elk Creek Gold Mining Company*, (65 *Pacific Reporter*, 978); Supreme Court of Oregon.

RIGHT TO FILE ADDITIONAL CERTIFICATE IN COLORADO.—The laws of Colorado (Mills Annual Statutes, Section 3,160), providing that the locator of any mining claim may file an additional certificate, entitled the locator of a placer mining claim to file an additional certificate. And, where one sought to prevent the issuance of a certificate of patent to another's mine, and alleged that it included the claim located by himself, but did not show what were the local rules and regulations governing the location of mines, he cannot attack the validity of the defendant's location for the failure of the latter to comply with such rules and regulations. Defendant's mine was located in 1895, and in 1898 he said that his location did not include territory which plaintiff subsequently located. Afterwards defendant filed an amended certificate covering such territory, but it did not appear whether plaintiff's mine was located before or after the filing of such certificate. At the time the plaintiffs located their mine, the territory covered by it was in the actual possession of the defendant. And it was held that such evidence was not sufficient to show that plaintiffs' mine was located on unappropriated mining domain.—*Kirk v. Meldrum* (65 *Pacific Reporter*, 634); Supreme Court of Colorado.

SUFFICIENCY OF NOTICE BY MINER TO EMPLOYER.—The evidence showed that there was a custom or usage, established by the mine operator, as to the manner in which a miner there employed should make his demand for props and caps. According to this custom or usage, the miner, when he required or desired to have such props or caps, wrote with chalk on a blackboard, placed near the mouth of the shaft for that purpose, the number of props and caps he wanted and the length of the props. When they were furnished they would be sent down to him, and the driver would deliver them at the miner's room. The evidence tended to show that the miner had need of some props and caps, and for three successive days before he was injured he placed his order for them on the board or slate used for that purpose, according to the custom or usage above referred to, and they were not furnished to him. This mode of

making demand for props and caps was a reasonable and proper one, and it was the mode adopted and in general use, it constituted a sufficient demand on the mine manager, within the meaning of the law of Illinois; and was sufficient to justify an instruction to the jury that the miner had made a demand for props and caps.—Donk Brothers Coal and Coke Company v. Peton (61 *Northeastern Reporter*, CCJ); Supreme Court of Illinois.

LAW OF ILLINOIS REGARDING SUPPLYING TIMBERS IN COAL MINING.—The law of Illinois (2 Starr & Co. Annual Statutes, page 2730, chapter 93, section 10.) Requires that every owner of every coal mine shall keep a supply of timber constantly on hand of sufficient length and dimensions to be used for props and cap pieces, and shall deliver the same, as required, with a miner's empty car, so that the workmen may at all times be able to properly secure the workings for their own safety. In an action for the death of a miner while employed in a coal mine it appeared that deceased had informed the pit boss that a rock was liable to fall and was dangerous, and that he ordered props for it, which the boss promised to send, but failed to do so, and rock fell and killed the miner. The court held that the miner himself is the one to determine the length and dimensions of the props and caps necessary to secure his safety, and if he ordered props and caps of one dimension and length it is no compliance with the law for the owner to supply props which must be spliced or sawed before being used; and where owing to the wilful failure of the owner to furnish suitable props and caps the miner is injured, the owner cannot escape liability by showing that the miner was guilty of negligence contributing to his injury.—*Western Anthracite and Coal Company v. Beaver* (61 *Northeastern Reporter*, 335); Supreme Court of Illinois.

ASSUMPTION OF RISK AS TO UNSAFE PLACE IN MINE TO WORK.—A company was engaged in excavating a chamber in its mine for a pump-house about 30 by 50 feet in size, and an employe was operating a car for removing the loose rock taken out to the elevating shaft. When he had been so employed about four weeks, and the room had been excavated to the required size, except in height, a pillar left to support the roof was removed; and large quantities of rock fell, and continued to fall at intervals afterwards, rendering the room unsafe to work in. The company then commenced timbering next to the entrance, removing the fallen rock as the work progressed; the men being supplied with long hooks to enable them to pull out the rock while remaining under the protecting timbers. They were warned by the foreman not to go beyond the timbers. One while so working with others 10 days after the work commenced, and while under the timbers, was killed by a piece of rock which fell outside the timbers, but striking on a pile of rock was deflected under them. The deceased was 20 years old, but was an experienced miner. The court held that there was nothing in such facts to charge the company with a failure to exercise reasonable care and precaution to render the place safe as the nature of the work would permit, saying the general rule in respect to the duty to provide a reasonably safe place in which to work cannot be applied to a case where an employe when injured is engaged in performing such duty of the employer, by making safe a place which has become dangerous during the progress of the work, or from the manner in which the work was done. In such case the relation between the master and servant is changed, and the servant assumes the risk incident to the dangerous condition of the place, as one of the hazards of the employment, if he knows of it, or should know of it in the exercise of ordinary care and observation; and in action for his injury it is immaterial whether the place originally became dangerous through the negligence of the employer or not.—*Moon-Anchor Consolidated Gold Mines v. Hopkins* (111 *Federal Reporter*, 298) United States Circuit Court of Appeals.

ABSTRACTS OF OFFICIAL REPORTS.

Republic Iron and Steel Company.

This company's latest statement covers the half year ending December 31, 1901. The profit and loss statement for the half year is as follows:

Profits after all expenses save repairs and renewals	\$1,419,549
Improvements and repairs	486,426
Net profits	\$933,123
Preferred dividend, six months	711,616
Surplus	\$221,507
Previous surplus	1,109,665
Total surplus	\$1,331,172

The general balance sheet as of December 31, 1901, compares as follows with the statement of June 30, 1901:

ASSETS.		
	Dec. 31.	June 30.
Real estate, plants, etc.	\$41,091,018	\$41,093,724
New construction	3,618,610	2,382,378
Stock in other companies	147,200	147,200
Nov. blast fur. improve.	100,674	100,674
New gas pipe lines, etc.	216,154	245,171
Raw and fine materials	3,327,605	3,328,850
Acc'ts and bills receivable	3,015,041	2,527,209
Cash on hand	948,813	1,127,107
Total	\$52,364,444	\$50,952,315

LIABILITIES.		
	Dec. 31.	June 30.
Preferred stock	\$20,356,900	\$20,306,900
Common stock	27,191,000	27,191,000
Acc'ts and bills payable	2,829,801	1,685,350
Preferred dividend	356,245	355,370
Installments on coal lands	148,000	185,000
Res. for taxes and insur.	81,990	47,386
Reserve for bad collections	69,333	71,642
Surplus	1,331,172	1,109,665
Total	\$52,364,444	\$50,952,315

From the date of the organization of the company, on May 11, 1899, to December 31, 1901, the company has charged to operating and written off against profit and loss for amounts expended in reconstruction, improvements, renewals and repairs the sum of \$1,946,063. This money has been almost wholly expended on plants that are best located in reference to markets for raw material, and where steady sales are best insured by local conditions. The expenditure of these amounts has improved the physical condition of the plants now in operation, has very materially increased the future earning capacity and placed the company in a very strong position to produce a largely increased output at much saving in cost.

The report says: "In addition to this amount of almost \$2,000,000 expended for reconstruction, renewals and repairs, the balance sheet shows that since May 1, 1899, the company invested \$3,618,610 in entirely new construction.

"When this company was organized on May 11, 1899, its ore supply for bessemer mixture, by the acquisition of ore mines, consisted of 2,500,000 tons. Since that date the company has acquired, by contracts extending over a period of years, by fee, and favorable leases, 11,500,000 tons additional, making a total supply of more than 14,000,000 tons, or sufficient for the requirements of our Northern blast furnaces for a period of 28 years.

"We have a sufficient acreage of Connellsville coking coal to supply our Northern blast furnaces for a period of 20 years. This supply of ore and coke places the company in a strong position to produce bessemer and forge pig iron at the lowest possible cost.

"The following is a safe estimate of the value of the raw material in the ground now owned by this company: 14,000,000 tons Lake Superior ore at 50c. per ton, \$7,000,000; 6,000,000 tons Connellsville coking coal at 25c. per ton, \$1,500,000; 12,500,000 tons Pittsburg steam coal at 10c. per ton, \$1,250,000; 50,000,000 tons Alabama coking coal, 50,000,000 tons Alabama red ore, 20,000,000 tons Alabama brown ore at 10c. per ton, \$12,000,000; total, \$21,750,000."

Ouro Preto Gold Mines of Brazil.

The report of this company covers the year ending June 30, 1901. The accounts show the receipt of £87,037 from the sale of gold, £205 from the sale of arsenic, and £579 from rents, etc., making a total

of £87,822. Expenses in Brazil were £80,654, and in London £2,061, making a total of £82,715, and leaving a balance of £5,107. The expenses include £3,065 paid as Brazilian export duty on gold. In addition to these expenses £1,182 were written off for depreciation, and £1,963 paid for interest on debentures and preferred stock. The total balance at the close of the year, including £3,751 brought forward from the preceding year, was £5,713.

The superintendent's report shows a large amount of work done on the Passagem Mine, which is the company's principal property. The total development work amounted to 1,188 meters, and the total stoping to 41,771 cubic meters. The total rock taken out was 73,200 tons, of which 9,121 tons were rejected as waste and the balance sent to the mill. In the cyanide works 144 tons of concentrates from the mill were treated, while 2,497 tons were treated by chlorination. The superintendent's report says:

"The trials by agitation with cyanide in open agitators were continued, and during the first few months of the year, Mr. Kendall, the reduction officer, devoted a great deal of time and attention to overcoming the minor difficulties which occurred at various stages. A system of treatment has been evolved which is quite satisfactory in all respects, combining efficiency and rapidity in treatment, with low consumption of cyanide and general low working cost. As soon as all the details were settled, a plant capable of treating 250 tons of concentrates per month was arranged out of old materials and gear already on the mine, and during six months ran satisfactorily and without a hitch. As there is no doubt now that the whole of the concentrates can be treated cheaply and efficiently by this modified form of the cyanide process, it has been decided to enlarge the plant to a capacity of about 500 tons per month, and eventually to cease chlorinating work. With this object in view, agitators are being built on the mine, and other necessary material and gear have been requisitioned, and the work of grading a proper site for the greatest economy in working has been commenced. The cost of cyaniding is remarkably small as compared with that of chlorination, and a considerable economy has been effected by the suppression of one roasting furnace and part of the chlorination work, and this will naturally be still greater as soon as the extension of cyanide plant is completed."

The gold recovered is reported as follows:

	Total, ozs.	Per ton, ozs.
Mill	23,105	0.36
Chlorination	3,685	0.06
Cyanide	1,791	0.03
Totals	28,581	0.05

The average cost of ore per ton milled was \$6.02.

The company has recently purchased a property called Boa Esperanca, which lies in the direction of the dip of the Passagem vein, and which was obtained for a very reasonable price. A long lease has also been secured on an adjoining property called Valla Quem Tem. These two tracts together form what might be called a deep level to the Passagem Mine. The Borges, Santa Anna and Maquine mines purchased some time ago are held in reserve to be worked in the future.

Rhode Island Copper Company, Michigan.

The statement of this company, which is developing a copper property in the Lake Superior region, covers the year ending December, 31, 1901. The cash on hand January 1 was \$83,538; receipts from interest, \$1,346; total, \$88,884. Expenditures for development, taxes and general expenses were \$53,468, leaving a balance of \$31,416 on hand at the close of the year.

The development work during the year included 276 feet sinking on two shafts; 1,871 feet drifting on conglomerate, and 830 feet cross-cutting. The stoping done, all on the west lode, was 50 cubic fathoms.

The report of Superintendent Thomas Dennis says that the east lode showed up very little copper

during the year. The west lode, which is about 8 feet wide, shows far better, and appears to carry more copper. The report says, in conclusion:

"A second test is being made of the Albany & Boston conglomerate lode but at a greater depth than was made in the year 1900. There were two ways to make the present test; one was by sinking a shaft on the lode and the other by cross-cutting east from the east lode. To make this test by sinking a shaft from surface would mean a great deal of expense. It would be still more expensive to utilize the old shaft, as it is too small and was continually filling with water, and is sunk in the foot-wall of the lode. In either case, a hoisting plant would have to be installed. So it was decided to sink No. 2 shaft to the fourth level or 500 feet from surface, then drive a cross-cut east, and from the same level drive a cross-cut to the west lode. On December 11 the conglomerate lode was cut at a distance of 427 feet east of the east lode, or 475 feet east of the west lode. Before cutting the conglomerate lode, or at the beginning of the cross-cut, we first went through 110 feet of trap; then an amygdaloid lode about 3 ft. wide, carrying a little copper; then 80 feet of trap; then an amygdaloid lode about 2 feet wide, carrying a little copper; then 128 feet of trap; then the Mesnard Epidote lode, about 8 feet wide, carrying a little copper; and then 89 feet of trap. After ascertaining the width of the lode, which is about 20 feet, drifts were started north and south. There was 26 feet drifted north, and 26 feet drifted south. The copper bearing part of the lode is about 2½ feet in width. It will take some time to prove up this lode, which can be done at this depth without sinking a shaft, and at the least possible cost. We did not do any drifting on the lodes that lie between the east lode and the conglomerate lode. This work may be taken up at some future date. After the conglomerate lode is given a thorough test at this depth, and it proves to carry copper in paying quantities, shafts will be sunk from surface. The latter part of December preparations were made to sink No. 2 shaft below the fourth level. The lodes may improve in depth, as most properties did not prove their value until they had attained considerable depth. I think the best way to prove up the different lodes that traverse this property, and at the least possible cost, would be to sink No. 2 shaft only and to a depth of at least 1,000 feet. Then we can cross-cut east and west and drift north and south on the different lodes. I think in cross-cutting west at this depth, we would not have the difficulty with the inflow of water that we had at No. 1 shaft. No. 2 shaft is 1,200 feet north of No. 1 shaft, is more centrally located, therefore is the better shaft to open up from. No. 1 shaft is too close to the south boundary line to be profitable to sink at this time. At the present time the showing is more satisfactory than it has been since the shafts were first started."

BOOKS RECEIVED.

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

The Journal of the Iron and Steel Institute of Great Britain. Volume LX, Number II, 1901. Edited by Bennett H. Brough, Secretary. London; published for the Institute by E. & F. N. Spon, Limited. New York; Spon & Chamberlain. Pages, 596; illustrated.

Entwicklung und Anwendung der Dampfbohrung. Von Ingenieur Stach. Gelsenkirchen, Germany; Carl Bertenburg. Pages, 184; illustrated.

Railway Map of South Africa. Compiled from the latest sources. Size, 30 by 44 inches, folded, with cover. London; South Africa. Price (in New York), 35 cents.

Annual Report of the Comptroller of the Currency of the United States. 1901. Volume 1. Washington; Government Printing Office. Pages, 818.

Associations Industrielles et Commerciales. Par

Jules Gernaert et Vicomte de Hermais de Thun. Brussels, Belgium; published for the authors. Pages, 100.

The Standardization of Electrical Apparatus. By J. F. Broderick. Reprinted from the *Engineering Magazine*, Schenectady, N. Y.; the General Electric Company. Pamphlet, pages, 28.

Report of the United States Commissioner of Education for the Year 1899-1900. Volume 2. Washington; Government Printing Office. Pages, 1376.

Grundzuge der Siderologie. Part II. By Hanns Freiherr von Jüptner, Leipzig, Germany; Arthur Felix. Pages, 408; illustrated. Price (in New York), \$6.25.

Mathieson's Handbook for Investors. 1902. London, England; Frederick C. Mathieson & Sons. Pages, 264; pocket size. Price (in New York), 90 cents.

South Australia. Agricultural Statistics, 1901. Adelaide, S.A.; Government Printer. Pages, 72.

Die Bewetterung der Bergwerke. By Robert Wabner. Leipzig, Germany; Arthur Felix. Pages, 250; with atlas containing 30 plates. Price (in New York), \$5.50.

NEW PUBLICATIONS.

Contribution a l'Etude des Alliages. By MM. H. W. Bakhuis-Roozeboom, Ad. Carnot, G. Charpy, H. le Chatelier, H. Gautier, Ed. Goutal, Guillaume F. Osmond, Roberts-Austen and Mme. Sklowdowska Curie, under direction of the Commission des Alliages of the Société d'Encouragement pour l'Industrie Nationale. Paris, France; Chamerot & Renouard. Pages, 520; illustrated. Price (in New York), \$10.

In the ENGINEERING AND MINING JOURNAL, August 31 last, a brief preliminary notice of this very important work was given; but its importance entitles it to more extended comment. In these columns and elsewhere the writer of the present review has upon several occasions called attention to the excellent work that has been done during the past few years in explaining the molecular constitution of alloys and in searching out the causes of the remarkable transformation which the physical properties of metals undergo when they are mixed with other metals. While much of this has been the independent work of individual scientists in many lands, yet the greatest impetus has been given to alloys-research by the official action of several of the learned societies of Great Britain and France in appointing committees to conduct systematic studies along these lines. These committees receive financial assistance from their respective societies—but hardly in amounts commensurate either with the time and labor devoted to these researches or with the value of the results which have been obtained. The volume to which I refer in what follows is a collection of researches which, for the most part, have been carried on under the direction of a Commission des Alliages of the Société d'Encouragement pour l'Industrie Nationale, and many of them have been published in the *Bulletin* of that society during the years 1896-1900. In the collected papers now published under the title "Contribution a l'Etude des Alliages," we have a valuable addition to our knowledge of mixed metals. The problems concerning alloys which recent workers have solved and the encouragement we have to hope that the modern methods employed and devised by them will be just as fruitful in the future for solving the many questions of practical importance which are still unanswered, shows the wisdom of this and other societies in inaugurating and supporting investigations along such useful lines.

The work before us is a quarto volume of 520 pages, printed in good type upon excellent paper, but put together—we hesitate to say bound—in that flimsy fashion so common to Continental technical publications, which fall apart as soon as the leaves are cut, although the price in Paris is 30 francs. The volume is profusely illustrated with diagrams, curves, drawings of apparatus and microphotographs

—there being perhaps a score of full or even double-page plates.

M. Linder, president of the Commission des Alliages, contributes in the preface some general considerations concerning the chemical and physical properties of alloys, and outlines the motives which led to the undertaking of the researches which follow. In calling attention to some of the problems which are especially worthy of attention, he mentions the influence of small percentages of one element upon large amounts of another—traces upon masses, so to speak. We sometimes hear the unorganized ferments spoken of as bodies which produce effects upon other substances the magnitude of which are quite out of proportion to the mass of the ferment which is present. A somewhat analogous influence upon the physical structure, malleability or conductivity of certain metals is sometimes produced by "traces of impurities." M. Linder outlines, also, the experimental methods which the commission considered best suited to the work and concludes by mentioning that M. Solvay, the Société des Métaux, nearly all the great railroad companies of France and several metallurgical concerns had generously contributed to the work of the commission, thus showing their appreciation of such investigations and evidencing a desire to know the materials upon which their success, the lives of patrons and employees and their industrial advancement depends.

The plan of the committee, as outlined in the preface, included, (1) A study of the chemistry of alloys with especial attention to definite inter-metallic compounds existing in them; (2) The effect of mechanical treatment, hardening, annealing, cold working, etc., upon tenacity, hardness, malleability and brittleness; (3) The electrical properties—conductivity and electromotive force of solution—the latter being of great value in indicating the presence of inter-metallic compounds; (4) Fusibility, and on this point, for the most part complete series of alloys have been examined, that is, series in which each constituent varies from 0 to 100 per cent; (5) The effect of impurities upon the most useful metals and alloys; (6) The magnetic properties of iron alloys, from the practical side—the manufacture of permanent magnets.

It will be impossible to outline all the methods of experiment used or invented by the commission, or to summarize their results. A mere mention of the names of the contributors would indicate its probable worth, but we will outline a few of their contributions in order to further indicate the scope of the work.

M. Charpy's paper upon the alloys of copper and zinc, together with the appendices, occupies 62 pages. The author quotes Prof. Thurston as follows, in regard to brasses: "No other material is known, possibly excepting iron, which possesses such a great diversity of qualities and such a marvelous variety of uses." In view of the great importance of these alloys, therefore, M. Charpy has investigated in a most searching manner the relations between chemical composition and mechanical properties, and has studied these variations in quality with reference to the variations in microscopic structure which characterize each quality. Thus the first research, and nearly every succeeding one, testifies to the importance of this new branch of science—metallography. In view of its teachings and wonderful revelations we are at a loss to understand why it should have been so slow in obtaining recognition among scientific metallurgists and mechanical engineers, for we must remember that Dr. John Sorby published his first metallographic results nearly 40 years ago. In Charpy's paper we see how a microscopic examination, supplementing a chemical analysis, is capable of indicating almost the whole life history of the specimen; that is, to a certain extent it shows the amount and kind of mechanical or thermal treatment which the alloy has received.

The second research, by Sir William Roberts-Austen and Prof. Osmond, gives the result of some studies upon the effects of small additions of various metals to gold. The metals were added to the extent of 0.2 per cent approximately. Gold was chosen as

the chief metal because of the exceptional purity in which it can be obtained and because it does not oxidize in the furnace and is not likely to absorb impurities, gaseous or otherwise. The authors produce evidence to show that some relation exists between the atomic volume of the added metal and the effect produced upon the physical properties of gold. In general, the tenacity and ductility are increased by the addition of substances of less atomic volume than that of gold and decreased by the addition of substances with greater atomic volume. Osmond has previously mentioned that an analogous relation exists in regard to elements added to iron.

M. Henri Gautier's researches upon the fusibility of metallic alloys would have been much more useful had he given complete freezing-point curves instead of indicating only the initial points of solidification. However, a vast amount of work is represented by his results and the information given by his curves is of great value. It indicates whether the various pairs of metals which he studied alloy with or without the formation of intermetallic compounds. Gautier republishes the few curves of earlier workers, such as tin-zinc, tin-lead, tin-bismuth, tin-copper, copper-aluminum, copper-antimony, copper-zinc, iron-aluminum and gold-silver. His own freezing-point curves include antimony-aluminum, nickel-tin, nickel-copper, silver-aluminum, silver-antimony, silver-zinc, silver-cadmium and silver-tin, while M. Roland-Gosselin, also working under the auspices of the Société d'Encouragement, has studied the following series of metals and contributes his results to M. Gautier's paper; Tin-antimony, tin-aluminum, antimony-lead, antimony-zinc, antimony-bismuth, bismuth-copper, bismuth-zinc, zinc-aluminum, zinc cadmium and copper-lead. The optical methods of pyrometry, using the Le Chatelier couple with a reflecting galvanometer and reading the deflections on a scale, was used. This method is much more laborious and less accurate than the photographic-recording method of Roberts-Austen. From his results and those of others, Gautier classes the binary alloys as those found by the juxtaposition during the cooling of crystals of the constituent metals; those found by the juxtaposition of one constituent with a definite compound, and those which are isomorphous mixtures either of metals which are themselves isomorphous or those which form compounds isomorphous with one of the two constituents.

M. Charpy contributed three other chapters to this volume in addition to the one previously mentioned upon the copper-zinc alloys: "The Microscopic Study of Metallic Alloys," "A Study of the White Alloys called Anti-friction" and a "Study of the Influence of Temperature upon the Physical Properties of Metallic Alloys." Perhaps the second of these papers is the most interesting, for in it he extends to ternary alloys the methods which have proved successful in studying binary mixtures, and not only that, but he explains in a remarkably clear way the use of triangular co-ordinates and surfaces of equal fusibility in place of the familiar freezing-point curve of binary mixtures. But this paper does not indulge wholly in pure science; it is eminently practical, inasmuch as Charpy has discovered the "theory" of bearing, or anti-friction metals, and shows how all the bearing metals, which have been found by experience to be most useful, conform to a few simple requirements. Probably in no branch of the manufacture of alloys has there been so much of chance and haphazard as in the production of anti-friction metals. But, thanks to M. Charpy and his associates, a new science is springing up, and before many years most of the anomalous things about metallic mixtures will have been explained and laws will be discovered governing these hitherto unexplained phenomena. Charpy gives a list of nearly 100 different alloys which have been exploited for anti-friction purposes; probably this list includes but a small proportion of those that have actually been tried and is brevity itself compared to the number of mixtures of metals that experimenters have made from time to time hoping by chance to obtain a good bearing metal. I venture to say, moreover,

that prior to the publication of this paper by M. Charpy, probably not one of the many makers of bearing metals could have given a scientific reason for thinking his own mixture preferable to all the others. Especially must this be true of those whose mixtures contain from four to six constituents. Yet as the result of this investigation, Charpy tells us the essential points in a good bearing metal, the reasons why these qualities lessen friction and, finally, by a purely scientific study into the nature of ternary alloys, shows how it is possible by a relatively small number of trials to determine the limits of variation in composition between which we may expect to produce a utilizable alloy. It is found that anti-friction metals should consist of hard grains embedded in a plastic alloy. The former support the load and have a low coefficient of friction and are not liable to "cutting;" the latter, by reason of its plasticity, conforms readily to the irregularities in the shaft and distributes the friction evenly, thus preventing local pressure and heating which is the cause of so many accidents. Charpy recommends in general the use of ternary mixtures and can see no good to be derived from the use of four, five or even more constituents. The tests he recommends are first, microscopic, to see that the alloy possesses the desired structure; second, compression, to see that it possesses the requisite strength and plasticity and is neither too hard nor too soft. It should crush uniformly under pressure and not fly into fragments.

In a chapter of 47 pages, Mme. Sklodowska-Curie discusses the magnetic properties of hardened steels, from the practical standpoint of finding the most suitable material for the manufacture of permanent magnets. The relation of chemical composition to magnetic properties and the effects upon these properties of various conditions of tempering, etc., have been exhaustively studied. Many steels were tested, both carbon and alloy-steels, such as tungsten, molybdenum, chromium, nickel, manganese, silicon, copper and boron steels. As characterizing the magnetic properties of a steel, Mme. Curie magnetized the bars to saturation and afterward determined the coercive field and the intensity of the residual magnetism at the center of the bar.

Other contributors and the subjects they discuss are: H. Le Chatelier, "On Microscopic Metallography;" "On the Properties of Alloys"—a study of the relation between dilatation and allotropic transformations; "On the Electrical Resistance of Alloys;" "Metallic Alloys," and the "Technology of Microscopic Metallography." Le Chatelier's name is perhaps best known in connection with the platinum-platinum-iridium thermo-couple which is now so generally adopted for high temperature measurements. All of his papers are of great interest, but we cannot discuss them at this time. Prof. H. W. Bakhuys-Roozeboom's paper upon "Iron and Steel from the Point of View of the Phase-Doctrine," which originally appeared in the *Zeitschrift fuer Physikalische Chemie*, is reproduced in French. This paper has attracted very wide attention, and as it has been published in whole or in part by the *Journal of the Iron and Steel Institute* and in the *Metallographist*, need not be further considered here. A discussion of the paper by Messrs. Osmond and Le Chatelier is appended.

