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The material for our annual statements and accounts of the progress of the Mineral Industry was so abundant and varied that we were obliged to carry over much of it to the present week, and to give this issue also very much the nature of a review. This, however, needs no apology, for we believe that our readers will find very interesting reading in the various district and other reports which we present to-day.

The copper market has shown this week extraordinary excitement, and to-day Lake copper is selling in New York at 14 1/8 and 14 1/4 cents a pound, the highest price for a long time, and no less than 3 1/4 cents higher than a year ago. Consumption is large at present and stocks of Lake copper for immediate delivery are scarce, all the producers being sold for some time ahead. Electrolytic copper is also higher, selling to-day for 13 3/4 cents. The rise has been too rapid and a sharp reaction will very probably follow. The heavy demand warrants good prices, but anything like a boom should be deprecated.

Tin has also been very strong and shows a rise of 1 1/4 cents during the week, selling to-day at 22 cents, or 8 cents above the quotation a year ago. Visible stocks are low, and the speculation in this metal has been very strong.

Some of our English contemporaries hardly seem to understand the present position of the iron market in the United States. They assume that the sales of iron and steel for export are made because our plants are only partially employed, and that as business improves here we will have to withdraw from the foreign market. As we understand here, this is very wide of the mark. Our home demand for iron and steel in all forms is on a larger scale than ever before, and our makers are able to satisfy it and have a surplus for export only because the productive capacity has been very largely increased within the past two or three years. This increase, moreover, is still going on, and there is no doubt that we shall be able by the close of 1899 to meet any possible demand here and still be able to keep up competition in foreign markets. A proof of this is found in the fact that, notwithstanding the great increase in sales recorded, there has been only a very moderate increase in prices of iron and steel of all grades.

The condition of affairs in the Transvaal grows continually worse, and the tension of feeling between the "Uitlanders"—who include all the mine-owners and operators—and the Government is increasing. The imposition of a tax of 5 per cent. on dividends was accepted with only a few protests, but now a new land tax is proposed, to be levied on all property owned by foreigners and by corporations, citizens of the Republic being exempt. This, course, means that the tax is to be paid by the mines and industrial enterprises only. At the same time the Government refuses to grant any reforms, and maintains the railroad, dynamite and other monopolies in full force. The feeling is very strong, and protests are being sent to Great Britain in the hope that the British Government may interfere.

At one time it seemed as if the Boer rulers of the Transvaal were disposed to act justly and moderately, but it seems now as if the demoralizing influences had been too strong, and they have given way to the temptation to load the mining industry with all the burdens it can possibly bear. The material interests of the Uitlanders in the country are too great to permit them either to withdraw or to stand taxation indefinitely, and there is apparently serious trouble in prospect.

Some time ago the British Board of Trade appointed a special commissioner to inquire into and report upon the conditions and prospects of British trade in certain South American countries, and his report on the Argentine Republic has just been published. He gives striking instances of the falling off of British trade, and in discussing the various causes he remarks: "The want, in Great Britain, of the use of the metric system, which is the basis of the great bulk of first-hand business here (the Argentine) is undoubtedly a great drawback to British trade, especially in estimates for engineering work and such like."

This is a warning and a lesson which applies to us as well as to Great Britain. We are reaching out now for trade with foreign countries, and nothing will help us more in securing it than to adopt the system of weights and measures which is in use by the greater part of the civilized world. There is no reason why we should delay, especially when the system desired is a far more simple and convenient one than that we have. Now is a good time to press on the notice of our representatives in Congress the pending bill providing for the adoption of the metric system in all public works and public business.

The feeling in favor of the system in Great Britain is growing also. The Decimal Association is doing good work there in stirring up public opinion, with excellent results.

As we have noted from time to time in our news columns, the wire combination has been arranging for extensions, and these negotiations are said to have finally been completed. The existing trust, known as the American Steel and Wire Company, transfers its property to a new corporation of the same name, which is also to acquire other plants, including the great works of the Washburn & Moen Manufacturing Company, in Worcester, Mass., the largest in the world. Of course there is a great expansion of stock, the capital of the new company consisting of \$40,000,000 in 7 per cent. preferred stock and \$50,000,000 in common stock. Of this \$33,600,000 (\$12,000,000 preferred and \$21,600,000 common) will go to the stockholders of the old company, leaving the balance to acquire new properties. The evident intention is—patterning after the Federal Steel Company—to make the preferred stock an investment security, leaving the common as another “industrial” for the gamblers of the stock markets. The stockholders of the absorbed companies have no complaint, as they receive a high price for their securities—in the case of the Washburn & Moen Company it is said to be over 200 on the company's stock.

Our opinion of these combinations has often been expressed. They should be treated to free competition, and all the protection which they now have should be removed. In the present case also it must be remembered that it is not a very difficult matter to start new wire plants, and the process of buying these up at a high price may easily reach a limit, great as is the power of the wire trust at present.

#### ERRATA.

While, so far as we have discovered, there were no errors in the statement of reports of quantities produced, in the table of “Mineral and Metal Production in the United States,” published in our issue of January 7th, yet, owing to the haste with which the computations had to be made, the books being closed on the day of going to press, and owing to some typographical mistakes, certain errors occurred in transposing customary with metric measures and in unit values which should be corrected. Thus the value of barytes per metric ton in 1897 and 1898 should be changed to \$4.41, and the total of 1898 should be entered \$122,733. The total value of the coke product in 1898 should be \$21,700,000 and the average \$1.71 per metric ton. The totals and averages for 1897 and 1898 should be changed to read \$3,906,715 (\$14.10) and \$3,180,000 (\$12), respectively. The production of sulphur converted to metric tons should be 1,717 and 2,723, respectively. The value of the lead product in 1897 should be \$14,156,609, and that of quicksilver \$910,418. The production of gold in 1898 was 96,750 kilograms, and that of silver 1,992,522 kilograms.

Later returns lead us to change our estimates of the production of “other substances” to \$143,435,899 in 1897 and \$147,065,000 in 1898. These alterations necessitate changes in some of the totals, which should be as follows, the figures for 1898 being given first and the corresponding figures for 1897 following in brackets: Total non-metallic, \$487,493,443 (\$475,473,367); total metals, \$307,422,953 (\$266,830,417); grand total, \$794,916,396 (\$742,303,784); duplications, \$57,728,976 (\$56,455,031); net total, \$737,187,420 (\$685,848,753).

By an oversight, the foot note “j,” which referred to “kilogram or per kilogram,” was omitted. There were certain other errors of trifling importance in the conversions to metric measure and in misplaced decimal points, all of which were obvious.

#### ELECTRICITY IN MINING.

For many years it has been acknowledged that electricity can furnish the power for every line of mining work. At first it began with signaling, then blasting, and there was a pause. The idea of using electricity as a power for heavy work seemed absurd when exemplified to the ordinary observer in a current carried by a little copper wire, not much bigger than a telegraph or telephone wire. It was in Colorado that the first applications on a large working scale were applied, and the combination of water power and electricity was put in practice. The installment at the Virginus Mine is a familiar example.

Now we find electricity employed for hoisting, pumping, drilling and all the operations of mining. There was a hitch about the drill, the gadder and the coal-cutter, but it seems to have been overcome; so that it is now safe to say that there is nothing done in mining which can be done by steam power directly, or indirectly by compressed air or wire rope transmission, which cannot be done equally well by electricity—the selection depending upon difference in first cost, running expense and maintenance. The strange thing is that in some cases electricity has helped its competitors, as, for example, in the combination with air compressors.

Recently the advances have been quiet, but in reality revolutionary.

In Ohio and Pennsylvania coal mines electric coal-cutters have made a place for themselves, despite the opposition of those who desire to maintain hand labor and object to all machinery on general principles, and the antagonism of rival machine systems.

Underground haulage is another wide field for electricity. The system is particularly applicable in this direction, supplanting the clumsy chains, wire ropes, etc., and lessening the chance of accidents.

Of recent noteworthy plants we now mention only that of the Colorado Electric Power Company, at Canyon City, a full description of whose plant has already been published in the “Engineering and Mining Journal.”

The advantages of electric power distributed to small consumers are well proved at Cripple Creek. This is a most important point—the installing of small power plants where the mine owners could not afford steam hoisting and pumping works.

One great field for electricity in mining at present is not in connection with steam power, or a competition with wire ropes or air transmission, but where it can take advantage of water power. The difference between old and new conditions is that formerly the water power had to be above the point of application; now it may be thousands of feet below. If anyone had dared propose to a physicist of only a couple of generations ago that this could be done, the idea would have been pronounced incredible. Yet here we have a mechanical paradox in actual working shape.

#### THE BOSTON COPPER STOCK SPECULATION.

The speculation in copper stock in Boston continues unabated, and the rise in nearly all sorts of stocks has gone on almost unchecked. It is true that there have been occasional slight reactions, but they have only served to emphasize the general upward tendency. As in all boom times, the strongest stocks seem to be the purely speculative ones, and the advances in the steady dividend payers and investment stocks are relatively moderate in amount. Thus we find this week such old Boston favorites as Calumet & Hecla selling for \$640; Tamarack at \$199; Quincy at \$148; Osceola at \$82; Atlantic at \$34, and so on. Now these are high ranges of price, it is true; but they are for properties having a substantial value, and are not out of sight of their real paying capacity. It is in the new companies and in a few old ones which have been revived from well merited oblivion that the speculation is strongest.

There are possibly a few of these that may earn a position in the future, but most of them are unknown quantities. Some of them are even known to be worthless, but that makes no difference at the present time. When we find Butte & Boston selling at \$88; Arcadian at \$70 and Isle Royal at \$42, we must conclude that no known rule of valuation can be applied in such a market. The purchase is not of the stock, but is merely made on the chance of selling again at a profit while the boom lasts.

Naturally, such a market is bringing out a long list of new companies, some of them already organized in anticipation of the present movement, others hastily brought on the market to catch purchasers before the tide turns. Land in the neighborhood of the well known Lake Superior mines is capitalized at a fabulous rate, and the shares seem to find an immediate market without reference to any real values. Indeed, it almost seems as if the more worthless they are the better they sell.

Thus, to quote a few instances only, we find the old Minnesota, abandoned years ago after having been worked at a heavy loss, incorporated as the Michigan, and the stock subscribed for four times over. The Rhode Island, the Mendota, the Pawnee, the Old Colony are all companies based on lands whose value is really unknown and entirely in the future; yet they are paid for at a rate which would be sufficient for developed and producing mines. The list could be made to fill a page.

Of course such a boom as this cannot last forever, though—equally of course—buyers and speculators act as if it would. There is no known method of controlling people when such a craze takes possession of them, but the warning should be given, whether it is heeded or not. The copper stock boom is sure to collapse before long, though it is impossible to predict the time. It may be a few weeks or a few months; but the reaction will be ruinous in its effects for the time, and will leave only a load of stocks—no more worthless than they are now, but then utterly unsalable—as the only reminiscences of its course.

As we have said, it is little use to warn speculators at such a time; but investors should be very wary of new properties capitalized under present conditions, and should buy no stocks which have not an approved value, or are recommended by known honest and capable management. Only in this way can they avoid the losses which the boom is sure to leave behind when it finally vanishes.

## NEW PUBLICATIONS.

"Annual Report of the Iowa Geological Survey for 1897, and Accompanying Papers." Dr. Samuel Calvin, State Geologist; H. F. Bain, Assistant State Geologist. Des Moines, Iowa; F. R. Conway, State Printer, 1898. Pages, 427; with maps and illustrations.

This report, the sixth annual one of the Iowa State Geological Survey, forms Volume VIII. of the series. As in the earlier reports, the work has been well done and is to be commended as being inspired by an earnest desire to assist in the practical development of the mineral resources of the State. This tendency by no means precludes good scientific work; on the contrary, it appears that the two lines, of purely geological investigation and of economic exploration and exploitation, can be carried on simultaneously to advantage.

The present volume comprises the administrative reports of the State Geologist and assistants, and the following principal papers: Geology of Dallas County, by A. G. Leonard; Geology of Delaware County and of Buchanan County, by Dr. Calvin; Geology of Decatur and Plymouth Counties, by H. F. Bain, and Properties and Tests of Iowa Building Stones, by H. F. Bain.

With the work of the season of 1897 the mapping had been completed in 26 counties, besides which some work has been done in every county in the State, and in many it will require but little additional work to make a complete report. In addition to the areal work of mapping, special studies have been made of coal, clay, artesian waters, gypsum, lead, zinc, etc. The director notes that the reports of the Survey have been favorably received, appreciated and made use of by mine and quarry owners and prospectors, and by capitalists seeking information as to investment in Iowa mineral properties.

A considerable portion of the time of the geologists has been spent in the study of the Drift, with the object of mapping the different Drift sheets and formations as a preliminary step toward making an accurate soil map of the State. A not unimportant part of the work of the Survey has consisted in answering inquiries relative to the locations of various minerals in the State and their possible development. On the one hand various citizens send in to the Survey samples of clay, stone, coal or other minerals which they think are valuable; and, on the other, intending investors apply for information as to minerals or districts which they are interested in developing. As the director well says, it is the province of the Survey to bring these two classes together. It is not possible, of course, in every case to give a favorable report, but if the sample submitted is of good quality and the other factors which must be taken into account seem favorable, a personal inspection of the deposits, as far as possible, is made, and the matter is then brought to the attention of those likely to be interested. Among the minerals thus reported on are cement, chalk, clay, coal, flint, gypsum, lime, marble, ocher, stone, lead, iron, mineral paint, peat and limestone pure enough for use in connection with the manufacture of beet sugar. The director reports that in certain cases their work has led directly to placing orders. An opinion by a disinterested State officer naturally receives more attention than any given by local commercial bodies of interested persons, and in this way the Iowa Survey has done much to advertise the resources of the State. It is, of course, a question how far it is politic to go in this direction, but evidently the motive of the Survey officers is wholly commendable.

A systematic report has been made to obtain full statistics of the mineral production of Iowa, in addition to the former existing reports on the coal output, which, however, were made for fiscal, not calendar, years, and were issued biennially. This is an important undertaking and should meet with the hearty support of producers.

Dr. Calvin observes that "by some peculiar trait of mind we constantly minimize the value of the mining development going on around us, while the much more hazardous risk of investment in gold mines far away exerts a seductive influence hard to withstand. It is undoubtedly true that the best policy for any people is the fullest and most complete development of the natural resources of their own territory." Further, he remarks: "It is also important to correct the misapprehension . . . that Iowa possesses no important source of wealth other than agricultural. While the State must always depend largely upon its soils, its mining interests are by no means unimportant." This is borne out by the returns collected as to the mineral production in 1897, which show a total value of \$7,446,800, divided as follows: Coal, \$5,098,103; clay, \$1,591,866; stone, \$587,144; gypsum, \$195,000; lead and zinc, \$5,616, and iron, \$250.

The special papers which are included in this report are of much interest, and the volume is well illustrated.

## BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review on another page of the Journal.

"Memoria que el Ministro de Hacienda Ignacio Rey Presenta al Congreso Ordinario de 1898." Lima, Peru; National Printing Office. Pages, 221, with tables.

"Transactions of the American Society of Mechanical Engineers. Volume XIX., 1898." New York; Published by the Society. Pages, 1,033; illustrated.

"Biennial Report of the Bureau of Geology and Mines, Missouri, 1898." John A. Gallagher, State Geologist. Jefferson City, Mo.; State Printers. Pages, 68.

"Seventh General Annual Report by the Board of Trade of Great Britain, of the Companies Winding up, 1898." London, England; H. M. Stationery Office. Pages, 82.

"List of Beacons, Buoys and Day Marks in the Third Light-House District." Corrected to July 1st, 1898. Washington, D. C.; Government Printing Office. Pages, 146.

"Physico-Chemical Methods." By Dr. J. Traube. Authorized Translation, by Willett L. Hardin. Philadelphia; P. Blakiston's Son & Co. Pages, 238; with 97 illustrations. Price, \$1.50.

"The Journal of the Federated Canadian Mining Institute. Being the Proceedings for the Year 1898. Volume II." Ottawa, Ont.; Published by the Institute. Pages, 219; illustrated.

"Lighting by Acetylene." By William E. Gibbs. New York, 1899; D. Van Nostrand Company, and London, England; Crosby, Lockwood & Son. Pages, 161; illustrated. Price, \$1.50.

"Twelfth Annual Report of the Bureau of Industrial and Labor Statistics for the State of Maine, 1898." Samuel W. Matthews, Commissioner. Augusta, Maine; Printed for the Bureau. Pages, 213.

"Introduction to Chemical-Technical Analysis." By F. Ulzer and A. Fraenkel. Authorized Translation, by Hermann Fleck. Philadelphia; P. Blakiston's Son & Co. Pages 188; illustrated. Price, \$1.25.

"Commercial Organic Analysis; Volume II., Part 1. Fixed Oils, Fats, Waxes, Glycerol, Nitroglycerine and Nitroglycerine Explosives." By Henry Leffmann. Philadelphia; P. Blakiston's Son & Co. Pages, 388. Price, \$3.50.

## 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.

## Prospecting in Porto Rico.

Sir: The general impression existing that the West Indian islands only need a fair opportunity in the way of being provided with good government and lighter taxation to become great mineral producers is apt to cause disappointment to any intending prospectors. The rocks of the island of Porto Rico are most uninviting to the mineralogist. Feldspars form a very small percentage of the rocks; hornblende is every where and greatly in excess. Indeed, hornblende schist and crypto-crystalline hornblendic granite are the main rocks of the two mountain chains forming the island.

The American is told of many gold and copper mines among the mountains by the garrulous natives. Visiting three of these, I found one so-called gold mine to be a very nice example of the incrustation of pyrites; another was a spot where a peon and his mother removed the equivalent of a Spanish dollar daily by panning a gravel deposit in a mountain stream. The mother lode may have some richness, but in all probability the deposit is but small, as the gold is found to even this small an extent in but the one spot.

In another place a deposit of impure malachite had been developed and exhausted after half a cargo of ore had been transported on mule-back to the coast. North of Juncos, however, there is what seems to be a very large deposit of iron ore, a French engineer having calculated for the owner that at least 35,000,000 tons were in sight. The ore is magnetic, contains 66 per cent. of iron and only 0.023 phosphorus. In all probability this deposit will be developed if American engineers consider there is enough ore in sight to justify the enormous initial expenditure necessary for ore-handling railroads and docks. A really large deposit of good ore within easy distance of our coast would mean much for the seaboard iron trade if in hands strong enough to institute as modern and complete a system as there is between the Superior deposits and the Valley furnaces; for there is but 300 miles more of water haul, and the railroad distance at either end is considerably less.

The mountain ranges of Porto Rico are probably as old as our Appalachian system, and their mineral bearing deposits will probably be found to be about as rich. In no river bed did I see any rocks, such as diabases, euphotides or trachytes, which might have played the part of mother rock to a mineral deposit; it was hornblende schist and granite, basalt and eruptive rocks, as dry and uninteresting from the mineral hunter's standpoint as the most barren part of our Maine coast. In short, so far as my observations extended, there seems to be no prospect of mineral development in Porto Rico other than what one could expect of our well explored Atlantic States.

The departure of two brickmakers from Baltimore for Porto Rico recently was noted in the daily papers. They expected to introduce the manufacture of good, hard-burned bricks into that island. In this connection it might be noted that Porto Rican clay is nothing but alluvial mud. The rocks of the island being so poor in feldspar the mud is, in consequence, poor in kaolin. The Porto Rican scoops up his mud, molds, dries and burns it for \$4 (Spanish) per 1,000 bricks. Even if the material would stand hard burning without hopelessly melting, it would not pay the native manufacturer to spend the fuel necessary for hard bricks. He fears no freezing in the pores of his product and is abundantly satisfied with the inferior article. Brick houses in Porto Rico are covered with plaster of paris, and where plaster of paris stands outside exposure there is no need to burn brick hard.

W. V. Pettit.

Philadelphia, January 1st, 1899.

IRON-COVERED TIES IN MINES.—At the Johann Deimelsberg Colliery, in the South Essen mine inspection district, in Prussia, the sleepers in the roads where haulage is effected by horses are covered with wide channel irons, 4 mm. thick, for protecting them from wear, and, thanks to this arrangement which has been in use for three years, wear of the sleepers is entirely prevented. In the same manner the wear of the paving stones laid down in the roads—which stones, with the wood sleepers in their immediate neighborhood, were soon worn away—has been considerably reduced since the sleepers have been protected.

THE ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

Specially Reported for the Engineering and Mining Journal.

The annual meeting of the Geological Society of America was held at Columbia University, New York, from the 28th to the 30th of December, 1898, and was noteworthy for the large number of members in attendance at its sessions and for the number and character of the papers presented. The report of the council showed that the society had had a very prosperous year, and reviewed in brief the history of the first decade of its existence, which really closed with this meeting. To quote in part from the introduction to that report, the society has united the geologists of the continent, produced harmony of feeling, thought and labor, created and cemented friendships and prevented the geology of America from becoming provincial in character. It has stimulated research and publication and has placed on record a great body of knowledge. The avowed purpose of the society, "the promotion of the science of geology in North America," has been carried out, and already the "Bulletin" has given it a prominent place among the older societies of the world.

The address of welcome was delivered by President Low, of Columbia University, after which the necrology of the year was read, which consisted of a memorial of Professor James Hall, by Professor John J. Stevenson, of New York University. From the standpoint of a friendship which continued for more than 30 years, the speaker briefly sketched an outline of the life of the celebrated scientist to whose labors, carried on for more than 60 years, the State of New York owes more than its citizens appreciate. These labors were fully described in the "Engineering and Mining Journal" for August 13th, 1898.

After reading his memorial of Professor Hall, Professor Stevenson delivered the presidential address, "An Outline of the History of Geological Societies in America," of which we can give but a condensed resume. Several travelers in the eighteenth century, among them especially Guettard, Alexander and Schoepf, gave more or less important information respecting the geological structure and mineral resources of our country, but geological work, properly so called, began only with McClure's studies in 1806. By 1820 the students of geology had become so numerous that the American Geological Society was organized in New Haven, Conn., where meetings were held certainly until the end of 1828. On April 2d, 1840, as a result of the conference held in Albany in 1839, eighteen geologists met at the Franklin Institute in Philadelphia and organized the Association of American Geologists, with Professor Edward Hitchcock as chairman. The advantages of union and personal contact were so manifest that the following year (1841) the naturalists applied for and gained admission to the association. In 1842 the first series of geological surveys practically came to an end, and the geologists were scattered, many of the younger men being compelled to enter other callings. The Association of Geologists and Naturalists held its meetings regularly, but its strength diminished, and in 1848 it yielded to outside pressure and became merged into the American Association for the Advancement of Science.

The conditions which rendered imperative an association of geologists in 1840 were the conditions in 1880, only more oppressive. The problems of 1840 were chiefly those of a narrow strip within the Appalachian areas; those of 1880 concerned the whole continent. Geologists were increasing in numbers, but opportunities for making persons acquaintance were few; midsummer meetings of societies could be attended only by those who were not connected with official surveys or who were detached for office work. Workers were gathering into little groups on geographical lines, and there was danger that our geology would become provincialized. In 1881 the tension was such that several geologists connected with official surveys urged the formation of a geological society to bring about closer bonds among geologists, and they succeeded at the meeting of the American Association of that year in securing the appointment of a committee to consider the matter, but this committee was not able to accomplish anything very definite until 1888. Then under the guidance of a committee of organization, consisting of Profs. A. Winchell, J. J. Stevenson, C. H. Hitchcock, John R. Proctor and Edwin Orton, a provisional constitution was adopted, making the original membership of the new society rest upon membership in Section E (geology and geography) of the Association, thus avoiding a split with the parent society. Permanent organization was effected during the holidays of that year by the election of Prof. James Hall as president, and Profs. James D. Dana and Alexander Winchell as vice presidents, and the new society was fairly launched on the career which has amply justified its existence.

The number of papers dealing directly with subjects from an economic standpoint which were presented was not large, since the society does not trench much on the territory of the American Institute of Mining Engineers. Probably the most important paper from the geological side was that by C. D. Walcott, in which he described the occurrence of well marked fossils from a horizon 4,000 ft. below the Cambrian beds in Montana. The remains are separated segments of crustaceans related to the Euryuterus of the waterlime beds of the Upper Silurian. These are by far the earliest organic remains now known.

I. C. White, State Geologist of West Virginia, discussed the origin of the grahamite in Ritchie County, W. Va. Grahamite is a black, coaly mineral looking like anthracite, and it is very closely allied to the albertite of Nova Scotia. It consists essentially of 79 per cent. carbon, 6½ hydrogen and 14 oxygen. In Ritchie County it occurs in a vertical fissure nearly 5 ft. in greatest width, 7 miles from the ridge known as the Oilbreak, which is the top of an anticlinal fold. Years ago it was mined as a fuel, but the enterprise was never profitable. Within a year well-paying oil wells have been put down within a few hundred feet of the fissure. The theory of origin is that the crack, which was produced by the forces causing the anticline tapped the Pottsville conglomerate oil sand and that the oil flowed until nature plugged up the orifice with the products of the oxidization of the oil, paraffines, tarry products, etc., from the consolidation of which the grahamite has

resulted. In West Virginia grahamite and its related oxygenated hydrocarbons are considered economic guides to petroleum, if the country is not too much broken up by folds.

Another paper of economic interest was that by Edward Orton, the veteran State Geologist of Ohio, on the structure of the Iola gas-field in Allen County, Kansas. Natural gas is more widely distributed, geologically and geographically, and exists in larger quantity than any one would have claimed 20, or even 10, years ago, its productive horizons covering the entire paleozoic column of the country. Two distinct divisions can be made of its accumulations, viz., that which is stored in impervious rocks, such as shales and most limestones, and that which is found in porous rocks. These divisions may be provisionally styled shale gas and reservoir gas, each having characteristics of its own. Shale gas occurs in comparatively small wells, which lack uniformity of rock pressure. It does not occupy definite horizons; it exists independently of petroleum in many cases and has staying qualities—it does not depend on the structural arrangement of the strata which contain it. Reservoir gas is found in great wells, one in West Virginia having produced 75,000,000 cu. ft. a day. It approaches uniformity of rock pressure in each sub-division of territory, occupies definite horizons, is accompanied by oil, and its wells generally come to a sudden end. It has accumulated in sandstones and conglomerate. Two structural phases of rocks are specially important in this connection, the anticline and the terrace, and the time has come for the acknowledgment of structure in reservoir gas fields, even in advance of measurements. The gas field of Iola, in the southeastern corner of Kansas, is one of great promise. Its source is in a sandstone of the Cherokee shales, near the bottom of the coal measures, and its area is about 7 miles long by 3 miles in extreme width. This horizon proves to be a terrace of well marked character. The top of the gas rock has an average elevation of 131 ft. above tide, at no point rising more than 45 ft. above this. At this summit the largest well of the field is located and produces 10,000,000 cu. ft. per day. The gas is being used in enormous quantities and to very great commercial advantage by the smelters of Joplin, Mo., in the reduction of lead and zinc ores.

The Conshohocken plastic clays were described by T. C. Hopkins, of State College, Pa. These clays form a very valuable deposit about 13 miles northwest of Philadelphia. They are evidently not glacial in origin, and their origin is doubtful on account of their isolation. Their resemblances to the cretaceous clays of New Jersey and of Gay Head, on Martha's Vineyard, in colors, texture and structural features suggest that they are of the same age.

"Geology of the Crystalline Rocks of Manhattan Island and Vicinity," by F. J. H. Merrill, Albany, N. Y., was an interesting paper. The stratified rocks within the area under consideration belong to two principal divisions, the Precambrian and the Palæozoic. Of the Precambrian only one member can be recognized, which has been called "Ford Gneiss." Of the Palæozoic, there are two persistent members, the "Inwood Limestone" and "Manhattan Schist," and a third of local and slight development, the "Lower Quartzite," which underlies the limestone. The Fordham gneiss, named from the former town of that name, is a gray banded gneiss. It forms the east shore of the Hudson in southern Westchester County and the ridge on the east side of the Harlem River above 155th street. On New York Island it is exposed between Seventh and Eighth avenues south of 155th street. It also forms Blackwell's Island and the west shore of Long Island. The Inwood limestone is the crystalline limestone of southern Westchester County and Manhattan Island, and is an abundant source of good building material. The Manhattan schist is the prevailing rock of Manhattan Island and forms the north shore of Long Island Sound. The important waterways about New York City owe their origin chiefly to the solution of the crystalline limestone and subsequent submergence of the region. Long Island Sound, at least in its western part, owes its origin to the solution of limestone.

C. W. Hayes, geologist to the Nicaragua Canal Commission of Congress, delivered an interesting and valuable paper on "The Geology and Physiography of the Lake Region of Central America," in which he said in part: The region described includes Southern Nicaragua and Northern Costa Rica, extending from about 10° 30' north to about 12° 30' north latitude and from the Caribbean Sea to the Pacific Ocean. It comprises the route of the proposed Nicaragua Canal and the largest lakes of the Western Hemisphere south of the glaciated region of North America. The region is characterized by two types of topography, the recent volcanic mountains and plateaus in which the original constructional features are more or less perfectly preserved, and the areas of Tertiary igneous and sedimentary rocks, in which the forms are due to long continued subaerial erosion. A noteworthy feature is the absence of any continuous mountain range or chain of dominant peaks. No rocks older than the Tertiary are found along the line of the canal. They consist of eruptive and sedimentary formations, the former including basalt, andesite and dacite and the latter calcareous sandstones and shales. In addition to these Tertiary rocks there are extensive alluvial deposits and the tuffs and lavas of the modern volcanoes. The conditions throughout this region, but particularly in the eastern portion, are favorable to rock decay and the regolith is unusually extensive. In the eastern section it consists of 10 to 30 ft. of red clay at top, underlain by blue clay with a somewhat greater depth and passing downward into thoroughly weathered rock or saprolite, in which the original structure is more or less perfectly preserved. The depth to hard rocks varies from 50 to 150 ft. In the western section the regolith is much thinner and the red clay is almost entirely wanting, the residual products being blue or gray. In early Tertiary time this portion of the isthmus may have been wholly submerged. At any rate, marine sediments were deposited throughout a considerable part of its extent, and this was accompanied by intense volcanic activity. In middle Tertiary time there was an uplift and long continued erosion, the previous volcanic topography being obliterated, and the region, at least toward the south, being reduced to one of low relief. The present basin of Lake Nicaragua was then occu-

pied in part by a gulf connected with the Pacific to the northwest and in part by the valleys of tributary streams. The continental divide then occupied the hilly or mountainous region east of the lake, crossing the present San Juan Valley near Castillo. In late Tertiary or post-Tertiary time the isthmus was elevated at least 300 ft. and deeply dissected. Following the elevation came a renewal of volcanic activity. A series of rents on the Pacific side and their ejecta built a dam across the outlet of the gulf, thereby forming the lake basin. As the dam increased in height the waters behind it were raised until they overtopped the continental divide and escaped to the Atlantic, forming the present San Juan river. The region has suffered a recent depression by which the rivers were drowned and the estuaries thus formed have since been silted up.

N. H. Darton announced the discovery of fossil fish in the Jurassic beds of the southeastern part of the Black Hills region. Robert Bell stated that he had found gold in the pyrites which occurs very abundantly in rocks of Huronian age at the northwestern part of Hudson's Bay. J. B. Tyrrell gave a detailed account of gold mining in the Klondike district, illustrating his paper by means of lantern slides made from negatives taken by himself last year (1898). P. K. Gilbert said that careful study of the Niagara escarpment in Niagara County, N. Y., the past season had shown him that its greater features were pre-glacial, though glacial erosion had wrought important modifications. The Medina shale was so deeply sculptured as to obliterate its pre-glacial relief and substitute a broad fluting in the direction of ice movement. At Thirty-Mile Point a mass of strata several hundred

## MILAN C. BULLOCK.

It is with deep regret that we hear, just as we go to press, of the death of Milan C. Bullock, in Chicago, January 12th. His energy and ability as an engineer and business man commanded admiration and respect; and his personal qualities, known through years of intercourse, made him a valued friend to us, as to very many others—indeed, to nearly all with whom he came in contact. Through a long life of hard work and struggle he was always bright, cheerful and alert. He was always ready to help young men, and his ready sympathy and bright companionship made him friends everywhere he went.

Mr. Bullock was born in Granville, Washington County, N. Y., June 26th, 1838, was brought up on a farm in his native place, where he worked until he was 18 years of age, after which he served an apprenticeship with a miller to learn the trade, but was finally compelled to abandon it on account of ill health. When the civil war broke out he promptly enlisted, but was rejected on account of asthma, from which he was suffering at that time.

At the age of 24 Mr. Bullock bound himself as an apprentice to learn the trade of a machinist, and entered upon this work with such firm determination to go to the front that he made unusually rapid progress. He was promptly rewarded for his energy and ability by promotion, and when he had served but eighteen months was made foreman of a shop employing from 35 to 40 men. After serving his full time as apprentice, Mr. Bullock commenced changing from shop to shop for the purpose of getting wider experience, his unvarying good nature and



MILAN C. BULLOCK.

feet broad was moved by the ice. The activity of the fellows of the society is indicated by the fact that 46 papers were presented for reading at this meeting, covering a wide range of subjects. About 100 fellows were present during the sessions. The next meeting will be held in connection with the American Association for the Advancement of Science, at Columbus, Ohio, in August, but the next winter meeting takes place at Washington, D. C. The president for the ensuing year is Prof. B. K. Emerson, of Amherst College, Massachusetts, and the vice-presidents are Dr. G. M. Dawson, of Canada, and Dr. C. D. Walcott.

**NEW METHOD OF WATERPROOFING PAPER.**—The German journal, "Neueste Erfindungen," describes the following method of making a waterproof paper: The sheet is coated on both sides with a solution consisting of one part gelatine, four parts water and one part glycerine. When dry the paper is immersed in a 10 per cent. solution of formalin. After this treatment the paper is said to become impervious even to steam.

**BEECH WOOD FOR MINE TIMBERS.**—The experiment has been made by the mine inspectors of the Clausthal District, in Prussia, of using beech and fir for supporting the roof, instead of pine wood, which is very dear; and the conclusion arrived at is that both these woods are to be preferred as props where the thrust of the measure is not too great. It is quite another matter, however, as regards knotty and cross-grained beech wood that is not suitable for timber but is generally sold for firewood; while the straight-grained and more valuable beech trunks are not very suitable for mine timbering on account of their liability to split. Inasmuch as both beech and fir wood are far cheaper than pitch pine, in Prussia, it must be considered that a great saving may be effected by this innovation. The experiments are to be continued.

persistent push always gaining him friends among shopmates and employers. During this time he worked in machine shops of all kinds, from Massachusetts to Missouri.

In 1866 Mr. Bullock entered the employ of the Steam Stone Cutter Company of Rutland, Vt., manufacturers of the Wardwell channeller, and remained with it for two years, when he became connected with the old Windsor Armory Company of Windsor, Vt., which was then engaged in manufacturing diamond drills and channeling machinery, where he undoubtedly gained the particular experience which has subsequently become of so much value to himself and the mining industry in general.

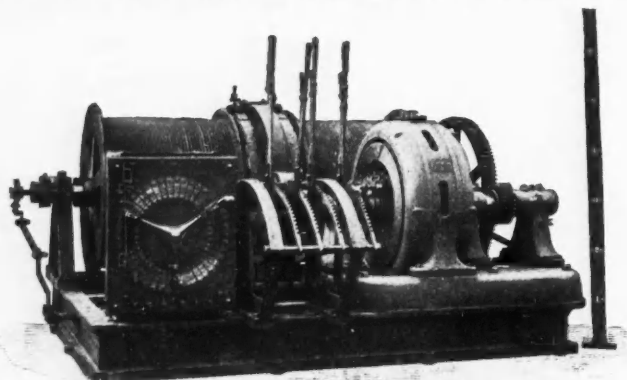
In 1870 Mr. Bullock was engaged as Superintendent of the Pennsylvania Diamond Drill Company, where he put down at Phenix Park, under the most discouraging circumstances, the first very deep hole ever put down by the use of a diamond drill. While engaged with this company he made and patented a number of important improvements on diamond drills, and in conjunction with Jacob Shelby brought out and patented the long-hole process of shaft sinking, made famous by that eminent engineer, Gen. Henry Pleasants, who (when other mining men were calling Mr. Bullock "that crazy Yankee crank") at once recognized its advantages and had the courage to accept and adopt his plans in sinking the two East Norwegian shafts, near Pottsville, Pa., to a depth of 1,685 ft., with remarkable rapidity for that time.

Mr. Bullock designed and made all the working drawings for the drill machines used in sinking these shafts, in five days and nights. The speed of sinking, which was then considered phenomenal, ranged from 80 ft. to 130 ft. per month, as against a speed of 20 ft. per month in sinking the Wadesville shaft through the same measures.

After building up a very satisfactory business for the Pennsylvania Diamond Drill Company, Mr. Bullock was offered and accepted, in the fall of 1871, the position of General Superintendent of the American Diamond Drill Company of New York. His first work for this company was to introduce the diamond drill at Hell Gate, New York har-

bor, where it was used successfully by Gen. Newton in exploring ahead of the work in the tunnels, headings and chambers. Mr. Bullock also introduced the diamond drill for prospecting purposes among many mines and quarries of the Eastern States, overcoming all the numerous difficulties which he encountered. He also designed many new and novel forms of drills used in submarine blasting, ventilating mines, etc. In the fall of 1873 Mr. Bullock superintended and built the plant used by the late Henry Meigs, of Lima, Peru, in driving the famous Lima & Oroya Railroad tunnel through the Andes at a height of nearly 14,000 ft. above the sea level, this being at the time the highest tunnel in the world.

In the summer of 1874 the American Diamond Drill Company failed, having lost a great deal of money in outside speculation, and in going down ruined Mr. Bullock financially. Nothing daunted, however, he began again and aided in reorganizing the company as the present American Diamond Rock Boring Company. Owing to some friction in the management of this concern, Mr. Bullock resigned in July, 1875, and went to Chicago, where he engaged in business on his own account with a very small capital of only \$600. For the first three years he found his undertaking hard work, but his energy and indomitable pluck won, and in 1878 he commenced the business of the M. C. Bullock Manufacturing Company with a force of two men and a boy, and about \$1,800 worth of tools and fixtures. Aiming at a high standard of excellence both in design and workmanship, and determined that nothing but strictly first-class work should leave his shop, he found it difficult to compete with cheap-made Western machinery, but perseverance and strict adherence to his rule have brought success, and in time a large and prosperous business was built up. To diamond drills the company added the manufacture of rock drills, air compressors, hoists and other machinery and steam engines; the "Bullock Corliss"



DOUBLE DRUM HOIST WITH ELECTRIC MOTOR.

being especially designed for its work. The latest addition was the Willans high-speed engine, of which Mr. Bullock had a very high opinion.

His death was somewhat unexpected, though he had been in failing health for over a year, but nothing seemed to interfere with his cheerfulness and energy.

#### A DOUBLE DRUM HOIST AND ELECTRIC MOTOR.

The electric hoist illustrated shows one of the recent applications of a General Electric induction motor to a double independent drum Lidgerwood mine hoist. It is compact in form and the levers controlling the clutches and brakes and the handle of the rheostat are placed in the position most convenient for control by the operator, who stands on a platform above the floor and has a clear view over the top of the hoist.

Each friction drum is driven through a single reduction gearing by a 100 volt 12-pole induction motor of 30 H. P. capacity running at 600 revolutions per minute. Each drum is independent and is 42 in. in diameter by 40 in. face. Together they hold about 420 ft. of  $\frac{3}{4}$ -in. rope. The maximum hoisting speed is 300 ft. per minute, and the weight hoisted—load, car and cage—is 2,100 lbs. The depth from which the load is to be hoisted in this case is 400 ft. from the surface.

#### A COUPLING FOR ENDLESS ROPE HAULAGE.

The "Official Report on Improvements in Prussian Collieries" describes a simple device which is shown in the accompanying illustration. The Von der Heydt Colliery, near Saarbrücken, the haulage to the screening floor is effected by main and tail rope, in sets of 120 mine cars, which have a collective length of 200 m. For bringing the cars up to the screens in sets of 12 together, and for making up the sets of empties, a mechanical haulage plant has been laid down on either side of the main haulage road with endless rope. The partial sets of cars are coupled to the rope by the clip shown, the action of which is as follows:

To the lever *a* is attached a coupling rope, having at its other end a hook, which is hitched into the eye of the draw-rod or into any other part of the car. When the lever *a* is placed in the position shown by the figure, the rope will, owing to the eccentric form of the lever at the point of rotation, be clamped fast. The endless rope is, as a rule, in continuous motion; and the clamping of the clip on to the running rope is easy and simple. After the lever has been taken off, it may be again brought up to the rope so as to effect the clamping, and the more the lever is pulled upon by the coupling rope through the car attached to it,

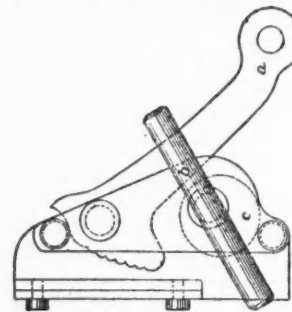
the tighter will be the clamping between clip and rope. The clip may be taken off from the rope by turning the key or handle, *b*, and with it the eccentric, *c*, which pushes away the lever, *a*. Moreover, not only can the disconnection be made very easily, but also the clip itself can be removed in an instant, and the clamping and unclamping of the clip is effected by the lad in charge of the loaded or empty cars.

#### FLUORSPAR.

The production of fluorspar in the United States in 1898 was probably rather less than in 1897. The chief producer was the Fluorspar Company of St. Louis, which operates mines at Crayneville and Annora, Ky., and vicinity. This company erected a new grinding mill at Crayneville and offers to deliver spar with a guarantee of 98.5 per cent. calcium fluoride. It has opened eight mines and reports that it has large bodies of mineral in sight. The Rosiclare Mines of Illinois were closed down in the first half of the year, and it is said to be doubtful if they will be reopened. The mines of Porter, Hudson & Company in Kentucky were turned over to the Kentucky Fluorspar Company, which operated them during the year. A new company, called the Eagle Fluorspar Company, was organized to operate in Kentucky. This company expects to become a producer before the end of January, 1899. The average value of the Kentucky fluorspar produced in 1898 was \$6 per ton, f. o. b. mines.

#### GRAPHITE.

Ticonderoga, N. Y., continues to be the only place in the United States where high grade crystalline graphite is produced. The output in 1898 was 1,400,000 lbs., December estimated, against 993,138 lbs. in 1897. Considerable attention was devoted to the graphite mines in Halleck Canyon, near Wheatland, Wyo., and arrangements have now been made to exploit them, a market for the product having been found



COUPLING FOR ROPE HAULAGE.

in Chicago. There was no output in 1898, but there is likely to be in 1899.

The most important event in the graphite industry of the United States in 1898 was the manufacture of an artificial graphite direct from coke, which it is thought can be put on the market at a price to compete with the natural product. During the year about 200,000 lbs. of carbon rods were graphitized for electrolytic alkali manufacturers in the United States, England and Germany. This reversed the direction of the trade in carbon electrodes, Europe now buying in America, whereas formerly America bought in Europe. It is anticipated that in the near future nearly all electric motor brushes will be made out of this artificial graphite, which has been found to possess not only high lubricating qualities but also an exceedingly high conductivity. The artificial graphite can also be substituted for the natural product in the manufacture of lead pencils, stove polish and paint.

The production of amorphous graphite in Rhode Island in 1898 was about the same as in the previous year, 1,200 short tons. The product was valued at \$8 to \$10 for lump and \$30 per ton for pulverized, f. o. b. Providence. The company engaged in this business is contemplating an extension of its plant, and if this is decided upon there will be a large increase in output in 1899. Some work was done on the graphite deposits of Custer County, S. D.

#### SULPHUR.

Sulphur was mined in the United States in 1898 in Utah, Nevada, and Louisiana. The total production was about 3,000 short tons, valued at \$66,000. The Nevada product was shipped to San Francisco. Utah produced 337 tons. The production of sulphur in Louisiana (made by the Frasch process as in previous years), amounted to 1,427 short tons. Nothing was done at the Louisiana mines after May.

Some exploration and development work was done in the sulphur deposits of Texas, especially on those near Guadalupe. The recent prospecting at this place has shown that a very considerable area is underlain by the mineral, but lack of experience as to the probable yield prevents any trustworthy expression of opinion as to the amount that may be derived from these deposits. It is expected that they will become productive in 1899. A new deposit of sulphur was located on the western rim of the Salton Desert, at the fork of the old Yuma and San Diego stage roads, in San Diego County, Cal. Some mineral was dug and piled up, but the owner stated that no shipments would be made until January, 1899. A deposit of sulphur was also developed near Whittier, Cal., and the discovery of a deposit in the Mojave Desert about 50 miles from Flowing Wells, on the Southern Pacific Railway, was reported.

## TALC AND SOAPSTONE.

The production of fibrous talc, or agalite, in 1898, continued to come, as heretofore, from Edwards and Fowler, St. Lawrence County, N. Y. Owing to the increased requirements of the daily newspapers on account of the Spanish-American war the paper trade was stimulated greatly and consequently a larger amount of fibrous talc was required, so that the statistics for 1898 will show an increase. The increased demand sustained prices at about \$5 per ton, although previously the business had been somewhat upset through the anxiety of some of the producers to make sales. The cost of production left very small margin for profit when the selling price was \$4.90.

There is now a prospect of better times for this industry since an agreement was made by the producers, December 1st, 1898, fixing the price at \$7 per ton. It is questionable, however, if this increase will not affect unfavorably the consumption, since in the paper trade fibrous talc comes into competition with china clay and other loading materials. The production of St. Lawrence County, N. Y., is estimated at 68,000 short tons in 1898, an increase of more than 9,000 tons over 1897.

The business in common talc was quiet throughout 1898. The supply of domestic mineral continued light, but certain of the North Carolina producers were reorganized with a view of working on a larger scale. There was probably a small increase in production, which in the trade is estimated to have reached a total of 10,000 tons. Inquiry was made in various States for new sources of supply, and prospectors were particularly active in Virginia, but no important discoveries were made. American talc sold in New York at \$10 to \$15.50 per 2,000 lbs., according to quality. The supply of French and Italian talc continued as in previous years.

There was no important change in the soapstone business. The Alberene Soapstone Company opened a new quarry at Howardsville, Va., on a stratum of very fine green stone, and production went on in Vermont and New Hampshire as heretofore. A new discovery was reported at Reedtown, near Sandusky, O., but investigation showed that the material was not soapstone at all.

## ALASKA COAL MINING IN 1898.

By W. M. Brook.

George Harkrader, of Juneau, has been developing a vein of bituminous coal on the lower end of Admiralty Island, beginning in July and working five men. The output for 1898 will be about 400 tons. The mine is situated near tide-water. The coal is worth \$8 per ton at the pit, and is claimed to be of better quality than anything else for sale in the Alaska market.

Seattle and Nanaimo coal has been selling at Juneau at \$10 to \$13 per ton. There is no regularity in steamship freight rates, but generally from \$5 to \$8 per ton can be added to the Seattle prices to get the Juneau prices.

Messrs. Samuel Brown of Cripple Creek, Fortner and Engel Brothers of Seattle and Graham of Juneau located 160 acres of coal land about 10 miles northwest of Lituya Bay, in August, 1898. No development work has yet been done but the formation is described as showing a series of horizontal seams aggregating 15 ft. in thickness and separated by thin layers of fire-clay.

## ALABAMA MINERAL INDUSTRY IN 1898.

By E. A. Smith, State Geologist.

The last quarter of the year just closed has been remarkable for the very general revival of the manufacturing interests throughout the State, many establishments already in existence having recently doubled their capacity, while many new industries have started up. This has naturally led to a greatly increased demand for fuel, and about the middle of October the supply of coal on hand was exhausted, and since that time there has been a coal famine. All the mines are at this time working up to their full capacity, but without being able to supply the demand. It is said that one of the largest coal companies has been obliged to buy Pittsburg coal in order to fill its contracts.

The Tennessee Company, which is the largest producer of coal and iron in the State, during the year 1898 erected a large by-product coke plant of the Semet-Solvay patent at Ensley, near Birmingham, where four of its large iron furnaces are located. At the same place there will soon be in operation a steel mill and a rod mill. The company is now putting in additional boilers and engines preparatory to keeping in operation at Ensley all four of the furnaces there, which in the near future will turn out basic iron only. This will involve an increase of 20 per cent. in the amount of dolomite used. To meet this demand the Dolcito Quarry, which at present supplies on an average 30 car loads of dolomite per day, is making preparations to increase its output by about 25 or 30 per cent. The steel mill will require 600 tons of coal a day and the rod mill 300 tons, and in view of this the Tennessee Company is taking steps to increase the coal output at the Pratt Mines. In Slope No. 6 they have recently introduced an endless rope haulage system, by means of which they are enabled to extend the profitable working in the slope almost indefinitely. The same system will be introduced into other slopes (considered as practically worked out under the old system) as occasion may demand. This company may be considered as practically out of the coal market, since the entire product will soon be needed for its own use.

The Pioneer Company is now engaged in opening a slope upon a 7-ft. seam of coal  $3\frac{1}{2}$  miles from the furnaces at Thomas, and is constructing a railroad of standard gauge from the furnaces to the mine. This new mine, which will have a daily capacity of 1,000 tons, will be sunk 1,500 ft. before headings will be turned off, and the appliances for handling the coal will be of the best order.

The Sloss Company is sinking a new slope on the Pratt seam, near

Coalburg, and the mines already in operation are being worked to their limit.

The Tutwiler Company, while not at present opening any new mines, is engaged in the development of the drifts and slope on the Pratt seam. At Murray, where the slope is, 82 bee-hive coke ovens, in double row with gas-flue between, are in course of construction; the gas to be used under the boilers which supply power to the haulage and washer plants.

The other large companies—American Standard, Galloway, Bessemer Land & Improvement, Woodward, Corona, Virginia & Alabama, and Ivy—make the same report of unprecedented demand for coal during the past two or three months and the inability of the companies to supply the demand.

In the western part of the Warrior Field, Mr. T. H. Aldrich is now engaged in developing a comparatively new territory, opening up one of the lower seams of coal measures, the Jefferson or the Black Creek seam. The coal is a good domestic and steam coal, and the openings now started will yield at once 500 tons, with the expectation of going soon up to 1,000 tons.

The iron ore output during 1898 has not shown much additional development. There is, however, a great and increasing demand for brown ore, and one of the most interesting developments in this direction has been made by the Sloss Company in the opening of a brown ore mine near Leeds in Jefferson County, where the hydraulic system is made use of not only in removing the overburden, but to some extent also in mining the ore and moving it to the cars, the washing of the ore being effected at the same time. These mines yield at present about 300 tons a day, the expectation being to increase the output to 700 or more in the Spring. Three of the furnaces of this company have been in blast during the past year, but a fourth will go in blast probably in April.

At this time there are in blast 19 iron furnaces, using each about 500 tons of coal a day; the cotton mills at Gadsden double their capacity this year, the rolling mills at Gate City and at Birmingham are working up to their limits, and, in fact, all the large manufacturing industries report increased activity. This means for the year 1899 a very considerable increase in the coal production. The coal output for 1898 probably exceeded that of the year 1897 by 500,000 tons.

The increase in the price of iron has already led to an increase in the wages of the coal miners of  $2\frac{1}{2}$  c. a ton, and with further advance in the price of iron goes a corresponding increase in the wages, not only of miners, but of other laborers. The outlook for 1899 of all the mining industries and the industries based upon them is exceedingly bright.

## ARIZONA MINERAL INDUSTRY IN 1898.

By John F. Blandy.

In making a review of the mining industry of Arizona for the year 1898 we find that the most prominent feature has been in the line of copper mining. Aside from the fact that the old established companies have increased their production, especially in the United Verde and Globe Districts, there has been such an inquiry for copper properties, that it has caused a very general prospecting in all parts of the territory, and many new attacks on deposits that have long been known. The most successful efforts have been in the Dragoon Mountains in Cochise County, where two furnaces have been erected, and are now getting fairly under way. Very promising developments are also being made in the Whetstone Mountains. Additional work is also being done in Pinal County, near Tucson. A furnace has been built at Williams in Coconino County for smelting ores from the Grand Canon Section, but has not yet been put in blast. Many deposits are known in Yavapai County, and much work has been done in proving them up, notably the Buster in the Peck District; Copper Mountain and the Swindler in Big Bug District. These three will be greatly benefitted by the building of the Prescott & Southwestern Railroad, which was recently finished. There is no more promising section than that south of the United Verde, extending for a distance of four miles, where much work is being done in development, by the several companies who have purchased the mining claims. Next in order come the many mining claims in the Black Rock District, near Wickenburg, where the openings are good and, no doubt, there will soon be a furnace erected. We have only good reports of the copper deposits near Mountain Springs, both as to quantity and value. Many other deposits are known where the ores are high grade, but with copper at an average of 11c. a pound, the mining of that character of ores and nature of deposits, together with cost of fluxes does not make them very promising for profits. In the northeast corner of Yuma County, in Striped Canyon, a large amount of work is being done and the parties interested expect in due time to erect furnaces. This mine is 50 to 60 miles from the railroad at Congress Junction.

Gold and silver mining is more than holding its own all along the line, although no conspicuous discoveries have been made during the year. The two metals are put together, as with the exception of the "White Hills" and several smaller silver mines in Mohave County, the silver production is a by-product with the gold and lead ores. The principal mines of former years, Pearce, Mammoth, Mohawk, Congress, Crowned King, McCabe, Fortuna and King of Arizona, still hold their rank. Probably the most prominent feature in this line of mines is the revival of work at Tombstone in the Head Center Tranquility mines with more than satisfactory results. Twenty-five per cent. of the product is in gold. There is no reason why that camp should not return to its old position as a leader in the Territory. There are fourteen cyanide plants in the Territory which handle about 400 tons per day. The average percentage extracted is reported as 85 per cent., and the agent of the Gold and Silver Extraction Company states that better results at less cost are obtained in the Arizona works than in any other country.

The lead production, which has always been small, will soon be large-

ly increased by the mines in Chloride District, Mohave County, where the veins are large and contain silver enough to pay expenses. There are also some very large deposits being opened in the Santa Teresa Mountains, about fifty miles northwest of Wilcox.

#### ARKANSAS COAL MINES IN 1898.

By Robert Boyd, State Mine Inspector.

There has been little, if any, development to increase the production of coal in this State during the year 1898. No additional companies have been formed to mine coal, and any new openings made by those engaged in the business were designed merely to take the place of others worked out and abandoned. The production of coal in the State during the year 1898 was nearly 200,000 tons over that of 1897, but this increase was due rather to greater demand than to any increased capacity to produce. The prospect for a very material increased production of coal in the future is very bright, especially in Sebastian County, which is the center of the coal mining industry in the State. One new railroad, the Choctaw & Oklahoma, extended from Wister Junction, in the Indian Territory, to Little Rock, Ark., passes right through the center of the coal field, furnishing an outlet for the product. The contemplated extension of the Missouri Pacific from a point 15 miles south of Fort Smith to Texarkana, this extension also passing through the center of the coal fields in Sebastian and Scott counties, furnishes a direct outlet south for the product.

The superior quality and peculiar character of this coal—it being nearly smokeless under combustion—makes it a general favorite.

There has been a marked improvement in the development and equipment of mines in this State during the past year, the development under ground being conducted on the most improved principles for sanitation and large production, while the top equipment is of the most extensive and modern character, especially designed for separating, preparing and loading the various grades of coal demanded by the trade.

#### CALIFORNIA MINING IN 1898.

By Our Special Correspondent.

In the early part of the year 1898 now closed, up to the end of July or thereabouts, gold mining was in an essentially prosperous condition; but the dry season bringing a lack of water stopped or materially affected the active work for the reason that a large number of mines had been relying upon water for power. Ever since hydraulic mining stopped the owners of ditches have arranged to supply water under pressure for the operation of quartz mines, and when this failed a general shut-down followed. For this reason there will be a heavy falling off in the gold yield of the State, which can only be expected to rank second in the gold producing States, Colorado taking the lead.

The mining interests of Colorado are in a remarkably healthy condition, and the mines there offer an attraction for capital which is coming in from every State in the Union, as well as from England, France and Germany. Another advantage is afforded upon the discovery of a new district there, the construction of branch lines by the railroad companies affording facilities for the introduction of cheap fuel and mining supplies of every description, as well as for the transportation of ores to points where numerous smelters are in operation. In many places the miner gets from 90 to 95 per cent. of the gold values, at a cost of from \$3 to \$5 for transportation and reduction; sometimes the charges being as low as \$2.50 where silica is much in request. In this way the prospector with a small mine can ship in carload lots of an assay value of from \$15 to \$20 per ton, getting cash ranging from \$12 to \$16 on delivery. This system has proved beneficial in the extreme for Colorado, while a lack of something similar has inured to the disadvantage of California; with proper railroad facilities many mines along the Mother Lode could be supplied with coal cheaper than the wood now used for steam purposes.