One of the most interesting constitutions is by Prof. Osmond on "A General Method of Micrographic Analysis of Carbon Steel." This paper is illustrated by some very beautiful microphotographs and contains much valuable information for the guidance of those who wish to do metallographic work. This monograph occupies 50 pages. The only remaining researches are also upon steel. Guillaume devotes 44 pages to the results of a "Research upon Nickel-Steel," and Messrs. A. Carnot and E. Goutal present a "Research upon the Chemical Constitution of Steel and Cast Iron," covering 24 pages.

All scientists who are interested in alloys will join in congratulating the Société d'Encouragement upon the success of their enterprise and acknowledge the debt of gratitude which this offering has imposed upon the scientific world.

JOHN ALEXANDER MATTHEWS.

CORRESPONDENCE

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Platinum in British Columbia.

SIR:—I see that the finding of platinum in rock has been noted for the first time in the *ENGINEERING AND MINING JOURNAL* as occurring in Wyoming.

I found platinum in rock in British Columbia in the year 1895, and mentioned the fact in the report of the Minister of Mines for that year. The metal occurred as fine wire-like filaments in a fine grained dark basaltic rock.

HERBERT CARMICHAEL,

Public Assayer for British Columbia.

Victoria, B. C., Jan. 28, 1902.

A New Use for Titanium.

Sir: Permit me after 25 years' silence once again, through your valuable journal, to point out to mineral producers a matter of growing interest to them. It is through the instrumentality of my improvements in electric incandescent lamps that there is now a market for ores containing titanium. Moreover, I desire to mention at least one locality in which such ore occurs, as I am inclined to believe, in workable quantity.

In 1878 I discovered the presence of titaniferous iron in a cave apparently of natural origin, in the valley of the Galisteo Creek in Santa Fe County, New Mexico, between the old village of Galisteo and the creek's junction with the Rio Grande. On a rock-shelf projecting beyond its overlying stratum handfuls of such ore in lenticular form and size could be gathered, evidently the heavier, or higher density, residue of a disintegrated sand-rock stratum.

The occurrence reminded me at the time of a similar lenticular ore in the sand of Muggelsee near Berlin, Germany.

My inclination to consider the sand-rock containing the lenticular metallic particles as workable results from the fact that crushing and sifting, with possible jigging of the enriched product, and the nearness of water at the very place of production would permit such production at a very low cost per ton of rock, the profit turning on percentage of contents and price obtainable.

Unless my memory misguides me, Messrs. Ambrosio Pino, of Galisteo, and Amado Chaves, of Santa Fe, two prominent residents of New Mexico, were present when the discovery was made and may be prepared to impart further information.

F. M. F. CAZIN.

Hoboken, N. J., Jan. 24, 1902.

Cyaniding and Amalgamation vs. Amalgamation and Cyaniding.

SIR:—The successful working of low-grade tailings from amalgamation plants by the cyanide process has led to the installment of numerous plants combining these two processes, in the same order as in the secondary treatment of the tailings.

The ore is first crushed to a sufficient fineness for amalgamation, passed over plates, then conducted to tanks and leached with cyanide, differing only from the old method of treating the tailings in that the cyanide treatment follows the amalgamation immediately instead of being delayed for a number of years.

The secondary treatment of tailings from the batteries is attended by many difficulties, one of the principal of which is the treatment of slimes. These have brought forth many ingenious methods for slimes treatment, but the problem has not been solved and a satisfactory solution seems far distant. Again the large excess of water used in amalgamation over cyanidation has to be disposed of.

Wet crushing and amalgamation leave from one-fifth to one-third as much water as is absorbed by the ore. This must be replaced by the cyanide solution, which it is difficult to do. It takes extended treat-

ment to get ore so clean that not a trace of cyanide remains, and the reverse is obviously just as true.

With these objections to the cyaniding of amalgamation tailings, I fail to see why cyanidation as the primary and amalgamation as the secondary treatment is not of more general application. There is no reason why some plants should have slimes treatment at all.

A more logical method seems, first, to crush the ore to the fineness adapted to the cyanide treatment of that particular ore, then convey to the tanks and apply the ordinary cyanide treatment. All the fine gold not contained in the coarsest particles of the ore is dissolved. So is any coating that may exist on the gold and the cause of one of the greatest losses in amalgamation, rusty gold, is eliminated. The ore will have sufficient cyanide present to prevent the accumulation of verdigris on the plates. The cyanide solution has been added directly to the dry ore bringing the solution into working contact with the gold. No mercury has been dissolved in treating amalgamation tailings, and there is no salivating of the employees in cleaning up zinc slimes.

The ore is now ready to be conducted to the stamps or other fine crushing machinery preparatory to amalgamation.

Of course some ores require as fine crushing to obtain any results from the cyanide treatment as for amalgamation, but the freeing of the gold from rust and the bringing of the cyanide solution in contact with dry ore warrant the order suggested. Other ores containing a large amount of talcose material will slime, no matter how coarsely crushed, but with a coarser material mixed with it it is more easily leached and, if anything, makes the slime problem less difficult. Of course all details for each ore must be worked out independently, and I have only attempted to give a general discussion on the order of the application of the two processes. I do not claim to be advancing any new ideas or any theories which have not been demonstrated, but I merely wish to protest against following a certain policy simply because it always has been done in that way.

MORRILL W. STACKPOLE.

Salt Lake City, Utah, Jan. 30, 1902.

QUESTIONS AND ANSWERS

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, or can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers. Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.)

"Thermite" for Welding.—We have noted in the issue of the ENGINEERING AND MINING JOURNAL for August 25, 1900, an article concerning the use of thermite for welding. We take the liberty of writing you to inquire if you can refer us to any recent use of this process in this country, or to any parties who are interested in it and from whom the thermite can be obtained.—H. P. J.

Answer.—The use of an aluminum compound—thermite—for welding in this country has been only occasional and experimental so far. It is not in use regularly or commercially, so far as we are aware; nor do we know of any agency in the United States. It has been patented in this country, however. The inventor of the process is Dr. Goldschmidt, and the patents are owned by the Chemische Thermo-Industrie, of Essen-Ruhr, Germany.

Nickel and Nickel Oxide.—I. I see that you quote the price of nickel 50 to 60 cents per pound. Does the size of order account for the 10 cent difference?

2. Under the heading of "Current Wholesale Prices," you quote for nickel oxide \$1 and 60 cents per pound for No. 1 and No. 2 respectively. Is the No. 1 chemically pure? What is the difference between the first and second quality? Which is pre-

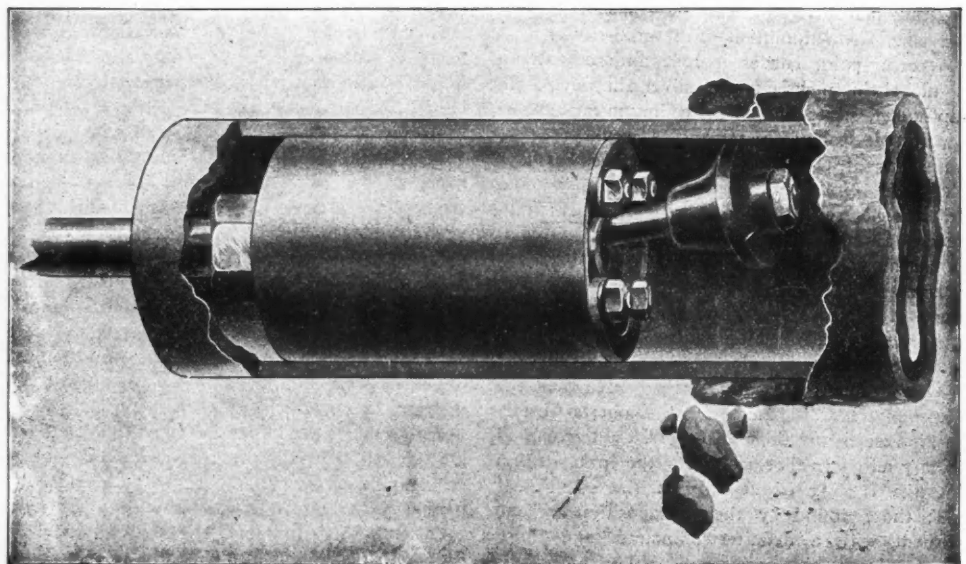
ferable to the consumers, the oxide of nickel, or the metal?—T. J.

Answer.—1. The size and conditions of the order make the difference in price, the lower quotation being for lots of 1 ton or over.

2. The difference between No. 1 and No. 2 nickel oxide is in the grade. No. 1 is practically chemically pure. As to preference for nickel or nickel oxide, it depends entirely upon the use to which the consumer intends to put the material.

Fluorspar.—I see in your issue of January 25, page 128, fluorspar quoted from \$12.40 to \$17.90 per ton. Will you please inform me of the nearest place to Montana where there is a demand for this material, and give me the address of parties who would be apt to use it, as I have a mine in which it occurs.—J. M. H.

Answer.—The prices quoted for fluorspar in the ENGINEERING AND MINING JOURNAL are for delivery in New York. The material is used to some extent as a flux in foundry cupolas and steel furnaces, and also for the manufacture of opalescent glass, and chemically, in the preparation of hydrofluoric acid.



THE DEAN STEAM TUBE CLEANER.

Probably the nearest market for your material would be Denver or Pueblo, Colo. We suggest that you correspond with the Colorado Fuel and Iron Company, whose headquarters are in Denver.

Molybdenum, Vanadium and Niobium.—Can you tell me whether there is any market for molybdenum, vanadium and niobium, or their ores? And where they can be sold?—F.

Answer.—There is a limited market for molybdenum ores, the metal being used to a small extent in making steel. There are two regular buyers of these ores, the Primos Chemical Company, of Primos, Pa., and Ash & Deninger, of Phoenixville, Pa.

For vanadium there is also a limited market. A little of the metal is used in making steel—chiefly in France and Germany—and some vanadium salts are used in dyes. The buyers, who take ores mostly for export are Poulot & Voillequé, of Cashen, Colo., and the Roessler & Hasslacher Chemical Company, 100 William street, New York.

Niobium has no commercial uses. A very small quantity may be bought by chemists and technical laboratories, but there is no market for the metal.

A MECHANICAL SCALE REMOVER FOR BOILERS.

The accompanying cut illustrates the working of the Dean steam tube cleaner operating in a return tubular boiler removing the scale from the outside of the tube. There has been a great deal of difficulty in steam power plants, especially so in boilers used about mines, in cleaning the tubes on the outside, that is, inside of the boiler. Very often boilers about mines

are dependent upon a very poor character of water, the result being incrustations forming on the outside of these tubes which are inaccessible for cleaning by any ordinary process. The invention consists principally of a vibrator or hammer which oscillates at a very rapid rate, dependent upon the steam pressure applied. This rapid vibration inside of the tubes causes the incrustation to crack from the outside and fall down in the boiler. The device works on the principle of an oscillating engine which is provided with a piston slide valve, inlet and exhaust ports. It is a device which, the manufacturer claims, embodies the only correct principle for removing boiler scale and thus avoiding the very expensive and troublesome operation of removing the tubes from the boiler for cleaning purposes.

It is also claimed that if these machines are used three or four times a year in boilers where the feed water is of a scale-forming character, that the life of these tubes will be prolonged almost indefinitely. Another point which is claimed in favor of this device is the entire absence of any injurious effects upon the tubes which are operated upon. The vibration of the hammer is very rapid but also very light,

thus affecting results by the rapidity of the stroke rather than by its power. The tubes are not expanded nor injured in any way; on the contrary the use of this invention acts as a safeguard and will detect any weak or defective spot which might be overlooked by the boiler inspector on account of its inaccessibility for examination. When this machine is used it is sometimes operated with compressed air and it is of course understood that the water is first removed from the boiler and the boiler dried before the machine is operated.

The device is already in use in various parts of the country and is equally adapted for removing scale from the inside of water tube boilers. The only change in the machine in this case is the substitution of a small hatchet-shaped cutter for the vibrator or hammer which is used with the return tubular boiler. The exhaust is then sufficient to blow the scale ahead of the machine. The machine is made by the Power Specialty Company, of Buffalo, N. Y.

BOX CAR LOADING BY MACHINERY.

The Union Pacific Coal Company is installing an Ottumwa box car loader at its new Cumberland mines in Wyoming. This property is being equipped with the finest and best machinery that can be had, and is destined to be one of the best mining properties in the West. The Central Coal and Coke Company, of Rock Springs, Wyo., with general offices in Kansas City, is also installing an Ottumwa box car loader at the Rock Springs mines. The prospect for the sale of Ottumwa loaders, as reported by the manufacturers, the Ottumwa Box Car Loader Company, is better than ever before, and the company expects to do a very large business this season.

TO GUARANTEE PATENTS.

Conditions are constantly changing and as conditions change new devices and ideas have to be originated and developed to meet them. It has long been claimed that a United States patent did not protect the inventor, and this condition has necessitated some other means for securing that protection. To this end the Patent Title and Guarantee Company, of 150 Broadway, New York, has been incorporated; the company having for its object the securing of its patrons against infringements of their inventions, and the indemnifying of patentees against loss by such infringements. The company undertakes to conduct, at its own cost, all suits in court necessary to establish the legal rights of its clients, and to pay them damages in such amounts as may be determined by the United States courts up to the limit of the protection guaranteed.

A report from Chicago states that a decision was recently rendered in the United States courts in that city which confirms the claims of an inventor of metallic curbing, and awarded him damages against a large number of property holders who had infringed his patents. The patentee held a guaranteed policy issued by the Patent Title and Guarantee Company and the suit was brought and conducted by the company in defence of its client's rights.

A MANGANESE ORE TRUST.—According to *L'Echo des Mines et de la Metallurgie* negotiations have been concluded at Berlin in connection with the formation of a manganese syndicate, to comprise 264 mines in the Caucasus, with an annual production of 400,000 tons. The Mangansyndikat has a capital of 3,000,000 marks, and will run for ten years. The object is to control the price of manganese, which the promoters consider feasible.

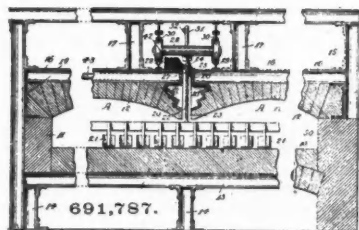
PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

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

Week Ending January 28, 1902.

691,787. **ROASTING-FURNACE.**—William A. Lorenz, Hartford, Conn., assignor to Lanyon Zinc Company, St. Louis, Mo., a corporation of New Jersey. A roasting-furnace comprising a hearth, the roof of which is formed of sections which are separated from each other by a slot dis-



posed longitudinally of said roof, and the adjacent portions of which are substantially in alignment with said slot and are nearer to the floor of the hearth than the central portion of said sections.

691,812. **METHOD OF FIREPROOFING WOOD.**—Karl Rucker, Zernsdorf, Germany. Impregnating the pores of wood with a solution of magnesium ammonium sulphate.

691,819. **ORE-SEPARATOR.**—Jay J. Snider, Xenia, Ohio. An inclosed chamber, a grating or support across the top of said chamber, a perforated bed or covering thereon, diagonally-arranged strips above the bed or covering, a second series of strips arranged diagonally above the first-mentioned series and in a contrary direction thereto, and leaving an air-space between the two series and means for causing air-pressure in the chamber and up through the bed and strip.

691,822. **EXTRACTION OF METALS FROM SULPHIDE ORES BY TREATMENT WITH CHLORIDE OR SULPHUR AND ELECTROLYSIS.**—James Swinburne and Edgar A. Ashcroft, London, England. The process consists in treating sulphur ores in a fused haloid salt with chloride of sulphur and producing sulphur and chloride, electrolyzing the chloride thereby producing chlorine and metal and combining the chlorine with some of the sulphur from the treatment of the sulphide ore using the so-regenerated sulphur chloride for treating more ore.

691,849. **FURNACE FOR HEATING INGOTS.**—Victor E. Edwards and Paul B. Morgan, Worcester, Mass., assignors to the Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts. In a furnace for heating ingots, provided with an opening adapted to receive an ingot broadside, an outer door by which said opening is closed and a series of inner swinging doors arranged in a row across said opening within said outer door and adapted to be opened by the advancing side of the ingot.

691,866. **LIQUID-HEATING FURNACE.**—David Laird, Forfar, Scotland. The combination with inclined bottom and walls, of a fire-clay crown above said bottom and encircled by said walls, a water bath or receptacle seated on said crown, a suitable cover for said receptacle, and an oil-burner discharging into the space between said bottom and crown.

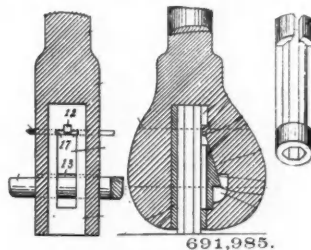
691,868. **GRAVIMETRIC ORE-ROASTER.**—James A. Ogdén, Philadelphia, Pa., assignor to Charles H. Cornell, Valentine, Neb. The combination with a furnace, an inclined, freely-swinging roasting-plate, located therein, means for swinging said roasting-plate toward its higher end, and abutments for suddenly checking its movement in the other direction, of a separating-plate separated from and superimposed upon said roasting-plate, and provided with a diagonal bridge, an outlet for said concentrates, and an outlet for the gangue, leading away from said concentrating-plate.

691,882. **CHEMICAL ROOFING MATERIAL.**—James W. Wright, Bloomington, Ind., assignor to Horace Blakely, Indianapolis, Ind., and Jefferson M. Wright, Bloomington, Ind. A composition of matter, consisting of coal-tar, lime, sal-soda, gum-acacia, oxide of zinc, litharge, and gypsum.

691,934. **PRODUCTION OF SOLID MATERIALS FROM TAR, ETC.**—Clemens Dorr, Gernersheim, Germany. In the manufacture of artificial stone a process consisting in adding a quantity of filling material equal to from 4 to 10 times the quantity of tar to liquid tar at a temperature from the normal to 150° C.; heating the mixture, under continuous stirring, to a temperature between 160° and 190° C., until from 7 to 10 per cent of the original raw tar has been distilled away, and the mixture is dry to the touch, and then molding the mixture.

691,977. **MEANS FOR EJECTING METAL PIGS FROM THEIR MOLDS.**—Edwin E. Slick, Braddock, Pa. Apparatus comprising in combination with a traveling series of molds, a knocker arranged to strike the rear sides of the molds, said knocker constructed and arranged to bear against the series of molds and be moved backwardly thereby, and having means adapted to urge the knocker forward as it is cleared by each passing mold.

691,985. **ROCK DRILL CHUCK.**—William Terry, Oakland, Cal. The combination of a chuck having an axial socket or cavity for the drill-bit, said socket having a downward extension with a surface sloping upward rearwardly, a shell or sleeve fitting in the socket, a block in the lower part of



the socket and having a rear upwardly-sloping lower surface to slide on the sloping surface of the extension and act as a wedge, said chuck being also apertured transversely through said extension, the block having a shoulder extending into said aperture, and a wedge or key in said transverse aperture engaging said shoulder to shift said block rearwardly and thereby clamp the drill-bit, the chuck being also apertured transversely in the rear of the rear end of the block whereby a suitable pointed instrument may be inserted to remove or loosen the same.

692,008. **SEPARATING PROCESS FOR ORES.**—Oscar Frolich, Charlottenburg, Max Huth, Halensee, and Arthur Edelmann, Charlottenburg, Germany, assignors to Siemens & Halske Aktiengesellschaft, Berlin, Germany. The process consists in heating the ore to a temperature below the decomposition temperature of the sulphate of the metal to be sulphated, but above the decomposing temperature of the sulphate of any other metal existing in the ore and then passing it over a gas mixture containing sulphur dioxide and oxygen.

692,007. **GAS-DETECTOR.**—Oscar Freymann and Charles Tolman, Brooklyn, N. Y., assignors to American Equipment Company, New York, N. Y., a corporation of New York. The combination with an automatic circuit-closing device of a connecting device, sensitive to the action of heat, for holding the contact-pieces apart, and of a piece or pieces of porous substance, affixed in proximity to the connecting device, said porous substance being treated with chemical composition as herein described and thereby rendered productive of heat when exposed to the action of gas.

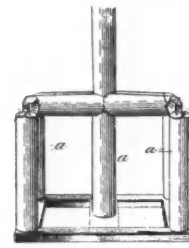
692,018. **APPARATUS FOR MAKING SULPHURIC ANHYDRIDE.**—Rudolf Knietzsch, Ludwigshafen, Germany, assignor to the Badische Anilin & Soda Fabrik, Ludwigshafen,

Germany, a corporation of Baden. In combination, a receptacle for the contact material, a holder whereby a cooling medium is held in heat-extracting proximity to said contact material, means for regulating the cooling capacity of said cooling medium, an apparatus whereby the percentage of sulphur dioxide in the gas-supply may be determined, a thermometer in the path of said gas-supply to the contact material, a thermometer in the path of the gases leaving said contact material and an apparatus for determining the percentage of sulphur dioxide in the waste gases.

692,030. **EXCAVATING MECHANISM FOR DREDGES.**—Robert H. Postlethwaite, San Francisco, Cal., assignor to Risdon Iron and Locomotive Works, San Francisco, Cal., a corporation of California. A tumbler having a series of radially-projecting fingers at the respective ends thereof, and removable face-plates for said fingers.

692,108. **APPARATUS FOR HANDLING TAILINGS.**—Hiram W. Blaisdell, Yuma, Ariz. In an apparatus for treating tailings, the combination with a frame of a bridge movable thereon and a revoluble distributor, mounted on said bridge and adapted to be carried thereby from one vat to another.

692,111. **MINE-TIMBER.**—David W. Brunton, Denver, Colo. Mine-timbers comprising a post having a truncated



pyramidal end, a girth having its ends beveled and terminating in a two-sided tenon, and a cap having its ends beveled and provided with a four-sided tenon, the top and bottom sides being deeper than the others.

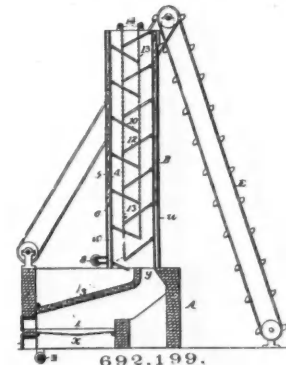
692,139. **METHOD OF MAKING HYDROGEN DIOXIDE.**—Paul L. Hulin, Clavaux, par Riouperoux, France. The process consists in decomposing sodium dioxide by hydrofluoric acid in the presence of water to form hydrogen dioxide and converting the sodium into an insoluble precipitate of cryolite by aluminum fluoride.

692,148. **PROCESS OF RECOVERING ZINC FROM SULPHIDE ORES.**—Hugh F. Kirkpatrick-Picard, London, England. The process consists in mixing unroasted ore with a basic material capable of combining with sulphur, and carbonaceous material suitable for coking, forming the mixture into briquets and distilling the briquets in such conditions that they are first coked into coherent masses, and finally the zinc is reduced and volatilized, while the resulting sulphide is retained in minute particles throughout the coke.

692,197. **PROCESS OF MANUFACTURING PLATES OR TILES.**—Fritz Gehre, Zurich, Switzerland. As an improvement in the process of preparing artificial stone from magnesium carbonate, calcining the material, combining the calcined material with a solution of chloride of magnesium, chloride of aluminum and water, supplementing this by a further addition of chloride of aluminum, adding limestone-spar in the proportion of one part of spar to four parts of carbonate, measured by weight, adding phosphate of aluminum, making the mass up into bodies of desired shape, and finally baking the same.

692,198. **ALLOY.**—George W. Gesner, Brooklyn, N. Y. An alloy consisting of iron, hydrogen and copper.

692,199. **APPARATUS FOR HEATING GRANULAR SUBSTANCES.**—Carleton Greene and William M. Dollar, Buffalo, N. Y., assignors to Barber Asphalt Paving Company, New York, N. Y., a corporation of West Virginia. The



combination with a combustion-chamber having a receptacle above its roof, and an outlet for the products of combustion, of a stack with its lower end communicating with said outlet and with a discharge-opening leading to the receptacle, a series of alternating imperforate platforms within the stack, and means for forcing the heated products of combustion through the stack.

PERSONAL.

Mr. Charles L. Lang, has resigned as superintendent of the Mack Consolidated Mining Company, at Big Oak Flat, Cal.

Mr. Ernest R. Walker, mining engineer of Nelson, B. C., has been in New York City, returning from England to Nelson.

Mr. W. Climo, superintendent of the Shannon Mine, at Clifton, Ariz., recently returned to that place from several months' sojourn in Europe.

Mr. J. H. Cook has resigned as superintendent of the Aberdeen Consolidated Company, at Lordsburg, N. M. Mr. E. McCormick is his successor.

Mr. Charles L. Fredericks, of York, Mont., superintendent of the Columbia Gold Mining and Milling Company, is in the Michigan copper district.

Mr. G. A. Overstrom, of Anaconda, Mont., inventor of the Overstrom diagonal concentrating table, is in the Lake Superior copper district.

Mr. G. A. Wagner is manager of the Cerbat Mining and Reduction Company, operating the Alexander Mine, at Union Basin, Mohave County, Ariz.

Mr. B. L. Smith, of Eureka, Nev., has been appointed superintendent of the Richmond Mining Company, of that place, to succeed the late R. K. Morrison.

Mr. F. C. Schrader, of the United States Geological Survey, sails for Valdez, Alaska, on February 15 with 8 assistants on an extended reconnaissance in the Copper River country.

Mr. James Howlison, of Otago, N. Z., has been appointed general superintendent for the West African Dredging Syndicate. The property of the syndicate includes 150 miles of river claims.

Mr. Gordon R. Campbell, of Calumet, Mich., secretary and counsel of the Calumet & Arizona Mining Company, has returned from a trip to the Calumet & Arizona copper mines at Bisbee, Ariz.

Mr. H. Van F. Furman, of Denver, Colo., has been appointed general superintendent of the Penoles Company's mines at Mapimi, Durango, Mex., and leaves for his new field of labor in a few days.

Mr. A. L. Mills has resigned the management of the works of the Mount Garnet Company, in North Queensland, Australia, to accept the appointment of lecturer in metallurgy at Melbourne University.

Mr. George H. Evans, formerly general manager California Gold Mines Company, of Oroville, Cal., and now manager for the Gold Pan Dredging Company, of Breckenridge, Colo., has been visiting San Francisco.

Mr. E. M. De La Vergne has been appointed manager of the Isabella Mine, at Cripple Creek, Colo., in place of Mr. Kilbourn. Mr. De La Vergne has been identified with the Elkton and other Cripple Creek mines.

Mr. George A. Laird, formerly of Minas Dolores y Anexas, of the Guggenheim Exploration Company, at Matehuala, San Luis Potosi, Mex., has accepted a position as superintendent of Mina Siderita y Anexas, Mapimi, Durango.

Mr. W. H. Remington, of Tacoma, Wash., president of the National Calorific Company and the Alaska Marble Company, left San Francisco recently for Rutland, Vt., to engage a large force of marble workers for Alaska.

Mr. W. J. Loring, formerly of the Utica Mine, at Angels, Cal., and later superintendent of the Melones Mine, at Robinson, Cal., has taken the general superintendency of a mine in Coolgardie, Australia, and left San Francisco, Cal., on February 6.

Messrs. Irving H. Reynolds and Charles E. Search, of the Allis-Chalmers Company, are now in Europe with a view to discovering any machinery, tools, etc., suitable for the equipment of the company's new shops. They will visit England, France and Germany.

Mr. William J. Harper, until recently mine manager for the Jones & Adams Company, of Springfield, Ill., has recently accepted a similar position with the Republic Iron and Steel Company at its Springfield, Ill., coal mine, locally known as the "Old North Shaft."

Dr. Henry B. Kummel, who was recently appointed state geologist of New Jersey, has been connected with the Survey since 1892, and since 1899 has been assistant state geologist, being in charge of the work since Dr. Smock's resignation last July. He is a graduate of Beloit College, 1890, and did post-graduate work in geology at Harvard University, and the University of Chicago. He was elected a fellow of the Geological Society of America in 1895.

Mr. Harry D. Merry, son of Captain Harry Merry, for some years manager of the Jackson Mine at Ishpeming, Mich., was recently appointed general manager of the Montana Coal and Coke Company, with headquarters at Horr, Mont. Up to a few months ago Mr. Merry was manager of the Low Moor Iron Company, with headquarters at Low Moor, Va. He gave up the position on account of ill health, and since then has spent much of his time in the South. Captain Harry Merry and his family left Negaunee 16 years

ago, retiring from the management of the Jackson Mine after the property passed under control of Samuel Mitchell, J. H. Wade and William Chisholm, the latter two of Cleveland, O. Mr. Merry is now living in Cleveland.

OBITUARY.

Francis A. Pratt, for many years president of the Pratt & Whitney Company, died suddenly of apoplexy at Hartford, Conn., on February 10. He was born in Woodstock, Vt., in 1827, and entered the machinists' trade at the age of 15. With Amos Whitney, in 1861, he founded the firm which grew into the great concern of Pratt & Whitney, the products of which, guns, machines and tools, go to all parts of the world. Two years ago he retired from the presidency, and the concern is now a part of the Bement-Niles-Pond Company. Mr. Pratt was a charter member of the American Society of Mechanical Engineers. His widow, one daughter and one son, Francis C. Pratt, secretary of the company, survive him.

Capt. John Sheridan, a member of the Black-Sheridan-Wilson Company, coal operators, died last week at the Maryland University Hospital, in Baltimore. He came to the hospital from his home at Mount Savage, Allegany County, Md., a week before, suffering from a complication of diseases. Capt. Sheridan had been for a number of years the resident manager in the coal region for the extensive mining properties of the Black-Sheridan-Wilson Company, of Baltimore. He was born in Mount Savage, Md., October 31, 1845. When a lad his parents removed to West Virginia, near Morgantown. He secured employment with the Cumberland & Pennsylvania Railroad. He was early to appreciate the undeveloped wealth of the George's Creek region, and his savings were expended in the purchase of coal lands. Among the more important offices which he occupied in large enterprises were: President of the New York Mining Company, director of the Black-Sheridan-Wilson Company, of Baltimore, and of the Potomac Coal Company. Capt. Sheridan left a widow and two daughters.

SOCIETIES AND TECHNICAL SCHOOLS.

STEVENS' INSTITUTE OF TECHNOLOGY.—Andrew Carnegie has given this engineering college at Hoboken, N. J., \$100,000 to be used as an endowment for the new Carnegie Laboratory of Engineering erected with funds donated by him.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—At the 22d annual meeting recently in Pittsburg, January 21, Henry W. Fisher, the retiring president, delivered the only address of the evening.

The reports submitted by the secretary and treasurer showed the society to be in a flourishing condition. The membership has grown to 510 during the year, while there is a bank balance amounting to about \$1,000.

The election of officers for the ensuing year resulted as follows: Charles F. Scott, president; Chester B. Albree, vice-president; C. B. Connelly, Charles Hyde, directors; Charles W. Ridinger, secretary; A. E. Frost, treasurer. The following were admitted to membership: Charles M. Clarke, Samuel E. Clarkson, Otto Eisenschiml, F. I. Ellis, Curtland C. Gardner, C. H. Garlic, F. H. N. Gerwig, Walter Schmidt, D. Y. Swaty, E. J. Taylor, Frank B. Ward. The annual banquet of the society will be held at the Hotel Schenley on February 21.

ENGINEERS' CLUB OF TORONTO.—At the recent annual meeting January 7, A. L. Hertzberg, president, was in the chair. The report of the secretary gave a resume of the proceedings of the club since its inception in February, 1899. The treasurer's report showed \$317 on hand after all expenses had been provided for.

The following new members were elected: Campbell Reeves, Toronto; Charles W. Dill, Toronto; Vaughan W. Roberts, St. Catharines; Fred. L. Gagnon, Toronto; Josiah G. Sing, Toronto; Wm. J. Bowers, Toronto; George Herbert Power, Toronto; Frederick W. Thorold, Toronto.

The constitution was amended so as to provide for a second vice-president; also providing that members joining during the year should be required to pay 50c. per month for the broken period instead of the full annual fee. The following officers were elected: President, Major H. A. Gray; first vice-president, C. H. Rust; second vice-president, C. M. Canniff; treasurer, Henry F. Duck; secretary, Willis Chipman; directors—Prof. Rosebrugh, Capt. Gamble, E. B. Temple.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on February 1 there were 61 members and visitors present. The secretary stated that the Board of Directors approved of the objects of the Appalachian Park Association, and recommended that the club as a body should join it. He read extracts from printed circulars, and from the report of the Secretary of Agriculture explaining the desirability of setting apart a forest reserve in the Southern Appalachian Mountains. A motion was carried that a committee of

3 be appointed by the president to draft and present to the club for consideration resolutions endorsing the setting apart of forest reserves in general and of the one proposed to be established in the Southern Appalachian Mountains in particular. Mr. C. H. Ott presented the paper of the evening on "Improvement of the Channels of the Delaware and Schuylkill Rivers by the City of Philadelphia." He explained the particulars regarding the amounts which had been appropriated by the United States Government and the city of Philadelphia for the purpose of deepening the channels of these two rivers, and showed where and how this money had been used. He described in considerable detail the engineering methods and apparatus used in taking soundings for depth of channel before and during the work, and those used in blasting, dredging and disposing of the material taken out. His remarks were illustrated by a number of drawings and photographs. The subject was discussed by Messrs. L. Y. Schermerhorn, George B. Hartley, Geo. S. Webster and others.

Messrs. Frank T. Weiler, Houston Dunn and William C. Kerr were elected to active, associate and junior membership respectively.

INDUSTRIAL.

The American Car and Foundry Company is about to ship from its Jackson & Sharp plant, Wilmington, Del., 6 passenger coaches for La Plata, Argentine Republic.

No. 2 stack of the Ohio Steel Works, at Youngstown, O., in January produced 19,645 tons, the largest month's output recorded by any 600-ton furnace in the world.

The Ingersoll-Sergeant Drill Company, of Easton, Pa., has given up its option on the Glendon furnace site and is looking after another property on which to build an extensive plant.

The partly completed plant of the Buckhorn Portland Cement Company, at Buckhorn Wall, near Rowlesburg, W. Va., was recently purchased under foreclosure sale by John T. McGraw, of Grafton, W. Va., for \$67,550.

It is expected that the plant of the Marksboro Cement Company, at White Lake, N. J., will be completed and ready for operation by March 1. It will have a capacity of 800 bbls. a day and about 150 men will be employed.

The Port Henry (N. Y.) iron furnaces, which have been idle for 7 years, will be put in full operation in April. The plant was recently leased by Pilling & Crane, of Philadelphia. Mineville ore will be used at both Port Henry and Crown Point.

The American Smelting and Refining Company has placed a contract with Westinghouse, Church, Kerr & Company, of New York City, for the equipment of La Gran Fundicion Central Mexicana, Aguas Calientes, Mex., with the steam loop and Holly return gravity system.

The 42-in. universal mill at the Homestead steel works has beaten the world's record for output of steel in 24 hours by making 711 tons of finished steel. The best previous record for a universal mill was 577 tons. It is thought by the mill officials that the run will soon be duplicated.

Dispatches from Birmingham, Ala., report that the deal for the absorption of the Birmingham Fertilizer Company by the Virginia and Carolina Chemical Company is consummated. The plant is considered one of the most prosperous in the country, and the deal for its purchase has been in progress for some time.

The Sullivan Machinery Company, of Chicago, Ill., is to supply a complete diamond drill equipment for prospecting extensive iron and other mineral properties located in the Chanda District, Central Provinces, British India. The work is about to be conducted by T. N. Tata, the head of the East Indian firm of Tata & Co., with offices in New York City.

The Ellwood City Brick and Clay Company has been formed at Ellwood City, Pa., to manufacture brick, tile, terra cotta and other products from stone, shale or clay. Thomas Dugan, A. C. Frey, H. D. L. Cunningham and H. M. Whittaker are among the parties interested. The works will be equipped for a capacity of about 50,000 bricks per day.

It is stated that the directors of the United States Gypsum Company, of Chicago, Ill., have secured the best paying gypsum plant in Ft. Dodge, Ia., and other plants there have signified their intention to accept terms. The new plant has a capacity of 30,000 tons, and was purchased out of the \$2,000,000 fund of preferred and common stock set aside for such purposes.

A. M. Swan, sales manager of the Henry S. Mould Company, Pittsburg, Pa., manufacturers of briquetting machinery, has just returned from a business trip of 7 months, during which time he visited every smelter on the North American continent. His trip covered the United States, British Columbia, and Mexico. He reports many smelters are already using briquetting presses and states that many orders were secured

from interests who had not made use of such machinery.

The Burt Manufacturing Company, of Akron, O., reports that it is busy with foreign shipments of exhaust heads and the Cross oil filter. Manaos, Brazil, was the southern extreme of last month's shipments, while 6 large oil filters were sent to Finland. Other important foreign shipments went to London, Eng., and Vienna, Austria. The Shelby Steel Tube Company, of Shelby, O., has equipped its plant with Burt exhaust heads.

The name of the Flint Eddy & American Trading Company, of New York City, has been changed to the American Trading Company. The company states that its capital remains unchanged and the active management will be in the same hands as before. The company will continue the same general export and import business as heretofore with South and Central America, Mexico, the West Indies, Australia, South Africa, China and Japan and other countries of the Far East.

The recently organized Standard Steel Car Company, of Pittsburg, Pa., has placed contracts for equipment. These presses, varying in capacity from 100 to 1,000 tons, have been ordered from the Mackintosh-Hemphill Company, of Pittsburg. The Hilles & Jones Company, of Wilmington, Del., will furnish the punches and shears, while the riveters will be furnished by the Chambersburg Engineering Company, of Chambersburg, Pa. The electrical apparatus will be furnished by the Westinghouse Electric and Manufacturing Company, and the electric cranes will be furnished by the Shaw Crane Company, of Muskegon, Mich. Temporary offices have been opened in the Bijou Building, Pittsburg.

The Fluor Spar Company states that by a reorganization of the Kentucky Fluor Spar Company, all its properties and business have been merged into the Kentucky Fluor Spar Company; and, that hereafter all the business of the two companies will be conducted under the name of Kentucky Fluor Spar Company, Marion, Ky. The Pittsburg, Pa., office of the Kentucky Fluor Spar Company has been discontinued. All orders and remittances for fluor spar ordered or shipped should be made to the Kentucky Fluor Spar Company, Marion, Ky. This company states that the merger and change in the fluor spar business has been made necessary on account of the rapidly increasing demand for its product, compelling better facilities for serving the trade. The new arrangement enables the Kentucky Fluor Spar Company to fill all orders promptly.

The Jeansville Iron Works Company, of Jeansville, Pa., reports that the large amount of repairs made necessary in the pumps in many of the Pennsylvania mines by the December floods, has thrown work into the hands of the company beyond its capacity. No orders are taken but with an allowance of 6 months in which to fill. It is intended to enlarge the works this spring. The following is a partial list of contracts the firm has for mining pumps: Lehigh Valley Coal Company, Hazleton, Pa.; Philadelphia & Reading Coal and Iron Company; G. W. Payne & Company, Luzerne, Pa.; M. C. Conkey, Joplin, Mo.; Delaware & Hudson Company, Scranton, Pa.; Cambria Steel Company's mines near Johnstown, Pa.; Consolidated Coal Company, Frostburg, Md.; Alden Coal Company, Alden, Pa.; Arcadia Coal Company, Nova Scotia; Nova Scotia Steel Company, Sidney, N. S., and the H. C. Frick Company, Connellsville, Pa. It has also contracted for building 4 electric pumps for the Calumet & Hecla Copper Company, Calumet, Mich., and 2 electric pumps for the Denver Engineering Company for Mexico.

The Crocker-Wheeler Company, of Ampere, N. J., reports that the outlook is most promising, both in orders coming in and in the indications for a heavy Spring business. Among the January shipments may be noted the following: DeLamar Copper Refining Company, Cartaret, N. J., 1-520-kw. generator; 1 100-kw. generator; 1-50-kw. generator; Pennsylvania Steel Casting Company, Chester, Pa., 1 350-kw. generator; Quintard Iron Works, New York City, 1 65-kw. generator; Marine Engineering and Machine Company, Harrison, N. J., 2 size 111, 50-kw. generator, 1 60-h. p. motor, 2 35-h. p. motors; National Tube Company, Pittsburg, Pa., 1 110-kw. generator. Niles Tool Works, Hannibal, O., a consignment of motors; Erie Rapid Transit Railway, Harbor Creek, Pa., 1-200-kw. generator; Lake Shore and Michigan Southern Railway Shops, Collinwood, O., 1 400-kw. generator, 1 75-kw. generator; Mechanical Laboratory, Lehigh University, So. Bethlehem, Pa., 1 30-kw. generator; American Car & Foundry Company, Madison, Ill., 1 110-kw. generator; Armour Fertilizer Works, Atlanta, Ga., 1 150-kw. generator, 2 50-h. p. motors, 1 90-h. p. motor; Park Steel Company, Pittsburg, Pa., 1 200-kw. generator; Fort Hill Chemical Company, Rumford Falls, Me., 4 140-kw. generators.

The American Air Compressor Works, of 26 Cortlandt street, New York City, states that James Clayton, late sole owner and proprietor of the Clayton Air Compressor Works, having sold his entire interests to the International Steam Pump Company, the

American Air Compressor Works has been organized to manufacture machines, etc., similar to those formerly constructed by the Clayton Air Compressor Works, such as air and gas compressors, carbonic acid gas machines, air receivers, vacuum and tar pumps, etc. The works, located at Van Brunt and Summit streets, Brooklyn, N. Y. (formerly South Brooklyn Steam Engine Works, where John J. Riley has been established for the last 40 years), are equipped with the latest improved machinery, including blacksmith shop and foundry, and the company is prepared to make prompt deliveries.

William S. Fairhurst, late manager of the Clayton Works, will have entire charge of manufacturing. Frederick B. Vail, late manager of the Clayton offices, will have charge of the sales department at the New York City offices in the Havemeyer Building, New York City. The company says it is prepared to furnish any repairs for Clayton compressors at reasonable rates and purposes to construct a compressor, simple in design, durable and economic, embodying the good points of the Clayton and many improvements.

The Abendroth & Root Manufacturing Company, 99 John street, New York City, has resumed the manufacture of its well known spiral riveted pipe and water tube boilers, with new works at Newburgh, N. Y., having purchased the recently built plant of the Wright Steam Engine Works. At the time of the recent fire the works were busier than at any time for months. Twenty large special machines were wrecked and hundreds of tons of raw material and partially manufactured goods were destroyed, including 7 miles of pipe for one purchaser ready to ship.

In the new shops the company states that it has an equipment which will enable it to improve its products to the highest degree, with a great increase in capacity. The buildings are entirely of brick. The foundry is 200 by 200 ft., machine shop 200 by 200 ft., pattern, carpenter and forge shops, 100 by 200 ft. The company has added a new building, now nearly completed, 100 by 300 ft., which will contain special appliances for spiral pipe, boiler, tank work and galvanizing. Besides having deep water transportation the plant is on a spur track from the West Shore Railroad, and connections have been established with the Newburgh terminals of the Erie, New York Central, and New Haven roads, giving excellent shipping facilities.

As the purchase of the Newburgh property included the entire equipment of machinery, patterns, stock and good will of the Wright Works, in which were built "Dixon-Corliss," "Wright," and "Payne" high-speed engines, the Abendroth & Root Manufacturing Company is prepared to execute orders for these engines or for repair parts for those already in use.

TRADE CATALOGUES.

The Joseph Dixon Crucible Company, of Jersey City, N. J., continues to send out circulars and other printed matter calling attention to its various graphite products. One of these is Dixon's traction belt dressing and leather preservative, recommended as keeping belts soft and pliable and doing away with slipping.

The problem of loading soft coal in box cars with minimum breakage is that which the Christy box car loader attempts to solve. This loader has been tried at a number of important coal mines in the Middle West and J. M. Christy, general agent, of Des Moines, Iowa, sends out a pamphlet containing letters giving some flattering opinions from the superintendents of the mines in question.

Wonham & Magor, of New York City, publish circulars and pamphlets showing the industrial steel cars, portable track, etc., they manufacture. These cars are for mines, rolling mills, quarries, etc., and are made in a great variety of styles and sizes. Some are bottom dump, some side dump, others end dump, with various attachments. The wheels have outside bearing boxes. Wonham & Magor also make designs and furnish estimates for all kinds of industrial railway equipments.

M. H. Treadwell & Company, of Lebanon, Pa., successors to the Lebanon Manufacturing Company, issue a 31-page pamphlet describing a number of the different types of wooden railroad cars built at their works. These comprise cattle and stock cars, hopper coal cars, coke cars, steel tank cars, etc. The firm states that it aims to use standard types in constructing cars and to make all parts interchangeable, enabling quick replacements. The cars are made with link and pin or automatic Janney couplers, and may be had equipped with air-brakes.

The Foster Engineering Company, of Newark, N. J., has just issued a 90-page catalogue describing the Foster regulator and reducing valve specialties for steam, water, gas or air. The company states that having found its old factory too small for its increasing business, it has just moved into a new factory built after its own ideas and equipped throughout with every modern tool and up-to-date appliance needed. The Foster regulator is of the spring-and-dia-

phragm type, and the company claims to have overcome entirely the defects in this type as heretofore used. The pamphlet states that Foster valves are found in pulp and paper mills, salt and chemical works, mines and collieries, oil refineries, etc., also in some of the largest steam plants in the world including the Carnegie steel works and, in Germany, the Krupp works. The pamphlet gives clear and concise descriptions of the various patterns in which the valve is made, and is decidedly superior to the ordinary run of trade publications.

Book No. 1 of the mining machinery catalogues published by the Allis, Chalmers Company, Gates Works, Chicago, Ill., is a 56-page pamphlet containing a description of the Gates rock and ore breaker. This crusher is of the gyratory type, and is claimed to have such advantages over jaw crushers as greater capacity, freedom from vibration and less power required. The company states that nearly 5,000 of these machines have been sold since the Gates Company started their manufacture over 20 years ago, and that they are in operation in all parts of the civilized world. The crushers are made in a variety of sizes from style "K" requiring 100 to 150-h. p. and capable of crushing material to 4-in. cubes at the rate of 150 tons per hour, to a style "B" sample grinder for laboratory work. The Gates "H" fine crusher is designed to take material of 3-in. size or under and reduce it so that 90 per cent. of ore will pass a half-inch screen. The company also manufactures a portable railroad ballast plant and portable outfits for preparing and maintaining macadam roads.

A catalogue containing a large amount of information not easily accessible ordinarily is that published by the R. D. Wood & Company, of Philadelphia, Pa., on centrifugal pumping machinery. The catalogue is of the convenient 6 by 9 size, contains 100 pages, and is said to be designed more as a general handbook for users of centrifugal pumps than as a mere list of sizes of the company's machinery. The pamphlet includes much descriptive matter and tables of information usually not found in manufacturer's catalogues, and omits some of the tables of speed and other details which are frequently given. The catalogue calls attention to the fact that the first practical centrifugal pump was invented in this country in 1818, and shows what are the most recent developments in centrifugal pumping. Some of the pumps shown are direct-connected to engines or motors, while others are driven by belts. The pamphlet calls attention to the uses of centrifugal pumps in irrigation and sewage work also for coffer-dams and general excavating work. Interesting formulae and tables for determining capacity, lift, efficiency and power of such pumps are given, and the pamphlet is of unusual excellence.

GENERAL MINING NEWS.

Interstate Miners' and Operators' Convention.—The joint conference of the miners and operators at Indianapolis on February 8 unanimously ratified the old wage-scale agreement. The admission of Iowa and Michigan to the next joint conference was denied because of the opposition of the operators from Illinois and Ohio.

A resolution providing for an equality of conditions of mining throughout the competitive field was adopted, and Indianapolis was selected as the place for holding the joint conference next year. The wage agreement, which stands, was adopted February 8, 1901, and in its original form reads as follows:

"An advance of 14c. per ton of 2,000 lbs. for pick mined screen coal shall take effect in Western Pennsylvania thin vein and in the Hocking district, the basing district of Ohio (making the rate 80c. a ton.) and in the block coal district of Indiana. The Danville district, the basing point of Illinois, shall be continued on an absolute run of mine basis, and that an advance of 9c. per ton over present prices be paid on the district named (making the rate 49c. a ton.)

"The bituminous coal district of Indiana shall pay 49c. per ton for all mine run coal loaded and shipped as such. All other coal mined in that district shall be passed over a regulation screen and be paid for at 80c. per ton of 2,000 lbs. for screen lump.

"The price of machine mining in the bituminous district of Indiana shall be 18c. per ton less than the pick mining rate for screen and lump coal when punching machines are used and 12½c. per ton less than the pick mining rate when chain machines are used.

"When coal is paid for on run of mine basis the price shall be 10c. per ton less than the pick mining rates when chain machines are used. That the machine mining rate in the Danville district, the basing point of Illinois, on both punching and chain machines be 39c. per ton.

"The machine mining rate in the thin veins of the Pittsburg district and Hocking, the basing district of Ohio, for shooting and cutting, shall be advanced 9c. per ton, and the block coal district of Indiana shall be advanced 11½c. per ton.

"The mining rates in the central district of Pennsylvania were referred to that district for adjustment.

"The advance on inside day labor shall be 20 per cent, based on the present Hocking Valley scale, with the exception of trappers, whose compensation shall be \$1 per day.

"All narrow, day work and room turned, shall be paid a proportion advance with the mining rate. The scale is based on an 8-hour work day."

By this scale the rates in the Indiana-Illinois field are 49c. for run-of-mine, and in the Pittsburg-Hocking field 80c. per ton for screened coal.

United States Coal and Coke Company.—It is stated this company is to be formed to operate the United States Steel Corporation's mines in the Pocahontas field. It will be operated by the H. C. Frick Coke Company, of Pittsburg. W. G. Wilkins, the Frick Company coke and mining engineering expert, has completed an examination of the field and arranged for the opening of 4 mines in April. The construction of 1,200 coke ovens will soon start.

ARIZONA.

GRAHAM COUNTY.

(From Our Special Correspondent.)

Chiricahua District.—Development work has started on a group of copper claims in this district discovered last September. A shaft is being sunk exposing a ledge 4 ft. wide, said to carry gold, copper and silver.

MARICOPA COUNTY.

American Gold and Copper Company.—This company has 8 men at work on the Santo Domingo.

Ardath Mining Company.—This company's mill, southeast of Wickenburg, is being put in condition to run under Captain Cree.

Idaho Consolidated Copper Company.—A 200-ft. shaft is being sunk on the Angell copper group near the Vulture.

Oro Grande Mining Company.—This company has a group of 9 claims near the Hassayampa, 5 miles northeast from Wickenburg. The development is reported to aggregate about 1,500 ft., there being a 300-ft. shaft, with 500 ft. of drifting on the 100-ft. level. Several cross-cuts are said to show the ledge to be 75 to 130 ft. wide. On the 200-ft. level is a 100-ft. cross-cut from wall to wall, also on the 300 level. The ledge carries masses of non-mineralized diorite. The ledge matter is talc, with iron oxide stringers. The free gold values are carried in both the talc and iron. The property is under the management of Geo. B. Upton, with B. O. Hatfield as foreman. The shaft has a gasoline hoist.

Socorro.—A 20-stamp mill is being put up on this mine, 40 miles west of Wickenburg. John Witherly is superintendent.

United Gold and Copper Extraction Company.—This company, of Cleveland, O., recently made a payment of \$3,000 on J. Ellis' Alice group, near Gilbert.

Vulture.—At this mine cyanide work on mill tailings continues and a cross-cut is being run at the 200-ft. level in the new shaft. George W. Sanders, of Vulture, is superintendent.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Grand Gulch.—This property on the Utah-Arizona line, shipped to Salt Lake smelters 145,130 lbs. of high grade copper ore for the 2 weeks ending February 1.

Minnesota.—The new 200-ton concentrating plant at this mine near Chloride has started up work.

SANTA CRUZ COUNTY.

(From Our Special Correspondent.)

Happy Jack Mining Company.—This company, with a capitalization of \$200,000, has been recently organized under the laws of Arizona, with the following officers: President, R. R. Richardson; vice president, Richard Eames; secretary and treasurer, A. E. Crepin; general manager, W. H. Barnett; directors, W. F. Copper and G. Ben Heney. The properties consist of 5 claims, near Patagonia.

Pride of the West.—This property, at Washington, midway between Patagonia and Nogales, is developed through tunnels and shafts, showing a vein from 8 to 30 ft. wide, carrying copper-zinc-lead-iron sulphides. The property includes a concentrating mill and a smelter, both of which are being remodeled and enlarged. The mill will contain 2 crushers, 5 sets of rolls, 4 magnetic separators, 9 Wilfley tables and a roasting furnace. The ore from the rolls is to be roasted at a moderate heat to magnetize the chalcopryrite before passing the material through the magnetic separators. The smelter will produce matte. E. Gee is manager.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

Copper Mountain.—Work has started on this group of claims on the Rio Agua Fria. The claims belong to Isaac T. Stoddard, of Phoenix, who has lately formed a company for developing them.

Uncle Sam Copper Company.—This company owns

12 claims or 210 acres upon 3 of which work has started. On the St. Louis claim there is a shaft 75 ft. deep in ore.