California gold mines have a great future before them when the necessary capital is forthcoming, as the State is possessed of vast and unequalled resources in the way of water power. By utilizing this for electrical purposes and transmitting the power derived therefrom for distances of from 10 to 50 miles, with proper attention to the storage of water in the mountain reservoirs and dams, an abundance of power can be secured during the entire year. In fact, from the present outlook no better investment for capital can be suggested than the storage of water flowing from the Sierra Nevada Mountains. In California facilities exist for the distribution of hundreds of thousands horsepower, at distances ranging from 10 to 75 miles. A plant of the kind has just been completed in Tuolumne County, by the Rawhide Company, where the electrical transmission is now secured of 3,000 H. P. Here the water falls 1,100 ft. before reaching Phoenix Lake, 12 miles from Sonora. In the meantime the capacity of storage reservoirs in the mountains is being largely increased, insuring a safeguard in the future against such a calamity as that which has befallen Tuolumne County this year through lack of water. The best of it is that in this case the water is again distributed into the main ditches after it has been utilized at the electrical works, making it available for the use of similar plants at lower levels in its course down the mountains to the sea level. This is only one point out of many where transmission of this power is available, the fall being as a rule, sufficient to cover the vast territory below the foot hills, even as far as San Francisco. All that is required is the necessary capital to develop a valuable and highly remunerative adjunct of the gold mining industry in California.

Outside of the old-time mining districts which have maintained their usual conditions of activity throughout the year, considerable attention has of late been paid to Del Norte, Siskiyou and Shasta Counties by investors. A large amount of work has been done in these sections on quartz lodes, the veins being as a rule small in comparison with the deposits on the Mother Lode. In Shasta considerable work has been done in the development of copper mines, and appearances are that

these copper deposits will eventually make this the leading county of the State. Elsewhere there has also been considerable attention paid to copper mining. Down in Madera County capitalists have been engaged in opening up a deposit of copper ores, and good developments are reported in Plumas County, samples of ore reaching San Francisco of a highly encouraging character. It is rumored that the old Lancha Plana Mine, at Campo Seco, in Calaveras County, is about to be reopened by Eastern capitalists who contemplate the erection of a smelting plant on an extensive scale similar to the works of the Mountain Mines, Limited, at Keswick. This property was a large producer in the early '60's, and many thousands of tons of ore were shipped to Europe and the East.

In the southern section of the State the mines of Randsburg are still fulfilling the sanguine predictions made for them when they were first discovered. Work has now settled down in this district to a legitimate basis, the boom feature having been entirely eliminated. The Vanderbilt mines, which were under a cloud for some time, have commenced to loom up as a prominent factor in the bullion yield of the State, although the original owners turned them down as worthless. Recent developments there have been such as to bring the district into high favor again, the ore body being very rich and of a permanent character.

River dredging will be a prominent feature of mining operations in California during the coming year. Experiments made at various points have resulted most favorably, and a number of new enterprises are already outlined for operation on the upper reaches of the Sacramento and on the northern river channels.

In the way of foreign flotation the year has been very barren of results. The methods of promoters in the past have been such as to alarm investors inclined to enter the State. Any offerings calculated to win success in the future will have to show proof of merit, with a more liberal system of payments based upon the productive character of the property.

With the assurance that the rainfall will be up to the average for the present season, giving a full supply for working purposes at the mines, the year 1899 ought to be one of the most prosperous of any recorded in the annals of California mining.

#### COLORADO MINERAL INDUSTRY IN 1898.

Clear Creek County Mines in 1898.

By R. C. Bonney, Special Correspondent.

The year 1898 was a prosperous one for Clear Creek County. Its production was of silver, gold, lead, and copper. The output for the year was slightly over \$4,000,000, and was divided as follows: Gold, \$1,747,922; silver, \$2,033,622; lead, \$170,340; copper, \$67,810. These figures were obtained through the ore-buying concerns of W. J. Chamberlain & Company, Kilton Reduction Company, State Ore Company and Dewey Brothers, together with information furnished by independent shippers and the mills of the county. There was a decrease in the output of silver and an increase in the other three minerals. Iron ores of the district carry the more precious metals, and while the iron is not paid for, such ores command a lower treatment charge, figuring on a mutual iron and silica basis.

Over 600 new locations were made in the county and over 200 patents were obtained.

In the upper part of the county is the silver belt, and the greater production of white metal comes from that locality, and among the working camps are Silver Plume, Georgetown and Lawson. Empire is also classed in the upper parts, but it is on the sulphide belt, and the ores from that locality carry gold. However, the upper end produced \$10,000 of the copper and more than half of the lead.

Lower Clear Creek is the gold section of the county, and its camps include those of Idaho Springs, Dumont, Yankee, Freeland and Lamartine. The latter, however, is a heavy producer of silver. Most of the gold output came from points tributary to Idaho Springs, which is the treatment point for all of the ores of the lower end. Of the total product almost one-half of the value was handled by the mills, the capacity of which exceed 500,000 tons per year. These are intended for the low grade minerals, which cannot be shipped direct to the smelters at a profit.

Silver Plume has the biggest silver mines, and the production there is good. Smelting and wages are lower, and the profits are almost as great as in the earlier days of mining. There is a great amount of work being carried forward under the leasing or tribute system. Miners prefer that to day's pay, although they pay high royalties. Some new work among these properties has been undertaken and the development has been steadily advanced during the 12 months.

At Georgetown some silver mines are working and these have been augmented by two gold properties—the Centennial and the Griffith. The town has never recovered from the great depression, but during the year the production was fully one-third more than for 1897.

Empire is one of the camps that has come to the front during the year. Several deals of importance were made. The Conqueror, Silver Mountain and Tenth Legion-Gold Dirt properties produced the heavier tonnage of ores. The Atlantic mill was erected at a cost of about \$10,000 for the treatment of ore with tables. Several tunnels were driving, one of which—the Marshall—took up and had patented 100 claims on its line. Another tunnel of promise is being driven by Byrns & Kilton to reach the mines of Silver Mountain and the north part of Empire.

At Lawson the principal silver mine is the Joe Reynolds, which has sunk its shaft to a depth of 800 ft. and extended levels to reach ore bodies that were found near the surface. The Rochester-Bellevue tunnel is a new undertaking for reaching the same hill, but far to the west. It has but recently been equipped with compressors and air drills. The Princess of India tunnel has also a good record for the year, and a strike of importance was made during the summer which drifting on the vein has proven to be of great size. But very little work was done on Red Elephant Mountain, yet in the early days of silver mining it was a great producer of that metal and plans are forming for the



resumption of work, such as tunneling, to overcome the water difficulties.

At Dumont the work was development on some of the newer finds of gold. The sulphide belt is of great size here, the pay streaks being frequently 25 ft. wide and of milling values. Capital has been lacking, but one scheme nearing completion is that of installing an electric light and power plant at this place to supply the mines of both Gilpin and Clear Creek counties with power. The coal expenses at the mines are now very heavy.

Yankee Hill is some distance from the railroad lines and it has not received much recognition. However, the local operators are well satisfied with the district and have carried forward development. The Chesapeake Tunnel added compressors and air drills, and pushed the bore ahead until a good lead was cut. For three months the drifting continued on it, and as a result the tunnel has proved a success, and the production and shipment of smelting ore from now on will be under way. The Alice Mine started in early in the year with California backing, which was withdrawn before the working of the big ore deposit could be made a success, so that it continues as one of the future problems to be solved, just as occurred at the Homestake and Treadwell mines, where the deposits were large, but of low value.

The tunnels around Idaho Springs perhaps received greater attention than any other feature of mining. With the exception of the Newhouse the following tunnels are being driven ahead to cut various parts of the mineral belts: Perkins, for the Alps Mountain, with a big strike made early in December; Mammoth, which has added compressors and air drills, and is pushing ahead to intersect at great depth the gold lodes passing from Spanish Bar and Spring Gulch to the west; Toll, owned and being driven to reach the Banner District and Freeland lodes, over 100 of which are patented, by Clarence Stephens, of New York; Wilcox, in Dry Gulch, which has opened up sylvanite ore worth \$5,000 a ton, the first in the county; Pennsylvania, opening up a group of 200 patented claims on Fall River, and which is extending to the mines of Russell Gulch, United States, in Hukill Gulch; Star, B. B., Sears and Chicago Mountain, driving in various directions up Chicago Creek; Golconda, working with air drills and heading for the lodes between Fall River and Spring Gulch; Knickerbocker, to open the great Crown Point Vein and also as a crosscut; Lamartine, in connection with the mine, which has opened up a deposit of ore 1,500 ft. west of the first pocket (which produced \$3,000,000) and at a greater depth on the vein—1,000 ft. below the surface.

The Newhouse Tunnel, which was driving early in the year, was stopped with the commencement of the war with Spain and it has laid idle up to this time. It is heading for the lodes of Seaton Mountain and those in Gilpin County, cutting a belt over 4 miles wide and opening over 1,000 known lodes. Some changes are contemplated, and it is expected that the tunnel will again be driving within another 3 months.

Cripple Creek Mines in 1898.

By Our Special Correspondent.

The Cripple Creek District has quite fulfilled its promise of a year ago. The production has increased, new prospects have been opened, and a number of old ones have developed into mines. The amount of dividends paid is much greater than in previous years. A number of substantial improvements have been made, the most important being the introduction of electricity in the district for use in the mines, etc.

The production of the district for the year amounted to about 381,600 tons of ore of the total value of \$14,501,849. Of this 107,750 tons of the value of \$69.90 per ton, making \$7,531,725, were treated by the smelters, and 272,800, of the value of \$24.95 per ton, making \$6,807,724, was handled by the chemical mills. The stamp mills probably did not handle much over 1,000 tons of the value of about \$10 per ton.

Below is shown the tonnage by months treated by the smelters and chemical mills:

Months.	Smelting, Tons.	Milling, Tons.	Total, Tons.
January.....	8,290	20,200	28,490
February.....	11,310	18,400	29,710
March.....	9,968	22,300	32,268
April.....	8,237	21,050	29,287
May.....	9,917	23,705	33,622
June.....	9,168	22,511	31,679
July.....	8,629	22,400	31,029
August.....	9,592	24,939	34,531
September.....	6,542	24,800	31,342
October.....	9,192	24,098	33,290
November.....	7,395	24,057	31,452
*December.....	9,000	24,300	33,300
Totals.....	107,750	272,800	381,550

\*Estimated.

It will be seen that the heaviest tonnage was taken out in August and the next largest in May. The smelting ore of the district was treated by the three Denver smelters and the three in Pueblo, with a little going to Leadville. Of the milling ore, 94,150 tons, of the value of \$1,790,261, or about \$19.02 per ton, were treated at the Metallic Extraction Works at Florence; 77,588 tons, of the value of \$2,420,720, or about \$31.20 per ton, were handled at the Colorado-Philadelphia Company's works at Colorado City. The El Paso Reduction Company, at Florence, also treated about 36,000 tons of ore of the value of about \$25 per ton. The balance of the milling ore was treated by the local mills, the Gillette Reduction Company, Brodie Gold Reduction Company and the Colorado Ore Reduction Company. The Kilton, at Florence, also treated some ore.

The following table shows the production of the district since the year 1891:

1891.....	\$2,300	1895.....	\$6,970,015
1892.....	585,010	1896.....	8,499,300
1893.....	2,010,367	1897.....	11,500,000
1894.....	3,250,787	1898.....	14,339,449
Total.....			\$47,157,503

A large amount of development work has been done in the mines during the year, besides a good deal of prospecting, and the mines are probably in a better physical condition than ever before. Among the principal shippers at present are the Portland, Gold Coin, Independence, Strong, Legal Tender, Vindicator, Lillie, Victor, Isabella, Union, Zenobia, Free Coinage, Modoc, Last Dollar, Half Moon, Anchoria-Leland, Moon-Anchor, Gold King, Anaconda, Mary McKinney, Raven, Elkton, Thompson, Battle Mountain, Consolidated and others. The Strong, which, during the first part of the year was one of the heaviest shippers, has lately been devoting most of its energies to development. The C. O. D., Abe Lincoln and Ironclad, which have been idle some time, have recently resumed work. The Moose, the old-time producer on Raven Hill, is still idle. The Jack Pot, on the same hill, during the latter part of the year has shipped a large amount of ore. The Thompson, on Gibbon Hill, near the Elkton, has developed into quite a shipper. The Orphan Bell on Bull Hill has proved somewhat of a disappointment, being now only worked by leasers. The Pharmacist has been practically closed during the past few months. Great activity has been noticeable in the vicinity of the town of Independence, especially during the latter part of the year. The Hull City Placer of the Independence Town and Mining Company has made a splendid record as a shipper. It will pass from the leasers to the company the first of the year. The leases on the Mary McKinley, near Anaconda, will also expire about the first of the year. The Fluorine, on Copper Mountain, has made a fair record as a shipper.

Considerable work has been done on the tunnels of the district, the principal ones being the Uintah, Battle Mountain, Columbine-Victor, Standard, Raven, Ophelia, Gold Hill and Red Mountain. The Ophelia and Gold Hill tunnels were driven quite extensively during the early part of the year. The Standard has recently begun work on a new contract of 600 ft. The Red Mountain has been run for the prospecting of Red Mountain, which is at present outside of the producing district. No work has been done on the Good Will tunnel this year.

The principal new working shafts put down are: Moon-Anchor, 4½ by 15 ft.; Lillie, 4½ by 15 ft.; Independence Town and Mining Company, 5 by 14 ft.; Portland, 5 by 15 ft., and a lot of smaller ones. The Lillie shaft was upraised from the bottom to the collar of the old shaft. The Portland has just begun its new shaft on the Captain claim.

Among new hoisting plants are the Victor, Moon-Anchor, Half Moon, Modoc, Ajax, Lucky Guss and a number of smaller ones. The Moon-Anchor hoist is direct connected, there being but 2 of this kind in the district. The Independence Town and Mining Company will soon be ready for its new hoister, as will also the Mary McKinney.

No new railroads have been built into the district from the outside, but the two steam roads already in, the Florence & Cripple Creek and the Midland Terminal, the former especially, have extended their tracks and now a large number of the producers have close railroad connections. The Florence & Cripple Creek Railroad will soon have its tracks to Altman. The Cripple Creek District Electric Railway was completed about the first of the year, but at present it is used for passenger service only. It runs from Cripple to Victor via Gold, Globe, Ironclad and Bull hills and Battle Mountain, and is patronized extensively by the miners. This company has an electric plant run by water-power at Lake Moraine on Pike's Peak, about 10 miles from Cripple Creek, but it has not been used since October 1st, the current being supplied from the local light plant.

No new mills have been erected, although some of the old ones have been remodeled. The Economic Gold Extraction Company has begun a 600-ton chlorination plant near Victor, which is expected to be finished in May. It is being built by the Woods Investment Company to treat ore from the mines controlled by that syndicate. The stamp mills did very little during the year, but just at its close they seem to be making a feeble effort to revive. The samplers ran much as usual. The Gold Ore Sampler started up under a new management. It is also understood that the Kilton Sampler has been leased by one of the mines.

The Lillie has been changed into an English company. The Woods Investment Company has secured control of the Mt. Rosa Company. James Doyle has disposed of his holdings in the Portland. The Battle Mountain Consolidated Company has purchased the Trail group of mines and the Uintah Tunnel. A deed conveying to the Crippen-Lawrence Investment Company of Denver the Jewel Lode on Womack Hill has been placed in escrow. The Katherine Claim of the Nugget Company has been bought by the Elkton Company, which has also purchased the Apple Ellen Claim. Another payment has been made on the Orphan Bell Group.

The most important lawsuit filed during the year is between the Portland and Strong. The question of apex rights is involved, and it bids fair to be a hard fight. Other suits were the Portland and Uintah Tunnel and the Jefferson and Anchoria-Leland. The Portland and Granite have settled their differences, as have also the Garfield-Grouse and Mineral Rock. The patent on the Hull City Placer has been issued after several years of litigation.

This year has not done much for the extension of the producing district. The Fluorine Mine, on Copper Mountain, has kept up its record as a shipper, but no other ore to amount to anything has been found in the vicinity. A large amount of work has been done on Red Mountain, which lies west of Copper Mountain, and though good reports have been heard about it, no ore in any quantity has been shipped. In the Gillette District the Bolivia has attracted a good deal of attention, but it recently closed down. Ore in paying quantities has been opened up on the school section in Grassy Gulch, and while no ore has been discovered before in this vicinity, it is still within the eruptive area.

The number of applications for patents on mining claims has not been very great. A number of applications were made on claims on Copper Mountain and vicinity on account of the strike on the Fluorine.

The year has been essentially a dividend paying one. Most of the old payers have continued to distribute dividends at the same or increased rates, and some new ones have been added. Following is a list of the principal dividends paid: Portland, \$570,000; Victor, \$350,000; Elkton Consolidated, \$220,000; Vindicator, \$177,625; Moon-Anchor, \$165,000; Lillie, \$153,950; Gold Coin, \$120,000; Anchoria-Leland, \$72,000;

Golden Cycle, \$60,000; Matoa, \$25,000; Montreal, \$7,500; total, \$1,921,075. The Raven and the Modoc also paid some dividends, the exact amounts of which are not known, but they will be enough to bring the total over \$2,000,000. The Associated Gold Mining Company and the Jersey Leasing Company also paid some dividends derived from the working of leases. The Strong is supposed to have paid good dividends, but its affairs are not made public. A number of properties are owned by private individuals, and there are also quite a number of paying leases. The dividends paid by the Matoa and Montreal were derived from royalties paid by lessees. The Portland has resumed its payment of 2c. dividends during the year, and it is now distributing \$60,000 per month among its stockholders. The Victor pays quarterly, and for the last 3 quarters has been paying at the rate of 40 per cent. per year on its capitalization. The Elkton has passed its December dividend, and it is understood that beginning January 1st it will distribute quarterly. The Moon-Anchor has also changed to quarterly and is paying at the old rate. The Vindicator is a new payer and distributes quarterly. It began in April, and has declared 4 dividends, the last to be paid January 1st, 1899. The Isabella has not declared any dividends during the year. The Orphan Bell Company paid a good sized dividend from money received from the sale of property.

The year 1898 marks the introduction of electricity into the district for mining, etc. The Colorado Electric Power Company has put in a generating plant at Canon City, about 25 miles distant. The power was turned on August 17th, and there are now 23 electric hoists at work, aggregating 325 H. P.; Ingham, 30 H. P. geared hoist (this hoist is situated in a tunnel and is used to hoist from a winze); Jack Pot, 16 H. P. friction, also 5 H. P. geared (in winze); Mary Anne, 15 H. P. geared; Joe Dandy, 5 H. P. geared (winze); Trilby, 10 H. P. friction; Ben Harrison, 5 H. P. geared; Wisconsin, two 15 H. P. geared; Modoc, 5 H. P. geared, Clyde, 10 H. P. friction; Findley, 15 H. P. geared; Deadwood, 5 H. P. geared; Garfield-Grouse, 5 H. P. friction, also one of 30 H. P.; Lafayette, 30 H. P. motor attached to steam hoist; Los Angeles, 30 H. P. geared; Hart 15 H. P. geared; June Bell, 15 H. P. geared, and Wild Horse, 15 H. P. geared. These hoists are all connected to Station No. 1 on Bull Hill. Besides the above, a 5 H. P. geared hoist is to be put in on the Trachyte, and also one of the same kind on the Victoria. A 100 H. P. motor is in place at the Lillie to be used in running the compressor, and one of 75 H. P. at the Taylor & Brunton Sampler. Distributing Station No. 2 is on Globe Hill and will be running by January 5th. From this several other hoists will be supplied: Badger Boy, 15 H. P. geared; Last Chance, 15 H. P. geared; Ironclad, 5 H. P. geared, and Home Fraction, 15 H. P. geared. Also 100 H. P. has been contracted for to run the pump at the Moon-Anchor and about 75 H. P. for the Rio Grande Sampler. The electric hoists in use are small and mostly used by leasers. They seem to give good satisfaction. Another large electric plant is being built at Goldfield by the Smith-Moffat syndicate. This plant is a steam one and will not be ready for use just yet. It is understood that considerable of the current will be used by the mines controlled by the owners of the plant.

On the whole, Cripple Creek enters the new year with very flattering prospects.

#### Gilpin County Mines in 1898.

By Our Special Correspondent.

Gilpin County has maintained its reputation as a steady and increasing producer. The production for 1898, as near as can be estimated, is \$3,881,968, divided as follows: 62,518 tons of mineral, \$3,031,968; mint purchases, \$800,000; shipped to New York and other sources, \$50,000; total, \$3,881,968; production for 1897, 6,012 tons, \$3,637,705; increase for 1898, 2,406 tons, \$244,263.

The above represents the shipments of smelting ore and concentrates over the Gulf Road to the Denver and Pueblo smelters and elsewhere. The following figures are taken from the statistics compiled by the "Register-Call":

1893.....	\$2,574,300
1894.....	2,844,851
1895.....	2,969,126
1896.....	3,094,954
1897.....	3,637,705
1898 (estimated).....	3,881,968

Total from 1893 to date..... \$18,998,904

This represents the production since the discovery of gold in this country by Gregory, the Georgian pioneer. The greater portion of this is gold, the silver percentage being small.

The smelting grades was of a higher value this year than formerly, attributed to the rich ore shipped from the Topeka, Lillian and East Notaway. In most cases the milling ore averaged as in former years. In no case has it been lower.

In the older sections, 2 miles of Central City, increased depth has opened the properties better than ever.

Gilpin County to-day owes its success to the leasing and home-pool system of working its mines, as has been proven during the past year in the successful starting up of more than one property which had been idle for 20 or 30 years. And to this is due the desire of capital to invest more heavily in Gilpin mines. In 1898 there were very large deals consummated, still a careful estimate would place the amount of money transferred at about \$250,000. There have been more new plants of machinery put in and shot houses erected than at any time since the early days. During the summer the Gulf Railroad increased the freight charges on ores from both Gilpin and Clear Creek Counties, but a strenuous protest brought back the former rates. The present smelting rates are hard on some of the low grade iron propositions. The tin-pail brigade, that is, the working force of miners, numbers about 2,000, of which 1,700 find employment in the older sections and the balance in the outlying districts. The usual wages are \$2.50 around Central City, and at Nevadaville \$2.75. No labor unions or organizations prevail, and the county has been free from strikes since the day of its discovery. The miners are considered among the best in the whole State and are in demand everywhere.

Considerable placer operations have been carried on in the northern portion of the county, on South Boulder Creek and on North Clear Creek, with satisfactory clean-ups. The heavy snows will insure longer operations in 1899. The Pactolus Hydraulic Mining Company, at Yosemite, will build another plant next spring.

The strikes in the Topeka, East Notaway, Lillian, Pierce and other mines continue to make money. With the exception of the Topeka, these mines had been idle since the sixties, awaiting a little development. The Topeka is now producing heavily a good graded mill ore. A new bunch of free gold ore, struck on December 1st, gives returns of over 2,000 oz. of gold per ton. Of the larger properties, the Cook, operated by Boston parties, is the best equipped of those on which work was started during the past year. A fine shaft has been sunk 620 ft. since April 1st. The daily product is 125 tons and the working force numbers nearly 150 men. The Phoenix-Burroughs and Pease-Kansas have shipped over 100 tons every 24 hours, of a fair grade ore, and employ nearly 100 men. The Gregory-Consolidated Mines Company, operating the Gregory and Bobtail properties, is producing heavily. The Concrete is one of the most consistent producers, and the Fisk, operated by New England capital, is swelling its past record of \$2,000,000. The old section of the county has done well and the outlying sections of Pine Creek, 12-Mile, Gilpin, Moon Gulch and others will be heard from at a no late date. The outlook for Gilpin County is very bright. The stamp mills at Black Hawk, oftentimes designated as the home of the mills, as the first one in Colorado, was erected there in 1860. The following is a list of the active mills with the stamps dropping: Bobtail, Black Hawk, 75 slow drop; Gilpin, Black Hawk, 50 slow drop; Mead, Black Hawk, 40 slow drop; Eagle, Black Hawk, 35 rapid drop; Polar Star, Black Hawk, 40 slow drop; Hidden Treasure, Black Hawk, 75 slow, 10 rapid drop; Randolph, Black Hawk, 50 slow drop; New York, Black Hawk, 50 slow, 20 rapid drop; Oro, Black Hawk, 10 rapid drop; Iron City, Black Hawk, 25 rapid drop; Penn, Black Hawk, 35 slow, 10 rapid drop; Vendome, Nevadaville, 30 rapid drop; Wide Awake, Wide Awake, 20 slow drop; Rollins, Perigo, 25 slow drop; total 460 slow, 140 rapid drop.

These 600 stamps are treating 800 tons of ore every 24 hours; besides the Rocky Mountain Concentrator treats 75 tons, and the Chamberlain's and State Ore Sampling Works are handling together 125 tons, bringing the total daily production of mineral handled to 1,000 tons. During the past year 40 stamps of the rapid drop pattern were erected, and at Gilpin a 25-ton rapid drop stamp mill is going up, showing a tendency to rapid drop rather than slow drop. At Black Hawk a small smelter or roaster process is about ready, with a daily capacity of 10 tons for experimental purposes, and it is understood that a 50-ton cyanide plant will be put up in Black Hawk during the coming year. In the Pine Mining District a roaster is being built in the Elk Park concentrator, which is expected to prove a success on the low grade ores in that camp.

#### KANSAS MINERAL INDUSTRY IN 1898.

By Erasmus Haworth, State Geologist.

While Kansas has been known principally as an agricultural and stock raising State, it has mineral resources of great value, including lead and zinc ores, coal, oil, natural gas, gypsum, salt, and a great variety of clay.

Lead and Zinc:—The lead and zinc mines are confined to the extreme southeast corner of the State, and are geographically and commercially a part of the Joplin Region of southwest Missouri. Their history is practically that of the region. The first discoveries were made in 1877, and since then the business has been carried on steadily without very great fluctuations. The year 1898 was one of very great prosperity, with an output approximating 75,000 tons of zinc ore from Kansas mines. This is included in the figures for the whole Joplin District, which were given last week. The production of lead ore was not as great as in previous years, but reached about 16,000,000 lbs.

The lead and zinc ores occur in a subcarboniferous limestone, which is a continuation of the formation extending from southwestern Arkansas across Missouri and into Iowa and Illinois.

Coal:—The coal bearing area of Kansas covers nearly one-fourth of the entire State. The Western limit of this area may be roughly defined by a line drawn from the north boundary of the State, 25 miles west of the Missouri River, southwestward to a point 125 miles west of the Missouri line on the southern boundary. The coal bearing strata are from 2,000 to 2,500 ft. thick, being the thickest in southern portions of the State. The non-productive carboniferous rocks overlie these, and at their base is a heavy bed known as the Cherokee shale. The best coal-beds of the State are found in the Cherokee shale, the belt extending from the Weir-Pittsburg mines to Fort Scott, and thence to Leavenworth. At the last named place coal is mined at a depth of 700 to 800 ft.

The quality of Kansas coal is superior to that of much of the coal found further west, and an extended market is thereby secured for it. For 1898 it is estimated that the total output was not less than 4,000,000 tons, with an average value of \$1.20 per ton.

Petroleum and Natural Gas:—Kansas has been a producer of petroleum and natural gas for more than 20 years, but it is only within 5 years that the production has been of commercial value or has had any considerable development. The value of the oil production in 1898 was about \$55,000, or \$5,000 more than the average for several years previously.

The gas production has been increasing very rapidly for 3 years, and this is especially true since zinc smelting with natural gas for fuel was begun at Iola early in 1897. At present there are 6 large zinc smelting works in operation or under construction located within the gas belt. Three of these are at Iola with a total of 5,400 retorts. A very large plant with 3,000 retorts is in operation at La Harpe, while two others are in process of construction near Iola with still another at Cherryvale.

These zinc smelting furnaces do not represent the total amount of

gas used. A number of brick-yards have been established which use gas as fuel for their kilns. The gas is also supplied to a number of villages containing mills and other factories. It is difficult to estimate the total values, but it must have been during 1898 not less than \$250,000, estimated on the basis of the rates charged to consumers by the different companies. The main source of both gas and oil is the Cherokee shale. No well of importance has been found which did not penetrate that formation. From the explorations made it is pretty well established that the gas bearing sands are not continuous like those of Indiana, but are found in pockets.

**Gypsum:**—The gypsum industry continued active during 1898. No new deposits were located, but the development of the older ones continued steadily. At the present time there are 9 plaster mills in successful operation in the State, with another one under construction and nearly ready to begin work.

**Salt:**—Rock salt is mined in Kansas at several points, but the production is very much less than that of evaporated salt, which is made by the ordinary processes and is shipped in every direction, the market being limited only by freight charges. Beginning with 1892 up to 1897 the production has varied from 1,250,000 barrels to 1,500,000 barrels, the price fluctuating between 31c. and 50c. In 1898 the output was greater than in 1897, and reached a total estimated at 1,500,000 barrels, the average price being about 40c. a barrel, giving a total value to the product of \$600,000.