CALIFORNIA.

ALPINE COUNTY.

(From Our Special Correspondent.)

Curtz-Evans Mining Company.—An electric-power plant is to be installed at this company's mine at Loope, of which Capt. Peter Curtz is superintendent. These gold-quartz mines have been actively worked only in the past few months, but are producing profitably. Forty stamps are to be added to the 20-stamp mill in the spring. Capt. Curtz is also shipping some copper ore from mines in the same neighborhood. This is the first active work in Alpine County for some years.

AMADOR COUNTY.

(From Our Special Correspondent.)

Bay State.—Operations are to be resumed at this mine, near Plymouth, belonging to the Rhetta Mining Company. There is a shaft on the mine 850 ft. deep and considerable work has been done in times past. Twelve men are employed under John Ross, Jr., of Sutter Creek.

Fremont Mining Company.—The properties, including the old Gover Mine, owned by members of the firm of Goodall, Perkins & Company, of San Francisco, and of which C. E. Purrington is superintendent, are being prospected. A cross-cut to the vein from the bottom of the 700-ft. shaft on the Fremont is being run. If the ore continues to show up well a large mill will be erected.

BUTTE COUNTY.

(From Our Special Correspondent.)

Feather River Exploration Company.—This company has bought from W. P. Hammon a tract of land near Oroville for dredging purposes. The same company has bought 35 acres from John Beall, of North Rio Bonito. This latter tract is covered with peach trees 49 years old, and a profit will be made by cutting them into stove wood before dredging commences.

Henderson Mining Company.—At Wyandotte, this company is putting up a 10-stamp mill.

Mount Ida.—Judge John C. Gray, of Oroville, has discovered on his ranch at Mount Ida, in a fine peach orchard, a 4-ft. quartz ledge assaying over \$60 per ton in gold.

Pactolian.—A contract for considerable work has been let by J. E. Miller & Company on this mine at Hurlston.

Steifer Mining Company.—This company, of Magalia, has bought a hoist and other machinery, and is sinking for the old Perschbacher gravel channel, from which so much gold was taken years ago.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Deep Gulch.—The bond has been accepted on this mine near Mokelumne Hill. Kiser & Nunes are the owners.

Good Hope.—S. H. Krim has received word that the first payment on the bond of the Good Hope, San Bruno and Monte Cristo Mines, at Glencoe, have been paid by the Chicago men who have them under bond.

Melones Consolidated Mining Company.—This company (a Boston corporation), of which Wm. C. Ralston is general manager, will shortly have its 60-stamp mill running. The flume and tunnel are completed. The mines are at Robinson's Ferry.

Sugar Pine.—On this mine, near Murphys, owned by the San Joaquin Mining Company, of which Joseph McClay is superintendent, a shaft is now being sunk 300 ft. at the lowest point of the present levels. A water-power hoist is being put in. There is a 10-stamp mill on the property.

KERN COUNTY.

(From Our Special Correspondent.)

Talc.—The cyanide plant of this mine at Woody is completed. The old tailings to be worked are said to be worth \$7 per ton.

Yellow Aster.—This mine, at Randsburg, John Singleton, manager, has resumed paying dividends, the new 100-stamp mill and water plant being completed.

MADEIRA COUNTY.

(From Our Special Correspondent.)

Rea.—Charles Ward, of Grub Gulch, has struck high grade in this mine. The discovery has caused some local excitement. Mr. Ward has been working the claim for 2 years, and operating a small stamp mill.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Mariposa Mining and Commercial Company.—This company, at Mount Bullion, owning the Princeton, Josephine, Pine Tree, Mariposa, Lewis, Mt. Ophir and other mines, expects to save largely by using

electrical power. The fuel costs at the Princeton Mine alone are \$100 per day. The dam and electrical plant are on the Merced River. Four dynamos are being put in at the Princeton for the mill, hoist, rock crushers and machine shops. The largest is 150 h. p. and is to operate the hoist; another of the same capacity will run the hoist at the Mariposa.

Mary Harrison.—At this mine, at Coulterville, owned by the Merced Mining Company, of Boston, Mass., extensive improvements have been made and milling has begun at the 40-stamp mill on Black Creek, 3 miles from the mine.

NEVADA COUNTY.

(From Our Special Correspondent.)

In excavating for a cellar at the Floriston Hotel, Floriston, a quartz ledge of good grade has been found, and Mr. A. Fleishacker will develop it.

Cleveland.—John Tilton and brother have struck high grade ore in this mine, 8 miles from Nevada City, where they have been doing considerable development.

Murchie.—This is one of the claims owned by the Lone Star Mining Company near Nevada City. The mine has been some time idle and full of water. The mine has been bonded and will be unwatered and the shaft sunk 200 ft. The mill and other machinery will also be put in good condition. A. W. Blundell, of San Francisco, is secretary of the company.

Sierra Queen Mining Company.—This company is to put in heavier machinery and sink the shaft 100 ft. on the Styles Mine, at Nevada City. The new directors are: S. W. Marsh, W. H. Martin, E. T. R. Powell, E. J. Rector and B. J. Miller.

PLACER COUNTY.

(From Our Own Correspondent.)

Bonnie Bee.—At this mine, near Dutch Flat, the prospect tunnel is being driven by power drills.

Decker.—This mine, near Newcastle, is to be opened and developed by G. L. Threlkel, F. E. Brye, S. Bartlett and A. L. Smith.

Inskip.—This hydraulic mint, at Gold Run, has closed owing to scant water supply.

Placer County Stamp Mills.—The following new quartz mills were built in Placer County last year: 20 stamps on the Washington, near Forest Hill; 20 stamps at the Three Stars at Ophir; 10 stamps on the Rawhide, near Towle; 10 stamps on the Central, near Damascus, and 10 stamps on the Shady Run, American River.

Tadpole Consolidated Gravel Mining Company.—This company is extending its tunnel, near Gold Run, rapidly and expects pay gravel within 100 ft.

Zelma Bell Mining Company.—This company is getting out timbers for its new dredger on the American River near Colfax.

PLUMAS COUNTY.

(From Our Special Correspondent.)

Blue Bell.—This copper mine, near Genesee, J. J. Sullivan, manager, is to have an oil-burnig smelter. Ore shipped to the smelter at Keswick gave very good returns.

Franklin Group.—This group of mines, near Genesee, A. Dragovich, superintendent, is being developed. The principal work is on the Grant, where the ore carries gold, silver and copper. In the same group a tunnel is being run on the Robinson to tap the bottom of a 200-ft. shaft.

Plumas Copper and Smelting Company.—This company, owning several locations near Genesee, has a number of men doing development. The owners are Minneapolis and St. Paul men, and C. L. Adams is superintendent.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Copper World.—This mine, now owned by the Ivanpah Consolidated Smelting Company, at Rosalie, is yielding about 50 tons of smelting ore daily. A new hoist has been put in.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

A. E. Ladner has sold the quicksilver claims on his ranch, 17 miles from Templeton, to Los Angeles men who are working the Oceanic quicksilver mines. The property is to be developed.

SHASTA COUNTY.

(From Our Special Correspondent.)

De La Mar Smelter.—This plant is treating 5,000 tons of ore monthly, and the converters are producing between 400 and 500 tons monthly.

McClure.—This property has been bonded by the Mount Shasta Gold Mines Corporation, Frank E. Ware, superintendent. The mine is in the Bully Hill region, near the De Lamar mines.

Mountain Copper.—At this company's smelters, Keswick, the converters are about installed and the change from steam to electric power nearly completed. This mine is the largest producer of copper and silver in California.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Evening Star.—John Daggett, of the Black Bear Mine, Siskiyou County, has deeded to the Evening Star and Central Mining Company, of San Francisco, this and the Central Mine, at Eddy's Gulch, Liberty Mining District, near Rollin. The mines are to be reopened by the new company, with Ben F. Daggett, of Black Bear, as superintendent. This was many years since a producing mine, but the ledge was lost. Governor Daggett, formerly superintendent of the United States Mint at San Francisco, and for many years owner of the Black Bear Mine, is president of the new company.

Tyser Mining Company.—This company, at Klammath, has started up the new mill.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Dead Horse.—This mine, near Carters, is temporarily closed owing to lack of water.

De Lay.—A prospecting mill is to be set up on this mine, at Groveland.

Dreisam.—At this mine, near Carters, a new vein of good ore has been found in the upraise at the 400 level.

Fidelity.—The pipe line ditch and well at this mine, near Columbia, have been completed, and a test run made.

Harvard.—At this mine, Jamestown, owned by a Boston company, the hoist-house on No. 1 shaft is ready for machinery.

Independent.—This mine, at Soulsbyville, which has been idle some years, has started up with Mr. De Masters in charge. The mine is owned by Thomas West, William Sharwood and Mrs. Curnon.

Mack.—At this mine, Big Oak Flat, the mill is running on ore from the 100-ft. west level of the new shaft. Some men have been temporarily laid off.

Prudhomme.—A new vein has been found in this mine, near Carters. The shaft is to be sunk 100 ft. A. W. Bryant is in charge.

Republican.—This mine, near Jacksonville, has a force of 25 men. B. Deleray is superintendent.

Santa Ysabel.—A 6-ft. vein has been struck on the 800-ft. level of No. 3 shaft in this mine at Stent. The mine is owned by a Boston company, with T. C. Gorie as superintendent.

Star.—The financial obligations of this mine, near Columbia, have been met, and Superintendent Ohlsen is getting ready to resume work.

YUBA COUNTY.

Miller.—Dr. A. H. Elftman, of Indianapolis, consulting engineer for this company, is on the ground and expects to have the new mill built by Mr. Has-kill, the superintendent, in running order by March 1. Dr. Elftman reports encountering a large body of high grade ore.

COLORADO.

BOULDER COUNTY.

Columbia.—Lessees on this mine at Ward recently shipped a car of rich ore to the smelters. They have also over 200 tons of mill ore which is being put through the Benford Mill.

Texas.—The contractors on this mine at Ward are working 2 shifts in order to complete their 400-ft. contract as soon as possible.

Wirth.—The lessees on the 300-ft. level west in this mine at Ward have opened up a streak 2 ft. wide, of which about 2 in. is solid smelting ore, said to run 5½ ozs. in carload lots.

CLEAR CREEK COUNTY.

Argus Mines and Tunnel Company.—This company has been incorporated on the plan of the Leadville Home Mining Company. George M. Post is president; J. W. Bent, vice-president; Fred G. Shaffer, secretary; and S. A. Noyes, treasurer. Among the stockholders are numbered bankers, lawyers, physicians and business men of Idaho Springs.

The company owns 25 claims, a mill site and tunnel site for 4,500 ft., and will drive a tunnel through Gold Hill. The Argus vein is known as a producer and the extensions of the Lexington, Bismarck, Gold Leaf, Josephine, James Bell, Golden Dustman and others will be cut by the tunnel at depth. J. J. Hoban, former owner of the property, will be manager.

(From Our Special Correspondent.)

Burns-Moore Tunnel.—A vein 14 ft. wide of broken up mineral has been cut and will be explored. Some of the mineral is high grade.

Crockett Mining Company.—This company working at Idaho Springs has cut a body of smelting and mill ore.

Kokomo-Pioneer Mining and Milling Company.—Two boilers are being put in at the mill with 125 h. p. and a gasoline engine at the Milton Mine. At the Pio-

near Mine a strike has been made by Manager E. H. Willsoff; about 12 in. of the streak runs \$100 to the ton. The company has a lot of mill ore ready to be treated as soon as improvements are completed. The Kokomo Mine has a wide body of sulphide ore.

Little Mattie Company.—In drifting in the Republic adit of this mine at Idaho Springs a streak of smelting 8 in. wide running \$70 a ton and about 2 ft. of mill ore have been opened.

Red Oak Company.—The mill belonging to this company at Georgetown was destroyed by fire entailing a loss of \$30,000 with \$15,000 insurance. The mill was built in 1901 but had a checkered career owing to the incompetent manager at first in charge. The stockholders took sides and the mill closed down on the night preceding the fire. At a meeting of the company after the fire in Denver it was decided to work the mines but to do nothing about rebuilding the mill at present. The insurance companies have not paid the loss, waiting for the tangle to be straightened out.

S. & S. Mining and Milling Company.—In working some of the old time mines on Red Elephant Mountain at Lawson, 9 in. of smelting ore were opened on the Silver Coin ground. The tunnel is being driven with machine drills to reach the lode at greater depth, about 600 ft. ahead.

EL PASO COUNTY.

(From Our Special Correspondent.)

Telluride Reduction Company.—This company with works at Colorado City, designed to use a bromide process, has decided at a recent meeting at Colorado Springs, to increase the daily capacity of the new mill from 100 to 600 tons, involving an additional expenditure of at least \$250,000.

FREMONT COUNTY.

(From Our Special Correspondent.)

Metallic Extraction Company.—The concentrator at this company's works at Cyanide is being put in working order, and it is proposed to concentrate the tailings dump from the main mill. This dump represents the accumulations of years.

GILPIN COUNTY.

(From Our Special Correspondent.)

Boston & Denver Consolidated Gold Mining and Milling Company.—Woodbury tables for 25 stamps are being removed to be replaced by others. This big mill has handled from 200 to 300 tons per day. L. H. Stockbridge, Central City, Colo., is manager, and arrangements will be made for sinking the Cook 900-ft. shaft deeper.

Gilpin Ore Shipments.—Shipments of smelting and crude ores, tailings and concentrates for January from the Black Hawk depot were 325 cars, or 6,012 tons, a gain of 37 cars or 684 tons over January, 1901, or 10 per cent.

Mining Deeds and Transfers.—F. E. Norton to J. E. Lightbourn, et al, Samson placer, South Boulder District; H. J. Hawley to E. J. Sears, 1-5 interest Success lode, Lake District; S. W. Whitlock, et al, to Little Sunshine Gold Mining Company, the Badger Boy group of 6 claims in Central District; Thomas J. Flynn to T. Cody, 1-3 interest Baby A, Baby B, Texas and Protection lodes, Lake District; E. Moyle to C. S. Thomas, 1-2 interest Tywarnhall lode, Lake District; G. Zancanella to Argo Mining Company, 3-4 interests Elizbone and Treutina lodes, Russell District; Mark Bentley to N. Dahlberg, 1-5 interest Cyclops lode and 1-10 interest Ajax lode, Pine District; E. G. Pryce to L. W. Kimball, 1-4 interest Baltimore group of 6 claims in Central District.

New York Mill Company.—The newly elected directors are J. F. Hopkins, A. B. Seaman, S. K. Howes and J. W. Best, all of Denver, and Chase Withrow, of Central City. The new officers are: President and general manager, J. F. Hopkins; vice-president, A. B. Seaman; secretary, S. K. Howes.

Stewart Gold Mining Company.—A 25 1-2 cord shipment of about 200 tons from this mine to the Gilpin Mill gave gold returns of \$9.67 ozs. valued at Denver Mint at \$1,466. From this ore 22 tons of tailings were caught, which sold for \$401, or nearly \$20 per ton, making a total of \$1,867, or an average of nearly \$10 per ton for the product. The ore had to be hauled 7 miles. The company expects to erect a stamp mill at the property. J. A. Gilmour, Central City, is manager.

GUNNISON COUNTY.

(From Our Special Correspondent.)

Forest Queen.—F. W. Fuller, who has long been connected with the development of this mine, is reported having given a bond and lease to John K. Hollowell, of Chicago, Ill. The mine is equipped with needed buildings and machinery, and has a fine record as a producer of high grade ore.

Tin Cup District.—A. E. Reynolds, of Denver, Colo., who has been working for some time in Chicago Park, is reported to have disposed of a 1-4 interest in a group of claims in this district, to M. D. Thatcher, of Pueblo, who also obtains a 1-5 interest in the Omoifer lodes Nos. 1, 2, 3, 4, 5, and 6, and a 1-2 interest in the Alps claims.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Chippewa.—The ore occurs in small veins in porphyry. Small shipments of high grade material are made and development work goes on.

Ohio Mining Company.—After sinking from 350 to 385 ft. a new drift started that at 35 ft. encountered the same sulphide ore found in the upper levels. The vein is widening and grade improving.

Rialto Mining and Leasing Company.—An air compressor has been added. The shaft is going down rapidly and is nearly 1,300 ft. deep. The flow of water is light. Diamond drill work showed a great sulphide body.

Tamarack Company.—This proposition at Riverside has a large body of low grade copper sulphides showing small values in gold and silver. Bins are being filled.

Tarshish Mining Company.—A good looking vein of lead ore is being developed between the 250 and 300 ft. levels and occasional shipments are made.

Waswado Mining Company.—The company has the Eclipse and other important property on the gold belt, and has sunk to 800 ft. where drifting has started.

MINERAL COUNTY.

(From Our Special Correspondent.)

Wooster Tunnel Company.—This company's property includes a long lease on the old Nelson Tunnel, at Creede, and is used in connection with the Humphrey Tunnel, an extension into the property of the United Mines. The Wooster Tunnel is over 8,000 ft. and the Humphrey Tunnel over 700. By a contract with the Amethyst, Last Chance, New York Chance and Commodore Mines, the Wooster Tunnel Company is to transport all their ore below the 400-ft. levels at an average charge of about \$1 a ton, and that of the United Mines at about the same charge. The vexatious litigation of several of these mines is about to be adjusted.

OURAY COUNTY.

Caroline Mining Company.—Two cars of machinery for the new electric power house have arrived in Ouray. The building is ready for the balance of the machinery, and the plant may be in operation within 30 days. This will enable the company to drain the lower levels of the Revenue Mine. The three power houses now in use did not furnish power enough.

J. I. C. and Maud S.—These claims at Red Mountain will be transferred to a new company which will start in the spring to develop the properties. The claims have belonged to the Gen. McClurg estate in Chicago.

Last Chance.—This mine and the Forest Queen, near Guston, have been sold by C. F. Blake to A. E. Cox, of Huntington, W. Va. Mr. Cox will also come into possession of the Great Western and Sundown, adjoining claims, and has purchased mining machinery for working these properties. A tunnel will be driven 1,000 ft.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Henrietta & Lizzie.—The superintendent of these mines, of the Kendrick & Gelder Smelting Company, states that a Gardner electric drill, driven by a gasoline engine and dynamo, using 2½ h. p., is doing good service. The men are making 3 ft. each 8-hour shift in hard quartz. In the same rock by hand 2 men on a shift, with 3 shifts per day, made 1 ft. per day. In driving a cross-cut in the country rock the men with the Gardner drill put in a full breast of 4-ft. holes each shift of 8 hours.

SUMMIT COUNTY.

King Solomon Tunnel and Mining Company.—This company, backed by Colorado Springs capital, has filed articles of incorporation to operate its property of 50 acres on Royal Mountain in the Ten-Mile Range. Considerable development work has been done, chiefly through a tunnel now in 200 ft. Considerable ore, said to run over \$1.40 a ton, has been shipped. D. D. Hunt, of Colorado Springs, is president.

TELLER COUNTY—CRIPPLE CREEK.

Portland Gold Mining Company.—At the annual meeting at Council Bluffs, Ia., W. H. Bryant, a law partner of ex-Governor Thomas L. W. Ross, and D. L. Ross were the sole attendants at the meeting, holding proxies for a large majority of the stock. The old board of directors was re-elected. A directors' meeting will be held in Colorado Springs for the election of officers, but it is stated that all the present officers, including James F. Burns, as president, will undoubtedly be re-elected.

(From Our Special Correspondent.)

Cripple Creek January Output.—The gold output of the district for January amounted to 55,800 tons, yielding \$2,121,250. The closing of the Bull Hill mines on account of water shortage tended to decrease the production total.

Elkton.—This property has resumed sinking below the 8th level and active stoping is in progress. The management is troubled with very little water, the flow having diminished to between 500 and 1,000 gal. per minute, and is now handled by one of the big pumps. The mine is producing about 60 tons of ore a day, and President Bernard states that the production will probably be increased soon.

Golden Cycle Company.—The deferred annual meeting will take place March 1, when the officers and directors will be elected and the full reports of recent operations will be given. The company has been very prosperous during the last month or two, and the outlook is encouraging. It is reported that the profits average between \$15,000 and \$20,000 monthly.

Isabella Gold Mining Company.—At the recent meeting of this company the following directors were elected: William Lennox, K. R. Babbitt, W. S. Jackson, E. W. Giddings and J. G. Shields. This is an entire change in the directorate, with the exception of Mr. Jackson. The choice of directors was unanimous, as the old management did not vote its stock. The new board elected Mr. Lennox president and Mr. Babbitt vice president and general counsel. Much satisfaction has been expressed in the change of control, and Mr. Williams and the entire former administration have offered to render any assistance they can to the new board. It is admitted that a great many unjust charges have been made against the former management of the mine.

Portland Mining Company.—The eighth annual report of this company states that the total development of the mine by drifts, tunnels and shafts has a length of over 20 miles. Of this 2,601 ft. represent the work of 1901. The total areas of the properties is over 200 acres, and includes 36 claims and fractions. The total net output, not counting reserve fund, as represented by 71 dividends, is \$4,207,080, being about one-third more than the capital stock. The 1901 gross output was 76,909 tons of ore of an average value per ton of \$31.30, and a gross value in gold and silver of \$2,408,413. For this year alone over \$625,999.67 was paid for treatment charges, and \$21,474 for freight. The deepest works are 1,100 ft. In conclusion, Superintendent Trevantham says: "The mine physically is in better condition by fully 50 per cent at present than it has been at any time during my connection with the company."

Vindicator Consolidated Gold Mining Company.—The company has issued splendid reports of the progress made at the mines last year and of the increase in the earnings and in the treasury reserve. The property is in excellent condition.

IDAHO.

IDAHO COUNTY.

(From Our Special Correspondent.)

Cracker Jack Mining and Milling Company.—The new 5-stamp mill will be hauled to Buffalo Hump as soon as possible. Development work at the mine is progressing, and the showing is reported very satisfactory.

Crooked River Mining and Milling Company.—The first car-load of machinery, comprising part of a 10-stamp mill for this company, has reached Stites. The property comprises a large group of free-milling quartz claims, placer and timber claims, and water rights, 11 miles south of Elk City, on the north side of Crooked River. A water-power plant will be installed this season with capacity to operate 20 stamps. A large amount of good ore is reported ready for extraction. Wm. Hogan, of Elk City, is manager.

Midas Gold Mining Company.—The 10-stamp mill at Dixie has been running since December 11. The ores are soft, and about 40 tons per day are run through. Jesse Coulter, who has had charge, is reported as saying the ores run \$10 per ton.

Wise Boy.—The machinery for a 10-stamp mill for this mine at Buffalo Hump is being freighted in. The property is about 2 miles north of the Big Buffalo on the same lead. The development work shows a large body, estimated to run \$50 per ton.

SHOSHONE COUNTY.

Mammoth Mining Company.—This company, it is said, has found ore west of the fault in the upper workings on the No. 3 level and again on the No. 4. The "throw" of the fault was much greater on the No. 4 than on the No. 3, and while it still continues down to the No. 5, there is no evidence of it on the No. 6 level, 600 ft. below. A cross-cut is now being run from the No. 2 level to hunt for it. Only a few cars of ore have yet been taken from the find. In the upper works generally the ore body runs from 5 to 12 ft. wide.

ILLINOIS.

SANGAMON COUNTY.

(From Our Special Correspondent.)

Cantrall Co-operative Coal Company.—This company is still idle on account of the fire in its mine, and it is hard to say when it will be able to resume.

Republic Iron and Steel Company.—This company's coal mine at Springfield has been shut down for a week finishing the installation of the tail rope plant, but will resume work again in a few days with the tail rope in operation.

MARYLAND.

HOWARD COUNTY.

Maryland Granite Company.—This company has installed a surfacing machine and employs about 125 men at the quarries at Guilford.

NORTH CAROLINA.

BURKE COUNTY.

(From Our Special Correspondent.)

An important outcrop 50 ft. wide is reported just opened, assaying \$738 gold per ton. This is on the land of J. L. Tasc. There is some excitement over the find, which will prove quite a bonanza if true.

MONTGOMERY COUNTY.

(From Our Special Correspondent.)

Iola.—This gold mine has been operating 3 Chilean mills for January with a result of \$5,600. It has a rich shoot of ore that has run into quick-sand and will suspend milling pending repairs to shaft.

Russell.—Parties from Kalamazoo, Mich., are making tests of the ore at this gold mine and examining it with a view of erecting a large plant.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Baltic.—The January output was 175 tons mineral, with 1 stamp in use.

Calumet & Hecla.—Several car-loads of machinery for the mine and for the stamp mills at Lake Linden have arrived. The steel work on the new electric power house at Lake Linden is completed and the Boston Bridge Company's force has returned to Boston.

Franklin.—All development work is confined to the Allouez conglomerate lode at the Junior branch. The output of this lode has gradually increased, and it is now furnishing nearly enough rock for 2 heads.

Lake Superior Smelting Company.—The Dollar Bay works are refining electrodes from Montana copper mines.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Arnold.—There is little likelihood of a resumption of active work on a large scale at this property, and the Ashbed, Humboldt and Meadow with copper selling at the present price. Developments on the Arnold Mine proper have been disappointing, and the management hopes to find the Owl Creek fissure vein at the Copper Falls branch.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Michigan.—The work of re-opening the old Minnesota Mine continues and rich ground is reported encountered carrying numerous masses ranging between 25 and 250 lbs.

Victoria.—Operations are still confined to the main shaft. Drifting is under way on the 6th, 8th, 10th and 12th levels. Several thousand tons of stamp rock, besides the mass and barrel copper, have been secured in the regular course of development.

IRON—MARQUETTE RANGE.

Cleveland Cliffs Iron Company.—The company has begun active work in its new Negaunee property, which is to be called the Maas. The land in the early days of the range was part of the holdings of the Pioneer Iron Company, that later sold it out to farmers without reserving the mineral rights. The Negaunee Mine was afterward found $\frac{1}{2}$ mile away, and the Regent group was opened. Mr. Maas 2 years ago got the land, and sunk drill holes. He gave an option to the Cleveland Cliffs Company, which put 5 drills on and sunk 16 holes, proving the find, and locating a large ore body. The working shaft will be in the foot wall, and will reach the solid ledge at 170 ft. Much of this distance will be through quicksand, and 6 large pumps are on the ground. The shaft will be 3-compartment and vertical, carrying 2 skips and a cage.

MINNESOTA.

(From Our Special Correspondent.)

The Eastern Railway of Minnesota is planning to materially increase its ore dock capacity. It now has a double dock 1,500 ft. long and will add 600 ft., giving 100 more pockets. The dock has a larger pocket capacity than any in the world, though its aggregate storage capacity is less than that of the Misabe road's No. 2 dock at Duluth. The addition will make a total storage of nearly 100,000 tons, the largest yet. The addition will cost about \$240,000 and will take 4,000 long piles and nearly 5,000,000 ft. of timber, most of which comes from Washington. The road expects to handle sufficient ore the coming season to require all its dock capacity.