KENTUCKY COAL AND COKE IN 1898.

By G. W. Stone, State Geologist and Mine Inspector.

Estimating the product of a number of mines not yet reported for a portion of the year, the reports from the various coal mines of the State indicate a slight increase over the output of 1897. There have been gains or losses in the several districts and counties, brought about by different causes, local and general. Some localities have had good trade and large production, and others have suffered from strikes and dull trade.

The abnormal increase in Hopkins County of 184,230 tons during 1897, over 1896, occasioned by the general and prolonged strike among the coal miners of Indiana and Illinois, has not been fully maintained during 1898, though the county has done well.

As compared with 1897, I estimate a loss in the county of 34,000 tons. This is small when we consider that there were 961,412 tons produced during 1897, and that the output of 1897 is 150,000 tons in excess of the output of 1896, when the two contiguous coal fields were working as during this year under very similar conditions. The mines in this county have been remarkably free from strikes or troubles of any kind. There was a strike of about two weeks' duration at one of the mines, but it was declared off and harmony was restored and work resumed. But for a six months' strike among the employees of the Taylor Coal Company, in Ohio County, a larger output than that of 1897 would have been made in that county. The six months' enforced idleness of this mine has caused a loss in this county of about 27,000 tons.

I estimate large gains in the counties of Whitley, Knox and Pulaski, occasioned by better trade conditions, and continuous work, whereas, during much of 1897, no mining was done on account of the "Jellico Strike."

The Jellico District is slowly recovering from the paralysis of the great strike of last year, though the output is still far behind that of 1896.

There are but five commercial mines in Union County and two of these are small, and two of the three larger mines were idle four months of the year, caused by strikes among the employees.

I estimate the gain or loss of each mining county, in tons of 2,000 lbs., as follows:

	Gain.	Loss.		Gain.	Loss.
Bell	4,000		Laurence		3,500
Boyd		30,000	Lee		3,700
Breathitt	9,500		McLean		10,000
Carter		21,000	Ohio		27,000
Christian	29,600		Rockcastle		6,500
Davies	4,400		Union		13,000
Hancock		10,500	Webster		28,000
Henderson		38,000	Whitley	120,000	
Hopkins		34,000			
Johnson	4,000		Totals	391,500	295,200
Knox	105,000		Net gain	6,300	

This net gain would make the production of the State for 1898 about 3,290,000 short tons; the output of cannel coal 49,000 tons. About 20,000 tons of coke were made. Most of the mines are now in operation, and if present conditions continue, the output will be greater than in 1898.

There has been a decrease in the production of cannel coal of about 7,500 tons, and the production of coke of about 12,500 tons.

On December 19th only five deaths have been reported during the year as attributable to mine operations, and these mainly from defective mine operations, and not from bad mine conditions. The maximum number of employees was about 8,300.

MICHIGAN AND MINNESOTA IRON MINES IN 1898.

By Dwight E. Woodbridge.

During the season just passed the iron ore mines of the Lake Superior region shipped to market about 1,500,000 tons more than in the year preceding, which had been the largest up to that time by not less than 2,000,000 tons. The total output for the year, when returns from winter all-rail shipments can be made, will be shown as not less than 14,100,000 gross tons, a movement so vast that the ordinary mind fails utterly in grasping its significance. Fourteen million tons of freight

moved for an average distance of nearly 800 miles, almost all of it in a period of less than eight months, a daily movement of not far from 60,000 tons, is a business in one commodity that is a stupendous matter. All this ore must be mined and shipped by rail to docks, loaded into ships, carried over the lakes, shoveled and hoisted out of ships, and then taken many miles by rail again to final destination; and though the transportation business has been wonderfully simplified in the past half-dozen years, an army of men and a mint of money is necessary for its successful conduct.

The writer well remembers the time when the first million tons of ore was sent from Lake Superior in a year. The accomplishment was talked of far and near, more so than the shipment of 14 times that quantity is thought of to-day. It was looked on as the maximum of production, and the early depletion of the mines was prophesied. Mining men looked at the immense piles of ore represented by that million tons, and wondered if there would be any market for ore another year or two. But the million melted from sight, and other millions have followed it in a constantly increasing stream. The uses of iron have widened since then, and things are now commonly made of iron and steel that were not then thought of. Only so far back as 1894 a friend of the writer's was traveling between Duluth and Chicago to induce his principals to put \$1,100,000 into the new Mesabi Range, for which sum they might have gotten almost all that John D. Rockefeller owns there to-day. The times were hard, and the far-sighted men who had that money shook their heads, as they wondered if there ever would be a market for that ore. Since then the Mesabi has shipped and sold over 16,000,000 tons, and its output for the present season has been 4,600,000 tons. So much has the expansion of the nation's industry exceeded the wildest dreams of its captains of commerce but a few years back.

In the increase of the year the mines of Michigan stand pre-eminent, and Minnesota is not so near its sister State as at the close of 1897. Minnesota has increased only about 315,000 tons over 1897, while Michigan has shown a gain of four times that amount, surprising not alone on account of the fact that ranges worked so long have been able to respond to the demand, but from the fact that the new Mesabi with its surface mines from which the steam shovel can scoop up ore at almost nominal cost, has not kept up to the pace set by others. The explanation is simple; it has come to be generally recognized among iron masters that there can be used in the furnace but a certain and well defined proportion of Mesabi ore, considerably less than had been supposed, and less in fact than had been tried and planned for by some of the greatest consumers of the country. At the new great furnaces of one steel company, built with especial reference to the largest possible use of Mesabi ores, in order to bring pig iron costs to the lowest point, it has been found that not over 35 per cent. of this ore is economical. These furnaces were constructed with explosion doors, heavy blowing power, and other devices suggested by experience, and it had been hoped to use not less than 75 per cent. of Mesabi ores in the charge. In view of these and other conditions, it is now a recognized fact that the amount of Mesabi ore that can be taken by the market is fixed at a certain more or less exact proportion of the total consumption, and the iron masters of the old ranges breathe more freely than they did during the new range's first years. That is one of the things that has been settled in the iron trade by the passing year, and a most important one it is.

The year has been important in settling other things of interest to the iron trade as well. It has seen the culmination of the movement of the largest consumer of iron to use none but ore of his own mining; it has seen the economies of transportation so widened that more money can be made by a ship at 50 cents a ton freight than could have been made three years ago at twice that; it has seen the day of wide fluctuations in the price of ores and their products pass away, perhaps never to return; it has seen ores from west of Lake Superior reach furnaces on the Atlantic, and it has seen the export business in iron and steel put on a firm basis of enormous tonnage. Roughly speaking, all these things are results of the development of mines in Minnesota; to be more exact, of the Mesabi Range.

Final returns from all mines are not yet in, but it is probable that the first place in shipping totals has been taken by the Cleveland Cliffs Company, of Ishpeming, with a total of 865,900 tons; the second by the Norrie, of the Carnegie combination, with 832,343 tons, and the third by the Chandler, of the Federal Steel consolidation, with 715,000 tons. For the year there was a reduction in the number of what are called independent producers, so far as Minnesota is concerned, only about 3 per cent. of the State's production being by companies whose output is sold on the general market and who are not closely connected with transportation companies. The peculiar conditions surrounding mining in Minnesota have not spread to other ranges, and the old districts are still mining ore for the market, though this has been sadly curtailed by the entrance of such concerns as the Carnegie Steel Company, the Illinois Steel, the Cambria Steel, and a number of Youngstown and Valley concerns into the mining field. Nine mines of the Lake Superior region have this year made an individual output of over 500,000 tons, four of which have been in the Minnesota fields. Of these four every one is by a company engaged in the manufacture of steel.

The largest individual miner in the lake region is the Oliver Iron Mining Company, whose stock is owned chiefly by the Carnegie Steel Company. Its production for the year has been 2,343,780 tons. Close to it is the Minnesota Iron Company, controlled now by the new Federal Steel, with an output of 2,342,500 tons, and third is the Rockefeller Company, mining on the Mesabi Range, with 927,211 tons, and on the Gogebic, with about 600,000 tons more. No other concerns have mined to approach 1,000,000 tons.

The year has seen in Minnesota a steady movement in the line of control by big corporations—already in the mining and transportation business—of additional ore tonnage; more mines have been bought, and the present time several are under negotiation for early purchase. The Rockefeller Company is chief in this respect, and its purchases for the year, if put in detail, would startle the general ore consumer. It will not be long, if the present trend of business is continued, before there

will not be mines enough for sale in Minnesota to make the nucleus for a successful combination. The Oliver Company, too, has been in at the field for mines, and has during the year secured control of lands supposed to cover an ore body two miles long and of great depth. Some of its transactions have not yet been formally closed. Another year, and it will be mining from Minnesota fields not less than 1,750,000 tons, and very probably considerable more. Its mineral leases on other ranges call for a minimum output of 1,000,000 tons more, and it is quite likely to be the chief miner in the United States, all for its own consumption.

The change that has been coming in transportation of ore seems to have reached a culminating point the present year. A very large share of the ore carried down from the head of Lake Superior has been in ships of 7,000 to 8,000 tons capacity. Boats of this size, of the most solid construction, have become the arbiters for all classes of ships, and have borne down the rates to a point where the smaller and older vessels cannot make a profit. It would appear that for the present at least the limit of size had been reached in ships like the "Morse," of the Rockefeller fleet, with her 475 ft. of extreme length, or the "Superior City," of the Duluth Transit Company, with her capacity for 7,600 tons of ore. Additional depth in connecting channels of the lakes must be had before ships much longer can be made strong enough for safety.

The average freight rate this year on iron ore from the Minnesota ports to Cleveland, 900 miles, has been 61c. a gross ton, though for a times cargoes were taken at 40c. From Escanaba, with a distance about half as great, the average rate has been only 10c. less. From Marquette, 150 miles nearer the East than Duluth, the price has been but 2c. under that from the more distant point, while from Ashland it has been the same as from Duluth, though Ashland is 80 miles less distance. Only so far back as 1887 the rate from Ashland averaged for the season \$2.23. The increase in the size of ships, the more rapid handling of cargoes, and the extremely light cost of running ships, compared with their cargoes, has made it a matter of little importance whether the vessel carries its cargo a few hundred miles more or less.

Improvements on ore railroads the past year have been almost entirely confined to Minnesota, and have cost not far from \$1,000,000. That the work is not over is evidenced by the fact that another million will be put into these roads the present Winter, and that the old ranges will fall into line with perhaps half a million more, most of which will be on the Marquette and Gogebic Ranges. Nowhere in the United States are the traffic conditions so severe and the tonnage per mile of road so heavy as on some of these ore roads. None of the great trunk lines of the East, to which we are accustomed to look for figures in the movement of freight, come up to the Duluth, Mesabi & Northern, for instance, in the amount of traffic moved per mile of road, and few roads can equal it in tonnage pulled per train. Nowhere can more perfectly equipped roads be found than the Duluth & Iron Range, for example, and nowhere in the world is money spent more freely if operating expenses can be thereby correspondingly reduced.

About 14,000 men are now employed at the mines of the five ranges at wages that are better than for the past six years. They are mining ore at a rate never equalled, and by the opening of navigation next Spring there will be stocked at mines not less than 4,000,000 tons of ore, most of which will have to be mined fresh during the Winter, for not in 25 years have the mines been swept so bare of ore as at the close of this Fall's navigation. Stocks that had grown moss covered and bore trees and bushes of years' growth were cleaned up, and a weight on the market was removed. Now the stocks are very small. In Minnesota there were only about 450,000 tons on the surface at the close of navigation, and in Michigan nearly all the mines had succeeded in cleaning up everything. The new year opens, therefore, with a better outlook for the miner than ever, and for the mine owner also. There will be a far greater demand for this ore than ever, and the fact is recognized by all that continued rains of millions of tons yearly will gradually deplete high grade ores to the point where they will be scarce, so that a demand for better prices will be made. It is freely predicted that the output of the new year will not be under 15,000,000 tons, and it is difficult to see how the imperative demands of the steel market can be met with a less output than this, if it continues as it is to-day. This will mean a very much heavier production and higher prices all along the line, though every effort will be made to keep costs at such a point that new markets and outlets will not be disturbed. With an output of 15,000,000 tons a year there should be not less than 5,000,000 tons taken from the Mesabi Range, while new leases and sales indicate an output of 1,700,000 tons from the Vermilion, making a total of almost 7,000,000 tons from Minnesota, a State whose first mines were opened only 16 years ago. To handle the immense tonnage of the year men and money must be used to the best advantage, and technical skill of the highest kind will be needed from one end of the transportation route to the other.

#### MARYLAND MINERAL INDUSTRY IN 1898.

By Wm. Bullock Clark, State Geologist.

The year 1898 has been one of much prosperity in the mineral industries of Maryland. The coal output especially has been larger than ever before, while the building stone, cement and clay trades have all had a successful year. There has also been some agitation, with successful sale of lands at considerably above their usual value, due to the reported discovery of gold in Cecil County. Considerable excitement was produced some years since by the discovery of gold in the more southern portion of our Piedmont belt, but the workings have never paid.

The increased coal output has been the most significant factor connected with the growth of the mining industry in Maryland, a development which has been largely due to more efficient management of the extensive property of the Consolidation Coal Company. The general

improvement in trade, and particularly the demand for high grade steam coal by the National Government, have been important factors in the increased output of the mines. Modern machinery has also been introduced, and further improvements are proposed which will still further develop the coal properties.

The building stone trade, owing to the revival of the building industries, has been actively engaged during the past year in furnishing to the cities and towns of the Middle Atlantic Slope the valuable and attractive stones which it is able to place upon the market. The granites and marbles especially have been extensively exploited, larger demand being created in the latter on account of several public structures of moment that are employing this material, among them the new court house of Baltimore City.

The cement industry has shown very considerable increase during the past year, and use is being made of some of the Coastal Plain deposits which have not hitherto been considered. The older cement rocks in the central and western sections of the State are still extensively mined, and the industry here as well as in the eastern section of the State has had a prosperous year.

The clay industry—next to coal, the most important in Maryland—has been extended during the past season by the utilization of certain clays not hitherto regarded as available. The clays of Maryland, like those of New Jersey, are well adapted for a great variety of uses, and the various varieties of brick, potters' and tile clays are well distributed throughout the central and southern counties of Maryland.

The porcelain materials, which include flint, feldspar and kaolin, have been worked as in the past, and the various sand deposits have also been utilized to some extent, although the latter industry has never had a very large output in Maryland.

The iron ores, formerly so important in Maryland, and constituting one of its chief industries in Colonial days, are to-day being worked to a limited extent, although the valuable carbonate ores found in the clay deposits along the western margin of the Coastal Plain are always worked more or less extensively. The last year has been no exception to this rule, and the high grade character of the ore always affords a market for the product. This same region has also produced in recent years a considerable quantity of mineral paints, and this industry showed some signs of increased activity during 1898.

The agitation of the good roads movement in Maryland has aroused an interest in the natural road building materials of the State, and there are indications that the State will inaugurate a system of improved highways. The Maryland Geological Survey is mapping the rocks available for the supply of these materials, and an enlarged use of them will doubtless take place in the immediate future.

The Maryland Geological Survey has just issued an elaborate report, under the supervision of Professor Merrill, of Washington, upon the building and decorative stones of the State, and reports upon the other products are in preparation. This official exploitation of the mineral resources cannot fail to attract the attention of the public to the various natural products of the State, and the results are sure to be favorable.

#### The Maryland Coal Mines.

By Alexander Rankin, State Mine Inspector.

The coal region of Maryland, commonly called the Georges Creek Coal Region, lies in the western portion of Allegany County, in the valley between the Great Savage and Dan's Mountain. The principal vein, known as the Big Vein, begins north of the town of Frostburg and extends in a southwesterly direction to the Potomac River, a distance of about 18 miles. Its greatest width is at Frostburg, where it lies in one continuous layer from 10 to 14 ft. thick across the valley, a distance of 3½ miles. North of Frostburg this vein is divided by the valleys of two small streams, Braddock Run and Jennings Run, into three divisions. South of Frostburg, 5 miles distant, it is similarly divided by Georges Creek.

A survey of the region in an early period of its history resulted in an estimated area of about 17,000 acres. About two-thirds of this area has been mined. Other but smaller veins underlie the Big Vein, some of which are being worked at the southern end of the region, and the coal is of a very fair quality.

With improved methods of mining, improved facilities for handling coal, and the reputation of furnishing excellent steam coal, there is no reason to apprehend any loss of markets. Much more coal per acre is gotten out than under obsolete systems, and the machinery used now includes the latest and best types of stationary engines, air compressors, pumps, tail-rope haulage systems, etc. These appliances have increased the quality mined, besides placing coal in better shape in the hand of the consumer.

The region affords employment to 4,000 good miners, whose output this year will approach closely 4,000,000 tons.

There are here also 2 fire-brick manufacturers in the coal region, one in Mount Savage, the other in Frostburg, whose brick is noted for fine quality.

The Cumberland & Pennsylvania Railroad, which runs direct through this coal region from Cumberland to Piedmont, 34 miles, has made some extensive improvements during this year, having replaced wooden bridges with steel and relaid almost the entire line with new 80-lb. steel rails. Over this road all of the coal is carried to the connecting line, extending to the seaboard.

#### NORTH CAROLINA MINERAL INDUSTRY IN 1898.

By J. A. Holmes, State Geologist.

In connection with the mining interests in North Carolina, although there have been no large developments during the year, there has been substantial activity in several directions. The kaolin mines, especially those in Jackson County, have been worked on a larger scale than heretofore and with satisfactory results. In connection with the mica industry a number of new North Carolina mines have been opened up and a number of older ones have been reopened and actively worked

during the year. This special activity resulted largely from the increase in the import duty on mica in the present tariff bill.

In monazite mining there was but little activity in the earlier part of the year, but during the later months a considerable number of deposits have been worked on a limited scale, a portion of the product being shipped for home consumption, but the larger part of it seems to have been purchased for export trade. The total output from this State, however, has not been large, amounting to about 65 tons up to October.

In gold mining there have been no large new developments, but several old mines have been opened up again both in the mountain and in the midland counties, and the output for the year will probably be greater than that for 1897. There has been considerable activity in the copper belt along the border between Person and Granville counties, the Holloway and Blue Wing mines having been opened up and mined actively, the former throughout the entire year, and the latter during the later months. Gem mining has been prosecuted actively during the year at the ruby mines in Macon County and at a number of places in Macon, Mitchell and Yancey counties mining has been carried on for garnets and beryls. While there are no large coal mines being operated in the State, the Cumnock Mine in Chatham County has been worked actively during the year, and some development work has been done at other places in that county.

The Cranberry Iron Mine has been opened up again during the year and is now being worked on a considerable scale.

#### SOUTH DAKOTA MINES IN 1898.

By J. E. Todd, State Geologist.

This year has been one of healthy and vigorous growth of mining affairs in this State. This has shown itself in the revival of old mines, the development of mines which have long been waiting for capital to take hold of them, in the threading of gulches with railroads, often at great expense, and by the enlargement and multiplication of smelters and other reduction plants. The silicious ores are found to mantle the whole of the northern slope of the Black Hills, and several rich discoveries have been made during the year. The region from Portland to Deadwood is one continuous network of railroads, and the sides of the gulches are studded with mines. The extension of the rich mining region to Spearfish Canyon, which attracted much attention more than a year ago, though not so much spoken of, was a material advance. The mines about Ragged Top are fairly productive still.

During the year rich silicious ore has been found in the Southern Hills, near Custer. The phenomenon of that region, however, is the Holy Terror Mine at Keystone. The clean-up of one week recently was \$70,000 from a 10-stamp mill. A similarly rich vein seems to have been struck recently near Hills City. A very promising camp has sprung up near Rochford.

Old mines like the Galena, Spokane, Gushurst, etc., which have been long idle from litigation or lack of means, are alive and surpassing their former popularity.

The Deadwood & Delaware smelter has been rebuilt, with enlarged capacity, and yet has more than it can do. The 50-ton cyanide plant at Deadwood has been duplicated at Spearfish and both are over-run. Another has started at Garden City and several others are projected. This process has had much to do with the revival of mining in the region. The chlorination works are active at Deadwood, and those at Rapid City which have been rusting for many years have started again.

Lead is produced in considerable quantities at Galena and Spokane. This is a benefit to the region, because of its need in the separation of gold. There are increasing promises of rich deposits of copper, but no mines are devoted to it exclusively.

The mining prospects of the Black Hills are brighter than ever before, and though other States have largely increased their production of gold, South Dakota bids fair to keep her place as third in the race.

#### VERMONT MINERAL INDUSTRY IN 1898.

By George H. Perkins, State Geologist.

The mineral wealth and production of Vermont depend much more upon its quarries than its mines. The former include marble, granite and slate; the latter copper ore, manganese, kaolin, ochre and talc.

In copper mining the only extensive operations now being carried on are by the Elizabeth Mining Company at Strafford, under the management of Mr. J. W. Tyson. This mine is located on the deposit of chalcocite in Orange County; it has been worked for some 10 years, but until recently very superficially. The development of the past 2 years, however, has shown between 300,000 and 400,000 tons of ore in sight. The vein has been opened by 2 shafts, 4 levels, and numerous cross-cuts to a depth of 300 ft. and a length of about 800 ft. A crushing and concentrating plant with a capacity of 300 tons a day is now being erected. The machinery will be run by water power. The ore carries about 5½ per cent. copper, with a small quantity of gold and silver. Some smaller mines are being worked or developed also in this neighborhood, and it looks as if a considerable industry would be built up.

The production of building and ornamental stones in Vermont is very large, over \$13,000,000 being invested in Vermont quarries. Vermont marble has a high reputation and is shipped all over the country, bringing a higher price than that from almost any other State. The marble beds are in the western part of the State, and the greater proportion of the quarries are in Rutland County. The oldest quarry known is one at Dorset, which was opened in 1803. Most of the quarries did a greater business in 1898 than for some years past.

Besides this marble many quarries are located on the sand-rock formation which extends from Northern Vermont nearly all along the western border of the State. From these beds are obtained what are known as the Champlain and Swanton marbles. The stone is very hard but durable, takes a fine polish, and has a great variety of shading and pattern. It has been used in many important buildings, the latest being the new Union Station in Boston. A number of quarries have been opened on a peculiar silicious limestone found in the town of Washington. The Chazy limestones are extensively quarried on some of the islands in Lake Champlain.

The slate quarries of southwestern Vermont are of great importance, their annual output amounting to almost \$1,000,000, while some 1,500 men are employed. The only new development to be noted here is the reopening of a quarry at Northfield on the Connecticut River.

The granite quarries have made astonishing progress during the past few years, the value of the production having risen from \$59,675 in 1890 to \$1,517,000 in 1897, and probably a much larger amount in 1898. The best know deposits are in Barre, Woodbury, and Ryegate, where the granite is found in large masses and of excellent quality. The town of Barre shows a production of over 100,000 tons yearly, about 2,000 workmen being employed, with 100 derricks and other machinery to correspond.

In addition to the quarries already mentioned, there was a considerable production of limestone which is converted into lime.

Nothing new can be reported in 1898 about kaolin, ochre or talc, and the manganese mines are not at present worked.

#### WASHINGTON COAL MINES IN 1898.

By R. H. Norton, late State Mine Inspector.

The year 1898 has been a record breaker, from a coal mining standpoint, in the State of Washington. There is only one mine of any importance where the output for 1898 is less than for 1897. The leading coal mine in the State is the mine of the Northern Pacific Coal Company, at Roslyn. The output of this mine for 1898 is over 500,000 tons, 150,000 tons more than in 1897. Notwithstanding this increased output, the mine is in splendid condition, great foresight and judgment having been used by the management. New developments and machinery in process of erection will increase the output for 1899 very considerably. The local mines in this vicinity have also considerably increased their output, and several properties are in process of development. A similar condition exists in Pierce County. All the mines in operation in this county have materially increased their output, and judging from new ground broken and machinery erected, will show a steady increase in future. One very pretentious undertaking and two or three smaller ones have been started during the year now drawn to a close. The banner county for the production of coal in the State of Washington is King County. There are about a dozen coal mines in active operation in this county, four of them with a capacity of 500 to 1,000 tons per day. As in other sections of the State, developments in this county have been quite extensive, so much so, that by the time the season opens in 1899 it will be an easy matter to double the present output.

It is not too much to say that the demand for Washington coal will go on steadily increasing; the rapidly growing Alaska trade has been one of the chief sources of demand, and enough is known of that country now to insure its continuance. Honolulu and our other recent acquisitions are also going to be consumers of Washington coal, as the duty on Canadian coal, which they have used there heretofore, is a factor in favor of our home product. California, as usual, has used large quantities of Washington coal.

In conclusion, there can be no doubt but that the future prospects of this industry in this State are good. There are thousands of acres of coal lands in the State that are awaiting development, and while the mines already in operation are probably adequate to supply the demand for some years, the immense area of known coal lands insures permanency to the industry and profit in its successful and economical operation.

#### WEST VIRGINIA MINES IN 1898.

By J. C. White, State Geologist.

The production of coal is still the largest mineral industry of the State. This is destined so to continue indefinitely, though for 1898 the petroleum industry is a close competitor for primacy. It has been a period of low prices, but the coal mines of the State have run steadily and the total output has exceeded that of any previous year. The State Mine Inspector, Mr. Paul, reports a production of over 14,000,000 tons of coal for the official year ending June 30th, and the latter half of the year 1898 has been no exception to the increased demand for West Virginia coal. A shortage in cars and transportation facilities has prevented the acceptance of many orders by operators, which would have materially increased the total output. This shortage, it is expected, will be largely remedied during the coming year, so far as the mines along the Baltimore & Ohio Railroad are concerned.

During the war our fleet was largely provided with West Virginia coal. The celebrated New River and Pocahontas coal, low in ash and sulphur, high in fixed carbon, and incapable of spontaneous combustion, is preferred by the United States Navy over any other fuel accessible to our coast, while the great ocean racers prefer it to anything else on this side of the Atlantic. During the year this coal has been successfully introduced into South America as a rival of the Welsh coal.

The coals at the head of the North Branch of the Potomac on the West Virginia Central Railroad, in the vicinity of Davis and Thomas, still retain an increasing hold upon the market, especially for smithing

purposes, and are shipped all over the country. The Davis Coal and Coke Company is arranging to increase greatly its output from that region both of coal and coke, and is also opening a large tract of the Pittsburg coal near Tyrconnell, on the Parkersburg Branch of the Baltimore & Ohio, and shipments from there will begin early in 1899.

The Fairmont region has had the busiest year in its history, and the great vein of Pittsburg coal with which that district abounds has found many new markets during 1898. The three-fold uses of this coal (gas, coke and general fuel), the ease with which it can be mined and the low cost of production, all combine to give a much greater demand for this Pittsburg coal than the transportation companies have been able to handle.

The Great Kanawha region has continued to supply the demand for the excellent splint, cannel and bituminous coals of that district, and there is every reason for believing that the output of coal from that series will continue to increase on the Kanawha, the Elk and the Sandy (Tug Fork waters).

The Roaring Creek region, in Barbour and Randolph counties, continues to increase its output from the Upper Freeport bed, and it will soon be an important mining center.

The Wheeling District has probably not mined as much coal from the Pittsburg bed there this year as formerly, since some of the larger consumers have found it the better policy to purchase coal delivered at their furnaces from other regions at a cheaper price per ton than it would cost from their own mines.

The Riverside Iron Company, of Wheeling, has just installed a large plant near its Benwood works, for the saving of by-products, in the manufacture of coke. The coal used will be brought largely from the Connellsville region, and the plant is modern in every respect. It is hoped that this, the pioneer works of the kind in the State, is the beginning of the end of the present wasteful methods of manufacturing coke.

The coke industry of the State, while important and growing every year, is mainly incidental to the coal business, but in the future this industry is bound to increase, as the coking coal of the Connellsville region will fail to supply the great demands now drawing upon its limited supply.

The freedom from strikes and labor troubles of any serious nature during this and previous years has given great confidence to the coal trade in the ability of the West Virginia coal operators to fulfill their contracts, and this confidence has been a considerable factor in the development and prosperity of the coal mining industry.

The petroleum industry of the State has been most prosperous, and several new and prolific fields have been opened during the year. The production is all of the "white sand" type, and therefore of high quality. The output has been greater this year than ever before, and it now surpasses the total yield of Pennsylvania, New York and the "white sand" district of Ohio combined. Just how much the production for future years will be increased over that of 1898 is a problem that only the drill can determine, but there is no apparent reason for any sudden decline of this great industry, which for the year 1898 has yielded from the wells of the State a total of about 14,000,000 barrels of oil.