New No. 4 dock, of the Duluth & Iron Range road, is well under way and will be completed by May 1. All the old dock has been torn away.

Minnesota Iron Company.—This company will probably erect a large ore crushing plant at its Two Harbor docks, in place of those at the Soudan and Pioneer mines which have a capacity of about 750 tons daily.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Explorations continue in section 36 T 59 R 17, where some lowans have been exploring all winter. They are still in the banded magnetite and are sinking one pit slowly.

Explorations are under way in the northwest corner of T 58 R 14, southeast of the Stevens Mine, where there are said to be indications of iron. The fee to 2,000 acres was bought by the exploring party for 50c. per acre.

East Itasca Mining Company.—This company, incorporators J. H. Pearce, G. H. Crosby, J. A. Wharton, W. H. Brooks and E. B. Hawkins, capital stock \$50,000, has been formed to explore and develop lands in Itasca County on the Mesabi range.

Interstate Mining Company.—This company, the Mesabi mining end of Jones & Laughlins, has let a contract for sinking a three-compartment shaft on its Grant Mine, in section 20 T 58 R 19, and expects to ship about 50,000 tons this year from there. The contract calls for a certain sum to be paid for ore delivered on surface, the contractor to pay all costs of developing and mining. The mine pays a 25c. royalty to the state school fund of Minnesota.

Kinney-Hawkins.—The ore on lands under control of Messrs. Kinney, Hawkins, Pearce and Crosby, of Duluth, located in section 32 T 57 R 22, has been sold for \$520,000 to a syndicate, rumored to be the McCormick Harvester Works. There are about 30,000,000 tons of ore in the property, including all that runs above 50 per cent iron, but this is the first time that ore as low as 50 per cent has figured in a Mesabi range transaction. There are some 8,000,000 tons of good ore. The Eastern Railway of Minnesota gets the haul, and will build a branch line at once. The find is about 12 miles s. w. of Hibbing and is the most westerly of all merchantable ores, so far opened. There is a royalty of 20 c. a ton to be paid the fee holders, who are lumbermen of Minneapolis, Ottawa and elsewhere.

Pickands, Mather & Company.—This firm has an option on an 80-acre tract in 32 T 58 R 20, which has been under lease to A. Maitland, of Negaunee, for \$125,000. Mr. Maitland has sunk a shaft 50 ft. into ore. It is believed the option will be closed. Additional exploration is likely to show much more than the comparatively small tonnage now proved.

Republic Iron and Steel Company.—This company's Franklin Mine is hoisting about 350 tons a day, and the Union, adjoining, about 450 tons. There are 400 men at the 2 mines and a large stock of ore is already out of the ground. The company is also working 60 men in a logging camp. Its Pettit Mine, near Bender, was flooded last week and is being pumped out. The company is sinking a shaft on its new property in section 14 T 58 R 19, and will work it in a small way this year. There are about 7,000,000 tons of ore of fair chemical character and excellent physical structure.

United States Steel Corporation.—It is probable that shipments from some of the largest mines will be curtailed and the difference made up from new mines and from smaller producers. The Fayal will probably not ship as last year, while the Hibbing shipments will be materially increased. The East Pillsbury, now named the Glen, will be a shipper; the Chisholm, which shipped about 50,000 tons last year, will produce more than 200,000 tons; the Burt will be a heavier shipper and will send out some ore from its proposed open pit, and the Rust and Hull will both ship heavily. The Sellers, idle last year, is mining for a large shipment.

MONTANA.

FERGUS COUNTY.

New Year Gold Mining Company.—This company's property is at New Year. Pending the completion of the new plant the old mill is running to its full capacity, 55 tons per day. With the starting of the aerial tramway 25 men were put to work. The tramway is conveying 17 tons of ore to the terminal at the mill every hour. It is the intention of the company to push work steadily, and when the entire plant is in full operation about 250 tons of ore, it is said, will be treated daily. The first clean up will be made on February 15. Many improvements have been made in the old mill, including much larger tanks, which materially decrease the cost of treating the ores. Three of these tanks have a capacity of 56 tons wet, while one is built to receive 85 tons. The new mill will contain 5 tanks, with a total capacity of 540 tons, 2 of them holding 150 tons apiece. The delay in the completion of this plant is due to the non-arrival of

important parts of its machinery. It is said that the ore in the New Year claims is almost perfect for treatment by the cyanide process, and can be handled at a cost of 40c. per ton.

FLATHEAD COUNTY.

(From Our Special Correspondent.)

Butte Oil Company.—The drill near the head of Kintla Lake is down 800 ft. It is some 60 miles from the railroad at Belton, necessitating building 40 miles of wagon road to take in machinery. The company has expended \$30,000 in preliminary work. J. O. Bender, of Butte, is general manager.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Ada.—From this property, 12 miles from Basin, at the head of Rocker Gulch, 400 tons of ore were shipped in January under the new lease held by Joseph Smith. Ten miners are employed. The shipments are sent to the Montana Ore Purchasing Smelter, at Butte. The ore is a heavy sulphide, carrying 2 to 5 per cent copper. The smelter makes a \$5 treatment rate on account of the iron excess. The property was first located in 1868 by Al. Axe and others. Some work was done from time to time since. The original partners of Axe dropped out. New partners becoming interested only to eventually give it up. In the early part of 1900 Axe deeded a 1/2-interest to Tim Downey, of Basin, for about \$50 worth of grub. L. Westgate, an old miner, took a lease of a 1-3 interest and took charge of development work. A prospecting shaft 4 ft. by 6 ft. was sunk to the 70-ft. level, the last 40 ft. through solid ore. A cross-cut at the bottom of the shaft exposed a body of solid ore free of waste 63 ft. wide. Drifts showed the ore to be about 60 ft. long, the shoot being cylindrical. At this stage of development several cash offerers were refused. Springfield, Mass., people secured it under a short time bond for \$200,000, with a substantial cash payment down, which went to Mr. Westgate for his leasehold interest. The easterners failed to come to time on the balance of the payments and the property reverted to the owners. Joseph Smith and associates then secured a lease to mine the ore exposed, paying a royalty of 75 per cent. A 400-ft. cross-cut tunnel was driven to tap the ore at about 136 ft., and the ore stopped. After mining this ore Mr. Smith secured a new lease at 25 per cent royalty. Further prospecting under the new lease discovered that the ore went down on the hanging wall side of the lead, where it is fully 6 ft. wide at present. Mr. Axe, after staying with this property for 34 years, is at present enjoying the balmy breezes of Southern California.

Eva May.—The Montana Mineral Land Development Company that has spent a deal of money developing this property, and building a concentrator seems to be in financial straits. The employees have had no pay for some months, and several merchants in Basin are creditors from \$500 up to \$7,000. The company has made an assignment to Manager Drakensfield. It is thought that the eastern stockholders will raise the required funds and continue work.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

The assay office at Helena during January received a larger amount of gold than during any January in its history. This county as usual contributed the largest proportion. The receipts were \$190,760, compared with \$159,425 for January, 1901.

SILVER BOW COUNTY.

Anaconda.—In the Supreme Court at Helena on February 7, the order issued by Judge Clancy, of the District Court, granting F. A. Heinze an order of survey and inspection of this mine, was stopped. The order gave the Heinze people their second writ of survey and inspection within 3 weeks. The order was to take effect immediately. The first granted to Heinze was also stayed, and the action is now pending. The Heinze attorneys are ordered by the Supreme Court to appear within 10 days and show cause why the order staying the lower court's writ of survey should not be made permanent.

NEVADA.

NYE COUNTY.

(From Our Special Correspondent.)

Salt Lake & Tonapah Mining Company.—The former owners have received \$21,000 as part payment on the Stone Cabin and Wandering Boy locations. The former joins the Valley View on the East and the latter on the West. Ore taken from the 100 ft. shaft of the Stone Cabin is reported to assay 178 ozs. silver and about 3 oz. gold per ton. The property is equipped with a gasoline hoist. W. H. Dickson, A. C. Ellis, O. J. Salisbury, David Keith, and Thomas Lynch, of Salt Lake, Utah, are the owners.

WHITE PINE COUNTY.

(From Our Special Correspondent.)

Cocomongo Mining District.—This district, some 7 miles south of Cherry Creek, is being developed rap-

idly. Prospectors have opened small veins of free-milling gold ore by open cuts and shallow workings. The country rock is quartzite, and the veins are quartz from 3 in. to 8 in. wide. Much coarse gold is visible in hand samples, and all mining is guided by panning. The ore is milled in the branch mill of the Glasgow & Western Company, some 15 miles distant. About 25 leasers are at work on a royalty of 20 per cent. of the gross output.

NEW HAMPSHIRE.

MERRIMAC COUNTY.

American Graphite Company.—This company, with mines in this county, is preparing to build a refining plant upon its property, and may erect a factory for the manufacture of paints, lubricants, etc., at Canton, Baltimore County, Md. It is backed by Baltimore capital. A tunnel 120 ft. long has been driven at the main mine.

NEW MEXICO.

TAOS COUNTY.

Wayne Arriba Mining Company.—This company, capitalized at \$1,250,000, comprised of George A. Kirker, president; Adelbert R. Lee, vice-president; Stanton Clarke, secretary and treasurer; Charles Howard, Charles L. Clark, Al. Diemmel, Thomas M. Lucking, all of Detroit, Mich., and Albert Royal, of Pueblo, Colo., is organized to develop mining property in the Bromide District, about 14 miles from Tres Piedras, where it has 4 claims, 2 of which are under development.

NEW YORK.

JEFFERSON COUNTY.

Sterling.—Modern machinery is being introduced at this old mine and the Dickson, near Antwerp, since the Sterling Iron and Mining Company took hold. W. J. Jamieson is general manager. Heavy scales for weighing car loads of ore have been put in, and a large ore crusher and compressed air drills are being installed. The mines will have electric lights.

OREGON.

BAKER COUNTY.

Perry & Rachel.—The cyanide plant of this property, operated by the Aurora Gold Mining Company, is about ready to start. The stamp mill and cyanide plant were recently removed from Baker City to the mine. The company has ordered a new pump for deeper sinking. The mine is near the Flagstaff in the Baker District.

JOSEPHINE COUNTY.

Gopher Gold Mining Company.—The owners and operators of the Gopher Mine, of Jump-Off-Joe District, have purchased the 5-stamp mill owned by Wright & Pike, in Grant's Pass, which has been used as a custom mill. The mill will shortly be doing service. The mine is said to show a 24-ft. ledge carrying values from wall to wall that average \$25 per ton in free gold and sulphurets. Mr. Dean is manager of the mine, which lies close to the Baby and the Lucky Queen Mines.

LANE COUNTY.

(From Our Special Correspondent.)

Boomers are getting ready to make a harvest through the proposed railroad from Cottage Grove to the mines, and many new stock companies are being organized. The railroad is said to be in the hands of Boston people, but no reliable information can be obtained locally as to its financial backing.

Black Butte.—The furnace at this quicksilver mine has closed down, owing, it is stated, to the foundation walls settling. Repairs cannot be made until spring. The plant has a capacity of 50 tons daily.

Bohemia District.—Practically no snow has fallen in the Bohemia mountains this winter. The Helena has the only operating mill in the camp this winter, the Noonday, Champion, Musick and Vesuvius mills are all closed down. The Grizzly group has been bonded to Spokane parties for \$15,000. The Laura group is being developed by the Le Roy Mining Company, a local concern.

PENNSYLVANIA.

BITUMINOUS COAL.

Porter Kinports, of Cherryhill, recently sold to Charles J. Langdon the "D" vein of coal on 210 acres of land in Susquehanna Township, Cambria County, the consideration being \$15,000. Considering the fact that only one vein has been sold, the price paid, about \$71 per acre, is the largest on record in the county.

Clearfield & Cosh Creek Coal and Coke Company.—At the recent annual meeting in Indiana the following directors were elected: T. D. Collins, Nebraska, Pa.; W. V. Hughs, Altoona; Henry Prothero and John P. Elkin, Indiana, and G. W. Hoover, Phillipsburg. The board organized by electing G. W. Hoover, president; Henry Prothero, vice-president, and John P. Elkin, secretary and treasurer. The company owns 2,100 acres in Banks and Montgomery Townships, and is mining and shipping coal from 2 mines near Glen Campbell. It has a capital stock of \$75,000.

SOUTH DAKOTA.

LAWRENCE COUNTY.

Deadwood & Delaware Smelting Company.—Suits have been instituted against this company, and the Golden Reward Mining and Milling Company for damages to property from the smoke and fumes of the smelter in the lower part of Deadwood. There are eight suits against each company, aggregating \$25,000. The damages asked range in amount from \$800 to \$6,000, it being alleged that the smoke has killed the vegetation on the property, thereby causing a depreciation in value, and that it is also detrimental to the health of the plaintiffs. The Golden Reward Company purchased the smelter of the Deadwood & Delaware Company several years ago.

UTAH.

(From Our Special Correspondent.)

Salt Lake Bullion Settlements.—The lead bullion containing gold and silver shipped East to refineries by the Salt Lake Valley smelters for the week ending February 1 was valued at \$70,800. During the same period the banks made settlement on copper bullion amounting to \$5,200; gold bars, \$9,200; auro cyanides, \$7,000.

BEAVER COUNTY.

Francisco Mining and Milling Company.—This company held its annual election at Elsinore a few days ago, about 3-5ths of the stock being represented. The old board was re-elected, as follows: D. P. Jensen, president; Erastus F. Marquardson, vice-president; Dan Hansen, secretary; Thomas Fouts, treasurer; and these, with Albert Olsen, Henry C. Larsen and Hans Johnson, complete the directorate. A shaft has been sunk 51 ft.

(From Our Special Correspondent.)

Copper Ranch.—The shaft on this property, not far from Frisco, is down 275 ft. in copper ore.

Horn Silver.—This company has been reserving its copper ore for a better market. For the week ending February 1, 320,860 lbs. of silver-lead ore were shipped to the Salt Lake smelters.

Majestic.—This company, owning the O. K. copper mine near Frisco, is contemplating putting up a Vulcan furnace of 100 tons capacity near the property. F. M. Hubbell, the representative of the Vulcan Smelting and Refining Company, San Francisco, Cal., has been investigating conditions at the mine.

IRON COUNTY.

(From Our Special Correspondent.)

Ophir.—The new mill at Stateline is closed for lack of water, but this has not affected the working of the mine. An increased force of men is doing development work. The mill, capable of treating by the Russell process 100 tons of ore daily, is equipped with a Gates rotary rock crusher, a revolving dryer, 2 14 by 26 in. Gates rolls, a 15 by 36 in. roll, 4 revolving screens and 2 White & Howell roasters. The engine room contains a 150 h. p. Corliss engine, a 10-drill air compressor, and an engine for the dynamo that lights the mine and mill. Two 80 h. p. boilers furnish steam.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—Following are the shipments of ore to the Salt Lake smelters for the week ending February 1: Carisa, 4 cars; Gemini, 11 cars; Godiva, 2 cars; Lower Mammoth, 2 cars; Mammoth, 5 cars; May Day, 2 cars; Star Consolidated, 1 car; Tesora, 3 cars; Uncle Sam Consolidated, 5 cars; Victor, 8 cars; Yankee Consolidated, 6 cars; Mammoth Mill, 3 cars of concentrates; Tesora Mill, 3 cars of concentrates; Swansea, 15 cars of ore; Total, 70 cars.

Black Jack Mining Company.—This company owning property near Mammoth and controlled by Evans & Knight, has opened some good looking quartz. The claims adjoin the Lower Mammoth and Ajax.

Boston & Tintic.—This property near Eureka in its north drift on the 170 ft. level has a 6-in. streak of ore reported to carry 71.2 oz. silver, .04 oz. gold, and at the side of the streak 2 ft. of fair concentrating ore.

PIUTE COUNTY.

(From Our Special Correspondent.)

Annie Laurie.—Since the additions of machinery to the cyanide plant of this company, near Marysvale, the gold ore treated in the mill has averaged 260 tons per day. Six Columbia shaking screens lately installed, made by the Jeffrey Manufacturing Company, of Columbus, Ohio, are giving satisfaction. Superintendent Rader expects to increase the capacity of the mill to 500 tons daily.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—The following ore was shipped from Bingham to the Salt Lake smelters for the week ending February 1: Queen Mill, 102,740 lbs.; Northern Light, 44,640 lbs.; Redwing, 145,100 lbs.; New England, 51,180 lbs.

Butterfield.—Another lot of concentrates of about 100 tons is to be forwarded from Bingham to the smelter. During the week ending February 1, 157,070 lbs. concentrates were sent to Salt Lake City. The properties are in better condition than ever. An expert from Paris, France, where the stock is largely held, is looking into conditions at the property.

Commercial.—Leasers on this property, which has been producing 150 tons of ore daily, have suspended operations. The ore carried gold, silver, lead, and copper, and has been a paying proposition.

Grizzly.—This property at Alta for the two weeks ending February 1, shipped 105,340 lbs. of silver-lead ore.

Highland Boy Consolidated Mining Company.—This company expects to market a trial lot of ore from the Parnell Group at Bingham. A strike of 12 in., assaying 1½ oz. gold, 30 oz. silver, and 8 per cent copper, was lately encountered.

Miner's Dream.—Under the management of the Bingham Consolidated property at Bingham is developing a large body of lead, silver, and copper ore.

Silver Shield.—The opening of this property at Bingham through a tunnel on Niagara ground, belonging to the United States Company, is to be accomplished by driving the breast of the Franklin Tunnel a few hundred feet. The company has shipped considerable ore and paid several dividends last year.

Yosemite.—From this mine at Alta 52,700 lbs. of ore were shipped to Salt Lake during the week ending February 1.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—The following are the shipments of ore for the week ending February 1: Quincy, 1,255,370 lbs.; Anchor, 418,100 lbs.; Daly-West, 952,100 lbs.; Ontario, 1,187,990 lbs.; Silver King, 1,519,940 lbs.

Wabash.—A controlling interest in this property adjoining the Ontario at Park City was recently sold to J. A. Creighton, of Omaha, Neb., after an exhaustive examination by W. Wishon, of Butte, Mont.

TOOELE COUNTY.

(From Our Special Correspondent.)

Stockton Shipments.—Following are the ore shipments from Stockton to Salt Lake City smelters for the week ending February 1: Hidden Treasure, 84,340 lbs.; East Honorine, 85,320 lbs.; Cygnet, 41,340 lbs.; Ophir, 422,600 lbs. Total, 633,600 lbs.

WASHINGTON COUNTY.

(From Our Special Correspondent.)

Utah & Eastern Mining Company.—This company owning the Dixie Mine, near St. George, closed down its copper furnace early in January. The furnace is a small one and expensive to operate. To get a larger plant, Grant Snyder, the general manager, has been in Connecticut conferring with the owners.

TENNESSEE.

POLK COUNTY.

Tennessee Copper Company.—At the annual meeting held in Jersey City, the number of directors was increased from 7 to 9 and 2 new directors elected to fill the places created. The old board, composed of A. C. Burrage, Leonard Lewisohn, Adolph Lewisohn, Edgar Buffum, Frederick Lewisohn, H. H. Rogers and J. P. Channing, was re-elected.

VIRGINIA.

TAZEWELL COUNTY.

Faraday.—This coal and coke company, composed principally of capitalists from Pittsburgh, Pa., has purchased about 23,000 acres of valuable coal and timber lands in Tazewell County, and in McDowell County, W. Va. The greater portion of this land is reported underlaid with coal.

Virginia Pocahontas Coal Company.—This company has been organized at Bristol. It will open and operate coal fields in Southwest Virginia, and prepare for the market iron, coal, stone, clay, and timber. The charter specifies that the capital shall be from \$25,000 to \$500,000. T. P. Trigg, of Abingdon, has been elected president.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

The outlook for Republic is brighter than at any time in its history. Attorneys and engineers of the Washington & Great Northern and the Kettle Valley railroad companies met recently and signed an agreement by which all matters in controversy were ended. There seems now nothing to prevent both roads being completed before winter passes. The Kettle Valley Lines has finished its grade up the west side, and the Washington & Great Northern is grading up the east side of Eureka Gulch. By the time the roads are completed all the producing mines will probably be running.

The Washington & Great Northern Railway is constructing a switch from its line up Eureka Gulch to pass under the west side chutes of the Lone Pine ore

bin, and the Kettle Valley Lines will run its switch under the chutes on the east side of the bin.

Copper Queen.—A new shaft will be sunk.

Gold Ledge.—The tunnel is in 832 ft., with no vein yet reported in sight.

Lone Pine-Surprise.—The upraise from the No. 3 Lone Pine tunnel lead has been holed through and the pay shoot substantially proved over 290 ft. in length and 183 ft. in depth. The average width is about 12 ft. The quartz extracted in raising was daily sampled and the superintendent says it runs close to \$20 per ton. The company intends continuing the No. 2 tunnel, about 145 ft to connect with a winze above for ventilation. As soon as railroad transportation can be had a 10-drill air compressor and power drills will be brought in, as also a hoist, to be installed in the tunnel, when a shaft will be started on the vein.

Park & Central.—The company expects to resume work about March 1.

Monroe.—The tunnel is in about 200 ft.

Tom Thumb.—M. Downey, the superintendent, has returned from Spokane, and will resume work, building ore bins and sinking the main shaft.

Trade Dollar.—The working force now numbers 15 men. The north drift is in 118 ft, the south drift is in 82 ft., with the vein yielding good shipping ore.

WEST VIRGINIA.

MACDOWELL COUNTY.

Pearl Coal Company.—This company is to operate coal lands on the Norfolk & Western Railway. The officers are: John A. Clark, of Fairmount, W. Va., president; J. E. Sands, of Fairmount, vice-president; C. S. Sands, of Clarksburg, treasurer; C. D. Junkins, of Fairmount, manager, and T. O'Ferrall, general manager. There are five operations under the management of the company. They are the Pearl, the Camp Branch, the Freeport, the Olympia and the Union. The offices of the company will be at Dingess.

WYOMING.

UINTA COUNTY.

Wolverine.—A rich strike of copper is reported in this mine, at Pearl, owned by the Coldwater Copper Mining Company, consisting of 4 ft. of ore, carbonates, oxides, sulphides and native copper. Average tests are said to show copper values of over 30 per cent, and the vein has been opened for over 30 ft. The ore is being saved for shipment to the Encampment smelter. E. S. Drury, of Encampment, is vice-president and manager of the company.

FREMONT COUNTY.

Carrisa.—This gold mine, at South Pass, is reported sold to a Chicago syndicate, headed by Henry M. Ryan. The mine has been operated many years. In early days a fortune was taken from the mine in 3 years. During the 25 years following very little was done. During 1898, 1899 and 1900 the mine again became a producer of gold bullion. The mine has been handicapped by lack of transportation, the nearest railroad being over 80 miles away.

FOREIGN MINING NEWS.

AUSTRALIA.

NEW SOUTH WALES.

Broken Hill Proprietary Company.—For the four weeks ending January 29 the report shows that the refinery produced 410,057 oz. silver, 5,193 tons lead and 36 tons hard or antimonial lead.

QUEENSLAND.

Mount Morgan Gold Mining Company.—This company reports for December 20,306 tons of ore treated, the yield being 9,791 oz. gold; an average of 0.48 oz. per ton.

CANADA.

BRITISH COLUMBIA.

Discovery Gold Mining Company of British Columbia of New York.—This company has been incorporated under New York law, with a capital stock of \$300,000. Among those interested in the new company are said to be: Leicester A. Bonner, president of the Caribou Gold Fields, Limited, and A. E. Allison, of British Columbia; John D. Hage, Robert Logie, Alexander M. Sutherland and E. W. Moister, of New York City; Benjamin P. Morris, of Long Branch, N. J.; William Braunstein, of Union Hill, N. J., and C. H. Porter, of Albany, N. Y. The company has been organized to purchase, lease and sell mining properties, to deal in real estate, securities, etc., to become a construction company to build dams, ditches, flumes and reservoirs for mining purposes and to deal in machinery. The syndicate some time ago acquired the Jack o' Clubs properties, about 3 miles from William's Creek.

ONTARIO—RENFREW COUNTY.

Ontario Graphite Company.—This company has completed its mill on Whitefish Lake. The building is 46 by 87 ft., and 4 stories high. The company is developing power on the Madawaska River, for operating the mill.

ONTARIO—SEINE RIVER DISTRICT.

(From Our Special Correspondent.)

A L 282.—This property, in the Island Falls section, has been secured from the Hammond Estate by P. L. Kimberley, J. L. Greatsinger, A. R. Flower and others, and will be developed. The same parties will open the Tiptop copper property near Round Lake.

British Ontario Gold Mines Company.—This concern, which 2 years ago bought the Foley Mine in Mine Center, is re-opening it and has about 25 men employed.

Golden Star.—About 40 men are at work and are said to be meeting satisfactory results. A find of good ore is reported.

Zenith.—About 2,000 tons of black-jack will be mined this winter and hauled to the lake for summer shipment to Belgium. This ore runs about 55 per cent zinc.

EUROPE.

GREAT BRITAIN.

St. David's Gold and Copper Company.—This company reports for the month of December 50 stamps running at its mine in Wales. The ore crushed was 1,539 tons, and the yield was 840 oz. gold; an average of 0.55 oz. to the ton.

MEXICO.

CHIHUAHUA.

(From Our Special Correspondent.)

The 150-ton mill of Angel Garcia will soon be in active operation.

Union Mill.—Machinery for this plant at Parral is arriving.

NUEVO LEON.

Mexican Mining and Smelting Company.—It is stated that this company, recently organized with a capital of \$10,000,000 (gold), is making active preparations for constructing a smelter plant in the City of Monterey. The company, it is said, also proposes to develop mines throughout Nuevo Leon and other parts of Mexico. The directorate contains the names of Thomas H. Watkins, Clarence D. Simpson, Walter H. Devereux, J. Roger Maxwell, Thomas L. Lawson, Samuel F. Peters, Walter H. Stow, Henry H. Hollister, G. C. W. Dowery, E. C. Snipley and C. F. Jones.

SONORA.

(From Our Special Correspondent.)

Kansas City & Sonora Mining Company.—The 10-stamp Boss process mill at Gabilan started running about February 1. The property, of which W. Simpson is general manager, comprises 5 claims, rich in silver bearing ores.

Sonora Mining and Milling Company.—This company recently purchased the continuation of the Tubutama copper property. Work is progressing favorably on the new smelter, which will blow in some time during April.

Venice Copper Company.—A 42-in. water jacket smelter is to be erected in the town of Soyopa, 1½ miles from the mines. The necessary machinery was recently purchased by Ben T. Scott, general manager, and will be on the ground inside of 60 days. The company owns several claims, aggregating 120 pertenencias. Upon one it has opened up large bodies of sulphide copper ores, carrying good values in gold and silver.