The natural gas interests of the State have continued to increase during the year. Nearly all of the important towns and cities west of the Alleghenies are now supplied with this matchless fuel, while all of the petroleum operations, including drilling, pumping, transportation of product, etc., receive their power from this source.

The 16-in. line of the Philadelphia Company, which extends down through the prolific gas fields of Wetzel County into the heart of Tyler, is now transporting many million cubic feet daily to the Pittsburg region, while the Carnegie Company has just concluded a contract to extend its lines into the State. Several cities of Ohio, including Steubenville, Canton, Wellsville, etc., are now supplied from the high pressure fields of Marshall and Wetzel counties, so that the total daily consumption must reach something like 200,000,000 cubic feet, and probably as much more is wasted, the greater portion of the waste being at present unavoidable, as the gas comes in with the oil.

The clay industry is confined mostly to the New Cumberland region of Hancock County, and has been fairly prosperous. The manufacture of fire and paving brick, as well as common brick, is on the increase, and promises to assume much more importance in the immediate future.

No other minerals of value have been produced in the State during the year excepting lime, cement and building stone, of which the usual quantity has been marketed.

#### WYOMING MINES IN 1898.

By Wilbur C. Knight, State Geologist.

The mineral industries of Wyoming never looked better than they do to-day, when considered as a whole. During the last year numerous prospects have been developed, new companies have been organized and old ones have made material advances. There are several new enterprises on foot that may materialize any day. This prosperity, however, in no way savors of a boom. Men entering the new enterprises are as a rule being directed by skilled representatives, which is a most desirable change. From the present outlook the year 1899 will be the greatest in the history of Wyoming along the line of mineral discovery, development and output in gold, copper, soda, petroleum and coal.

As usual numerous gold discoveries have been reported, but none of them have yet produced enough to be called a mine. Among the mines that have produced the Carissa is the only one that shows a marked change; it has been fully equipped with new machinery and new buildings. One stamp mill was started in September and a second new mill a month or more later. Judging from the amount of ore in sight this mine will stamp throughout 1899, at least, without further development.

The placers have also changed in methods of operation for two com-

panies have purchased large steam shovels which will go to work as soon as the frost is out in the Spring.

The copper camp at Battle Lake has shown marked improvement. The Haggerty Mine has been added to the producers, and many prospects bid fair to make producing mines during the Winter development. The ore is rich enough to haul 50 miles to the railroad and then leave the miners a good profit.

The coal mines are about the same in number as 1897, but nearly all have made improvements and can handle a larger tonnage of coal than ever before. Early in the Fall the demands for coal were greater than the supply; and then there have been times when a single company has been behind 600 cars on orders.

The shipment of soda eastward from the soda beds at Laramie was resumed in the Fall and later a great company was incorporated to manufacture soda, glass and chemicals at Laramie, which has ample means. The other soda companies are talking of incorporating.

The petroleum industry has been in very bad shape. Until recently the Denver & Gulf Railroad has furnished the only outlet for the Wyoming oil. Less than a month ago the Fremont, Elkhorn & Missouri Valley Railroad gave satisfactory rates to Omaha and Chicago. There has been ample capital to launch in the oil industry in Wyoming, but there was only a limited market and no way to reach the Missouri River trade. This new rate means everything to the development of the oil industry. New companies will commence to drill early in the Spring. Wells partly down will be completed and a rush may be expected into oil territory along the Fremont, Elkhorn & Missouri Valley line, at all points that are within 50 miles of the road.

The development of the graphite deposits at Hallack Canyon made progress during the year and the owners say that they have a market for the product in Chicago and that they will commence to ship very soon.

The stone quarries were quite active. The Diamondville quarry worked a large force of men all the season, furnishing stone for the Oregon Short Line and Union Pacific railroads. The Union Pacific Railroad worked its decomposed granite beds to full capacity until the cold weather. As a ballast this material has no equal and for road work it cannot be surpassed.

#### BRITISH COLUMBIA MINES IN 1898.

By Our Special Correspondent.

The revised figures showing the shipment of ore from Rossland mines for 1898 are: Le Roi 66,000 tons, War Eagle 42,779 tons, and various other mines 7,918, being a total of 116,697 short tons, after deducting errors and deficiencies. The official figures last year were given at 72,000 tons, and so reported to the Minister of Mines, and by him accepted and published. The net value of ore in this camp has always afforded ample scope for the imagination. The gross value of the ore as delivered at the local smelters is another subject on which light needs to be shed. The two smelters treating this ore are the one on Trail Creek and the one at Northport, 16 miles from Rossland. The former is owned by the Canadian Pacific Railway Company and the latter by the Le Roi Company. The Canadian Pacific Railway makes no profit, charging only for cost of treatment, while the Northport smelter handles its own ores.

The gross value of the 66,000 tons of Le Roi ore produced in 1898 is placed by outside authority at \$25 per ton, and the value for the 7,918 tons from small producers \$23.52. This would give a total gross valuation of the 116,697 tons at \$2,842,393.

During 1898 the Le Roi produced 66,000 tons of ore net, valued at \$18.36 per ton, or \$1,211,800. There were produced about 52,850 oz. of gold, 68,000 oz. of silver, and about 825 tons of copper. The gold is valued at \$20, though no reason has been given for putting it less than \$20.60 per oz., the price given by J. B. Hastings in his report on the War Eagle. The net value in amount produced was \$1,650,000.

The Iron Mask produced 3,500 tons, gross value \$23.52, net value \$11.70 per ton, giving total values of \$82,320 and \$40,960; the Centre Star 2,707 tons of the same gross and net values per ton, giving gross value of \$68,373 and net value of \$34,012; and the Penman 453 tons, giving at the same valuations a gross value of \$10,634 and net value of \$5,320.

Mr. J. B. Hastings, general manager of the War Eagle, is the first mining man to introduce a tabulated scale of smelter and other charges connected with ore production here. According to the table in his report of the War Eagle Mine, the net value of ore produced in the War Eagle in 1894 was \$24.41; the direct smelter charge per ton then was \$12.50; smelter's gross value was \$36.91 per ton; indirect smelter charge was \$6.63. Actual total smelter charge was \$19.13, and the gross smelter's value was \$43.54 per ton. In 1898 the figures in the same order were \$11.70, \$7.50, \$20.01, \$3.51, \$11.06 and \$23.52, and the gross value this year \$1,066,162, and the net value \$500,514.

The development work in the Le Roi amounted to about 2,950 ft.; shafting, 150 ft.; drifts and crosscuts, 2,550 ft.; raises and winzes, 280 ft. The shaft is down to the 850 ft. level, and the greatest ore body yet encountered is at 700 ft.

Of the smaller British America Corporation properties, on the Josie 1,250 ft. of development work was done; on the No. 1, 700; on the Great Western (now called East Le Roi), 950 ft.; on the Nickel Plate, also the East Le Roi, 2,400; and on the Columbia and Kootenay, 4,700, being a total of 10,000 ft.

There is nothing, so far as my investigations go, to justify the apprehensions felt in some quarters that the percentage of the precious metals and of copper in Rossland ores is decreasing. Such a decrease has, however, been supposed because the tables of output and valuation heretofore have been made up by those who imagined that giving large figures was a substantial way in which to "help the camp."

## LAKE COUNTY, COLORADO, IN 1898.

By Our Special Correspondent.

A successful year is to be recorded for Lake County, and prospects for 1899 are more encouraging than for many years past. The daily output of Leadville now averages 2,000 tons of all grades of ore. Figures, not yet complete, will show a tonnage of over 500,000 tons of ore and a valuation upward of \$9,000,000 for 1898 and a total valuation of the Leadville District output for the past 20 years of \$253,000,000.

The opening of the sulphide contacts in the Carbonate Hill section, the starting of the pumps on the downtown mines, the extension of railway branches, the Lake Park gold finds, the Breece Hill and Evans Gulch explorations, all came the latter part of the year; while the promised introduction of concentrating mills and the reopening of old time producers like the Iron Silver Combination, A. Y. & Minnie, Louisville, and others, warrant the prediction of a great season the coming year. In addition, both the Arkansas Valley Smelter, owned by the Kansas City Consolidated Smelting & Reduction Company, and the Bimetallic, owned by the Bimetallic Smelting Company, are running at full capacity. The Kansas City Company has secured control of the old Union Smelter and uses the roasters.

In Leadville Basin the downtown pumps have started to drain the territory that has lain idle since the Summer of 1896. In March, 1897, an effort was made to start the pumps, but failed, as did other attempts. Finally, through the efforts of Major Bohn and others the Home Mining Company was formed and stocked for \$50,000, most of the stock being taken by local people. The company finally became a member of the Leadville Pumping Association, and assumed the interests discarded by the Smith-Moffat combination. Under the management of Mr. Albert Sherwin the association resumed work on October 13th, 1898, beginning with 1,000 gals. per minute on the Penrose, and following on the Bon Air and Bohn. At present the pumps are handling 3,500,000 gals. of water every 24 hours. With the water out, the Leadville Basin will take its place as one of the most important sections of the camp.

The Carbonate Hill and Graham Park section shows wonderful improvement and oldtime activity, especially in the Graham Park District. On the Morning and Evening Stars about 15 shafts are in operation and shipments have kept up steadily. The Maid of Erin Silver Mines Company has a lease on all the old Maid workings and sub-leases the ground. The output has been 1,500 to 2,000 tons per month. The Catalpa-Crescent has shipped from 150 to 200 tons per day of manganiferous ore to the Illinois Steel Works and the Bessemer plant at Pueblo. The William Wallace, the Seneca, the Elk and a number of surrounding leases have produced steadily. The Mab found the main ore body on the Agassiz ground in July last and soon started shipments of 100 tons per day, which ran up to 150 tons. It produces from ore bodies opened up at a depth of 1,100 ft. and has paid off its indebtedness.

The Mahala has resumed its place as a rich producer. After the cave occurred a year ago, the company began sinking a winze from the 900-ft. level to the rich sulphide contacts, some 230 ft. below. This lower contact is proving even better than the upper ones, and the Mahala is shipping 50 to 75 tons daily.

Manager Mudd has opened up good ore in the lower workings below 1,300 ft., of the ground worked under lease by the Small Hopes, and through his main shaft, the Marian, has been producing from 150 to 200 tons of fine iron-sulphides per day. Over 200 men are employed. The water is handled through the Emmet shaft.

The Gallagher shaft on the Mikado, operated by lessees, showed a tonnage of 75 to 80 tons of high grade ore per day for the first 8 months, but the lessees have quit, having apparently exhausted the rich ore body and not caring to handle the low grades.

The Pyrenees, operated by the Rialto Leasing and Mining Company, a Boston and New York syndicate, sank a deep shaft to catch the extension of Mahala shoot. At 1,240 ft. drifts were started in November. One of the drifts struck ore. This is very low grade and the management is searching for richer.

The Wolfstone and Adams have shipped over 1,000 tons per month of good sulphides from the upper levels, on account of water below. New leases are to be given in January.

On the Greenback, where a shaft was down some 450 ft., a company headed by T. S. Wood and others has let a contract to sink the shaft 800 ft. deeper into the eastern extension of the Mahala ore shoot.

The Freyer Hill Section tonnage is nearly all iron, and the producing properties include leases on the Little Chief, the R. E. Lee, Matchless, Big and Little Pittsburg, Niles Augusta, Chip, O. K., Four Per Cent, Chrysolite, Gambetta and others, the tonnage amounting to over 400 tons daily.

In California Gulch the Yak Company has pushed its big tunnel into Breece Hill. The Emmet Mining Company's property has made small but steady shipments. On Rock and Printer Boy hills much important work has been done on the Nisi Prius combination, Stone and La Plata leases, Lillian and others. Early in the year the Stead Leasing Company worked the Nisi Prius through the Hall shaft. More important work, however, has been done since the Nisi Prius Leasing Company took charge of the Hall, Vivian, Weir and Pinnacle shafts, which have made some good shipments. The Stone and La Plata have shipped some lead ore.

The most important thing on Iron Hill was the resumption of work by the Iron-Silver Mining Company, under the management of S. S. Robinson, in June. The company is in possession of its lower workings and shipments of 100 tons per day will be made from now on. The reduction in smelter and transportation charges, etc., have enabled the company to resume work after 6 years' idleness.

There are also a number of leases worked by different sets of lessees, including the Ruby, where a fine body of ore was recently opened, the old Iron-Silver shafts, comprising the Tucson and Iron Hat claims and several others. The A. Y. & Minnie is owned by the Guggenheims of Colorado, and Graham of Philadelphia. The Moyer shaft of the Iron Mine combination drained the A. Y. & Minnie workings, and Douglass

& Newton, the lessees, now have no difficulty in handling about 100 tons per day for their mill. The ore runs 10 to 12 oz. silver, but is handled at a profit. The ore bodies lie at a depth of 250 to 370 ft.

The old Louisville, owned by D. H. Moffat, has resumed work and began shipping several months ago from the big ore bodies at the 600-ft. level. The upper levels are operated by lessees.

A year ago, in an interview in this "Journal," Mr. T. S. Wood, a well known mining man, made the assertion that the possibilities of Breece Hill were simply unbounded. I have talked with a number of the largest operators on this territory, who declare, however, that the fact that there is no continuous ore shoot on this hill, that the mineral is to be found in porphyry at different elevations, and that it takes deep mining to find the ore, require a longer time to bring this section to the front. The three most important finds in Breece Hill section were on the old Breece-Iron workings, by the Penn Mining Company, the Fanny Rawlings and the Ballard.

Early in the year the Penn Mining Company, in which Gov. Thomas, Messrs. Dennis Sullivan and Fletcher, of Denver, are interested, caught the ore body in on the Philadelphia claim. The mine is developed by 3 shafts and low and high grade ore is being opened up. Shipments of the richer ore average 50 to 75 tons daily. A 10-stamp mill, erected as an experiment by Mr. Sullivan for the very low grade ore, has proved profitable, and 10 additional stamps have been put in. It is understood that the company had taken out enough ore this year to pay for all development work and give a nice dividend, or that in round figures the production during the past 8 months will be in the neighborhood of \$250,000.

The Banker Mining Company of New York, operating the Banker property, under the management of Mr. Guth, has the shaft down over 600 ft., and has put in a pumping plant at the 600-ft. level.

The Ballard, the last shipper on Breece Hill, has been operated under lease for many months and has developed into a producer. The \$10,000 bond on the property has just been taken up and development work will be pushed. The ore averages 2 oz. gold, some of it 4 oz., and is found at a depth of 300 ft.

The Ixex Mining Company, commonly known as the Little Jonny, but a misnomer, as the Jonny claim has not been operated for several years, employs over 450 men. The pay-roll is about \$40,000 per month. The Ixex will show a tonnage for the year of over 100,000 tons of ore, about 60 per cent. of which is sulphide and 40 per cent. oxide. Mr. John F. Campion is manager and Mr. E. M. Ray superintendent. About 5 to 6 miles of new workings have been added. The company owns 120 acres and has 6 shafts in operation. Steady development is opening up new ore bodies, some of which are 50 ft. thick and 200 to 300 ft. long. The ore is found in different planes in the porphyry, and two-thirds of the men employed are on exploration and development. The Ixex is now shipping by rail and can greatly increase the output during the new year. Production at present is about 8,000 tons per month.

The Mike & Starr has been shipping about 75 tons per day. It is worked by lessees. The Garbutt has made small shipments. The Fanny Rawlings worked along in a small way until last August, when the Big Four adjoining ran a drift into the Rawlings. Two large ore shoots are now worked. Shipments are about 50 tons per day. The ore is oxide below the second level for 50 ft., where a sulphide body opens up. The shaft is 600 ft. and is still in ore. That shipped runs from \$30 to \$40 to the ton. The lower grade body shows an ore shoot about 40 ft. wide, which is stopped out in places to a height of 50 ft. The same ore body is being opened in the Big Four that has been a steady but small shipper of rich gold ore.

The New Monarch Mining Company and the Lida Gold Mining Company, in charge of Mr. Tim Goodwin, have done a large amount of development work and a strong ore body has been opened up. Shipments average about 50 tons per day. On the Louise a fine plant of machinery is put in and the mine will be worked by local lessees. The Black Prince has made occasional shipments of very good ore.

The Little Bob and Reindeer Mining companies, controlling a large amount of good territory, are worked under the management of Mr. George F. Campion. On the former the 200-ft. shaft and drifts show a good mineralization in gold. In the Reindeer the shaft is down 600 ft., where occasional bunches of fine ore have been encountered. A good plant of machinery is in position. On Bald Mountain lessees are shipping on the Alps. On the Iowa Gulch slope new lessees have secured the Butcher Boy.

In Big and Little Evans territory the Sedalia was a producer of low grade gold ore most of the year. During the first 6 months of the year over 6,000 tons were shipped.

The Resurrection is shipping now almost 200 tons per day. Under the management of Mr. Carnahan, the property has been extensively developed during the year and produced 30 to 60 tons per day up to December. Ore sheds and bins have been erected for rail shipments. The company has secured ground for a concentrating mill to handle the low grade ores. The Little Ellen is shipping about 30 tons daily.

From the Dollie B. shipments average 35 to 75 tons per day of fair grade gold ore. Manager Connolly is now handling the water successfully and is putting in still heavier pumps. The improvements include new boarding houses, ore bins, etc., and the lighting of the entire mine with electricity.

One of the most important outlying districts is Weston Pass. The formation is a southern continuation of the belt upon which the Hill Top, Continental Chief and others have been discovered. The principal mine is the Ruby, which was sold to Eastern people in August. The new owners have been shipping until stopped by snow from 30 to 40 tons per day of good lead ore. Crowley & Kavanaugh, who sold the Ruby, are putting down a new shaft to catch the same ore body, while the Colin-Campbell people are also prosecuting work.

In the Twin Lakes section much of the work the past season has been cleaning up, preparatory for the coming season. The Twin Lakes Consolidated Placer Company, an English concern, has taken out some gold, but has made many repairs and improvements. The Bull Hill group, the Champion, the Mt. Elbert Tunnel and others will be actively developed.

Leadville's newest acquisition in the gold field is Lake Park. The section has been worked for years by D. L. Griffen and others, but it was not until late last summer that the Hahnwald Brothers found gold on the Hap-Hazard. They have about 20 acres of territory and are shipping ore running from 5 to 15 oz. in gold to the ton. The Hap-Hazard tunnel is run on the vein about 200 ft. The vein appears to be a fissure in porphyry and shows a pay streak from 6 in. to 3 ft. wide. The ore is free-milling quartz and is similar to the quartz found in the Ibex. The last shipments carried 8½ oz. gold. The Nanticoke and several other workings adjoining are operated by local lessees and new strikes are promised early in the year.

The low price of silver has much to do with the little work going on in St. Kevin, Sugar Loaf and other purely silver sections, which lie too far away. In St. Kevin the Berdella is shipping, while Sugar Loaf is shipping occasional lots. The Dinero and Tiger are also shipping small quantities. The Venture, after losing its mill by fire, ceased work entirely.

On Democrat Mountain, in the Alicante District, a few Park County prospectors opened a vein showing well in gold. This vein was traced over 5,000 ft., and demonstrates that the great London vein has been found.

#### THE BLACK HILLS, SOUTH DAKOTA, IN 1898.

By Our Special Correspondent.

Of the companies in Lawrence County, the Homestake, the most important company in the Hills, has had a very successful year. The Ellison hoist, which was started nearly two years ago, on Lead Hill, across the gulch from the stamp mills, will be finished in the early months of 1899. The eight boilers are in place, and the 2,000 H. P. engine, manufactured by the Union Iron Works, is set up. Work progresses on the large ore bins, and the Gates crushers will soon be in. There is no special hurry to complete the plant, as the present hoisting works are able to keep the mills in ore. The 1,250,000 gal. reservoir in the rear of the Ellison hoist is nearly completed. The water supply comes from Whitewood Creek, 11 miles distant. The Ellison shaft was started in 1896, and is down only 400 ft., where it connects with the long steel tramway leading to the mills. It is estimated that the total output for the year will amount to over 500,000 tons of ore, valued at about \$2,200,000. The ore is being taken from the second to the ninth levels. The main tunnel is driven about 30 ft. from the ledge, and at intervals of 40 ft. crosscuts are driven to the ore. No ore is being taken from the Deadwood-Terra at present. Nearly everything has been worked out to the 800 ft. level, but prospecting goes on continually. The burning of the hoist last Spring threw 150 men out of employment. The plant is nearly rebuilt and will be in use in January. The Highland Company expects to lease it when finished, and will mill Highland ore in the old mill beside the hoist. It is not thought that the burning of the Deadwood-Terra hoist will make much difference in the output of bullion from the Homestake Mines, as there has been a considerable increase in the per cent. saved owing to new methods.

The Highland Company has been working during the year and has made a good record. When the Deadwood-Terra hoist burned down the company was using it and the mill, and the Homestake Company was leasing the Highland mill at Lead. After the fire the Highland Company took its mill back again and worked its mine from the Lead side. Ore is being taken out from the fourth and fifth levels.

The Deadwood & Delaware Company had its large smelter in Deadwood burnt last Spring, entailing a loss of over \$100,000. The plant was rebuilt at once, and two months ago the first furnace was blown in. In the new works electricity is used to haul the slag cars, for the elevators and for other purposes. The plant is now running at full capacity, with four furnaces, and handles 350 tons daily. The two reverberatory furnaces were not damaged by the fire, and have run steadily, while a third furnace is being built. About four cars of concentrates from the Homestake mills are treated daily. The company has mining interests in different parts of the Hills, especially in Ruby Basin, where the Union Mine is producing about 100 tons of ore daily. Farther south in the center of the basin the Delaware shaft was started a year ago, but water has proved very troublesome. A steel shaft-house and a fine hoisting plant have been erected, and a Prescott pump is to handle the water. Sinking will soon begin.

The Golden Reward Company has kept its chlorination works in Deadwood busy. Numerous experiments have been made on treating different refractory ores with good results. The company is handling about 150 tons of ore per day, chiefly from the Tornado Mine, at Terry.

The past year's work of the Horseshoe Mining Company has been very satisfactory. The chlorination works at Pluma, with a capacity of 140 tons daily, have been kept steadily at work on ore from the Mogul, Golden Sands and other mines at Bald Mountain. There was a scarcity of water during the Summer, but the supply was increased by crosscutting the bedrock. The company owns a large tract of mining and timber ground on Spearfish Creek and has given a contract to cut about 500 acres of timber.

In Blacktail District several promising mines have been opened during the year. The best properties are the American Express, a steady producer of \$25 ore, and the Boley. The latter company, chiefly Chicago men, has bought or bonded a tract of ground 1 mile long and ½ mile wide. About 30 tons of ore are shipped daily. Mr. Boley's lease on the Rossiter cyanide plant has expired, and it is said that he and Mr. P. L. Gibbs will erect a cyanide mill at Gayville, at the mouth of Blacktail.

The Garden City District has taken on new life in the past four months. Messrs. Alexander & Dotson have remodelled the old chlorination works for a cyanide plant, and it started to treat ore in November. The first clean-up has not been made yet.

Mr. E. May, of Lead, has bonded and leased the Faust & May property and begun work. In Carbonate District Wendal Koerner has

a lease on the Iron Hill, and is shipping 30 tons of ore per day from the 100 ft. level.

In Squaw Creek a great deal of development work has been done this year. The Cleopatra Mining Company has opened up its mining ground and will begin mining the first of the year when the new machinery is in. The litigation over the Gushrust and Mansfield groups of claims at the head of the creek has been settled, and P. M. Hanson, of Minneapolis, has taken a bond and lease on both groups and has begun developing them. The litigation over the Two Johns, formerly the Rua, has also been settled and a larger force of miners has been put on.

In Ragged Top the Crown Hill Company has opened up a body of fair grade ore, and it is stated that a contract with the Spearfish Cyanide Company has been let to treat 1,000 tons of Crown Hill ore. The Crown Hill Company is developing the Spokane, near Keystone, in Pennington County, where most of the company's work is being done. The Ulster, owned by A. J. Smith, has been a steady producer of high grade ore. The Little Bud, leased by C. C. Barnes, has made some shipments. F. M. Wall has made steady shipments. The Kilpatrick Brothers have tried to get the Dacy shaft down to quartzite. It is already down 480 ft. The Badger shaft is down nearly as deep, and a Chicago company is negotiating for the property. Ragged Top is shipping more high grade ore than any other camp in the Hills. In Paradise Gulch, a mile south of Ragged Top, the Spearfish Company has taken out about 2,000 tons of \$10 ore from the Metallic Group, which has been shipped to Spearfish and treated in the new cyanide mill. This mill was remodeled from the old stucco plant, and it has been running successfully two months. It is being enlarged to 50 tons capacity.

In Nevada Gulch a good shoot of ore was struck on the Ben Hur claim and also on the Ryan fraction and the Cherry Lode. R. M. Maloney spent some time and considerable money in prospecting the Snowstorm, but gave the project up, and is moving a part of his machinery to his recently purchased Keystone property. The old Portland Mines started up in November and 50 tons of ore are shipped daily. Three mines are worked, the Trojan, Empire and Old Portland. The Golden Sands, in the same district, but owned by the Horsehoe Company, has been a steady producer. The Clinton Mining Company has taken out ore most of the year from its mine joining the Old Portland, while the Decorah and Dividend have both made frequent shipments.

In Ruby Basin the Sunset Mining Company of Minneapolis purchased a large tract of mining ground between the Mogul and Union properties and put up an expensive hoisting plant. A shaft is sinking to quartzite. The Mogul has produced 100 tons of ore daily, and so has the Union. The ore bodies are large and of uniform grade. The Big Bonanza and Buxton have been steady producers.

Regarding the Two Bit District there is considerable disappointment over the way it has turned out. It was boomed greatly a year ago. The Hardin brothers interested Chicago capital in their ground. Five companies were organized and each erected large and costly hoisting plants. Some ore was found in the original Hardin shaft last Spring. At the time it was said that a flat body of pyritic ore, 22 ft. thick had been struck, but the mine closed down soon after. All the companies subsequently closed down except the Chicago & Two Bit. Quartzite was struck in this shaft in November, and preparations are being made to drift. The companies are generally criticised for spending too much on the surface in costly hoisting plants and not enough in exploring ground. The Detroit & Deadwood Company, which is separate from the Hardins, is sinking a shaft on the east fork of Two Bit, adjoining the original Hardin. Quartzite has been struck at 290 ft., the last 80 ft. being a drill hole. Ore is being shipped from the Golden Crest, farther up the east fork of Two Bit, while over in Spruce Gulch the Highland Chief has started up again.

In Strawberry Gulch the Gilt Edge, which began shipping about a year ago, has been opened up to 200-ft. level and prospected about 100 ft. east and west. In July Morrow, Secoy & Shaw began work on a lease of a portion of the Dakota Maid, east of the Gilt Edge. A shaft is now down 160 ft. and shipments of high grade ore have been made. C. E. McHugh, on another lease on the north end of this property, has organized the McHugh Mining Company. The Edgemont & Union Hill Company has done considerable development work on its claims. Test runs have been made on ore from the Hoodoo, Alert and Nevada in the stamp mill at Galena. The company has just been reorganized with new officers, and it is announced that active mining will begin. The Wolverine Mining Company has been organized to work 5 claims adjoining the Union Hill ground.

Of the Pennington County mines those in Keystone District have advanced most the past year, due greatly to the success of the Holy Terror and Keystone, the former of which has paid regular dividends of 3 cts. per share. September 1st the Holy Terror Company purchased of the Keystone Company the stamp mill and mining ground and the two companies are now consolidated. The 40-stamp mill on the Keystone ground has been repaired and will run at full capacity on ore from both mines. The 10-stamp Holy Terror Mill is still running. The underground workings of both mines were connected in August. Mr. Ranney is now superintendent. He formerly had charge of the Sunnyside. R. M. Maloney has begun a plant on ground adjoining the Holy Terror. J. W. Jones of Iron Mountain, Mich., has purchased 5 mining claims east of the Holy Terror and has placed orders for machinery for a concentrating plant. The Big Hit Mining Company, John Barth of Milwaukee having the controlling interest, has done considerable work on the Bismarck and Big Hit claims. In the former two ledges of ore assaying \$3.50 free gold and \$30 concentrates have been found. The company has nearly completed a large concentrating plant on Battle Creek. The Golden Return Company has carried on extensive development work. It is announced that the Burlington Railroad will build into the district in the spring.

Hornblende is a new camp. On November 1st Carl Blank and H. Donnell of Deadwood leased and bonded the King of the West group of claims in Smith Gulch. The ore runs \$4 to \$18 per ton. They also leased the Montezuma quartz mill at Rochford, 40 tons daily capacity.