NEW CALEDONIA.

Exports from the colony in November included 8,886 tons of nickel ore, of which 1,712 tons went to Great Britain, 2,740 tons to Germany and 4,434 tons to France. Exports of cobalt ore were 166 tons, of which 98 tons went to Great Britain and 68 tons to Australia. Exports of chrome ore were 2,299 tons, 1,255 tons going to Australia and 1,044 tons to the United States. The copper ore shipped was 405 tons, all to Australia.

NEW ZEALAND.

The Mines Department reports the exports of gold and silver from New Zealand for November and the 11 months ending November 30, as below, in ounces:

	—Gold—		—Silver—	
	1900.	1901.	1900.	1901.
November	19,739	39,185	33,274	55,679
Eleven months	337,985	410,323	278,404	466,793

The increase in gold shown in 1901 was 72,338 oz., or 21.4 per cent; in silver, 188,389 oz., or 67.3 per cent. The gold exported in 1901 was equal to 371,977 oz. fine gold, or \$7,688,763.

SOUTH AMERICA.

BRITISH GUIANA.

The Department of Mines reports for the month of December that the gold mined in the colony on which royalty was paid was 12,588 oz. In December, 1900, the total was 14,363 oz., showing a decrease this year of 1,875 oz., or 14.8 per cent.

The total gold yield for the year 1901, reported by the Mines Department, was 102,258 oz., against 113,749 oz. in 1900; showing a decrease of 11,491 oz., or .01 per cent. last year.

MINING STOCKS.

New York.

Feb. 14.

Copper shares show smaller trading, which is purely speculative. The bearish element was awakened by the reports that insiders in Amalgamated had again become sellers. As a result this stock fell from \$73½ the high price on Monday, to \$69½ on Thursday. Anaconda was sympathetically weak, selling off from \$34 to \$32½, but transactions were small.

On curb Green Consolidated, of Mexico, sold at \$29 @ \$26½; Tennessee at \$13¼ @ \$14; British Columbia at \$8½, and Union, of North Carolina, at \$3¾ @ \$3½.

The California and Colorado gold stocks were quiet. In the Cripple Creek list Isabella moved at 29c., and Anaconda at 30c. A sale of Small Hopes was made at 39c and later at 37c.

Iron Silver, of Leadville, Colo., is in request at 65c., but holders ask 70c. Proxies are being solicited by the management for the meeting on March 4, when the sale of the property to the New Jersey Zinc Company will be voted upon. The offer made is \$350,000 for the Moyer Mine, including the Sierra Nevada and Gardner lode claims, and some 30,000 tons zinc tailings. Some stockholders are severely opposed to the deal, since the Moyer Mine is the main source of income to the company, and has yielded \$2,550,000 in dividends, the last being paid in December, 1900. The operations during the year ended December 31, 1901, showed a net profit of \$42,848. Adding this to the \$54,289 held on January 1, 1901, makes a total surplus on January 1, 1902, of \$97,137, which, if divided, would yield over 19c. per share.

Of the Comstocks, Consolidated California was higher, at \$1.35. Other sales were: Ophir, 88c.; Mexican, 34c., and Best & Belcher, 25c.

The mid-week holiday has left the market featureless, and unless something unforeseen happens trading will be of a desultory nature for a while.

Boston.

Feb. 12.

(From Our Special Correspondent.)

Less interest was taken in the copper share market than the previous week, and as a result prices have yielded materially with few exceptions.

Tri-mountain maintains its strength around \$74, and the Dominion securities have been features. Dominion Coal touched \$73, a net advance of \$2½ during the week, and Dominion Iron and Steel touched \$33¾. Centennial sold off \$1¼ to \$11¼ as a result of closing down. There has been no particular feature in the market outside of the general weakness. Osceola has lost \$3 to \$82, and Tamarack \$10 to \$255. Utah has yielded \$1½ to \$25, Mohawk \$2 to \$34. Franklin \$1 to \$14½, Parrot \$1¼ to \$31¼, Wolverine \$1½ to \$59¼ and Baltic \$1½ to \$39. There has been considerable activity in Consolidated Mercur and in Montreal & Boston mining shares, but little variation in prices has occurred. Guanajuato slipped off to \$3¼ on large offerings of stock.

Old Dominion mining affairs promise excitement. The firm of Towle & Fitzgerald claim to control over 10,000 shares, and they have had various interests take hold with them, so that in all probability a change will be made in the management at the annual meeting in April. Several mining reports for the year have been issued, namely the Quincy, Mass., Tri-mountain and Rhode Island. The Quincy shows a surplus of \$1,082,360 carried over above all expenses, dividends and depreciations. The current excess of assets above liabilities is \$164,406. The Mass. Con. report shows a balance of \$96,880 carried over. These changes were made in the Mass. Con. board: Messrs. F. H. Begole, C. H. Bennet and B. T. Cable, succeeding T. F. Cole, S. Harwood and A. Mathews. The annual meeting of the Tri-mountain Mining Company was held and one change made in the board, B. N. Hamlin succeeding E. L. Clark, resigned. A balance of \$9,310 is shown above operating charges. Expenses were \$568,760, but the company received no returns from the smelter. It commenced to mill rock January 3, and has treated 14,000 tons. The company has \$200,000 assessment money coming due this spring. Yankee Consolidated Mining, of Utah, is expected to be listed in this market. The properties are at Tintic, Utah. The stock is traded in at Salt Lake City and is quoted about \$2.25. It pays 5c. per month. The Franklin Mine has suspended operations at No. 1 Junior shaft, owing to the lean rock. Poor Cochiti sold at 50c. per share this week. It has sold close to \$22 per share. Late advices from the property state that a receiver has been appointed. An effort will be made to pull the company out of a hole by annexing adjoining properties. United Verde Extension is to be reorganized under the laws of Maine with \$3,000,000 capital, par \$10. Forty thousand shares will be offered at 60c. per share. One new share will be given for 5 old in the reorganization. The annual report of the Rhode Island Copper Company shows an unexpended balance of \$31,415. An assessment is expected on this stock later on. The Shawmut Mining Company will be reorganized and stock assessed up to 50c. per share.

Under the Copper Range consolidation 96,406 shares of Baltic and 98,714 shares of Copper Range were deposited. The new stock, it is expected, will be issued soon.

Salt Lake.

Feb. 8.

(From Our Special Correspondent.)

The week on the Stock Exchange was devoid of activity. Transactions, which included the open board, are represented by sales of 534,410 shares valued at \$208,831. The principal stocks dealt in were Ajax, Carisa, May Day, Star Consolidated, Uncle Sam, Victor and California.

The Northern Light Mining Company of Mercur calls for an assessment of 2c. per share of \$8,000, delinquent March 10.

The Yankee Consolidated of Tintic has posted a dividend of 5c. per share, or \$25,000. The books close on February 22 with the distribution following March 1.

The May Day Mining Company of Tintic will pay a dividend February 20 of 1c. a share, or \$4,000.

Shareholders of the Blackbird Mining Company, developing copper claims near Salmon City, Id., and near Frisco, Utah, have elected P. A. H. Franklin, president; C. J. North, of Buffalo, N. Y., vice-president; John E. Dubois, of Dubois, Pa., treasurer; L. A. Amsden, secretary. H. V. Van Pelt, Oliver Heyward and C. H. Fowler, of New York City, were made directors.

At a meeting held February 8 for the reorganization of the Consolidated Mercur Mines Company the following officers and directors were elected: John Dern, president; E. H. Airis, vice-president; G. H. Dern, treasurer and general manager; W. H. Cunningham, secretary; Arthur W. Chesterton, of Boston; John Heimrich and Ed. T. McLaughlin, of Jersey City.

San Francisco.

Feb. 8.

(From Our Special Correspondent.)

The stock market has been only moderately active this week, and the demand for the south end Comstocks has fallen off a little. The chief feature in the trading has been Silver Hill, which was run up to 80c., with a reaction of 10c. later in the week.

Some quotations noted are: Consolidated California & Virginia, \$1.25; Ophir, 83c.; Silver Hill, 70c. @ 80c.; Caledonia, 32c. @ 33c.; Best & Belcher, 26c. @ 27c.; Mexican, 29c.; Hale & Norcross, 27c.; Gould & Curry, 14c. The heaviest trading was in Silver Hill, Best & Belcher, Caledonia and Gould & Curry.

On the Producers' Oil Exchange trading has been more active with quotations firmer. A good deal of interest was shown during the week. Some prices noted are: Peerless, \$6.25 @ \$6.50; Home, \$3.75 @ \$3.80; Twenty-eight, \$1.50; Sterling, \$1.15 @ \$1.20; Central Point Consolidated, 90c.; Independence, 8c.; Lion, 7c.; Petroleum Center, 5 @ 6c. There was more demand for the higher-priced stocks than for several weeks past.

London.

Jan. 31.

(From Our Special Correspondent.)

There has again been a great deal of activity in South African shares of all kinds this week. At the settlement day early in the week the amount of business to be transacted was tremendous and the crush reminded one of the old days when booms were on. The market in the street after exchange hours has also been very active. Quotations have still further advanced, though now and then profit-taking checks the onward tide. A good deal of attention is being given to shares in diamond companies that have hitherto not been very successful, for it is expected that under the new government the labor and other conditions will be more favorable.

The revival of South Africans has induced some of the houses to introduce new propositions to the public. The firm of Albu are offering for sale a large block of shares in their General Mining and Finance Company at a substantial premium. These shares are not treasury shares, but belong to the firm and their friends, so that no new capital will thus be obtained for the company. The transaction is only an extensive unloading on the public, though as a matter of fact the money obtained will go toward developing the firm's interests in South Africa. The chief mine controlled by the company is the Meyer & Charlton, which was the first to recommence operations after the war and the chief holders belong to the circle of the Dresdener Bank.

The West Australian market has been once more mystified by a change in the management of one of the leading mines. This time it is Lake View Consols, from the management of which Mr. Hartman has resigned. The control of the company has been changed twice during the past year for, firstly, the Whitaker Wright influence was removed and a month or two ago Mr. Rose resigned the chairmanship to be succeeded by Mr. F. A. Govett, a London stockbroker. Mr. Mackinnon was manager under Whitaker Wright control, and Mr. Hartman under Mr. Rose's chairmanship. Mr. Govett has recently ar-

rived in West Australia, and Mr. Hartman's management has terminated concurrently. It will be remembered that Mr. Mackinnon and Mr. Hartman had divergent views as to ore in sight. It is now announced that Mr. Govett has placed the management in the hands of Bewick, Moring & Company, and I am informed that Mr. Feldtmann and Mr. H. C. Hoover are to examine the mine on behalf of the firm and report as to the prospects and future method of development. This appointment is well received in London, for both these gentlemen are well known authorities, and it is to be hoped that the mine has now got to the end of its troubles.

The feature of the West Australian market has been the activity in Great Boulder Perseverance, the company working at Kalgoorlie and controlled by Mr. Frank Gardner. The mine seems in pretty good shape for paying dividends in the near future, but the chief cause of the boom has been the appointment of Sir Christopher Furness to the directorate. Sir Christopher has hitherto confined his attention to iron and steel shipbuilding and ship-owning, and it is surprising to find him concerned in gold mining. It may be mentioned as a matter not generally known in this country that Mr. Frank Gardner and Mr. Davison Dalziel (of Dalziel's News Company) have for some years been Sir Christopher's advisers on the subject of company promotion and have been at the back of all the flotations of his iron, coal and ship-building companies.

Prospectuses of the Montezuma Gold Mining and Milling Corporation are being circulated privately in England with an invitation to take up 20,000 shares of \$5 each at par. The property is located at Barnes City, Colo., and the mining man on whose report the prospect is based is Mr. James Freeman, of Howard, Colo. The circular that is sent out is very vague in its statements and practically no information whatever is given with regard to the mine. Perhaps some of your local readers can give you some information about the property.

I have often mentioned the Foreign Syndicate, a company which has introduced all sorts of wild-cat mining propositions from America and unloaded on an unsuspecting public by means of private circulars. The syndicate is now very actively pushing the shares of the Boston Liquid Air, Power and Automobile Company and of an English company about to be registered to carry on similar business in England. The company has a carriage on view that is supposed to be driven by liquid air, but no public demonstration of its capabilities has been given. No doubt a few subscriptions will dribble in, and then we shall hear no more about the company. People who subscribe obtain shares in American companies, and they have no means when dissatisfied of co-operating with others in the same position. The only possible way of finding each other would be by means of advertising in the financial papers, but as nobody who subscribes for such rubbish ever reads the financial papers, even this method would be of no avail.

DIVIDENDS.

Name of Company.	—Latest Dividend—		Total to Date.
	Per Share.	Per Date.	
Am. Coal, Md.	1.25	Mar. 1	1,207,500
Cambria Steel, Pa.	.75	Feb. 15	4,590,000
*Central Lead, Mo.	.50	Feb. 15	277,000
Central Oil, W. Va.	.25	Feb. 1	82,500
*Colo. Fuel & L. pf.	4.00	Feb. 20	1,400,000
*Daily West, Utah	.40	Feb. 15	1,327,500
*Empire State, Ida.	.05	Feb. 15	1,308,892
Esperanza, Mex.	4.43	Feb. 1	946,920
*Gwin, Cal.	.05	Feb. 17	281,500
*Jeff. & Clearf. C. & L. pf.	2.50	Feb. 15	487,500
May Day, Utah	.01	Feb. 20	4,000
*Modoc, Colo.	.01	Feb. 18	5,000
*New Leadville Home, Colo.	.005	Feb. 20	265,500
*N. J. Zinc	3.00	Feb. 15	3,900,000
N. J. Zinc, extra	15.00	Feb. 15	400,000
*Quincy, Mich.	4.00	Feb. 15	13,270,000
*Quincy, Utah	1.00	Feb. 15	975,000
*Standard, Con., Cal.	.10	Feb. 24	4,053,297
*U. S. Steel, com.	1.00	Mar. 21	15,227,812
Yankee, Con., Utah	.05	Mar. 1	50,000

*Monthly. †Quarterly. ‡Semi-annual.

ASSESSMENTS.

Name of Company.	Loca- tion No.	Delinq.	Sale.	Am't.
Alaska	Utah	Feb. 7	Feb. 27	.02
Alpha Con.	Utah	Jan. 27	Feb. 20	.03
Andes	Utah	Feb. 10	Mar. 18	.05
Annandale	Utah	Feb. 15	Mar. 12	.004
App Con.	Cal.	Feb. 6	Mar. 5	1.00
Best & Belcher	Utah	Feb. 3	Feb. 28	.15
Boss Tweed	Utah	Feb. 7	Feb. 24	.01
Challenge Con.	Utah	Feb. 9	Mar. 5	.05
East Honerine	Utah	Feb. 12	Feb. 28	.004
Emerald	Utah	Feb. 15	Mar. 12	.004
Garibaldi	Cal.	Jan. 21	Feb. 15	.012
Gould & Curry	Utah	Feb. 2	Feb. 24	.10
Lady Washington	Utah	Feb. 23	Mar. 20	.03
Martha Washington	Utah	Jan. 25	Feb. 17	.01
Minnie	Utah	Feb. 22	Mar. 25	.001
Orient	Utah	Feb. 15	Mar. 15	.004
Savage	Utah	Feb. 2	Feb. 27	.05
Shower Con.	Utah	Feb. 3	Feb. 24	.02
Skylark	Utah	Feb. 10	Feb. 26	.004
Tintic Copper King	Utah	Feb. 5	Mar. 5	.004
Union Con.	Utah	Jan. 31	Feb. 24	.10
Utah	Utah	Mar. 1	Mar. 25	.05
West Morning Glory	Utah	Feb. 10	Mar. 8	.01
Yellow Jacket	Utah	Feb. 8	Mar. 18	.10
Yuba Con.	Cal.	Jan. 27	Feb. 17	.03

COAL TRADE REVIEW.

New York.

Feb. 14.

ANTHRACITE.

Cold weather still prevails in all regions where anthracite is used. Retail buying is active, and wholesale trade is good. The steam sizes and chestnut are most wanted, and none of the great producing companies have any surplus of these sizes. The outlook favors a good demand into March, for many consumers who laid in light winter supplies are now forced to buy again. A February cold wave affects the market more than one in January. Dealers hesitate to lay in large supplies with the prospect of a drop in prices on April 1, and buying is therefore largely for immediate needs. It is too early as yet to make any prediction on April prices, but probably last year's price list will not be the basis, unless the labor situation at the collieries is clearer. The United Mine Workers will announce their demands at a meeting to be held in March. It is safe to say that the matter of card inspection will come up at that meeting, and if the union asks that operators permit card inspection to suit the convenience of union officials, the demand will be refused. Many of the prominent men in the Temple Iron Company realize that conditions this spring are not what they were in the fall of 1900, and rather than submit to all manner of interference with the running of collieries will make a firm stand and fight, if necessary, to a finish. Even the leading light of the Civic Federation might find trouble in patching up any compromise that called for a minimum wage or a fixed rate per ton for mining at all collieries in the same field.

In the Northwest there is a good steady winter demand, and coal is going freely from the docks at the head of the lakes. In Chicago territory trade is brisk, and chestnut coal is in particular demand. Arrivals of all-rail coal have been fair, and shipments from the docks are liberal. Buying by dealers is for immediate wants owing to the prospect of a new price list on April 1. Demand at the lower lake points and in Canadian territory is strong and active, and the small sizes are hard to get for prompt delivery. All-rail trade further East is taking a lot of coal. Along the Atlantic seaboard buying has been brisk, and the coal dealer is a happy man. Generally speaking there is no scarcity of coal, but the demand takes all that comes forward. The steam sizes are in rather short supply. We quote current prices for free-burning white ash f. o. b. New York harbor ports as follows: Broken, \$4; egg, \$4.25; stove and nut, \$4.50; pea \$3; buckwheat \$2.50.

BITUMINOUS.

There is little change in the Atlantic seaboard bituminous trade. Car supply is reported better for the poorer grades of coal than for the high grades. The large 50-ton steel hopper cars are in better supply than wooden cars, and as many collieries are not ready for the high cars, their increase does not help producers much as yet. The lower grades of coal are in better supply, and we hear of sales at \$2.60 f. o. b. New York harbor shipping port, but such coal is of the very poorest sort. In fact little can be said of it, except that it is black. The higher grades are just as scarce for prompt delivery as they have been, a rather remarkable state of affairs for the middle of February.

As regards new business we hear of one or two little contracts closed on a mine-price basis, and at the same figures as last year. The railroads have not yet named through tidewater charges, so mine prices are the only basis available for making new contracts, and mine prices are objectionable to both producers and consumers.

In the far East considerable coal is wanted. Ice blockades, however, are interfering with shipments. Both Philadelphia and Baltimore are practically closed, and at Newport News vessels get in and clear with difficulty. Trade along Long Island Sound is calling for more of the better grades than producers can supply. The poorer grades are easier to get, and are used in place of the better grades as far as possible. At New York harbor points vessels and barges are more or less bothered by ice. Demand is fairly good. All-rail trade needs coal badly, as producers have cut shipments to a minimum.

Transportation from the mines to tidewater has been impeded by snow and cold weather, and is, naturally slower. Car supply at the mines ranges from 25 per cent to 50 per cent of the demand, and seems to vary according to the region. In the coastwise vessel market there is little going on. A lot of vessels are tied up on account of ice, and practically none are offering charters. Coastwise freight rates are about the same as last week. We quote as follows: From Philadelphia: Providence, New Bedford and Long Island Sound, 90c.; Boston, Salem and Portland, \$1; Portsmouth, \$1.05.

Birmingham.

Feb. 10.

(From Our Special Correspondent.)

The coal production in Alabama continues heavy and the demand unprecedented. There is need for more

coal and the operators are leaving no effort undone to meet the business.

During the past week C. E. Buek & Co., operators of the Trussville Furnace, bought the properties and good will of the Graves Coal and Railroad Company. The properties of the latter concern consist of a big coal mine and appurtenances several miles out from Birmingham and about 15 miles from Trussville. It is the intention of Buek & Co. to mine coal and coke it for their own use. The deal was consummated through Mr. P. G. Shook, of this city, and the new owners have already taken charge of the properties and are making preparations to increase the production.

There has been no change in the coal prices in this district and none are expected. The demand from the railroads continues heavy, the iron highways being busy in all kinds of traffic.

Chicago.

Feb. 11.

(From Our Special Correspondent.)

The soft coal market is very firm, and prices are practically unchanged from those of last week: Birdseye cannel, \$5.50; West Virginia splint, \$3.50; Hocking lump, \$3.50; lower vein Brazil block, \$2.80; Indiana semi-block, \$2.40; Clinton lump, \$2.25; smokeless lump, \$3.80; smokeless egg, \$4; smokeless mine-run, \$3.50; blacksmith's coal, \$3.50. There is not much coal coming forward, and the demand for the products of Eastern mines exceeds the supply. Hocking is in especial demand. The railroad situation is worse, if anything, than it was last week, though some dealers claim to be well supplied. Ohio coal is not coming forward, though needed. Complaints are made by dealers that the railroads are absorbing the soft coal output generally and neglecting their patrons.

Anthracite is in a healthy condition at \$6, the trade being good and no scarcity existing in any grade, though there is a strong demand for nut.

Cleveland.

Feb. 11.

(From Our Special Correspondent.)

The week opened with squally conditions for the wholesale dealers. The snow of all last week blocked most of the railroad tracks in such a manner as to delay the movement of freight very seriously, and the coal trade suffered with the rest. It amounted to a general reduction of the stocks on hand in the yards here, and in some instances it was difficult for the big institutions to get what coal they actually required. The railroads assert, however, that from now on they will be in better shape than they have been for handling the coal, and the movement may be expected to be prompt. The price at which the material is being sold has not been effected so far by the shortage, the quotations remaining as they have been.

It has become apparent in the last few days that the shipment of coal by lake this year is to be more expensive than it was last year as well as heavier. The contention which the shippers and the vessel owners are having over the price for the movement of ore will most likely result in a reduced rate being agreed upon. This being the case, on down-bound cargoes the vessel owners announce that they will expect the shortage to be made up on the movement of up-bound cargoes, and the coal trade will pay the fiddler. There is no talk as yet as to what the rates will be, that being a question for decision after the matter of coal prices has been decided upon. The conference looking to such a settlement has not been fixed as yet.

Pittsburg.

Feb. 12.

(From Our Special Correspondent.)

Coal.—The miners of this district are satisfied with the continuance of the present mining scale for another year as agreed upon at the joint inter-state conference in Indianapolis last Saturday. There are some, however, who believe an advance should have been granted. They are silenced when told that the operators had agreed to submit the matter to arbitration. It was proposed that if it could be shown that the selling price is as high or higher than when the advance was given two years ago the operators would concede a 10 per cent increase, but if an investigation showed that prices were not as high then the miners would accept a reduction of 10 per cent. Rather than take such a chance which might result in a reduction of the demand for an advance was withdrawn, and a compromise reached by continuing the present scale for the year beginning on April 1. The outlook for the coming year is extremely bright, and there will be no change in prices at present. The Pittsburg Coal Company is preparing to guard against failure to fill contracts on account of a lack of transportation facilities, and will build more cars. Last season the company was unable to fill its northwestern contracts by fully 2,000,000 tons.

CConnellsville Coke.—Shipments were again disturbed last week by the snow storm, and many furnaces were short of fuel. As a result heavy premiums were paid for prompt shipment of coke. Contract prices for coke for the first half remain at \$2.25 for furnace and \$2.75

@\$3 for foundry. The Courier in its last issue reports the production for the week at 208,381 tons. The shipments aggregated 10,736 cars distributed as follows: To Pittsburg, 3,708 cars; to points west of Pittsburg, 5,402 cars; to points east of Connellsville, 1,626 cars. Luis was a decrease of 178 cars.

San Francisco.

Feb. 8.

(From Our Special Correspondent.)

Coal receipts at San Francisco by water in January showed an increase of 10.6 per cent over January, 1901. These receipts do not include California coal nor Wyoming and Utah coal received by rail. The figures for the month are as follows, in tons:

	1901.	1902.	Changes.
Eastern	2,015	1,025	D. 990
Oregon	3,190	2,700	D. 490
Washington	55,195	42,452	D. 12,743
Total domestic.....	60,400	46,177	D. 14,223
British Columbia.....	35,838	33,634	D. 2,204
Australia	11,737	19,725	I. 7,988
Great Britain.....	400	20,323	I. 19,923
Total foreign.....	47,975	73,682	I. 25,707
Totals	108,375	119,859	I. 11,487

The increase this year was due to larger receipts from Australia, and to the receipt of several cargoes of English and Welsh coal during the month.

Foreign Coal Trade.

Feb. 13.

The export coal trade continues quiet, although supplies of coal at the seaboard are better and freights continue low. Most of the business at the present time is in contracts for the West Indies and South America.

Imports of coal and coke into Germany for the full year ending December 31, are reported as below, in metric tons:

	1900.	1901.	Changes.
Coal	7,384,049	6,297,389	D. 1,086,660
Brown coal (lignite).....	7,960,313	8,108,943	I. 148,630
Coke	512,690	400,197	D. 112,493
Totals.....	15,857,052	14,806,529	D. 1,050,523

Imports of coal were chiefly from Great Britain; those of brown coal were all from Austria. Imports of coke were principally from Belgium. The coal reported from the United States in 1901 was 5,694 tons.

Exports of coal from Germany for the year ending December 31 are reported as below, in metric tons:

	1900.	1901.	Changes.
Coal	15,275,805	15,266,267	D. 9,538
Brown coal (lignite).....	52,795	21,718	D. 31,077
Coke	2,096,931	2,229,188	I. 132,257
Totals	17,425,531	17,517,173	I. 91,642

The chief exports of coal in 1901 were to Austria, 5,671,173 tons; Holland, 4,025,631 tons; Belgium, 1,761,791 tons; Switzerland, 1,028,599 tons; Russia, \$38,950 tons; France, 796,987 tons. The heaviest exports of coke were 753,647 tons to France, and 607,281 tons to Belgium.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of February 1 that the general tone of the Welsh coal market, both for Cardiff and Monmouthshire descriptions, is a shade weaker. Quotations are: Best Welsh steam coal, \$3.78@3.90; seconds, \$3.66; thirds, \$3.54; dry coals, \$3.54; best Monmouthshire, \$3.54@3.66; seconds, \$3.36; best small steam coal, \$2.40; seconds, \$2.22; other sorts, \$1.92.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The tone of the freight market is very quiet, with little business passing. Rates of freight remain very weak. Some rates named from Cardiff are: Algiers, \$1.30; Marseilles, \$1.35; Genoa, \$1.26; Naples, \$1.32; Port Said, \$1.26; Singapore, \$2.76; Las Palmas, \$1.38; St. Vincent, \$1.56; Rio Janeiro, \$2.58; Santos, \$2.88; Buenos Aires, \$2.34.

IRON MARKET REVIEW.

NEW YORK, Feb. 13.

The iron market continues to show immense activity, and mills are pressed in all quarters to hasten deliveries, which they are unable to do. In new business the most important feature is structural steel, for which there is a very active demand.

Pig iron contracts continue to be made for the third and fourth quarters of the year, and there is a tendency to advance prices. Orders for early delivery cannot be filled, though some have been pressed. It is quite possible that the situation may be relieved by some imports of pig iron and steel billets from Germany.

Transportation is generally better, except in Western Pennsylvania and Ohio, where heavy snows have disarranged matters. This is only a temporary obstruction.

The blowing in of several large furnaces in Janu-

ary has brought up the production. The weekly capacity of the furnaces in blast on February 1 was over 341,000 tons, the largest figure on record. We are now making pig iron at the rate of over 17,000,000 tons a year. At the same time unsold stocks are extremely low, the total reported on February 1 being only 154,200 tons.

Birmingham. Feb. 10.

(From Our Special Correspondent.)

Strong and steady continues the pig iron market in this State. The admission was made during the past week that it has become necessary on account of the amount of iron sold ahead to withdraw some of the furnaces from the open market. This is very significant. The shipments of pig iron are heavy and an advance of 50c. per ton is being paid by purchasers for immediate delivery on orders.

Two furnaces have been blown in this month, one at Trussville and the other at Talladega. They are not very large furnaces but will add to the production of the State.

Deliveries on orders accepted some weeks ago are being rushed as much as possible. It is given out officially that orders are being taken for delivery the latter part of the last half of the year and the Alabama furnaces are receiving many inquiries for that period.

The following quotations are given: No. 1 foundry, \$12.50; No. 2 foundry, \$12; No. 3 foundry, \$11.50; No. 4 foundry, \$11; gray forge, \$10.50; No. 1 soft, \$12.50; No. 2 soft, \$12.

There is much activity in finished iron and steel.

The Birmingham and Gate City rolling mills are working well in all departments.

The steel plants at Ensley have a large amount of business on hand.

There is litigation on at the plant of the Alabama Steel and Wire Company at Ensley and a receiver has been asked for but the plant remains in operation. C. E. Robinson, a minority stockholder, began proceedings a couple of weeks ago against majority stockholders and had Messrs. E. T. and G. H. Schuler, president and secretary-treasurer, respectively of the company, arrested on charges of contempt of court, resulting in the finding by the court that they were in contempt and they will this week suffer a penalty of five days' imprisonment. The application for a receiver will be heard shortly in the courts here. The plant has been doing well ever since its construction in the Birmingham District. It is one of the most important independent wire rod and nail mills in the country.

During the past week the Hood Machine & Foundry Company made a shipment of a wheel press to Honduras, Central America. A newly patented automatic ladle for use about blast furnaces is being manufactured by the Hood concern. This is the patent of Master Mechanic Stewart, of Woodward Furnace.

Buffalo. Feb. 12.

(Special Report of Rogers, Brown & Co.)

The unprecedented severity and continuance of storms in this vicinity has been too much for the railroads. Freight traffic has had to be abandoned temporarily, causing added hardship to furnace men. As the result of such poor transportation service those who have stocks are drawing on them heavily, and those who generally run without reserve stocks are being compelled to shut down. The shortage of pig iron continues with added intensity. We quote below on cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$18.25; No. 2, \$17.75; Southern soft, No. 1, \$17.25; No. 2, \$16.75; Lake Superior charcoal, \$20.

Chicago. Feb. 11

(From Our Special Correspondent.)

Pig iron is still very active, and heavy prices are being paid for prompt deliveries. Furnaces are crowded, and sales have been large. Nearly all contracts are for delivery after June, in the latter half of 1902. There has been a decline of 50c. per ton on Northern No. 2, and an advance of 50¢@75c. per ton on Northern charcoal. Lake Superior coke iron is quoted at \$16.50 @17 for No. 1, and \$16@16.50 for No. 2. Standard Southern brings \$16.15@16.40 for No. 1, and \$15.65 @16.15 for No. 2. Lake Superior charcoal is quoted at \$20.25@20.50. Coke has declined 25c. per ton in the week, the present quotations being \$5.25@5.75. There is still a bad scarcity of coke; very little is coming in, most of that received being West Virginia coke.

The building ordinance recently passed by the City Council of Chicago became a law on February 11, on account of the failure of Mayor Harrison to veto it. It had been expected that the Mayor would endeavor to restrict the height limit to 260 feet or thereabouts, and he is quoted as saying that he may soon send a message to the Council recommending a limit. The ordinance, as passed and now effective, places no restrictions on height. Something like a boom in structural metal and other materials is looked for in the next year, by Chicago architects and builders, it being

estimated that no less than \$20,000,000 to \$25,000,000 will be spent on buildings within the business district. Dealers in structural iron and steel are figuring on an exceptionally active year in and about Chicago, the trade at present being crowded to its utmost to take care of orders. For all structural shapes there is a demand exceeding the capacity of mills and railroads.

Cleveland. Feb. 11.

(From Our Special Correspondent.)

Iron Ore.—About all of the ore has been sold for this year, and the shippers and vessel men are trying to get together to fix the rate of carriage for the season. This is to be a difficult task since the United States Steel Corporation's representatives have deserted the policy prevalent last year, and are now demanding that the vessel owners accept 75c. between Duluth and Ohio ports; 65c. from Marquette and 55c. from Escanaba. This the owners refuse to do, and a very sharp contest has arisen. The ore sales are not very heavy now, but the old prices prevail, being \$4.25 for bessemer old range, \$3.25 for non-bessemer old range; \$3.25 for bessemer Mesabi and \$2.75 for non-bessemer Mesabi.

Pig Iron.—The pig iron situation is not at all reassuring to the men who own foundries. Merchant furnaces in the Valley are reporting that all of the material for the first half of the year has been sold up, and in addition a great part of that for the second half. Car-load lots are even very difficult to find for the remainder of the first half. The price on foundry grades does not change from \$16.50 for No. 1 and \$16 for No. 2, Valley furnace. Bessemer sales for the remainder of the first half comprise only lots of 100 tons or less or even down to car-load lots with no sales being made, anticipating delivery during the third quarter. The price is ranging about \$16 in the Valleys. Basic iron is also bringing now about the same price, being quoted not less than \$16 in the Valleys and most of the furnace men demanding better figures for their output. The supply of coke is not up to standard, and many of the furnaces are beginning to feel the shortage.

Finished Material.—The sale of structural shapes is still the leading feature on the market, and mill men are now offering nothing better than 5 months on deliveries. Many of the contractors are compelled to depend upon store supplies, upon which the prices range between 2.25c. and 2.75c., according to the amount of cutting demanded and the lengths required. Mill sales are still made upon the basis of the old price of 1.70c. Sheets are also in demand, the purchasers supplying their wants very largely out of store. The store supply is able to take care of quite a volume of business. But very few mill sales are reported. Store prices hold firm at 3.35c.@3.50c. on No. 27, one pass cold rolled with 10c. added for full cold rolled. Plate sales have also been quite heavy of late, the output of the mills being sold up further ahead than at any one time for six or eight months. It is now impossible to get plates inside of six weeks or two months. The price holds firm at 1.70c. Rail sales are comparatively light, but little business being done. The sales are mostly in cleaning up lots of car-loads or 100 tons that do not aggregate a great deal of tonnage. Billets are still in demand with no material for disposition. The bar market is strong at the old prices of 1.50c. for bessemer steel bars. Pittsburg and 1.60c. for bar iron and open-hearth steel bars, Pittsburg.

Old Material.—The scrap iron trade is running along evenly with no great fluctuations in prices. The demand is steady and good, and the market is strong. There has been no change in the prices for several weeks.

Duluth. Feb. 11.

(From Our Special Correspondent.)

The Eastern Railway of Minnesota, in addition to building a \$250,000 addition to its larger ore dock at Allouez Bay, at the head of Lake Superior, has ordered 1,000 new 50-ton pressed steel ore cars of the universal hopper type, and will have them in use the coming season. The road will handle a great deal of ore this year, and may come pretty close to the tonnage to be shipped by the Duluth, Missabe & Northern line.

H. L. Holden, dock agent of the Duluth & Iron Range road, has issued a little statement of the business of that road in ore for the past year that is exceedingly interesting, as the road is now the greatest ore hauling line in the world. There were received at the docks of the road during the season a total of 5,008,579 tons of iron ore, all of which was shipped excepting 419 tons of Chandler and Savoy. In addition to this shipment there were shipped of ore left on hand from the preceding year 2,184 tons, making the actual shipment for the season off these docks 5,010,344 gross tons. The greatest month in the year was July, in which shipments of 964,486 tons were made. In April 1,015,78 tons were shipped, and in December 2,804 tons. The greatest shipment from any

one mine was from the Fayal in July, 375,000 tons, or about 15,000 tons daily. This record has never been approached by any other mine in the world. There were loaded during the season of navigation at these docks 1,082 ships, and their average cargo was 4,630 tons, a very high figure. The maximum cargo was on the schooner *Manila*, of the United States Steel Corporation, 7,473 tons, and the smallest was the steamer *D. D. Calvin*, 787 tons. The entire business of the year, so far as shipments were concerned, was done between May 1 and December 2, a shorter period than usual, at both ends of the season. All figures in this discussion were in tons of 2,240 pounds.

Philadelphia. Feb. 13.

(From Our Special Correspondent.)

Pig Iron.—An unexpected rush, especially from the smaller buyers, has served to arouse interest in the iron trade, especially crude iron. Further advances are liable to be made any hour. In fact, premiums are now being offered for special accommodations, but the fact of such offerings are carefully guarded. It is therefore difficult to give true selling prices. Some furnace representatives are refusing to quote except to bona fide buyers. No. 1X foundry may be given at \$18@19; No. 2 plain, \$16@17; forge, \$16@16.50; basic, \$16.50 nominally. Buyers, especially the large consumers, are not contributing any fuel.

Merchant Bars.—The local manufacturers, including Schuylkill Valley mills, have been able to keep in sight of their customers' wants. They are running at top capacity. Some shaded quotations are given by a few small mills of limited equipment. There are intimations of further shading, but no one in the trade appears to know any basis for it. Bars \$1.70 for iron and \$1.65 for steel.

Sheets.—The signs of a struggle for business in sheets is surprising. Some makers have found it advisable to proffer some inducements to keep capacity sold up. In a large way the usual quotations are \$2.40@3.50, but quality and quantity have a good deal to do with prices.

Merchant Steel.—The feature of the market this week is the placing of some business for the late summer by large consumers.

Plates.—The volume of business put on the books since February 1 is calculated to harden quotations. The policy of consumers is to cover as soon as business is secured, and this accounts for the large bridge, locomotive and tank business recently transacted. Marine materials sold at 2@2.10c. and fire-box at 2c. Sheared and universals are 1.80c.

Structural Material.—The rush for bridge, tank and building material keeps up. Beams and channels are 1.80@1.95c.; urgent buyers pay more than this.

Scrap.—The weather forbids much delivery. Prices are not quite as easy as last week. Choice railroad is \$21.50@22; heavy steel, \$19.50@20; old car wheels, \$17; machinery cast, \$15@15.50.

Pittsburg. Feb. 12.

(From Our Special Correspondent.)

The production of pig iron during the week was greatly curtailed, probably 25 per cent, owing to the inability of the railroads to move cars promptly, resulting in a shortage of coke. It was found necessary to bank over a dozen furnaces in the Valleys, and they will remain closed until coke can be secured. Furnacemen say the difficulties are greater than at any time within the past six months. There does not seem to be a shortage of cars, but of motive power. The severe weather was principally responsible for the retarding of shipments. Manufacturers say there is no difficulty in making sales, the entire trouble being with deliveries. The iron and steel markets are stronger than for several months, and prices are bound to go up despite the efforts of the manufacturers to maintain a steady market. It is believed that an endeavor is being made to conceal sales made at unusually high prices. There are reports to the effect that some bessemer pig iron has sold at high as \$18 at Valley furnaces, but no confirmation could be obtained. A number of good orders were placed this week for delivery in the second and third quarters at prices that ruled a week ago. Gray forge is unusually scarce, and no sales of any consequence are recorded. Prices are firm, and may go higher. The demand for foundry iron continues, and several thousands of tons were sold, some at a trifle lower than the quotation for prompt shipment last week. The price for second half delivery remains firm and unchanged. A lot of Southern basic iron was offered in this market at \$18.15, but no sales were made. The freight rate from the Southern market to the Pittsburg District is \$4.15 a ton.

The steel market is extremely strong in all lines of finished products. Steel bars are particularly active. Orders were placed this week at the local mills, for

15,000 tons, making a total of 40,000 tons contracted for so far this month, and the mills are now pretty well sold up for the first half. It is doubtful if the mills of this district can take any more orders for structural material for delivery this side of July 1. Bessemer and open-hearth billets are scarce, and prices are \$1 to \$3 a ton higher than last week. The sheet market also continues to improve. The American Sheet Steel Company announced yesterday that it had been decided to rebuild the Wood plant at McKeesport and greatly increase its capacity.

The National Bridge Company received its charter during the week, and closed a deal for a big tract of land at the new town of Colonia, about 20 miles from Pittsburg on the Pittsburg & Lake Erie Railroad. Work on the excavations was begun on Monday. A plant to cost \$1,000,000 is to be erected, and it is proposed to have it in operation within six months. The organization of the company, which is composed of Pittsburg and New York capitalists, will be perfected this week and a number of contracts awarded.

Pig Iron.—Sales of bessemer pig iron this week aggregated 8,500 tons at \$16.25@16.50, Valley furnaces. Gray forge is scarce, and is held at \$16.25@16.50, Pittsburg. Several thousand tons of foundry No. 2 were sold, the price for delivery before July 1 ranging half \$17.10 to \$17.25, Pittsburg, and for the second half \$16.75 is quoted. A sale of 1,000 tons of Southern gray forge was made at \$15.15, and Southern basic iron was offered at \$18.15.

Steel.—The market is stronger than ever, and it is almost impossible to obtain bessemer billets. Quotations range from \$29.50 to \$31. Open-hearth billets are quoted at \$33. Steel bars are firm at 1.50c., and 15,000 tons were sold this week. Tank plate remains at 1.60c. The mills are practically sold up to July 1 on structural material.

Sheets.—The sheet market continues to improve, but prices are unchanged. The leading producer is still quoting No. 28 gauge at 3.10@3.20c. Galvanized sheets are not quite as strong this week, and are quoted at 70 and 5 and 75 per cent off in car-load lots.

Ferro-manganese.—There is no change, 80 per cent domestic still being quoted at \$52.50.

New York. Feb. 14.

Pig Iron.—The market is very strong, and Northern irons are higher. It is not improbable that prices may advance again, but furnacemen do not desire very high figures, rather a steady market. We quote for tide-water delivery: No. 1X foundry, \$17.65@18.35; No. 2X, \$16.75@17.75; No. 2 plain, \$16.75@17.25; gray forge, \$16.50@16.75. For Southern iron on dock, New York, No. 1 foundry, \$16.25@16.50; No. 2, \$15.75@16; No. 3, \$15.25@15.50; No. 4, \$14.75@15; No. 1 soft, \$16.50; No. 2, \$15.75@16.

Bar Iron and Steel.—Everything favors a good demand until into the second half of the year at least. We quote 1.58c. for common bars in large lots on refined bars, 1.63@1.68c.; soft steel bars, 1.68c.

Plates.—The market continues active, and most Eastern mills are supplied with orders for some months ahead. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universal, 1.78c.

Steel Rails and Rail Fastenings.—Mills are practically out of the market for this year, and a considerable tonnage may be imported. Standard sections are still quoted at \$28 at Eastern mills; light rails at \$28@30, according to weight. Spikes are 1.80c.; splice bars, 1.55c.; bolts, 2.60@2.70c.

Structural Material.—Building operators are likely to be brisk for some months to come. Demand is good. We quote for large lots at tidewater as follows: Beams, 1.80@1.95c.; tees, 1.85c.; angles, 1.80c.

Nails.—Cut nails and wire nails are in moderate demand. We quote for large lots on dock: Cut nails, \$2.10; wire nails, \$2.30.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 266.)

New York. Feb. 14.

Raw materials continue very firm, notably brimstone and nitrate of soda, owing to the limited spot supplies. Manufactured products are sympathetically strong, though few show advanced prices. Demand is improving, with the advancing of the consuming season. Some further contracting is reported, but most large buyers are already booked.

Heavy Chemicals.—Consumption shows a satisfactory movement on contract. Domestic highest alkali has sold forward at 77 1-2@85c. per 100 lbs., f. o. b. works, while prompt business is noted at 80@85c. f. o. b. Foreign alkali, owing to smaller arrivals is maintained at 90@92 1-2c. per 100 lbs. in New York. Some

further trading over 1903 in domestic high-test caustic soda is reported at \$1.90@1.92 1-2 per 100 lbs., f. o. b. works, while immediate shipment orders are being taken at an advance of several cents. Bicarb. soda is in pretty good request at \$1@1.05 per 100 lbs., for ordinary, f. o. b. works, while extra grades bring \$3 up, per 100 lbs., f. o. b. works. Sal soda is quiet at 55c. per 100 lbs., f. o. b. works. Foreign sal soda is also quiet at 67 1/2c. per 100 lbs. for nearby parcels. Bleaching powder continues easy, and spot Liverpool is offered at \$1.80@1.90 per 100 lbs., while contracting will be done at \$1.75@1.85. Continental bleach is quiet at \$1.70@1.75. The new electrolytic bleach made by the Solvay Process Company, of Belgium, is in the market and tests well it is said. Chlorate of potash is uninteresting; domestic crystals rule at \$8 per 100 lbs.; and powdered at \$8 1-8@8 1-4, for early shipment, while contracts will be booked for f. o. b. works at \$7 3-4.

Arsenic.—Scarcity in the visible supply has strengthened prices to \$3.75@4 per 100 lbs., for English, and \$3.50@3.75 for German. Red continues unchanged at \$6 3-4@7 1-4 per 100 lbs., according to quality and quantity.

Acids.—Sulphuric is in good request and further contracts have been taken on a basis of quotations. Muriate also shows a good tone, but oxalic lacks interest. Blue vitriol is unsteady, owing to the speculation in the copper market.

Quotations are per 100 lbs. as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Acetic, com'l 28%.....1.80	Oxalic, com'l.....4.15@5.12 1/2
Blue vitriol.....4.25@4.50	Sulphuric, 50 deg., bulk
Muriatic, 18 deg.....1.50	ton.....14.00@16.00
Muriatic, 20 deg.....1.62 1/2	Sulphuric, 60 deg.....1.00
Muriatic, 22 deg.....1.75	Sulphuric, 60 deg.....1.00
Nitric, 39 deg.....4.00	bulk.....18.00@20.00
Nitric, 38 deg.....4.25	Sulphuric, 66 deg.....1.20
Nitric, 40 deg.....4.50	Sulphuric, 66 deg.....1.20
Nitric, 42 deg.....4.87 1/2	bulk.....21.00@23.00

Brimstone.—The delay in the arrival of the *Ontanada* with 3,000 tons has caused some alarm to the trade. Spot unmixed seconds are quoted at \$25 per ton, \$24 to arrive, and \$23@23.25 for shipments. Best thirds are about \$2.50 less. The small buying would indicate consumers are awaiting the results of the large stocks of brimstone in Sicily that were carried over from last year. Last year the exports of brimstone to the United States and Canada showed a falling off of fully 9 per cent, owing in part to high prices. At the same time the imports of pyrites into the United States showed an increase of nearly 18 per cent. This shows that the consumption of brimstone in this country is seriously affected by the high price policy of the Anglo-Sicilian Sulphur Company.

Pyrites.—Business continues good at firm prices. Charters from Huelva, Spain, to Atlantic ports are noted at 9s. 6d.@10s. (\$2.28@2.40), February sailing.

Quotations are f. o. b.: Mineral City, Va., lump ore, \$3 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites 12@14c. per unit, delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Gas liquor, owing to limited offerings, is higher at \$2.95@2.97 1-2 per 100 lbs.

Potash Salts.—A German press dispatch states that the Kaiserada Mine, a most aggressive competitor in the potash industry, has joined the Kali syndicate. The harmonizing of interests is taken to mean an advance in potash prices.

Nitrate of Soda.—Very firm, owing to shortage in the visible supply. We discuss the situation in our editorial columns. Spot is quoted at \$2.25 per 100 lbs., while expected arrivals are held at \$2.20, and future shipments at \$2.05. Shipments from Chile to the United States have been rather light in view of the accumulation last year of stocks in store. At present very little of this nitrate is unsold, hence the high prices here. Steamers due in February are the *Buckingham* and *Virginia*, with 56,000 bags; in March the *Capac* will be the only arrival at New York, with 25,400 bags; in April the bark *E. M. Phelps* is due at Philadelphia with 32,400 bags; and during the same month the *Foonking Suey* with 11,000 bags, and *Cumbal*, with 40,000 bags, are also expected. Ocean freights are quiet, owing to scarcity of nitrate for shipment.

Phosphates.—The market is in a healthy condition, and prices are well maintained. A conservative estimate gives the orders already booked for high-grade Florida rock for this year's delivery at considerably more than one-half the maximum production. A large part of these sales has been made direct to superphosphate manufacturers, showing that speculative reselling will be comparatively small this

year. Consequently a material improvement in the industry is looked for.

January shipments of high-grade Florida rock from Fernandina were 13,650 long tons, showing a considerable increase over December and January, last year.

Concerning the Arkansas phosphate deposits a correspondent to a southern paper states that the Arkansas Phosphate Company, of Batesville, Ark., is building a large fertilizer plant on the phosphate lands, which are located on the White River Railroad, now under construction to the mines. The company is mining on a 2 1/2-ft. strata of 75 per cent phosphate rock, running less than 3 per cent iron and alumina, it is said. It is expected to supply the principal western trade.

A discovery of merchantable phosphate is reported near Marietta, in Cobb County, Ga.

A charter is noted from Coosaw, S. C., to St. Nazaire, France, at 11s. (\$2.64), February sailing.

We quote phosphate prices as below:

Phosphates.	Per ton F. o. b.	C. I. F. U'n'd Kingdom or European Ports.	
		Unit.	Long ton
*Fla. hard rock (77@80%)	\$7.50	7 @7 1/4d	\$10.92@11.31
*Fla. land pb. (68@73%)	3.00@3.25	5 @6d	7.00@ 8.40
*Fla. Peace Riv. (58@63%)	2.25@2.50	5 @5 1/2d	6.00@ 6.90
†Tenn. (78@80%), export	3.50	6 1/2@7d	10.53@10.92
†Tenn. ....78% domestic.	3.00@3.25	.....	.....
†Tenn. ....75% domestic.	2.75@3.00	.....	.....
†Tenn. ....70@72% domestic.	2.25@2.50	.....	.....
†So. Car. land rock.....	3.25	4 1/2@5d	5.67@6.30
†So. Car. river rock.....	2.75@3.25	.....	.....
Algerian, rock... (63@70%).	.....	6 @6 1/4d	8.04@8.70
Algerian, rock... (58@63%).	.....	5 @5 1/4d	6.00@6.30
Tunis, Gafsa... (58@63%).	.....	5 @5 1/4d	6.00@6.30

*Fernandina, Brunswick or Savannah. †Mt. Pleasant. †On vessels Ashley River.

Acid phosphate is quoted at 57 1/2@60c. per unit.

Liverpool. Jan. 29.

(Special Report of Joseph P. Brunner & Co.)

Manufacturers are kept fairly busy with contract deliveries, but fresh export orders are not coming in very freely at the moment. Soda Ash is strong at usual varying quotations as to market. For tierces we quote nearest spot range about as follows: Leb-lanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton net cash; ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton net cash; bags, 5s. per ton under price for tierces; soda crystals are steady at usually £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters; caustic soda is not active, but there is a fair business passing at the following range: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Bleaching powder is quiet at £6 15s.@£6 17s. 6d. per ton, net cash for hardwood, packages, with special terms for Continental and a few other favored markets. Chlorate of potash is dull at 3d.@ 3 1/4d. per lb. net cash. Bicarb. soda is in moderate request at £6 15s. per ton, less 2 1/2 per cent for the finest quality in one cwt. kegs, with usual allowances for large packages, also special terms for a few favored markets. Sulphate of ammonia is a shade dearer and firm at £11 11s. 3d.@ £11 12s. 6d. per ton, less 2 1/2 per cent for good gray, 24@25 per cent in double bags f. o. b. here. Nitrate of soda marks a further advance, and a moderate spot business is passing at £10 7s. 6d.@£10 10s. per ton less 2 1/2 per cent for double bags f. o. b. here as to quality and quantity.

METAL MARKET.

New York. Feb. 13.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in December and Year.

Metal	December.		Year.	
	1900.	1901.	1900.	1901.
Gold Exports....	\$410,533	\$4,744,073	\$54,134,623	\$57,729,889
Imports....	3,386,611	2,410,986	66,740,064	64,381,882
Excess. I.	\$2,976,078	E. \$2,333,107	I. \$12,614,461	E. \$3,348,007
Silver Exports....	\$7,358,339	\$4,723,982	\$66,221,074	\$55,638,901
Imports....	3,117,857	2,784,757	40,100,343	31,142,949
Excess. E.	\$4,240,482	E. \$1,939,225	E. \$26,121,321	E. \$24,495,952

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending February 13, 1902, and for years from January 1, 1902, 1901 and 1900.

Period	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$13,200	\$39,331	\$327,750	\$13,727 E.	\$287,892
1902.....	6,249,530	128,567	5,006,766	133,524 E.	11,018,205
1901.....	9,019,690	344,837	4,305,349	530,661 E.	12,44,541
1900.....	1,462,385	670,321	4,596,625	475,159 E.	5,813,520

The gold exported this week went to South America and the West Indies; the silver to London. The imports were from Central and South America and the West Indies.

Financial Notes of the Week.

The condition of general business remains strong. The great amount of new construction work going on all over the country and the general demand for materials continue to be prominent features in the situation. No further exports of gold are reported this week, last week's large shipments having apparently completed settlements for the present.