The Blair group, 1 mile south, has been opened up extensively. James Cochran has worked a small Huntington mill 2 miles east all the year, but has had a lack of water and has run only a few hours a day.

On the Castle Creek placers three large companies have put in steam pumps and sunk shafts to bedrock.

Near Mystic, M. H. Day and associates have begun work on the Dolcode and Tea Lodes. Dolcode shaft is down 230 ft. and is being sunk 100 ft. deeper. In the Sunnyside Mine at 300 ft. a vein of free-milling ore was found last Fall. The ore is said to be very rich. A 5-stamp mill has been in operation steadily.

The 10-stamp mill on the St. Elmo started up early in December. It was announced in September that the Harney Park Tin Company had reorganized by pooling the interests of the English and American stockholders and issuing new stock, and that work would begin by January 1st on the company's claims, with good gold values. Nothing has been done yet. A good share of the machinery has been sold from the mills and concentrating plants during the year. The Etta concentrating mill is still intact, and it was recently leased to the Crown Hill Company to treat concentrates from the Spokane Mine, which has been opened up extensively.

Of the mines in Custer County the Lizzie has worked steadily during the year. The shaft is now the deepest in the county. There is a need of a plant to treat the ore from the district, it being impossible to ship to the Northern Hills. A number of companies have been exploring for copper, and some promising veins have been exposed. Several shipments of mica have been made during the year. The price has remained good for first quality stuff.

UTAH MINES IN 1898.

By Our Special Correspondent.

Rarely has a poor beginning made a better ending than in Utah's production for 1898. In January last mining conditions were fairly favorable, but the war uncertainties intervened, and when the active season opened not only was there a curtailing of exploration in many of the standard producers, but nearly all new undertakings were abandoned. The year might be divided into six months of stagnation and six months of improvement and progress. Since October there have been numerous valuable ore uncoverings, each lending enthusiasm and aid for others to develop neighboring ground. During the first half year the rate of production was barely equal to the corresponding months of 1897, while now, as the statistics for the year are being made known, it is shown that in gold, lead and copper the yield exceeds that of 1897, and the silver output is about the same for both years.

At this time, before the 1898 metal statistics are fully compiled and finally revised, the best estimate for Utah is the one issued on January 1st by Wells, Fargo & Company. These annual precious metal bulletins are conservative and generally, where they err at all, are more apt to be under than over the truth. For convenience of comparison the 1897 totals are given with those just made known for last year:

	1897.	1898.
Gold, in oz.....	80,467	105,900
Silver, in oz.....	7,561,971	7,544,722
Lead, in lbs.....	77,387,570	90,346,100
Copper, in lbs.....	3,920,966	5,333,635

A weekly statement of all shipments East, of base lead-silver bullion, blister copper, copper matte, ore and concentrate products is prepared for the use of smelters and large metal dealers. In this summing up the output of the mines is all accounted for, either in the form of bullion or smelter products, except the tonnage treated by cyaniding, pan amalgamation, or by the Russell process at the Marsac Mill, Park City. To metallurgists, mine owners and others, who know the composition of smelter products from the different districts, this affords the most accurate data obtainable of what the Utah mines are doing. This record is kept by Mr. D. S. Spencer, of the Oregon Short Line, who supplies the totals each week to the "Engineering and Mining Journal," the only publication of this valuable current information. The compilation of the 52 bulletins of last year, compared with the corresponding ones of 1897, makes the following creditable showing:

Utah Bullion and Ore Shipments.

	1897.	1898.
	Pounds.	Pounds.
Base bullion .....	40,478,693	41,714,736
Blister copper .....	3,217,489	4,544,076
Copper matte.....	371,070	192,950
Ore .....	99,875,331	118,711,585
Carbonate .....	35,132	.....
Slag .....	71,800	.....
Tallings.....	.....	40,000
Total .....	144,049,515	165,203,347

An examination of these figures, together with those of the preceding table, indicates that Utah's shipping ore and concentrate products in 1898 were smelted about half at home and half outside the State. Practically all the Park City ore goes to Colorado for treatment. Most of the enlarged tonnage over the prior year was made by that camp and mainly by the Silver King. That great mine, commonly looked upon as a lead-silver property, last year also contributed over \$100,000 to the State's gold yield and is certain to afford a still bigger gold by-product in 1899. Tintic and Bingham fell off considerably. Stockton-Ophir section and Alta each sent forward an increased tonnage. All districts affording smelter products are in a more vigorous condition than at any time in recent years.

Production of Utah Smelting Works.—During 1898 the number of stacks in blast at the three home smelters varied from 3 to 7. The Hanauer was closed for over 90 days, while its plant was rebuilt, and to-day it has a model equipment. A fire last Spring at the Germania knocked out 2 stacks and delayed operations for a brief time. The most active period at all the smelters was toward the end of the season, and an ample ore supply is still being maintained. The figures

of production of the several metals, for the years 1897 and 1898, as furnished by the management of each plant, are as follows:

Germania Lead Works.		
	1897.	1898.
Gold, in oz.....	11,806	22,093
Silver, in oz.....	2,049,895	2,748,514
Lead, in lbs.....	25,089,700	30,981,700
Copper, in lbs.....	2,442,232	4,095,200
Hanauer Smelter.		
Gold, in oz.....	7,677	4,530
Silver, in oz.....	835,500	636,900
Lead, in lbs.....	13,292,000	8,656,088
Copper, in lbs.....	678,150	283,650
Pennsylvania Smelting Company.		
Gold, in oz.....	14,146	9,371
Silver, in oz.....	951,070	1,022,113
Lead, in lbs.....	12,462,360	11,366,000
Copper, in lbs.....	191,945	263,000

Neither the Hanauer nor the Pennsylvania is equipped to reduce copper matte and these products are sold to the Germania, where they are reduced to blister copper, carrying about 90 per cent. copper. In this form, locally called copper bullion, it is forwarded East to be refined. A small fraction of the ore tonnage treated by these plants comes from beyond the boundaries of Utah, mostly from Nevada, for which proper deductions are made in the several totals above, of Utah's 1898 metal production.

Cyaniding Products.—Although 1898 is a disappointment, relative to the gold yield obtained through cyaniding, the total is double that of the previous year. The cyaniding yield is estimated at 60,750 oz. gold and 140,000 oz. silver, by far the greater portion credited to the Mercur Region. Three mills were put in commission in that region during the past 12 months—De La Mar, Daisy and Chloride Point—and one at Bingham—Old Jordan & Galena. La Cigale and Overland plants were not started up in time to contribute to the 1898 yield. The big De La Mar mill, though it began operations early in the Summer, is but just getting in trim for normal work. The year, for the most part, was devoted to overcoming mechanical obstacles in the preparation of the ore for the leaching tanks, mainly in connection with the roasting furnaces. It is said these difficulties are nearing an end and within a few weeks 700 tons a day at least will be treated. The Mercur mill at Manning is just enlarged, with the intent of putting through 400 tons a day, in place of 300 or less. There probably will be 3 new mills, aggregating 550 tons' daily capacity, erected in the region early the coming season, while Bingham will have another mill, if not two, and there are two others planned.

Pan Amalgamating and Russell Products.—In a general way the yields of all the precious metals are roughly accounted for in the foregoing summaries, save those of the Tintic pan amalgamating mills—Eureka Hill, Mammoth and Sioux—which afforded as near as maybe: 16,400 oz. gold, 1,468,500 oz. silver; the Marsac Russell process mill at Park City, which ran the greater portion of the year on tailings from the Ontario mill dump, yielding 9.71 oz. gold, 72,471 oz. silver; and small amalgamating mills in the Henry Mountains, Blue Mountains and State Line, the production of which is not obtainable. However, the total for the three was small, for they did not run steadily.

The Utah Salt Industry in 1898.

The Utah salt situation has not been particularly flourishing during the current year. On January 1st, 1898, the solar evaporated crude salt in stock was 85,000 tons, and with this surplus it is not difficult to understand that but little crude salt was made, the past 12 months, from the waters of Great Salt Lake. The salt demand for the reduction of ores throughout the inter-mountain region, including Montana, Idaho and Eastern Nevada, has greatly fallen off. Salt marketed from stocks harvested in 1898 and from surplus stocks from last year may thus be summarized:

	Tons.
Refined salt, artificially evaporated.....	600
Refined salt, from solar product.....	9,500
Crude salt, for stock needs.....	3,000
Crude salt, for other purposes, sacked or bulk.....	11,500
Artificial rock salt.....	400
Mined rock salt.....	1,000
Total.....	26,000

Crude salt has ranged from 75c. per ton for bulk, for chlorination purposes, to \$3 for stock needs. Refined salt that has been shipped averaged \$10 per ton, including packages and labor. Mined rock salt sells at \$1 to \$1.50 per ton, while the artificial rock salt averages about \$8.50 per ton. From these figures it is shown that the total value of the products marketed in 1898 was \$120,000, as near as can be estimated, and this is very close to the truth. The railroads received more by \$25,000, in freight, for delivering these various products than the dealers in manufacturing and mining them.

Early last spring the refinery of the Inter-Mountain Salt Company was destroyed by fire. Shortly after that mishap a consolidation of the Inter-Mountain and the Inland Crystal Salt companies was effected—in May—the consolidated company retaining the latter name. Previously the Inter-Mountain Company had leased the plant of the Nebo Salt Manufacturing Company, of Nephi, and the result of the consolidation is the control, by the Inland Crystal Salt Company, of the refined salt industry of Utah. This change in the salt situation was marked by an advance in prices at such points in the territory covered as permitted it to be done.

The Eastern Colorado market still continues unsatisfactory, both on account of lower freight rates from Kansas salt producing points to this market and from the fact that Kansas can produce a refined salt by artificial evaporation at less cost than the Utah manufacturers can by solar evaporation and subsequent mechanical refining. However, the additional cost of refining the Utah article produces a more desirable salt for domestic use.

At this time the territory covered in the marketing of Utah salt embraces Western Nebraska, Colorado, Wyoming, Utah, Idaho, Central and Western Montana, Oregon, Washington, Central and Northern California and Nevada.

## THE NEW YORK CHEMICAL MARKET IN 1898.

The year 1898 has been an active one, and many new companies have been formed for the purpose of making chemicals of various descriptions. New plants have been built, especially in the middle West, where the extensive deposits of salt have favored the erection of alkali works. On the other hand, the methods of producing heavy chemicals are being improved continually. The time is not very distant when our imports will be at a minimum as compared with consumption.

With an increased home production there is always some demoralization in market prices, and the chemical trade is no exception. In some lines, such as phosphates, prices are considerably above last year, and it is believed they will go still higher. From all indications, 1899 promises to be a prosperous year for the chemical industry.

**Heavy Chemicals.**—With the increased output of our new works our imports are decreasing, and this is particularly so in the case of soda ash. On the other hand, we are building up some export business, and during the year we have sent soda ash to Australia, China and Japan, in addition to the Central and South American States.

The North American Chemical Company was incorporated in Michigan to represent the United Alkali Company in this country. The capitalization of the new company was placed at \$600,000, two-thirds being preferred stock and one-third common. The articles of association covered many objects, the principal ones being the manufacture of chemical products. The operations are to be carried on in Bay and Wayne counties, Mich., and other places in the United States. Of the total capitalization, \$300,000 has been actually paid in. The largest number of shares of the stock are held by John A. E. Rayner, of Liverpool, England. In September this company had a large plant at work in Bay City, Mich., and it is stated the output of soda ash and chlorate of potash will be greatly increased in the coming year.

The Solvay Process Company's plant at Detroit, Mich., was making early in the year about 150 tons of soda ash per day, while its capacity is 300 tons a day.

The Michigan Alkali Company at Wyandotte, Mich., is increasing the output of its No. 2 works from 200 tons soda ash per day to 300 tons. The Pennsylvania Salt Manufacturing Company has also purchased property in Michigan for a new plant to make soda ash, caustic soda, and bicarb. soda by the ammonia soda process.

In February it was reported that the Anglo-American Finance Syndicate, limited, an English incorporation, with £50,000 capital, would erect alkali works at Kanapolis, Kan., but nothing further has been heard of the enterprise.

**Caustic Soda.**—The imports into the United States during the 10 months ending October 31st, 1898, amounted to 21,065,250 lbs., against 51,794,308 lbs. last year. With the opening of the year domestic caustic soda suffered from a heavy production, and consequent cutting of prices. High test caustic soda, after reaching \$1.85 per 100 lbs., dropped to \$1.45 f. o. b. works in January, while foreign makers were selling at \$1.80@1.95. Powdered caustic soda was stationary at 3½@3½c. per lb. The prices of caustic soda in January, 1897, were somewhat higher. The stocks in bonded warehouses at New York on January 31st, 1898, amounted to 618,917 lbs., against 615,236 lbs. in the previous year. Early in February American caustic soda of high test fell to \$1.55, and the foreign to \$1.70; and in March the former tumbled to \$1.40, while the latter remained at \$1.70. The stocks in the bonded warehouses on April 1st were 574,000 lbs., or 44,917 lbs. less than was held February 1st. During April and May prices were \$1.50@1.55 for domestic, and \$1.65@1.80 for foreign caustic soda, notwithstanding the increased stocks in bonded warehouses at New York, which on May 1st amounted to 1,059,966 lbs. Powdered caustic soda (98 per cent.) from April to June, inclusive, ruled firm at 2½c. per lb. From June to August domestic caustic soda fluctuated between \$1.40 and \$1.50, while the foreign brought about 20c. more. As August closed contracts were taken for 1899 delivery at \$1.25@1.30, while spot domestic was quoted at \$1.40, and foreign at \$1.60. Powdered caustic soda sold down to 2½c. in September. Quotations for domestic high test caustic soda for the last quarter of this year ranged from \$1.35 to \$1.50 f. o. b. works, and for foreign \$1.60@1.70 delivered. Powdered was worth 2½@3c.

**Alkali.**—Business has not been as remunerative as last year, especially in domestic makes. Our imports show a large decrease. During the 10 months ending October 31st, 1898, the United States imported 58,437,008 lbs., against 125,326,441 lbs. in the same period in 1897. Of these imports we re-exported 2,895,645 lbs., against 2,187,936 lbs. in 1897. In January competition was very keen, forcing the price of domestic alkali from 60 to 50c. per 100 lbs. f. o. b. works. The appearance of new English makes had also a depressing effect on the market, and sales of the foreign article were made at about the same price as the American. From March to December domestic alkali brought from 45 to 60c., while the foreign were quoted at 70@75c. per 100 lbs.

**Bleaching Powder.**—Within the past year several of the leading makers of bleaching powder in France, Germany and Belgium have entered our market in competition with the United Alkali Company, of Great Britain, and as a result prices have been pushed rather hard. Besides, the new works at Niagara Falls, N. Y., put their product on the market in May, and a few months later the makers reported that they had booked orders for their entire output for some time to come. The imports into the United States during the 10 months ending October 31st, amounted to 89,024,871 lbs., against 86,338,062 lbs. last year. Of these imports we re-exported 28,495 lbs., as against 35,052 lbs. in 1897.

In January English prime brands of bleaching powder were quoted at \$1.80@1.85 per 100 lbs., while continental makes ruled at \$1.70@1.90. These prices are a little higher than the opening last year. In March, 1898, English prime brands sold down to \$1.60, and continental at \$1.65; and with the opening of April quotations were \$1.75@2 and \$1.60@1.80, respectively, and with few exceptions sellers held these prices until July 1st, though sales of French bleaching powder were reported at \$1.35. Early in July the American makers of bleaching powder reported that they were sold ahead for some time to come,

and therefore quoted \$1.70@1.80 per 100 lbs. at works, while the foreign makes were offered at \$1.40@1.65. At the opening of September the United Alkali Company's brands could be had to arrive at \$1.37½@1.40, while the other makes were obtainable at correspondingly lower prices, notwithstanding the market quotations of \$1.45@1.60. In September higher prices were asked, and at the close of December prime English brands were quoted for 1899 delivery at \$1.50@1.62½, while other makes were offered at correspondingly lower prices. Spot business was done in English prime brands at \$1.65@1.75, and others at \$1.40@1.65, according to test and make.

**Sal Soda.**—This trade has been kept well in hand, and the products of our domestic works are superseding the foreign article. During the 10 months ending October 31st the United States imported 4,175,422 lbs. of sal soda, against 14,308,015 lbs. in 1897. It may be noted that of our imports in 1898 we re-exported 1,272 lbs., as against nothing in 1897. Domestic sal soda sold in January at 55c. per 100 lbs., and foreign at 60@65c. These prices are about the same as last year. A drop of 5c. was noted in March, 1898, when purchases of domestic were made at 45c.; but from April until late in the year the quotations were 50@55c., while for foreign 62½@67½c. was asked, according to position. Concentrated sal soda in the first quarter of the year brought \$1.40@1.50 per 100 lbs., and later \$1.25@1.75, according to make.

**Bicarb. Soda.**—In January domestic bicarb. soda was quoted at \$1.25@1.50 for ordinary, and \$3.25@3.50 per 100 lbs. for extra grades, while the foreign sold at \$2.25@2.50. Thereafter prices fluctuated somewhat, and purchases of ordinary domestic were made in the last quarter of the year at \$1@1.25, while the finer grades ruled firm at \$3.25@3.50, less the usual discounts.

**Chlorate of Potash.**—The experiments for making chlorate of potash in this country have at last been successful, and it is estimated that the output of the Bay City (Mich.) plant in 1899 will aggregate about 35,000 kegs. At Niagara Falls, N. Y., a fair amount of chlorate of potash has been produced. Our increasing home production has naturally reacted on imports, and has to some extent affected prices. For the 10 months ending October 31st, 1898, the United States imported 4,156,548 lbs. of chlorate of potash, against 5,891,104 lbs. a year ago. This article opened in January at 8¾@9¾c. per lb., an increase of 1@1½c. from a year ago. The war sent prices up to 18c. Importations were stopped for a time, but the scare passed and in July prices fell, and purchases were made at 8¾@8¾c. per lb. A combination was effected among the English and continental makers to govern 1899 trade, and quotations in July were 9¼@9½c. In October prices were 9¼@10¼c., and December closes at 9¼@9½c. per lb.

**Acids.**—This has been a pretty good year for the acid makers. For the 10 months ending October 31st, 1898, the United States sent forward 12,952,183 lbs. sulphate of copper, besides \$153,666 worth of miscellaneous acids, showing a large increase over the previous year. As the year progressed there were heard many rumors of a new agreement among the acid makers, but nothing has yet resulted.

Commercial or No. 8 acetic acid was steady in January at \$1.40@1.50 per 100 lbs., a gain of 5c. as compared with 1897. The Paris green makers consumed quite a good deal of acetic acid. In November this acid sold around \$1.35, and in December at \$1.30.

The various degrees of muriatic acid were firm in drums in January at \$1 per 100 lbs. for 18°; \$1 for 20°, and \$1.12½ for 22°, while in carboys the prices were \$1.50, \$1.75 and \$2, respectively. These prices are about 25c. higher than the opening quotations in 1897. In March, 1898, two of the largest makers shut down, as they could not dispose of their salt cake. For 18° the quotation in March was \$1 in drums and \$1.37½ in carboys, and from then on \$1.10@1.75 were the prices. For 20° makers asked during the same period \$1.10@1.87½. For 22° the quotations were \$1.12½@2.25.

In January nitric acid sold on an average of 25@50c. less per 100 lbs. than in the preceding year; the quotations in 1898 being \$3.25 per 100 lbs. for 36° in drums, and up to \$4.12½ in carboys; \$3.75 and \$4.75 for 40°, and \$4.12½ and \$5 for 42°. Makers strengthened their position as the year advanced, and after the first quarter they asked from \$3.25 to \$4.75 for 36°, according to quantity. For 38° the quotations were \$3.50@4.62½; 40°, \$3.75@4.87½, and 42°, \$4.12½@5.25 per 100 lbs., according to quantity.

January found 66° sulphuric acid selling at \$1 per 100 lbs., in drums and up to \$1.75 for carboys. These prices compare with 85c. and \$1 in 1897. In March prices fell to \$1 for drums and \$1.65 for carboys, but as soon as the raw material market was affected by the war, sulphuric acid became stronger, and makers asked \$1.10@1.75, according to quantity.

The 50° chamber acid was steady at \$7½@8 per ton f. o. b. factory in January, and from April on jobbing lots were sold at \$11½@12 per ton.

Early in January contracts for oxalic acid were taken for 6 months' delivery at \$6.50 per 100 lbs., while a jobbing business was done at \$7.50. In January, 1897, the quotations were \$7.25@7.50. The combination held prices steady at \$6.50@7 after most of the 1898 contracts had been booked. In July sales were reported from dock at \$6.25, and from store at \$6.75. In October contracts were taken for 1899 delivery at 6½c., and in December the syndicate reduced its price to 6¼c., at which further contracts were booked.

The best grades of blue vitriol (copper sulphate) were quoted in January at \$3.37½@4 per 100 lbs., as against \$3.75@4 a year ago. As soon as the export business began prices improved, and in May they were quoted at \$3.37½@4.12½, according to quality. From June until December prices fluctuated between \$3.25 and \$4. During this period some Western makes came on the Eastern market, which weakened the market, and sales were reported of good grades at \$3.50. Poor grades could be had at as low as \$3.12½.

**Brimstone.**—The Sicilian sulphur trust has kept prices up to a profitable basis, and were it not for the war between the United States and Spain the quotations would probably have been the same as in 1897. Best unmixed seconds from January to March were quoted at \$20.50@23 per ton. In May a small quantity sold at \$37.50, and a month later it was reported that one purchase had been made at \$75, but

a leading importer expressed much doubt as to this sale. During the early part of the war shipments of brimstone were made to Montreal, Canada, from Sicily, and thence to the United States. In June prices were still high, and one seller quoted \$40, but in July supplies were plenty at \$21 for best unmixeds, and \$19 for thirds. From August to December best unmixeds were obtainable at \$20@23, though an occasional quotation of \$24 or \$25 was heard. Best thirds brought from \$18 to \$20, and here also there were dealers asking up to \$22 for spot goods. The importation of brimstone from Japan has virtually been stopped, owing to the unfavorable condition of the industry in that country.

The sulphur industry in Sicily is handled by the Anglo-Sicilian Sulphur trust, which has an option on 70 per cent. of the total output. The exports of brimstone from Sicily to all countries for the 7 months ending July 31st, 1898, amounted to 311,421 long tons, against 272,365 tons in 1897. The stocks on hand August 1st, 1898, amounted to 147,569 tons. The imports into the United States for the 10 months ending October 31st, 1898, amounted to 143,587 tons, against 123,446 tons in 1897, and 115,436 tons in 1896. Within the past year several new discoveries of brimstone have been made in the United States. The sulphur taken from the Utah mines has found a market among paper mills in the West, and it is said that purchases have been made for delivery in Wisconsin at about \$6 per ton less than the Sicilian. Deposits have also been opened in Venezuela, where the Venezuela Trading and Investment Company, of New York, owns several hundred acres. The sulphur ore there is said to average 62½ per cent. in sulphur, and can be delivered in New York at not more than \$6 per ton. Work is to be actively prosecuted in 1899.

Pyrites.—The demand has largely increased this year, while prices have not fluctuated to any great extent. New deposits of pyrites have been exploited in the United States, while the established companies have operated in a regular way. Considerable pyrites have also been imported from Spain and from Newfoundland. The Pennsylvania Salt Manufacturing Company is probably the largest individual consumer of Spanish pyrites. Of late bisulphite pulp makers have been experimenting with pyrites. It has been suggested that the sulphurous acid be made in the vicinity of the pyrites deposit, and shipped in steel cylinders. The coming year will doubtless show a large consumption, not only among acid makers, but in other industries. The pyrites imported from Spain contain from 46 to 51 per cent. sulphur; the Newfoundland, or Pilleys Island, about 50 per cent., and the American from 42 to 44 per cent. sulphur. Quotations were as follows: American lump ore (basis 42 per cent.), \$3.25 per long ton, f. o. b., mines; Mineral City, Va., \$5@5.25, f. o. b. Davis, and Charlemont, Mass.; Pilleys Island, \$6.50 delivered in New York. American fines ranged from \$2.75@3 per long ton, f. o. b., Mineral City, Va.; \$4.25, f. o. b., Massachusetts, and \$4.50 for Pilleys Island, delivered in New York. Spanish pyrites ranged from 10@13c. per unit, according to percentage, delivered ex ship New York and other Atlantic coast ports.

Magnesite.—During the year an increased amount of business has come from steel makers, who use magnesite bricks in their furnaces. In March inquiries were received from steel plants that proposed to burn crude magnesite for their own use. At that time the crude magnesite was quoted at \$7@8 per short ton, while the imported calcined sold at about \$25 per ton, and magnesite brick up to \$40.

Borax.—The makers quoted 6¼@7c. per lb. for refined crystals through the year.

Arsenic.—A combination was effected by the foreign makers of white arsenic lately, and prices have since been well maintained. In October, when the report first gained circulation, the quotation was 3¼c. per lb. for shipments and 4@4½c. for spot goods, and in December the quotations were 4@4½c. per lb. Besides the English makes some Canadian arsenic has been sold on the Eastern market at rather low prices. The red arsenic, which comes largely from Germany, is worth 7¼@8c. per lb.

Salt-peter.—The consumption of salt-peter in the United States is supplied largely from Calcutta, India. The prices did not fluctuate very widely until the second quarter of the year, when it was declared contraband of war. On July 1st crude salt-peter was quoted at 5c. for stock on spot and afloat, while refined commanded 6½@7c. per lb. The visible supply on July 1st was 17,887 bags, or 27,916 bags less than at the corresponding period in 1897. The stocks in hands of importers at New York on July 1st amounted to only 5,000 bags, as against 20,500 bags in 1897. Business in October was limited, but prices steady at 3¼@3½c. per lb. for spot crude, and 3.15c. for shipment. The imports from January 1st to December 31st amounted to 62,449 bags, against 77,137 bags in 1897. The consumption during this period amounted to 75,095 bags, against 81,109 bags in 1897. The stock on hand December 31st was 2,822 bags, against 15,468 bags in 1897.

Paris Green.—In February the Commercial Chemical Company of the United States was formed by the Adler Color and Chemical Works, A. B. Ansbacher & Company, I. Pfeiffer, Frederick L. Lavenburg, and Morris Hermann & Company, believing they could in that way dispose of their product more economically. The Commercial Chemical Company fixed prices early in the year at 16@16½c. per lb. for strictly pure Paris green in kegs or casks, in a large way, and in the second week in May it advanced the prices to 17½@18c., but allowed a net reduction by giving increased rebates. In December outsiders quoted 9@9½c. per lb. for next season's business; and as these figures were considerably below the combination figures a meeting was held by its members, and after due consideration they separated.

Copperas.—The combination formed in 1897 on May 1st, 1898, advanced prices from 52½c. per 100 lbs. to 62½c. for carload lots, and to 67½c. and upward for smaller quantities, and at the close of the year 57½c. is asked.

Fertilizing Chemicals.—This year has shown an increase in the consumption of fertilizers in the United States. The demand from the South has been interfered with by the low price of cotton. According

to States, the estimated consumption in 1898 was as follows: Alabama, 75,000 tons, against 80,000 tons in 1897; Florida, 70,000 tons, same as last year; Georgia, 400,000 tons, against 410,000 tons; South Carolina, 200,000 tons (160,000 tons); North Carolina, 175,000 tons (130,000 tons); Tennessee, 25,000 tons (45,000 tons); Kentucky, 25,000 tons (30,000 tons); Mississippi, 35,000 tons (40,000 tons); Arkansas, 30,000 tons, same as last year; Louisiana, 25,000 tons (40,000 tons); Texas, 40,000 tons (30,000 tons); Virginia, 180,000 tons (70,000 tons); West Virginia, 40,000 tons, same as last year; Northeastern States, 100,000 tons (110,000 tons); Western States, 155,000 tons (125,000 tons); Northern States, 200,000 tons (240,000 tons); total, 1,775,000 tons, against 1,650,000 tons in 1897.

The imports of fertilizers into the United States during the 10 months ending October 31st, 1898, were valued at \$920,879, against \$917,505 in 1897, and \$790,088 during the same period in 1896. Our exports of domestic fertilizers during the 10 months in 1898 amounted to \$4,225,133, against \$4,631,247 in 1897, and \$3,804,037 in 1896, made up largely of phosphate rock. Besides these exports, we reshipped during the same period \$11,360 worth of the imported fertilizers, against \$4,504 in 1897. We also built up a good export business in high-grade Western blood and tankage. Probably the most interesting feature in the fertilizer industry is the organization of the Virginia-Carolina Chemical Company, of Richmond, Va., which was formed in 1898 with a capitalization of \$12,000,000. It has thus far acquired 27 fertilizing plants in the South and is negotiating for more. This company intends to renovate its new acquisitions and to increase their output.

There was also a combination in the Atlantic menhaden fishing industry, headed by the Churches, of Rhode Island. This pool was named the American Fisheries Company, had the support of some Englishmen, and was capitalized at \$10,000,000. It is now extending its field of operation, and latest advices state it will build a large fish factory in Texas. The supply of fish scrap from menhaden this year was less than 1897. The Menhaden Oil and Guano Association report that in the season of 1898, 45,000 tons of scrap were made, as against 54,000 tons in 1897. The association had 40 factories in operation, against 41 last year, while the capital invested was \$2,500,000, against \$2,000,000 in 1897.

Gas liquor sulphate of ammonia was sold in January on a basis of 25 per cent. at \$2.32@2.55, while bone was quoted at \$2.25@2.45 per 100 lbs. From February to June prices fluctuated widely, and were for gas liquor \$2.35@2.65, and for bone \$2.25@2.47½. July opened with \$2.47½@2.50 quoted for gas liquor, and \$2.40@2.45 for bone. By August the foreign market grew stronger, and a sympathetic rise in price was experienced in New York; gas liquor was quoted at \$2.55@2.57½, and bone at \$2.40@2.45. In September the prices went up to \$2.60@2.62½ for gas liquor, and \$2.45@2.50 for bone, but as the month closed there were offerings of liquor at \$2.55@2.57½, and bone at \$2.40@2.45. The first shipment of sulphate of ammonia was made from the Semet-Solvay by-product coke ovens at Ensley, Ala., in September, amounting to 11,000 gals., which went to Syracuse, N. Y. In December a fire occurred at these works, which will interfere with further production for a time at least. At the close of December gas liquor sold at \$2.65@2.67½, and bone at \$2.55@2.57½. These prices are from 25@35c. higher than last year. In 1899 we may expect a large increase in the production of sulphate of ammonia, as there are several of the coke oven plants now being built to save the by-products. Efforts are being made by the Sulphate of Ammonia Committee in London, England, to increase the consumption of this article among agriculturists.

In potash salts an increased consumption was noted during the past year, while prices were stationary, as fixed by the German Kali Works. Quotations at New York and Boston were as follows: Muriate of potash, 80@95 per cent., \$1.78@1.81 per 100 lbs.; sulphate of potash, 90@96 per cent., \$1.90½@2.03½; double manure salts, 48@53 per cent., \$1.03; kainit, 12.4 per cent., \$8.50@8.80 per long ton; sylvinit, 36½@37½c. per 100 lbs.

Paints.—Early in February five of the leading manufacturers of vermilion—the Adler Color and Chemical Works, A. B. Ansbacher & Co., Morris Hermann & Co., F. L. Lavenburg and Isaac Pfeiffer—came to an agreement to maintain prices in the United States, and to sell their vermilion through a single sales agent, R. P. Rowe. Although two of the other leading concerns, the F. W. Devoe & C. T. Reynolds Company and D. F. Tiemann, did not join in the combination, they agreed to hold prices, which were 54c. per lb. in kegs, and 55c. in bags. In December American quicksilver vermilion was quoted at 59c. in bulk, and the lead at 14@16c. per lb.

Nitrate of Soda.—This article has experienced many fluctuations in price during the year, while the consumption steadily increased. The imports into the Atlantic ports from the west coast of South America from Jan. 1st, 1898, to December 1st amounted to 903,638 bags, against 568,153 bags in 1897, and 807,588 bags in 1896. We also imported here from Europe 55,171 bags, bringing the total imports to 958,809 bags, against 568,153 bags in 1897, and 807,588 bags in 1896. The stock in store and afloat on December 1st at these ports amounted to 46,617 bags, against 39,627 bags in 1897, and 152,213 bags in 1896. Adding 200,000 bags due to arrive March 15th, 1899, makes the total visible supply to that date 246,617 bags, against 254,627 bags in 1897, and 326,813 bags in 1896. The production of nitrate of soda has been large, notwithstanding the low market values, and although repeated efforts have been made to start a new combination, as yet no success has been attained in this direction. On January 1st there were 45 oficinas at work in Chile, as against 30 in 1897, and 38 in 1896. By June 30th the number of active oficinas fell to 42, which compares with 55 in 1897, and 56 in 1896. The total production for the 9 months ending September 30th, 1898, was 20,660,891 qtls., against 18,923,097 qtls. in 1897, and 19,561,878 qtls. in 1896. The exports during these 9 months were 15,252,850 qtls., as against 14,329,693 qtls. in 1897, and 16,759,366 qtls. in 1896. Of these exports 4,276,534 qtls. went to Germany in 1898, as against 4,409,386 qtls. in 1897 and 6,520,770 qtls. in 1896. The United Kingdom took the next largest amount, while the United States received 2,366,435 qtls., against 1,811,882 qtls. in 1897 and 1,784,673 qtls.





of December. The capital of the company is £1,000,000 and the purchase price was £950,000. Of course, the London public subscribed readily and the flotation has been eminently successful.

Most of the London promoters have followed the fashion in British Columbians, but so far they have not offered the public any property of first rate importance. The London & British Columbia Goldfields, Limited, which is represented in British Columbia by Mr. S. S. Fowler, has floated the Whitewater Mine (Slocan), the Ruth Mine (Sandon) and the Ymir Gold Mine, which are all progressing well. Another company—the New Goldfields of British Columbia, Limited—which is controlled by Sir Charles Tupper and Mr. Lowles, has floated the New Fraser River Company to work river gravels, but no actual results have been obtained. The Goldfields of British Columbia, Limited, operated by Mr. Grant Govan, has floated the Waverley and Tangier mines, at Albert Canyon, but these mines do not hold out any promise of success. The Canadian Pacific Exploration, Limited, of which Mr. W. H. Corbould is the managing director, has been doing gold-mining work in the province, particularly at the Porto Rico Mine, but little has been heard of this company on the London market.

Besides the above companies there have been multitudes of others that have been formed to operate properties in British Columbia and Canada, but it is not necessary to enumerate these as none of them has done anything, and most have not intended to do anything.

Klondike has been responsible for more new companies than any other mining center this year, and all the promoters of various degrees of honesty have considered it necessary to be in the swim. Some had properties and some were only intending to prospect, while others who thought they had acquired properties found that the vendors had sold them things that did not exist. It is unprofitable for the purposes of this review to enter into details of all or any of these companies, but, in passing, it is impossible to refrain from referring once more to the folly of the English investor and the want of conscience on the part of the London promoter.

As regards American mining in other parts of the Continent there is very little to say. The Mountain Copper Mines, Limited, floated last year to work the Mountain Mines in Shasta County, California, have not proved quite so successful as was expected, and the average grade of the ore has decreased. The Newfoundland Copper Company, Limited, has been floated to work certain mines on that island, and already some cargoes of ore have been sent to Swansea. The proprietors of the Palmarejo Mine in Mexico have at last decided to do without the services of Messrs. Applegarth and Drake, the original promoters, and in future the mine will be worked on different lines. The Montana Mining Company, though winning the lawsuit against the St. Louis Company, has found no new ore bodies of value and is looking for a new property. The Grand Central Mine in Mexico has improved considerably since the relapse of a year and a half ago and is now paying dividends. The Alaska Treadwell and Anaconda shares have stood well all the year, but they are very little dealt in now. The Harquahala and most of the other older mines on the London market have practically gone out of existence.

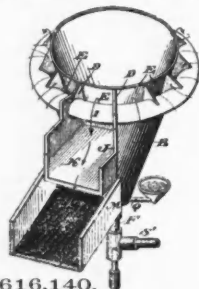
#### PATENTS RELATING TO MINING AND METALLURGY.

##### UNITED STATES.

The following is a list of the 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 Scientific Publishing Company upon receipt of 25 cents.

Week Ending December 20th, 1898.

- 616,084. COLUMN. Frederick A. W. Davis, Indianapolis, Ind. A column composed of a suitable base and a series of tubes mounted thereon one within another and braced and supported by connecting devices in the spaces between them.
- 616,139. METHOD OF ELECTROLYTICALLY TREATING STRAW OR OTHER FIBROUS MATERIAL. Goldsby H. Pond, Ashburnham, Mass. The method consists in electrolytically decomposing a solution of chloride of sodium in the presence of calcium hydrate in a suitable tank, the resultant being a solution of hypochlorite of sodium, hypochlorite of calcium and chloride of sodium and uncombined calcium hydrate, then allowing the calcium hydrate to settle and drawing off the solution, heating it and subjecting the straw to its action, then returning solution to the decomposing tank containing the uncombined calcium hydrate, and reinforcing it with fresh chloride of sodium and repeating the operation.
- 616,140. CONCENTRATOR AND DISTRIBUTOR. Julio H. Rae, Philadelphia, Pa. An amalgamator having inner and outer vessels with separating plates forming pulp compartments open at the top, a

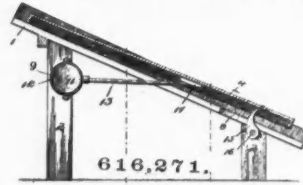


616,140.

pulp-supply pipe leading into the base of said compartments, distributors extending radially from said outer vessel and receiving the overflow of said compartments and radially extending concentrators secured to said outer vessel and receiving the discharge of said distributors, in combination with a pipe leading from the lower portion of the outer vessel, said pipe being provided with a receptacle.

- 616,161. PROCESS OF REDUCING TIN OXIDE OR DROSS TO PURE METALLIC TIN. John C. Tallafarro, Baltimore, Md. Assignor to Edwin Norton, Maywood, and Oliver W. Norton, Chicago, Ill. The process consists in collecting quantities of the oxide or dross from tinning-pots or other sources and subjecting it to the action of fatty acid and a low heat in the presence of molten metallic tin.
- 616,165. CARBON FOR ELECTRIC WELDING. George W. de Tunzelmann, London, England. An electrode for electric welding, brazing and the like purposes, composed of carbon and metallic oxides.

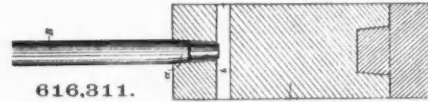
- 616,187. EVAPORATING APPARATUS. Louis D. Hobson and Herman E. Blair, Cincinnati, Ohio. The combination of the brine-evaporating vessel and steam-piping therein, a vapor and gas exit pipe and an air-inlet pipe, and an air-drum or air-heater, a blower connected to the air-heater and an exit pipe from the blower, all adapted for enabling the heater to carry air through the air-heater to the evaporating vessel, and thereby reconvey the heat.
- 616,254. PORTABLY MOUNTED ROCK CRUSHER. Edwin S. Phillips, Kennett Square, Pa. Assignor to the American Road Machine Company, same place. A rock crusher mounted on a carriage, which is also provided with a bucket elevator.
- 616,265. FIELD MAGNET FOR ELECTRIC MACHINES. Sidney H. Short, Cleveland, Ohio. A field magnet having grooves formed in the pole-surface thereof, in combination with a grid.
- 616,271. COAL SCREEN. William J. Steen, Rosevale, Pa. A frame having an open bottom formed of longitudinal slats, each provided with an opening formed in the lower end thereof, perforated parallel



616,271.

screen-plates mounted on said slats, ribs projecting from the under face of said screen-plates, forming channels when the plates are assembled, the openings in the said slats communicating with the said channels, eccentrics mounted on a shaft to impart a longitudinal reciprocating motion to said screen-plates.

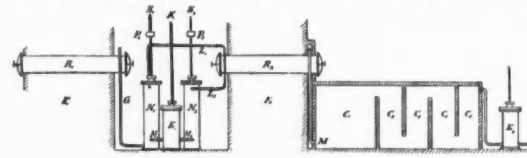
- 616,273. MINER'S DRILL. Joel F. Strauser and Harry T. Klinger, Tower City, Pa. A drill having four vertical wedge-shaped or beveled cutters at right angles to each other, with tapering or wedge-shaped side cutters, located above and in the same vertical plane with the central cutters, but having their cutting edges at a slight angle thereto.
- 616,311. CRUSHING MILL STAMP STEM. Charles Gracey, Kingman, Ariz. An improved stamp head having a transverse drift-opening and an opening in the centre of its upper end and converging downwardly, and a stem having a short tapered portion to closely fit the upper portion only of the central opening and having a portion below said



616,311.

tapered portion of less diameter than the latter to maintain this prolonged portion out of contact with the remaining portion of the walls of the tapered opening in the stamp head, the lower end of the said reduced portion extending into the drift-opening, whereby it may be engaged to detach the stem from the head.

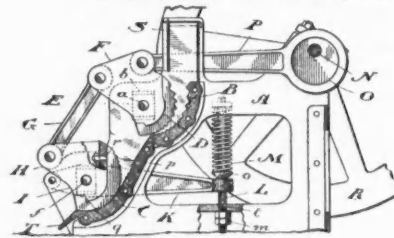
- 616,321. CONTINUOUS BRICK KILN. Edwin T. Harris, Ridgway, Pa. Assignor of one-half to Frank G. Earley, same place. A brick kiln having in its floor a series of concentric main flues of a length increasing outwardly, the longer or outermost flues having a greater number of branch flues than the innermost ones, said branch flues being carried out to one side of the kiln and provided with individual dampers, and the other portion of said branch flues being carried out to the other side of the kiln and provided with individual dampers, and two stacks for each kiln, one arranged on one side and the other on the other side of the kiln, and communicating through a main damper with the branch flues of the kiln.
- 616,391. PROCESS OF OBTAINING SULPHUR FROM SULPHATES. Vladimir de Baranoff and Eugene Hildt, Paris, France. The process is intended to extract sulphur simultaneously with sulphides and



616,391.

sulphurous acids from metallic sulphates; and consists in treating such sulphates with sulphureted hydrogen under heat, thereby decomposing them into sulphur, sulphurous acid and sulphides.

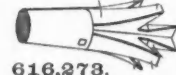
- 616,415. BRICK KILN. Willis N. Graves, St. Louis, Mo. Assignor to the Hydraulic Press Brick Company, same place. The combination of a series of chambers having individual furnaces and having individual flues covered by grates, a central partition provided with flues, a pair of side flues communicating with a chimney, a pair of side flues communicating with a suction fan, and portable flues for forming communication between said chambers and the central and side flues.
- 616,427. ROCK CRUSHER. Bagster R. Seabrook, Victoria, Canada. A curved bed supported in a suitable frame, in combination with an oscillator; bearing blocks vertically adjustable in suitable guide-ways in the frame of the machine and having the shafts of the oscillator journaled therein; a toothed upper curved bed communi-



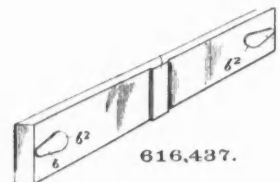
616,427.

cating with the lower bed and having a toothed oscillator adjustably journaled therein; an arm extending from each oscillator, a link connecting the arms, one or more eccentric rods journaled to the arm of the oscillator, and eccentrics operating said rods, and a shaft for transmitting power to said eccentrics.

- 616,437. ELECTRIC WELDING. Henry F. A. Kleinschmidt, Johnstown, Pa. Assignor, by mesne assignments, to the Lorain Steel Company, of Ohio. The method of joining rails and parallel splice bars consists in welding the central portion of the splice bars to the sides of both rails, and then welding opposite end portions of the splice bars to the sides of each rail.



616,273.



616,437.

## PERSONAL.

Mr. J. Parke Channing, of New York, is in San Francisco.

Col. I. N. Peyton, of Spokane, Wash., is in San Francisco.

Mr. William F. Wilson, mining engineer, from the City of Mexico, is in San Francisco.

Mr. Byron E. Shear is on the Pacific Slope investigating some mines which were called to his notice.

Mr. W. D. Gray, president of the E. P. Allis Company, of Milwaukee, Wis., spent the holidays in Denver.

Col. A. M. Hay, of the Dominion Reduction Works, has returned to Rat Portage, Ont., from England.

Mr. A. A. Grant, mining man and railroad contractor, of Albuquerque, New Mexico, is in San Francisco.

Ex-Senator Chas. N. Felton, of California, who is largely interested in mines in that State, is in Philadelphia.

Mr. W. H. Brevoort, of New York, is visiting the mining camps of Colorado, Utah, Idaho, Oregon and California.

Mr. Fred. Harvey, general manager of the Twin Lakes Hydraulic Mining Company of Colorado, has gone to England.

Prof. R. S. Stockton, of the State School of Mines, at Golden, Colo., was in Cripple Creek recently on professional business.

Mr. Patrick Clark, president of the Republic Gold Mining and Milling Company of Republic, Wash., was in New York recently.

Mr. Frank P. Swindler has been appointed superintendent of the De La Mara Mine, De La Mar, Nevada, taking charge January 1st.

Mr. W. C. Ralston, vice-president of the California Miners' Association, is in the East in the interests of a local mining syndicate.

Mr. George Wheatley, mining expert, with the American Exploration Company, has been examining mining properties near Tombstone, Ariz.

Mr. L. E. Griswold, who has been operating a gold mine near Helena, Mont., is now in Boston, Mass., where he is to establish himself as a consulting mining engineer.

Thomas Rowe, mining captain of the Saratoga Gold Mining Company of Central City, Colo., died on December 21st, aged 52 years. He was a native of Cornwall, England.

Mr. O. P. Posey spent the holidays in California and is expected to return to Salt Lake City this week. He will devote most of the winter to looking after his Utah mining interests.

Mr. L. E. King, superintendent of the Independence Town and Mining Company in the Cripple Creek District, Colo., has resigned his position, and has been succeeded by Mr. Ed Ray.

Samuel C. DeArmit, 38 years old, superintendent of the Plum Creek coal mines, owned by the New York & Cleveland Gas Coal Company, died December 24th at his home in Plum Township, Pa.

Mr. Francis M. Simonds, of Simonds & Wainwright, chemists and mining engineers, has returned to New York from Alabama and Tennessee, where he has been on professional business.

Mr. Eben Smith is visiting mines in Oregon and California. On his return to Denver he will spend some days in Utah. He has recently become interested in properties at Mercur and Bingham.

Mr. J. G. Edwards, the former Wyoming stockmaster, has about abandoned sheep and is diverting his capital and energies to mining. He has been looking into several attractive Utah propositions.

Mr. Robert G. Wells, connected with the Nicol-Marlopol Mining and Metallurgical Company, of Mariopol, Russia, has been in Pittsburg placing orders for machinery aggregating \$1,000,000 for the great mills to be erected at Marlopol, on the Sea of Azov.

Mr. W. J. Clark of the General Electric Company has accepted the position of general manager of the Foreign Department with headquarters in New York. Mr. D. Mazonot, who for five years has been general manager of the department, becomes managing director of the Mexican General Electric Company, with headquarters in the City of Mexico. Mr. Clark has had wide experience in foreign commercial matters and is the author of "Commercial Cuba," recently published.

## OBITUARY.

Peter Clays, a pioneer miner of Utah, died at Bingham on December 30th, aged 60 years. He crossed the plains in 1864, and made a modest sum placer mining near the present site of Bingham.

W. Dewees Wood, a sheet iron manufacturer and president of the W. Dewees Wood Company of McKeesport, Pa., died at Pittsburg, January 2d, aged 73 years. Mr. Wood was born in Philadelphia, and was grandson of James Wood, who founded the Schuylkill Iron Works at Conshohocken, Pa., early in the century. Receiving only a common school education. W. Dewees Wood went to Wilmington, Del., as a young man to manage one of his father's sheet iron mills. The McKeesport Iron Works, the original plant at McKeesport, Pa., was established in 1851, by Mr. Wood and Richard B. Gilpin, his father-in-law. The works manufactured a planished sheet iron by a process patented by Mr. Wood. In 1862 Mr. Wood and Alan W. Lukens, his cousin, formed the firm of Wood & Lukens, and manufactured American-Russia and black sheets. In 1871 the firm of W. D. Wood & Company, Limited, was formed, and in 1888 the firm was incorporated under the name of the W. Dewees Wood Company, Mr. Wood being president. The small plant built in 1851 has become one of the largest in the Monongahela Valley. Its annual capacity is between 12,000 and 15,000 tons of patent planished sheet iron, which has done much to displace in this country the Russian irons. Mr. Wood also owned the Wellsville Plate & Sheet Iron Company of Wellsville, O., and was interested in glass and gas enterprises, selling out the McKeesport illuminating gas works two years ago to the United Gas & Coke Company.

## SOCIETIES AND TECHNICAL SCHOOLS.

Association of Engineers of Virginia.—This association formally disbanded on December 31st, as the members found it impracticable to continue the organization longer. The publications in the hands of the society will be turned over to the library of Washington & Lee University at Lexington, Va.

Civil Engineers' Society of St. Paul.—The 16th annual meeting was held January 2d. The annual reports were read and accepted. The officers of the society were re-elected and Mr. Geo. L. Wilson was elected Representative on the Board of Managers of the Association of Engineering Societies.

University of Pennsylvania.—The annual catalogue gives the total number of officers of instruction as 331, and the total number of students as 2,310, of whom 284 are enrolled in the Towne Scientific School. There are 1,947 students from Pennsylvania, 33 from European countries, 32 from Canada and 5 from Australia.

Yale University.—The annual catalogue for the year 1898-99, just issued, gives the total number of students registered as 2,511, an increase of 11 over last year. These are distributed as follows: Graduate school, 283; academic department (Yale College), 1,224; Sheffield Scientific School, 567; art school, 84; department of music, 76; law school, 194; medical school, 119; divinity school, 95. The most notable increase is in the graduate department. The number of professors, instructors and lecturers in the university for the current year is 260—an increase of 5 over last year.

Massachusetts Institute of Technology.—A 140-page graduates' magazine, "The Technology Review," has been issued by the recently organized Association of Class Secretaries. The first number contains the announcement; a photograph with biographical sketch of President Crafts; articles on "The Function of the Laboratory," by Professor Silas W. Holman, and on the "Pierce Building," by Professor Eleazer B. Homer, the architect; and reprints in fac-simile of early institute documents and letters. The latter half is given to news of the institute of the undergraduate and graduate classes.

Harvard University.—The annual catalogue shows a total enrolment of 4,660 students, including the summer school, a gain of 84 over last year. The registration in the college alone is 1,851, 32 more than in 1897-98. Radcliffe College, which is not included in the total enrolment, has 411 students. As Radcliffe students are taught entirely by Harvard instructors, the total number of pupils obtaining Harvard instruction may be said to be 5,071. This is the first time that this figure has passed the 5,000 mark. The number of money scholarships available this year in the college, scientific and graduate departments is 206, with a total income of \$44,275.

Engineers' Club of Cincinnati.—The 11th annual meeting occurred on the evening of December 15th, at the club rooms, 24 members being present. Favorable action was taken in the matter of changes in the by-laws providing for an increase in the annual dues and a change in the time of calling the meetings to order. Offi-

cers for the ensuing year were elected as follows: President, Schuyler Hazard; vice-president, Thos. B. Punshon; directors, A. O. Elzner, Wm. C. Jewett, L. E. Bogen; secretary and treasurer, J. F. Wilson. The retiring president, Mr. Geo. W. Kittredge, read a very interesting paper giving a historical review of the club during its existence.

Merchants' Association of New York.—At the meeting of the directors on January 5th the directors re-elected as president William F. King; as first vice-president, John C. Juhring; as treasurer, Charles H. Webb; the office of second vice-president was filled by the election of Alvah Trowbridge, vice-president of the National Bank of North America, who was one of the newly elected directors, and the office of secretary was filled by the election of John C. Eames, of the H. B. Clafin Company, who recently took Mr. Clafin's position in the board. James B. Dill, of Dill, Seymour & Baldwin, was elected counsel for the association, and a vote of thanks was tendered Fred R. Kellogg, formerly of Mr. Dill's firm, who co-operated with Mr. Dill in the controversy and law suit growing out of the controversy in the question at issue between the express companies on the one side and the Merchants' Association on the other, concerning the payment of the 1c. stamp tax on the receipts of express companies.

The full board of directors of the Merchants' Association now stands as follows: William King, Meyer Jonasson, John G. Eames, Wm. L. Strong, Alvah Trowbridge, John W. Ambrose, F. W. Wurster, Frank Squier, J. G. Juhring, Chas. H. Webb, Wm. E. Tefft, Corcellus H. Hackett, John H. Starin, G. L. Du Val, Abraham Wolff.

The directors intend to continue the aggressive policy already laid down for the work of the Merchants' Association, and will spare no effort to increase the scope and efficiency of that association.

Franklin Institute.—At a special meeting of the Mining and Metallurgical Section on December 28th, Prof. T. C. Hopkins of State College read a paper on the feldspars and kaolins of Pennsylvania. The paper was based on field investigations made by the speaker during the past summer, under the auspices of the Pennsylvania State College, and the detailed results will be given in a forthcoming report by the College. The paper showed that the commercial feldspars of the State occur in Delaware and Chester counties; most of them in schistose, but some of them in serpentine rocks. They occur in pegmatite veins or dikes, and the feldspars are associated with considerable quantities of quartz, muscovite and biotite. There were 17 different quarries, operated by 10 different companies in Pennsylvania during 1898. The quarries are located at Chester Heights, Elam, Brothwyn, Chadd's Ford, Fairville, Unionville, Embreeville, Avondale, Chatham and Sylmar. The kaolins are of two classes, the residential kaolins and the transported kaolins. The former occur in Delaware and Chester counties, and the latter in the South Mountain District, in Cumberland, York and Franklin counties. The residual kaolins have been a source of commercial supply for more than 50 years. The others, while their existence has been known for many years, have had commercial importance for only about 5 years. The locality promises to be one of the most productive ones in the State. There are 8 active kaolin washing plants in the State, and 3 large mines that were formerly productive are now abandoned.

The paper was illustrated with maps of the district and photographs of the mines and quarries.

## INDUSTRIAL NOTES.

The Coal Handling Machinery Company, of Chicago, is making a specialty of gas and gasoline engines, manufacturing the Cornell gas engine.

It is said that the Wilmington Tin Plate Company, recently incorporated with \$250,000 capital, will build a large tin plate factory at Wilmington, Ill.

The Ingersoll-Sergeant Drill Company is about to open a branch office in New Orleans, with Mr. H. M. Perry in charge. Mr. Perry's office will be in the Hennen Building.

During the past year the Truax Manufacturing Company of Denver manufactured and sold over 300 of its automatic cars, a considerable increase over the previous year.

The Vulcan Metal Refining Company has started its plant at Perth Amboy, N. J., on an experimental run. The plant will handle tin scrap. It will use about 10,000 tons of scrap yearly.

The Babcock & Wilcox Company will supply 60 forged steel boilers of 520 H. P. each a total of 31,200 H. P. for the new plant of the Third Avenue Traction Company, New York. The boilers will be supplied with Roney stokers, made by the Westinghouse, Church & Kerr Company.

The West Virginia Steel Company, Wheeling, W. Va., has been incorporated with a capital of \$1,000,000. The incorporators are George Hook, W. A. Wilson, George E. Stifel, Charles W. Franzheim and Frank G. Caldwell.

The Southern Chemical Company has been incorporated at Winston-Salem, N. C., to manufacture chemicals and fertilizers. Authorized capital, \$100,000. Incorporators—H. B. Bate, P. H. Hanes, W. F. Brown and F. H. Fries.

Hughes Brothers, Scranton, Pa., manufacturers of all kinds of safety lamps, have just broken ground for a new factory, made necessary by the large increase in their business. The new factory will be located near the present one.

The Otto Gas Engine Works of Philadelphia, Pa., is busy on a large number of orders for small engines. It recently shipped 2 Otto gas engines, 120 H.P. each, to the Stockton Gas Company, Stockton, Cal., for use in street railway service.

It is reported that a combination has been effected between the Schoon Pressed Steel Company and the Fox Pressed Steel Company, of Pittsburg, Pa., to push the manufacture of steel cars. It is said the new company will have a capital of \$10,000,000.

F. L. Smidth & Co., manufacturers of cement machinery, state that they have instituted suit against the Bonneville Cement Company of Seigfried, Pa., for infringement of United States patent No. 548,115, of October 15, 1895, for what has become known as the tube mill.

The Steel Abrasives Company, of New York City, has been incorporated to deal in polishes and abrasives. The capital is \$50,000, and the directors J. L. Wills, C. M. Pielsticker, W. A. F. Jones and Wyllys Hodges, of New York City, and George De Metz, of Staten Island.

C. K. Williams & Company, Easton Pa., have purchased the works of the Helios Dry Color & Chemical Company, as well as the Allentown Copperas Works, of Allentown, Pa., and will operate them hereafter. The works have a capacity of about 200 tons of copperas per month.

The Hilles & Jones Company, Wilmington, Del., reports a great deal of work on hand. Among orders in course of completion are one from the Ohio Steel Company for 10 rail straighteners, and another from the Yarrow Company, Great Britain, for shipbuilding tools.