The statement of the New York Banks, including the 63 banks represented in the Clearing House, for the week ending February 8, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$720,735,000	\$895,289,400	\$918,506,000
Deposits	814,786,900	994,593,900	1,000,081,900
Circulation	17,026,200	31,231,900	31,301,700
Specie	165,029,600	195,890,400	193,038,700
Legal tenders.....	66,564,700	73,120,700	75,028,000

	1901.	1902.
Total reserve.....	\$231,534,300	\$269,011,100
Legal requirements.....	203,606,725	248,648,475
Balance surplus.....	\$27,897,575	\$20,362,625

Changes for the week this year were increases of \$28,974,300 in loans and discounts, \$24,684,000 in deposits, and \$223,500 in specie; decreases of \$63,500 in circulation, \$2,779,400 in legal tenders, and \$8,727,125 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver
N. Y. Ass'd.	\$195,830,400	.....	\$193,038,700	.....
England ..	163,137,425	.....	181,842,370	.....
France ..	475,981,330	\$219,615,750	433,821,795	\$220,384,595
Germany ..	143,685,000	73,710,000	166,385,000	85,715,000
Spain ..	70,005,000	92,890,000	70,100,000	87,685,000
Netherlands	25,140,000	28,350,000	28,655,500	32,237,500
Belgium ..	14,570,000	7,285,000	15,336,605	7,668,335
Italy ..	77,720,000	9,205,000	79,985,000	10,616,000
Russia ..	368,850,000	32,965,000	358,045,000	33,660,000

The returns of the Associated Banks of New York are of date February 8, and the others January 30, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie coined is chiefly gold. The Bank of England reports gold only.

We have no new features to record in the silver movement. India remains the chief purchaser, but inquiry is fairly good, and no great decline seems to be imminent.

Receipts of silver at the United States Assay Office in New York for the week ending February 13 were 43,000 oz.

Shipments of silver from London to the East for the year up to January 30 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£815,900	£657,820	D. £158,080
China	44,375	.....	D. 44,375
The Straits .....	.....	.....	.....
Total.....	£860,275	£657,820	D. £202,455

Arrivals for the week this year were £174,000 in bar silver from New York, £12,000 from the West Indies, and £8,000 from Australia; total £194,000. Shipments were £115,000 in bar silver to Bombay, and £600 to Calcutta; total, £115,600.

Indian exchange continues strong, and there has been a heavy demand for council bills in London, the average rate paid being 16.03d. per rupee. A fair amount of silver is also being taken on Indian account.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$0.44 3/4	\$0.46
Peruvian soles and Chilean pesos.....	.40	.44
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.84	3.88
Twenty marks.....	4.73	4.85
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

February.	Silver			Copper			Spelter		
	Sterling E. change	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London & per ton.	Lead per lb.	N. Y. cts.	St. L. cts.
7	4.87 1/2	55 1/4	25 1/2	12 1/4 @ 12 1/2	12 1/4 @ 12 1/2	55 @ 24 1/2	4.05 @ 4.10	4.05	3.90
8	4.87 1/2	55 1/4	25 1/2	12 1/4 @ 12 1/2	12 1/4 @ 12 1/2	55 @ 24 1/2	4.05 @ 4.10	4.10	3.95
10	4.87 1/2	54 3/4	25 3/4	12 1/4 @ 12 1/2	12 1/4 @ 12 1/2	54 3/4 @ 24 1/2	4.05 @ 4.10	4.10	3.95
11	4.87 1/2	55	25 3/4	12 1/4 @ 12 1/2	12 1/4 @ 12 1/2	54 3/4 @ 24 1/2	4.05 @ 4.10	4.10	3.95
21	.....	25 3/4	.....	.....	.....	.....	.....	.....	.....
13	4.87	55 1/4	25 1/2	12 1/4 @ 12 1/2	12 1/4 @ 12 1/2	54 3/4 @ 24 1/2	4.05 @ 4.10	4.10	3.95

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper.—In consequence of the free offerings of some lots in second hands and in the absence of any support from the leading interests, the market has ruled rather dull in spite of the fact that business in all branches seems to be very brisk. Exports continue on a large scale. We quote Lake copper at 12 1/4 @ 12 1/2 c.; electrolytic, in cakes, wire bars and ingots, at 12 @ 12 1/4 c.; in cathodes, at 11 3/4 @ 12 c.; casting copper, at 12 @ 12 1/4 c.

The foreign market, which closed on Friday at £55, has also suffered to a small extent, the closing quotations for standard copper being cabled as £54 12s. 6d. @ £54 15s. for spot, £54 @ £54 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £59 @ £60; best selected, £60 @ £60 10s.; strong sheets, 10 @ £70; India sheets, £68 @ £69; yellow metal, 6 1/4 @ 6 3/4 d.

Exports of copper from New York and Baltimore in the week ending February 12, as reported by our special correspondents, were: To Great Britain, 900 tons; Germany, 62; France, 25; Belgium, 20; Japan, 2; total, 1,009 tons. Also, 450 tons matte to Great Britain. Imports were 55 tons copper from England.

Tin—Has had an advancing tendency, and the market closes at the best, 24 1/2 c. for February, 24 1/2 c. for March, 24 1/2 c. for April. Spot tin is beginning to get rather scarce.

The foreign market, which closed last week at £112, opened on Monday at £113, declined on Wednesday to £112 5s., but closes firm at £112 15s @ £112 17s. 6d. for spot, £107 15s. @ £107 17s. 6d. for three months.

Lead—Has been in good demand. The ruling quotations are unchanged at 3.97 1/2 @ 4.05c. St. Louis, 4.05 @ 4.10c. New York.

The foreign market continues to advance, and at the close the quotations are cabled as £11 11s. 3d. @ £11 13s. 9d. for Spanish lead, £11 13s. 9d. @ £11 15s. for English lead.

Spelter—The firmer ore market and continued good demand on the part of consumers, both for galvanizing and brass purposes, have combined to stop the downward tendency, and the market is considerably firmer. The ruling quotations are 3.95c. St. Louis, 4.10c. New York.

The foreign market is also very strong, good ordinaries being quoted at £17 12s. 6d. @ £17 15s., specials at £17 17s. 6d. @ £18.

Nickel—The price continues firm at 50 @ 60c. per lb., according to size and terms of order.

Platinum—Consumption continues good. Ingot platinum in large lots brings \$19.50 per oz., in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver—The New York price continues \$48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are firm at \$47.50 @ \$48 for domestic orders, and \$44 for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

The *Revista Minera*, of Madrid, reports that the production of quicksilver from the Almaden Mines in Spain for the year 1901 was 22,775 flasks. In 1900 the output was 30,612 flasks, so that there was a decrease of 7,837 flasks, or 25.6 per cent, last year.

Minor Metals and Alloys—Wholesale prices, f. o. b. works, are as follows:

	Per lb.		Per lb.
Aluminum.....	.....	Aluminum.....	.....
No. 1, 90% ingots.....	33 @ 37c.	Ferro-Tungsten (37%).....	29c.
No. 2, 90% ingots.....	31 @ 34c.	Magnesium.....	\$2.75
Rolled sheets.....	4c. up	Manganese (over 90%).....	1.00
Alum-bronze.....	20 @ 23c.	Mangan's Cop. (20% Mn).....	3c.
Nickel-Alum.....	33 @ 39c.	Mangan's Cop. (30% Mn).....	3c.
Bismuth.....	\$1.50	Molybdenum (Best).....	\$1.82
Chromium (over 90%).....	1.00	Phosphoric.....	50c.
Copper, red oxide.....	50c.	American.....	70c.
Ferro-Molyb'dum (50%).....	\$1.25	Sodium metal.....	50c.
Ferro-Titanium (10%).....	90c.	Tungsten (Best).....	62c.
Ferro-Titanium (20%).....	\$1.10		

Variations in prices depend chiefly on the size of the order.

Average Prices of Metals per lb., New York

	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.000	4.350	4.27	4.13
February	26.68	.....	4.350	.....	4.01
March	26.03	.....	4.350	.....	3.91
April	25.93	.....	4.350	.....	3.98
May	27.12	.....	4.350	.....	4.04
June	28.60	.....	4.350	.....	3.99
July	27.85	.....	4.350	.....	3.95
August	26.78	.....	4.350	.....	3.99
September	25.31	.....	4.350	.....	4.08
October	26.62	.....	4.350	.....	4.28
November	26.67	.....	4.350	.....	4.29
December	24.36	.....	4.153	.....	4.31
Year	26.54	.....	4.334	.....	4.08

Average Prices of Copper.

Month.	New York—		London—	
	Electrolytic.	Lake.	Standard.	Standard.
January	11.053	16.25	11.322	16.77
February	16.38	.....	16.90
March	16.42	.....	16.94
April	16.43	.....	16.94
May	16.41	.....	16.94
June	16.38	.....	16.90
July	16.31	.....	16.61
August	16.25	.....	16.50
September	16.25	.....	16.54
October	16.25	.....	16.60
November	16.224	.....	16.33
December	13.845	.....	14.36
Year	16.117	.....	16.53

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902.		1901.		1900.	
	London Pence.	N. Y. Cts.	London Pence.	N. Y. Cts.	London Pence.	N. Y. Cts.
January	25.62	55.56	28.97	62.82	27.30	59.30
February	28.13	61.06	27.49	59.76
March	27.04	60.63	27.59	59.51
April	27.30	59.29	27.41	59.59
May	27.43	59.64	27.56	59.96
June	27.42	59.57	27.81	60.42
July	26.96	58.46	28.23	61.25
August	26.94	58.37	28.13	61.14
September	26.95	58.26	28.85	62.63
October	26.62	57.59	29.58	63.83
November	26.12	56.64	29.68	64.04
December	25.46	55.10	29.68	64.14
Year	27.11	58.95	28.27	62.33

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

LATE NEWS.

JASPER COUNTY, MISSOURI.

(From Our Special Correspondent.)

Joplin Ore Market.—The ore market is very strong. Zinc ore is advancing, and lead ore remains firm. The zinc ore situation was strengthened by the advent of the Edgar Zinc Company, that bought about 50 carloads.

The lead ore production was much larger than the preceding week, as the weather was much more moderate. The highest price paid for zinc ore during the week was \$30.50 per ton, upon a straight bid, an advance of 50c. per ton over the highest price of the preceding week. Much of the lower grade ore brought from 25c. to \$2 per ton over the preceding week's prices. No extremely high grade zinc ore was sold, however. Lead ore remained unchanged at \$21.76 per 1,000 lbs., and the local smelters bought almost all of the product.

During the corresponding week of last year zinc ore was \$27 per ton, and lead ore brought \$22.50 per 1,000 lbs. The shipments were valued at \$20,000 less than during the past week.

Following is the turn-in by camps of the Joplin District for the week ending February 8:

	Zinc lbs.	Lead lbs.	Value.
Joplin	2,490,440	378,140	\$45,991
Galena-Empire	1,017,320	119,600	16,534
Carterville	841,940	465,699	21,494
Oronogo	644,850	12,970	9,273
Neck City.....	466,190	.....	6,527
Zincite	282,610	8,880	4,190
Webb City.....	306,340	50,410	5,231
Cave Springs.....	307,110	3,080	3,367
Carl Junction.....	329,660	.....	4,615
Granby	192,000	44,000	2,508
Aurora	539,100	.....	6,413
Carthage	396,150	.....	5,744
Duenweg	1,188,280	5,880	15,524
Stotts City.....	142,580	.....	1,997
Roaring Springs.....	158,920	2,450	1,940
Spurgeon	107,450	50,800	2,397
Central City.....	69,740	907
Sherwood	60,580	818

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STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Alamo, Alice, Amalgamated, and others with columns for par value, Feb. 6-12, and sales.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations, including Am. Agr. Chem., Am. Car & Fdy., and others.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies like Am. Alkali, Am. Cement, and others.

MEXICO.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, and others.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adventure Con., Aetna Con., and others.

Official Quotations, Boston Stock Exchange. Total sales, 112,378 shares. †Ex-dividend. §Ex-assnt. paid. *Holiday.

ST. LOUIS, MO.*

Table of stock quotations for St. Louis, MO, listing companies like Am.-Nettie, Catherine Lead, and others.

*From our Special Correspondent.

SPOKANE, WASH.

Table of stock quotations for Spokane, Wash., listing companies like Black Tail, Crystal, and others.

SALT LAKE CITY.*

Table of stock quotations for Salt Lake City, listing companies like Ajax, Anchor, Bullion Beck, and others.

*By our Special Correspondent. Total number of shares sold, 422,035

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices for Feb. 3-8, and sales.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices for Feb. 6-12, and sales.

*Holiday.

MONTREAL, CANADA.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, etc., with columns for par value, high/low prices, and sales.

LONDON.

Jan. 30.

Table of stock quotations for London, listing companies like Alasks-Treadwell, Anaconda, Copiapo, etc., with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS.

Jan. 30.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, etc., with columns for country, product, capital stock, par value, latest dividends, and prices.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Golden Star, British Columbia, Center Star, etc., with columns for par value, high/low prices, and sales.

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

Abrasive—		Cust. Meas.	Price.	Barium—		Cust. Meas.	Price.	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price.	Paints and Colors—		Cust. Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F. F. F. F.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02 1/2	Pulverized	sh. ton		8.00	Metallic, brown	sh. ton		\$ 19.00
Grains			.10	Sulphate (Blanc Fixe)	"		.02	Best pulverized	lb.		30.00	Red	"		16.00
Corundum, N. C.	"		.07 @ .10	Barytes—				German, som. pulv.	lb.		.01 1/4 @ .01 1/2	Ocher, Am. common	"		2.25 @ 10.00
Chester, Mass.	"		.04 1/2 @ .05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.01 1/4 @ .02	Best	"		21.25 @ 25.00
Barry's Bay, Ont.	"		.07 1/4 @ .09 1/4	Crude, No. 2	"		8.00	Ceylon, common pulv.	"		.02 1/4 @ .03 1/4	Dutch, washed	lb.		.04 1/4
Crushed Steel, f.o.b. Pittsburg	"		.05 1/4	Crude, No. 3	"		7.75	Best pulverized	"		.04 @ .08	French, washed	"		.01 1/4 @ .01 1/2
Emery, Turkish flour, in kegs	"		.03 1/4	German, gray	"		14.50	Italian, pulv.	"		.01 1/4	Orange mineral, Am.	"		.07 1/4 @ .07 1/2
Grains, in kegs	"		.05 @ .07 1/4	Snow white	"		17.00	Gypsum—Ground	sh. ton		8.00 @ 8.50	Foreign, as to make	"		.08 @ .11 1/4
Naxos flour, in kegs	"		.03 1/4	Bauxite—Ga. or Ala. mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.11 @ .11 1/4
Grains, in kegs	"		.05 @ .07 1/4	First grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05 1/4 @ .05 1/2
Chester flour, in kegs	"		.03 1/4	Second grade	"		4.75	English and French	"		14.00 @ 16.00	Foreign	"		.09 1/4 @ .09 1/2
Grains, in kegs	"		.05 @ .07 1/4	Bismuth—Subnitrate	lb.		1.40	Infusorial Earth—Ground			20.00	Turpentine, spirits	gal.		.41 1/4
Peekskill, f.o.b. Easton, Pa.	"		.01 1/4	Subcarbonate	"		1.65	American, best	"		37.50	White lead, Am., dry	lb.		.04 1/4 @ .04 1/2
flour, in kegs	"		.02 1/4	Bitumen—"B"	"		.08 1/4	French	"		40.00	American, in oil	"		.05 1/4 @ .05 1/2
Grains, in kegs	"		.02 1/4	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.07 1/4 @ .09 1/4
Crude, ex-ship N. Y.: Ab-				Bone Ash	"		.02 1/4 @ .02 1/2	Iodine—Crude	100 lbs.		2.45	Zinc, white, Am., ex dry	"		.04 1/4 @ .04 1/2
bott (Turkey)	lg. ton		26.50 @ 30.00	Borax	"		.07 1/4 @ .07 1/2	Oxide, pure copperas col.	"		.05 @ .10	American, red seal	"		.06 1/4
Kuluk (Turkey)	"		22.00 @ 24.00	Bromine	"		.40	Purple-brown	"		.02	Green seal	"		.07
Naxos (Greek) h. gr.	"		.26.00	Cadmium—Metallic	"		1.40	Venetian red	"		.01 @ .01 1/2	Foreign, red seal, dry	"		.05 1/4 @ .07
Garnet, as per quality	sh. ton		25.00 @ 35.00	Sulphate	100 lbs.		2.00 @ 2.50	Scale	"		.01 @ .03	Green seal, dry	"		.06 1/4 @ .06 1/2
Pumice Stone, Am. powd.	lb.		.01 1/2 @ .02	Calcium—Acetate, gray	"		1.25	Kaolin—(See Clay, China.)				Potash—			
Italian, powdered	"		.01 1/4	brown	"		.85	Kryolith—(See Cryolite.)				Caustic, ordinary	"		.04 1/4 @ .06
Lump, per quality	"		.04 @ .40	Carbide, ton lots f.o.b. Niagara Falls, N. Y. or Jersey City, N. J.	sh. ton		75.00	Lead—Acetate, white	"		.07 1/4 @ .08	Elect. (90%)	"		.06 1/4
Rotenstone, ground	"		.02 1/4 @ .04 1/4	Carbonate, ppt.	lb.		.05	Brown	"		.08	Potassium—			
Lump, per quality	"		.10 @ .20	Chloride, com'l.	100 lbs.		.75 @ .80	Nitrate, com'l.	"		.06 1/4	Bicarbonate, cryst.	"		.08 1/4
Rouge, per quality	"		.10 @ .30	Best	"		1.00	gran	"		.08 1/4	Powdered or gran.	"		.14
Steel Emery, f.o.b. Pittsburg	"		.07	Cement—				Lime—Com. abt. 250 lbs.	bbil.		.80	Bichromate, Am.	"		.08 1/4 @ .08 1/2
Acids—				Portland, Am., 400 lbs.	bbil.		1.70 @ 1.90	Finishing	"		.90	Scotch	"		.08 1/4 @ .09
Boric, crystals	"		.10 1/4 @ .11	Foreign	"		1.65 @ 2.25	Magnesite—Greece.				Carbonate, hydrated	"		.04 @ .04 1/4
Powdered	"		.11 1/4 @ .11 1/2	"Rosendale," 300 lbs.	"		.75	Crude (95%)	lg. ton		6.50 @ 7.00	Calcined	"		.03 1/4 @ .03 1/2
Carbonic, liquid gas	"		.12 1/4	Slag cement, imported	"		1.65	Calcined	sh. ton		14.00 @ 15.00	Chromate	"		.35
Chromic, crude	"		.20	Ceresine—				Bricks	M		170.00	Cyanide (98 @ 96%)	"		.24 @ .25
Hydrofluoric, 36%	"		.05	Orange and Yellow	lb.		.12	Am. Bricks, f.o.b. Pittsburg	"		175.00	Kaifit	lg. ton		9.05
4%	"		.05	White	"		.13 1/4	Magnesium—				Manure salt, 20%	100 lbs.		.66
Best	"		.25	Chalk—Lump, bulk	sh. ton		2.45	Carbonate, light, fine pd.	lb.		.05	Double Manure salt, 48 @ 53%	"		1.12
Sulphurous, liquid anhy.	"		.02	Ppt. per quality	lb.		.03 1/4 @ .03	Blocks	"		.07 @ .03	Muriate, 80 @ 85%	"		1.83
Alcohol—Grain	gal.		2.53	Chlorine—Liquid	"		.30	Chloride, com'l.	"		.01 1/4	95%	"		1.86
Refined wood, 95 @ 97%	"		.60 @ .65	Water	"		.10	Fused	"		.20	Permanganate	lb.		.09 1/4 @ .10 1/4
Purified	"		1.20 @ 1.50	Chrome Ore—				Nitrate	"		.60	Prussiate, yellow	"		.13 1/4 @ .13 1/2
Alum—Lump	100 lbs.		1.75	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Sulphate	100 lbs.		.75 @ .95	Red	"		.37 @ .37 1/2
Ground	"		1.80	Sand, f.o.b. Baltimore	"		33.00	Manganese—Powdered,				Sulphate, 90%	100 lbs.		2.11
Powdered	"		3.00	Bricks, f.o.b. Pittsburg	M		175.00	70 @ 75% binoxide	lb.		.01 1/4 @ .01 1/2	96%	"		2.14
Chrome, com'l.	"		2.75 @ 3.00	Clay, China—Am. com., ex-				Crude, pow'd.	"		.01 1/4 @ .01 1/2	Sylvinit	unit		.35 1/4
Aluminum—				dock, N. Y.	lg. ton		8.00	75 @ 85% binoxide	"		.01 1/4 @ .02 1/4	Quartz—(See Silica.)			
Nitrate	lb.		1.50	Am. best, ex-dock, N. Y.	"		9.00	85 @ 90% binoxide	"		.02 1/4 @ .03 1/4	Salt—N. Y. com. fine	sh. ton		2.00
Oxide, com'l. common	"		.00 1/2	English, common	"		12.00	90 @ 95% binoxide	"		.03 1/4 @ .05 1/4	N. Y. agricultural	"		1.50
Best	"		.20	Best grade	"		17.00	Carbonate	"		.16 @ .20	Saltpetre—Crude	100 lbs.		3.50 @ 3.55
Pure	"		.80	Fire Clay, ordinary	sh. ton		4.25	Chloride	"		.04	Refined	"		4.37 1/2 @ 4.62 1/2
Hydrated	100 lbs.		2.60	Best	"		6.00	Ore, 50%, Foreign	unit		.22 @ .23	Silica—Best foreign	lg. ton		10.00 @ 11.00
Sulphate, pure	"		1.50 @ 2.00	Slip Clay	"		5.00	Domestic	"		.30	Ground quartz, ord.	sh. ton		6.00 @ 8.00
Com'l.	"		1.15 @ 1.25	Coal Tar Pitch	gal.		.08	Marble—Flour	sh. ton		6.00 @ 7.00	Best	"		12.00 @ 13.00
Ammonia—				Cobalt—Carbonate	lb.		1.75	Mercury—Bichloride	lb.		.77	Lump quartz	"		2.50 @ 4.00
Aqua, 16°	lb.		.03	Nitrate	"		1.50	Mica—N. Y. gr'nd, coarse	"		.03 @ .04	Glass sand	"		2.75
18°	"		.03 1/4	Oxide—Black	"		2.28 @ 2.30	Fine	"		.04 @ .05	Silver—Chloride	oz.		.65
20°	"		.03 1/4	Gray	"		2.28 @ 2.40	Sheets, N. C., 2x4 in.	"		.80	Nitrate	"		.37 1/2
26°	"		.05 1/4	Small, blue ordinary	"		.03	3x3 in.	"		1.50	Oxide	"		85 @ 1.10
Ammonium—				Best	"		.20	3x4 in.	"		2.00	Sodium—			
Carbonate, lump	"		.08 1/4 @ .08 1/2	Copperas	100 lbs.		.30 @ .35	6x8 in.	"		3.00	Bichromate	lb.		.06 1/4
Powdered	"		.09 1/4 @ .09 1/2	Copper—Carbonate	lb.		.18 @ .19	Mineral Wool—				Chlorate, com'l.	"		.04 1/4 @ .09
Muriate, grain	"		.05 1/4	Chloride	"		.27	Slag, ordinary	sh. ton		19.00	Hyposulphite, Am.	100 lbs.		1.60 @ 1.65
Lump	"		.08 1/4	Nitrate, crystals	"		.35	Selected	"		25.00	German	"		1.70 @ 1.90
Nitrate, white, pure (99%)	"		.12	Oxide, com'l.	"		.19	Rock, ordinary	"		32.00	Peroxide	lb.		.45
Phosphate, com'l.	"		.09	Cryolite	"		.09 1/4	Selected	"		40.00	Phosphate	"		.02 1/4 @ .03
Chem., pure	"		.60	Explosives—				Nickel—Oxide, No. 1	lb.		1.00	Prussiate	"		.10 1/4 @ .11
Antimony—Glass				Blasting powder, A	25 lb. keg		2.65	No. 2	"		.60	Silicate, conc.	"		.05
Needle, lump	"		.03 1/4 @ .03	Blasting powder, B	"		1.40	Oils—Black, reduced 29 gr.:				Com'l.	"		.01
Powdered, ordinary	"		.05 1/4 @ .07 1/4	"Rackarock," A	lb.		.18	25 @ 30, cold test	gal.		.09 1/4 @ .10 1/4	Sulphate, com'l.	100 lb.		.77 1/2
Oxide, com'l. white, 95%	"		.09 1/4	"Rackarock," B	"		.18	15, cold test	"		.10 1/4 @ .11 1/4	Sulphide	lb.		.01 1/4
Com'l. white, 99%	"		.12	Judson R. R. powder	"		.10	Zero	"		.11 1/4 @ .12 1/4	Sulphite crystals	"		.02 1/4
Com'l. gray	"		.07	Dynamite (20% nitro-glycerine)	"		.13	Summer	"		.09 1/4 @ .09 1/2	Sulphur—Roll	100 lbs.		1.85
Sulphate, com'l.	"		.16	(30% nitro-glycerine)	"		.14	Cylinder, dark steam ref.	"		.08 1/4 @ .10 1/4	Flour	"		1.90
Arsenic—White	"		.03 1/4 @ .03 1/2	(50% nitro-glycerine)	"		.16 1/4	Dark, filtered	"		.11 1/4 @ .15 1/4	Flowers, sublimed	"		2.15
Red	"		.06 1/4 @ .07 1/4	(60% nitro-glycerine)	"		.18	Light filtered	"		.14 1/4 @ .17 1/4	Talc—N. C., 1st grade	sh. ton		13.75
Asphaltum—				(75% nitro-glycerine)	"		.21	Extra cold test	"		.21 1/4 @ .26 1/4	N. Y., Fibrous, best	"		10.20
Ventura, Cal.	sh. ton		32.00	Glycerine for nitro (32 2-10° Be.)	"		.12 1/4 @ .13	Gasoline, 80° @ 90°	"		.14 @ .19	French, best	100 lbs.		1.25
Cuban	lb.		.01 1/4 @ .03 1/4	Feldspar—Ground	sh. ton		8.00 @ 9.00	Naphtha, crude, 68° @ 72°	bbil.		9.05	Italian, best	"		1.62 1/2
Egyptian, crude	"		.05 1/4 @ .03	Flint Pebbles—Danish, Best	lg. ton		14.75	"Stove"	gal.		.12	Tar—Regular	bbil.		1.95
Trinidad, refined	sh. ton		35.00	French, Best	"		11.75	Linseed, domestic raw	"		.62 @ .63	Oil barrels	"		3.65
San Valentino (Italian)	lg. ton		16.00	Fluorspar—				Bolled	"		.65	Tin—Crystals	lb.		.20 @ 3.00
Seysse (French), mastic	sh. ton		21.00	Am. lump, 1st grade	sh. ton		\$14.40	Calcutta, raw	"		.85	Oxide	"		.42
Gilsonite, Utah, ordinary	lb.		.03	2d grade	"		13.90	Ozokerite	lb.		.11 1/4	Uranium—Oxide	"		2.25 @ 3.00
Select	"		.03 1/4	Gravel and crushed, 1st gr.	"		13.40	Paints and Colors—				Zinc—Metallic, ch. pure	"		.07 @ .