At the stockholders' meeting of the Aetna-Standard Iron and Steel Company, at Martin's Ferry, O., the following officers were elected: President, John Topping; vice-president and general manager, B. M. Caldwell; secretary, J. N. Scott; treasurer, J. J. Holloway; assistant manager, T. W. Bray.

The Denver branch of the Jeanesville Iron Works Company, A. Middlebrook, manager, has sold the Leadville Pumping Association 2 large mine pumps, 22 in. x 10 in. x 12 in. and 22 in. x 10 in. x 18 in., and also a 12 in. x 6 in. x 12 in. mine pump to the Nisl Prius Leasing Company of Leadville.

At the annual meeting of the stockholders of the Howell Mining Drill Company of Plymouth, Pa., the following officers were elected: President, D. K. Spry; secretary and treasurer, J. A. Opp; superintendent, Franklin B. Spry; directors, D. K. Spry, J. A. Opp, F. B. Spry, Dr. H. L. Whitney and Thomas Kerr.

The new officers of the Harlan & Hollingsworth Company, Wilmington, Del., are: Henry T. Gause, president; Horace W. Gause, vice-president and secretary; and J. Rodney Gause to the vacant directorship. The above, with S. K. Smith, treasurer, and T. Jackson Shaw, superintendent engineer, completes the Board of Directors.

The "Selden," a packing for piston rods, plungers and wherever a gland packing is used, made by Randolph Brandt, New York, is being shipped to Europe, Japan, South Africa, Mexico, West Indies and South American countries. The manufacturer of the "Selden" packing is now putting on the market a boiler gasket for high steam pressures that is reported to meet with gratifying success.

It is said that the steel plant of the Watts Steel & Iron Syndicate, Limited, at Middlesborough, Ky., will be put in operation soon. The plant was built in 1890-93, but has been idle long. It contains seven 25-ton basic open hearth steel furnaces, two 4-hole soaking pits, and one 32-in. blooming mill, the product being billets, blooms and slabs, and the annual capacity 75,000 gross tons. The 2 blast furnaces are running.

The Everhart Brass Works of Scranton, Pa., will soon use the new factory. The new building will occupy a space of 48x110 ft., will be two stories high, and about double the capacity of the present works. It will be equipped throughout with Monitor and Fox lathes, and the boiler and engine will be furnished by the Erie Engine Works, through its Scranton agents, the Scranton Supply and Machinery Company.

The company will employ twelve hundred hands day and night at Providence. It will manufacture the Greene-Wheelock for the European and Canadian markets. There will be a department for manufacturing the appliances for attaching compressed air motors to coupes and carriages. Truck bodies and trucks, compressed air locomotives for suburban traffic and for hauling in coal mines will also be among the products of the company's shops.

Acquirements of the properties represents an investment of \$3,000,000. Among the stockholders of the International Air Power Company are the Cramps, of Philadelphia; Leiter, of Chicago; the Elkins-Weidener-Doran syndicate, of Philadelphia; Edgar K. Hill, Worcester; the Whitins and the La Salles, of Whitinsville, Mass.; the Hoadley Brothers, W. H. Knight, H. W. King, Worcester; George H. Graham, District Attorney of Philadelphia, and Lewis Nixon.

Mr. M. J. Martinez has been appointed resident agent at Havana, Cuba, for the Aultman & Taylor Machinery Co., Mansfield, O., manufacturers of the "Cahall" vertical and the "Cahall" horizontal water tube boilers. Mr. Martinez will be prepared to submit estimates on all the goods manufactured by the above named company. The vertical type of boiler is claimed especially adapted to the conditions and needs of the sugar industry in Cuba and Porto Rico.

The Colorado Iron Works Company has just finished at its works and shipped to the Smelting Corporation, Limited, Cheshire Port, Eng., a complete 42 in. x 140 in. zinc-lead water jacket smelting furnace with two spiral forehearth. The company is also now making for the Nederlandse Indische Mijnbouw Maatschappij of Batavia, Java, one of its latest improved copper matting furnaces, 42 in. x 120 in., with Nesmith patent hot blast stove, including blowers, slag cars, forehearth, all to be erected in the Celebes Islands. In addition, the Colorado Iron Works is making for Mr. George Mitchell of Jerome, Ariz., a 42 in. x 120 in. copper smelting furnace of latest designs, including blowers, slag cars, etc., to be erected in Old Mexico.

The new rod mill of Schoenberger & Company, Pittsburg, Pa., will have a capacity of close to 400 tons a day, and will cost about \$250,000. The main building will be 120x220 ft. A craneway parallel to this building will be 38x240 ft. The A. Garrison Foundry Company, of Pittsburg, has the contract for building the continuous mill, which will be of the Garrett design, and the Ritter-Conley Manufacturing Company will construct the buildings. A large extension will be made to the present warehouse of the Schoenberger Steel Company, and 2 metal casting machines are to be installed. Two large storage tanks will be erected, and the hot metal from the blast furnaces will be used in the Bessemer converters, preserving the initial heat through the whole process into the finished rods. The mill is expected to be ready by next June.

In the power plant which will furnish most of the steam for the universal plate mill which the Carnegie Steel Company has nearly completed at Homestead, Pa., there are 16 250-H. P. Cahall boilers, making a total of 4,000 H. P. in the building. The coal is fed steadily into the furnaces by a slowly moving bed of grate bars, between endless chains, supported within and without the furnace by gear wheels. Thus an even bed of fuel is gradually introduced and advanced as combustion progresses. The whole framework supporting the gears, chains and grate bars can be readily withdrawn for inspection and repairs. The quantity of fuel is regulated by a plate extending across above the grate bars at the entrance to the furnace. The ashes will be removed automatically. The feed pumps are regulated by the height of water in the boilers. Three men only will be required to attend to the 4,000 H. P.; these being machinists, who will see that the machinery remains in good order.

The trustees for the bondholders have sold rolling mills A and C at Catasauqua, Pa., to Baird & Co., of Philadelphia, for \$16,000. The Catasauqua mills were once the largest producers of merchant iron east of the Alleghenies, but are now being dismantled and sold as junk.

The American Steel and Wire Company is to become a New Jersey corporation, with a stock of \$90,000,000, of which \$40,000,000 will be preferred and \$50,000,000 common. Arrangements have been made by which the following companies will be taken in: Washburn & Moen Manufacturing Company, of Worcester, Mass., and Waukegan, Ill.; Worcester Wire Company, of Worcester, Mass.; Cleveland Rolling Mill Company, of Cleveland, O.; Oliver & Snyder Steel Company, of Pittsburg, Pa.; Newcastle Wire Nail Company, of Newcastle, Pa.; Pittsburg Wire Company, of Pittsburg, Pa.; Cincinnati Laid-Wire Fence Company, of Cincinnati, O.; Lairdlaw Bale and Tie Company, of Joliet, Ill., and Kansas City, Mo.; Consolidated Barb-Wire Company, of Lawrence, Kan., and Joliet, Ill.; Newburg Wire and Nail Company, of Newburg, N. Y.

The new company's preferred stock of \$40,000,000 is to pay 7% cumulative interest, and according to present plans the new company will have a working capital of \$17,342,500, less \$750,000 in bonds. The largest of companies taken in the Washburn & Moen Manufacturing Company has 4 furnaces, with an annual capacity of 52,000 tons of ingots, and the total capacity of its mills is 115,000 gross tons of wire rods. The Waukegan plant has a total annual capacity of 100,000 tons of wire rods. Including the mills in the old American Wire and Steel Company and those in the new concern, the total annual capacity is about 1,154,000 tons of wire rods, and about 10,500,000 kegs of wire nails. In 1898 the plants produced 826,830 tons of wire rods, 1,130,125 tons of drawn wire, 275,920 tons of barb wire, 6,551,750 kegs of wire nails, and somewhere around 10,000 miles of wire fencing.

The International Air Power, which recently made arrangements to use the plant of the Rhode Island Locomotive Works, has, it is said, also absorbed the Wheelock Engine Company, of Worcester, and purchased all the Hoadley-Knight compressed air patents of Europe. It will manufacture appliances for the New York Auto-Truck Company, and also horseless trucks to be operated by compressed air. The capital is \$7,000,000., and the corporation is legally of New Jersey.

The company will employ about 1,200 has received an order from the Gold Hill Mining Company of Johannesburg, South Africa, for 18 steel plate cyanide tanks, which will cost about \$30,000. The tanks will be about 40 ft in diameter each, and will vary in height from 9 to 24 ft. The Ritter-Conley Company will also erect a gasometer for the Allegheny Heating Company, in Allegheny, Pa., for storing natural gas, that will be 198 ft. in diameter and 43 ft. 9 in. in depth.

Messrs. Charles H. Besly & Co., Chicago, Ill., manufacturers and dealers in machinists' hardware, report a very successful business for the year 1898, especially for taps, Badger & Gardner die stocks, "Helmet" sheet bronze and wire for springs, parallel "clamps," "Perfection" and "Bonanza" oil cups, and Gardner grinders, the "Helmet" oil, and "Mannocitin," a rust preventive. Foreign business included shipments to England, Russia, France and India, Brazil, Argentina, Uruguay, Chile, Peru, Bolivia. The factory, at Beloit, Wis., is being run full time.

#### MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" what he needs he will be put in communication with the best manufacturers of the same.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind and forward them catalogues and discounts of manufacturers in each line. All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying and selling goods of any kind.

#### GENERAL MINING NEWS.

##### ALASKA.

###### Douglas Island.

Alaska Treadwell Gold Mining Company.—This company reports for November 20,445 tons ore milled and 365 tons sulphurets chlorinated. The gold return was \$39,095, of which \$11,839 was from the sulphurets. The average return was \$1.91 to the ton milled.

##### ARIZONA.

###### Graham County.

Arizona Copper Company.—This company's output in November was 820 long tons of black copper. For the five months from July 1st to November 30th, the total was 3,737 tons black copper.

##### CALIFORNIA.

###### Amador County.

(From Our Special Correspondent.)

Central Eureka.—The water at this mine, near Sutter Creek, is being pumped out, preparatory to commencing work. W. R. Thomas is superintendent.

Gover.—A small force of men is at work on this property, two miles north of Amador City. The intention is to operate on a large scale very soon.

Kennedy.—The temporary hoist for the new shaft is almost completed, and the work of sinking, which has begun, will probably be continued to a depth of 3,000 ft.

Keystone.—At this mine, in Amador City, a large gasoline hoist engine is being installed, which will be able to operate 20 stamps if neces-



sary on account of scarcity of water. Forty stamps are now running.

Lincoln.—The shaft at this mine north of Sutter Creek, down 650 ft., has been repaired, and the management thinks that the timbering below will prove to be in good condition. Development work will not begin until the mine is freed from water.

Potazuba.—The mill run of 180 tons of ore at the Balliol Mill yielded \$40 per ton.

Valparaiso.—On this property, 4½ miles south of Jackson, a rich strike has been reported, but no particulars given.

Wildman-Mahoney.—The Emerson three compartment shaft at this mine, in Sutter Creek, is down 370 ft., and the reservoir on the ridge has been nearly completed. Eighteen hundred ft. of iron pipe have been laid.

Kern County.

(From Our Special Correspondent.)

Black Hawk.—At this mine several shafts have been sunk to a depth of 75 ft., and some ore shipped to the Cuddeback mills, yielded \$15 per ton. The new mill will be erected on the property near the main shaft. With a first-class milling and hoisting plant the mine will pay good dividends.

O. K.—The shaft at this mine, near Randsburg, is down 75 ft., at which depth a crosscut and drift developed a rich 2½-ft. of pay ore.

Nevada County.

(From Our Special Correspondent.)

California.—This mine, 4 miles west of Grass Valley, at an elevation of 2,300 ft., is being operated by a large force of men under the management of Dana Harmon.

Diamond Creek Consolidated.—At the Eagle Bird mine, at Maybert, 30 men and 8 power drills are at work. On the 600 ft. level a large body of good pay ore has been encountered. This property is owned by a Pennsylvania company, which is developing the property under the superintendency of G. W. Hall. A telephone line, 7½ miles in length, has been established from Washington to Maybert and the Eagle Bird mine.

McCarthy Claims.—It is reported that these claims, near Washington, have been bonded by Eastern parties for the sum of \$40,000. A lot of ore is being crushed by the Eagle Bird mill, and if the result is satisfactory a mill will be erected at once.

Placer County.

(From Our Special Correspondent.)

Eureka Consolidated Drift Mining Company.—At the annual meeting in San Francisco the old board of directors, consisting of F. Chappellet, Frank A. Leach, C. E. Cotton, A. E. Britton and H. P. Dalton were elected. Reports from the mine, located 3 miles north of Sunny Side, are very encouraging, and important developments can be looked for in the near future.

Mayflower.—The 20-stamp mill at this drift mine, near Forest Hill, is still idle on account of short supply of water, but the prospects for an early start are good. Enough gravel has been breasted out to keep running from 4 to 5 months.

Shasta County.

(From Our Special Correspondent.)

Bully Hill.—Fifteen tons of high grade ore, taken from this mine near Copper City, were shipped to Selby's for treatment. This mine is said to be very promising.

Gold Bluff.—At this mine, northeast of Downieville, another air compressor has been installed. Thirty men are employed.

Holt & Gregg.—The lime kilns of this company are producing about 5 tons of lime per day, most of which is shipped to the Mountain Copper Company, to be used by them as a flux. Ten men are employed.

Plumbago.—This company has just declared a dividend of 15c. per share. Many improvements have been made during the past year, and an electric light plant is now being put in. A 10-stamp mill is running and 25 men are employed under M. W. Mather, superintendent. The mine is located near Alleghany.

Tuolumne County.

(From Our Special Correspondent.)

Goldwine.—At this mine, about a mile from the Providence Mine, near Summersville, the tunnel is in 800 ft. New buildings are being erected and other improvements are being made. Sixteen men are employed.

Grizzly.—The 20-stamp mill at this mine, on the North Fork of the Tuolumne River, near Summersville, has begun to drop its stamps. The ore is high grade. About 25 men are employed on development work.

Hunter.—This claim, about 12 miles southeast of Sonora, is being developed by the owners, Holland, Hines, Trewatha & Hull. There are two parallel veins about 60 ft. apart, which show very rich ore on the surface. A 10-stamp mill is on the premises.

Ribbon Rock Mining Co.—At the property of this company, west of the North Fork of the

Tuolumne River, the vein has been crosscut, and drifting both ways on the ledge has begun. On the upraise, which was first to reach the surface, some 300 ft. distant, 100 ft. of work has been done. The lower tunnel is in over 900 ft.

Sunshine.—The tunnels at this mine, near Summersville, are in respectively 125 and 150 ft. The croppings assay \$11 per ton.

COLORADO.

El Paso County—Cripple Creek.

(From Our Special Correspondent.)

Anchoria-Leland.—This company has declared its first quarterly dividend amounting to 3c. per share, making \$18,000, to be distributed among the stockholders. The rate is the same as the monthly one. The property is on Gold Hill and has been a steady payer for a long time. Charles Howbert is the manager of the property.

Gold Sovereign Mining & Townsite Company.—This company at its annual meeting elected the following directors for the ensuing year: A. E. Carlton, W. F. Rock, A. Rapp, E. S. Sharp, A. P. Mackey, F. A. Waters and W. A. Otis. The property on Bull Hill is being worked by 12 sets of leasers. The total shipments for September, October and November are: Tons, 288.5; gross, \$13,456; net smelter, \$9,400; royalty, \$1,774.

Independence Town & Mining Company.—The Russel & Allen and Fox leases on this property expired December 31st and the company will now take hold. A circular issued from the secretary's office shows the total output of the company's property for the past year to be: Gross, \$744,761; net smelter, \$581,935; royalty, \$158,135. Cash on hand, December 22d, 1898, \$71,000. The outputs for November and December are approximate. The company has sunk its large working shaft 400 ft. A streak of rich talc from 18 to 24 in. wide has been encountered and four new veins have been opened within 80 ft. of the shaft. It is the intention of the company to put a plant of machinery to cost about \$10,000 or \$11,000. It is also intended to build an automatic sampler and washing machinery. The boiler room, ore house, engine room and gallow's frame are to be built of steel. A number of leases on undeveloped parts of the property are still in operation. Ed Ray of Macon is in charge of the mine.

Lillie Gold Mining Company.—The new three compartment shaft has been sunk to the depth of 424 ft. and is now equipped with a hoist capable of going to a depth of 2,000 ft. The Midland Terminal Railway has put in a switch to the mine. The vein has been developed for a length of about 350 ft. There is a large ore reserve between 7th and 9th levels, and on the whole the mine appears to be in very good condition. The production has stopped since October 14th. The output of the mine for the 9½ months of the year is as follows: Net tons, 9,557; gross value, \$453,987; net smelter returns, \$352,091. The total output of the mine is shown by the following: Net tons, 17,258; gross value, \$752,346; net smelter returns, \$567,816. The company's stock is quoted on the London market. Francis Gilpin has charge.

Pinto.—Work has started again on this property.

Portland Gold Mining Company.—This company has purchased the property of the Morse Gold Mining Company, consisting of the following claims: Colorado City, Last Effort, Buckeye, Hawkeye and Wisconsin. The price given in the deed was \$225,000. The claims are on Battle Mountain, near where it joins Bull Hill. Some ore has been shipped, after a strike made by leasers on the Wisconsin, which caused considerable excitement about a year ago. This property adds materially to the already large acreage of this company.

Union Gold Mining Company.—The semi-annual report of the treasurer covers the 6 months from June 1st to December 1st, 1898. It is as follows, with inventory, property, capital stock and profit not taken into account: Resources in excess of liabilities on June 1st, \$3,753; receipts for six months ending December 1st, 1898: Gross value lease ore sales, \$78,071; net value, \$58,936; payments to lessees, \$37,760; net royalty to company, \$21,176; other receipts, \$745; total receipts, \$21,920; total expenses for six months, \$20,284; net profit for six months, \$1,636; resources in excess of liabilities on December 1st, 1898, \$5,390. The ore consisted of 1,711 tons of ore of the average value per ton of \$45.61. Average charges, \$11.18, and average net value, \$34.43. The average payment per ton to the lessees was \$22.06, and the average royalty per ton was \$12.37. The mine is worked by leasers in the different levels, the company doing the hoisting. Herbert Starkweather is manager.

Gilpin County.

(From Our Special Correspondent.)

Ore Shipments.—For December the ore shipments from this county to the outside smelters numbered 253 cars, or 4,554 tons. Failure to show the usual increase was due to the heavy snows of December, which curtailed shipments.

Hidden Treasure Mill.—During 1898 there were crushed at this mill 4,198¼ cords of ore, or 41,983 tons, which yielded 9,315 oz. of gold, or an average of 2¼ oz. gold per cord. The mill ore yielded 5,130 tons of tailings, shipped to the smelters, having an average value of \$10 per ton.

Justice.—Cole & Stansfield have opened up into a good pocket of ore between the 345 and 420 ft. levels, and will make steady shipments. W. H. Cole is manager.

Kelly Mining Company.—This company has been incorporated for 20 years, with a capital of \$10,000, and W. H. Kelly of Laramie County, Wyo.; Frank McGee and E. N. Goodlet of Denver, as incorporators. The company has taken a lease and bond on the Rialto Extension, owned by J. B. Hafer, and a new shafthouse, 32 by 50 ft., is being erected. The new plant of machinery will consist of a 40-H. P. flat friction hoister and 60-H. P. boiler. The shaft is down 165 ft. and will be sunk 100 ft. at once. E. N. Goodlet is manager.

West Notaway.—This property is operated by the Notaway Mining Company. For the fiscal year ending September 30th the ore sold gave returns of \$28.64, at a total operating expense of \$15.508, leaving a very handsome balance. The shaft is now down 525 ft., with a good showing. J. I. Perkins is the manager.

Lake County.

(From Our Special Correspondent.)

Mine Tonnage Figures for 1898.—The tonnage statements show the following results: Morning Star Combination, 1,000 tons carbonate and 19,000 tons oxidized iron; Evening Star combination, 4,000 tons oxidized iron; Louisville, 3,200 tons sulphide; Dunkin, 1,636 tons oxidized iron; Matchless, 21 tons carbonate and 8,434 tons oxidized iron; Lee Basin, 1,200 tons oxidized iron; Yankee Doodle, 100 tons carbonate and 500 tons oxidized iron; Robt. E. Lee, 5,600 tons oxidized iron; White Cap, 600 tons carbonate; Big 4, 1,500 tons sulphide and 1,250 tons silicious; Fanny Rawlings, 1,000 tons sulphide and 2,500 tons silicious; Emmett Mining Company, 50 tons carbonate, 1,200 tons oxidized and 900 tons silicious; Wolfstone, 12,667 tons sulphide; Mab Minicous; Wolf Tone, 12,667 tons sulphide; Yak Mining Company, 4,094 tons of sulphide; Vinnie Mining Company, 2,575 tons of carbonate; Chrysteite, 18 tons carbonate, 1,151 tons oxidized iron; Small Hopes Consolidated Mining Company, 2,963 tons carbonate, 4,460 oxidized iron, 49,520 tons of sulphides; Boreel Mining Company, 956 tons carbonate, 5,740 oxidized iron and 380 tons sulphides; Leadville Consolidated Mining Company, 936 tons carbonate; A. Y. & Minnie, 1,540 tons carbonate and 3,800 tons sulphides; Seneca Mining Company, 494 carbonate, 6,425 oxidized and 46 sulphides; Little Chief Mining Company, 297 tons carbonate, 2,380 oxidized iron; Elk, 820 tons carbonate; Resurrection Company, 25,768 tons carbonate; Maid of Erin Silver Mines Company, 9,580 tons carbonate, 18,860 oxidized iron, 3,830 sulphide; Catalpa-Crescent, 436 tons carbonate, 25,859 oxidized iron; Lillian Mining Company, 2,000 tons carbonate; Mike & Starr, 5,000 tons sulphides; Ballard, 2,700 tons silicious; Vivian Company, 4,500 tons carbonate, 500 tons oxidized; Kady, 3,600 tons oxidized; Ruby, Lease, 1,000 tons sulphides; Ruby Mine, 1,800 tons carbonate; Niles-Augusta, 2,000 carbonates and 12,000 oxidized; La Plata, 2,698 carbonates; Iron Silver, 12,600 tons oxidized iron, 3,900 sulphides; Iron Mine Lease, 1,336 tons carbonates, 118 sulphides; Mikado, 15,000 tons sulphides; Valley, 162 tons carbonates; Big Six, 5,000 tons silicious; New Monarch, 7,250 tons silicious; Lida, 600 silicious; Gunnison, 2,000 silicious; Wm. Wallace, 10,000 oxidized iron; Haphazard, 110 tons silicious; Penn Company, 9,000 tons carbonates; Ibox Company, 66,000 tons oxidized and 34,000 silicious; Dollie B., 10,000 tons carbonates; small leases, etc., 1,000 tons carbonates, 2,000 tons oxidized, 20,000 tons sulphides and 3,500 tons silicious, making a total tonnage of nearly 520,000 tons of ore for the past year.

Output Valuation.—There is somewhat of a variance in figuring the output figures, but all the annual reports show a valuation of over \$8,000,000. In my estimates I placed the output at over 425,000 tons and the valuation in the neighborhood of \$8,800,000. The "Herald Democrat" figures, which were carefully compiled, show a total of \$8,031,940. I am still of the belief that these figures are a trifle low.

Wolf Tone.—It is just learned that this territory has been leased to Sam D. Nicholson et al. for 10 years. The property includes the Agassiz, Wolf Tone and Monte Cristo claims, containing over 20 acres, and preparations have commenced for extensive operations. A fine plant of machinery is to be put in, and the shaft is to be enlarged and sunk 250 ft. The new work will command the ore bodies known to exist in connection with the Cambrian quartzite and permit of a thorough exploration of the underlying granite. The belief has long prevailed that in these latter and at this particular portion of the hill will be found an extensive fissure vein that has been the source of mineralization of the overlying sedimentary formations. This be-

lief comes from observations made in the Maid of Erin some years ago.

#### Ourray County.

(From Our Special Correspondent.)

The average output of Ourray mines for 1898 was 197 carloads monthly, against an average of 107 tons monthly in 1897. The mills now open for custom work are the Badger, Skyrocket, Bright Diamond, Munn's sampler and Beaumont sampler.

Octoroon & New Discovery.—This property, commonly known as the O. & N. Tunnel Company, has closed for a time, owing to complications over patent rights, but arrangements are being made to continue the Khedive tunnel into the O. & N. ground, a distance of 2,000 ft.

Teller.—This is the most promising property in what is known as the lower district. A few weeks ago a 12-in. vein of very rich bismuth was broken into. This mine is worked under lease by Messrs. Schmidt, Hohl & Enderli.

#### IDAHO.

##### Idaho County.

Big Buffalo.—It is reported that this group of claims, in Buffalo Hump District, has been bonded by Spokane parties.

Florence Gold Dredging Company.—This company has been organized to work a dredging plant near Florence, with \$500,000 capital in \$500 shares. The principal place of business is at Placerville. The company has 300 acres of ground on Sand and Meadow creeks, near Florence, and will put in a dredge of the New Zealand type. R. G. Wood and J. H. Myers, of Placerville, and W. H. Picking and W. S. Blair, of Ohio, are interested.

##### Owyhee County.

(From Our Special Correspondent.)

Tip Top Mining Company.—This is a Utah incorporation, the articles being filed with the Secretary of State at Salt Lake City on January 3d. The principal place of business is at Salt Lake City, and the officers and directors reside there. Annual meeting second Monday in January. Officers and directors are: W. S. McCornick, president; Clarence K. McCornick, vice-president; Josiah Barnett, treasurer; C. M. Dupont, secretary; Abraham Hanauer, Jr. Realty consists of Tip Top, Justice, Apex, Mountain Boy mines and mining claims in Carson mining district, also the Oro Fino 20-stamp steam quartz mill and Oro Fino warehouse at Silver City. The company is capitalized for \$50,000; shares, \$1.

##### Shoshone County.

Metal Output.—It is stated by the Wallace "Press" that the ore and concentrates shipped during the year approximate 150,000 tons by many pounds. This ore yielded approximately 180,000,000 lbs. of lead, 90 per cent. of which the smelters paid for at an average price of about \$3.60 per cwt. Besides this the mine owners were paid for 4,500,000 oz. of silver at nearly 60c., making a grand total of \$8,000,000 as the output. Of this amount, \$3,000,000 went for freight and smelter charges, \$2,500,000 was paid to the miners as wages and the other \$2,500,000 went for repairs, machinery, development work and dividends.

#### MARYLAND.

##### Allegany County.

Georges Creek Coal and Iron Company.—This company's suit against the Consolidation Coal Company, involving coal land valued at \$100,000, has been compromised, the defendants agreeing to a verdict of 1c. damages. Boundary lines will be established.

#### MINNESOTA.

(From Our Special Correspondent.)

Weather on the Minnesota ranges has been very cold, the thermometer the past week reaching 45 to 48 degrees below zero. This has stopped all outdoor work, and stripping is suspended till spring. At Virginia on the Mesabi Range there is absolutely not a bit of mining under way, except pumping out the Franklin mines.

##### Iron—Mesabi Range.

(From Our Special Correspondent.)

Aetna Iron Company.—This company has sold its 40 acres in section 3, 58-18, adjoining the Mountain Iron property, to the Thomas Furnace Company, of Niles, O. It has been under option since November 17th, and the Furnace Company has in that time explored the mine. It had an 18c. lease prior to that time, and had last year stripped the surface from an area about 900 by 125 ft. The mine is a part of the same deposit as the Mountain Iron, and is a steam shovel property. The purchasers expect to work the property the present year. The price paid was \$120,000.

Commodore Mining Company.—The suits against this concern by W. C. Yawkey, fee owner, have been settled by the filing of relinquishments of the leases. No new lease has yet been filed, but it is understood that the same parties that held it of late, Messrs. Corrigan & McKinney, have re-leased the mine on a new basis, and will open it shortly.

Franklin Mining Company.—It has been reported that the sale to the Pittsburg Furnace Company was closed, but this is not true. The mine is not yet entirely unwatered, and no thorough examination has been made of the property. John D. Rockefeller has a mortgage of about \$250,000 on the mine.

Hull.—At this mine, which resumed last week, some 60 men are now employed.

Mahoning Ore Company.—Men who have been employed in sinking pits in the ore body have completed their work.

##### Iron—Vermilion Range.

(From Our Special Correspondent.)

E. P. Allis & Co.—This company, whose first exploratory leases have been mentioned, have about completed arrangements for another large property, supposedly rich in ore, adjoining one of their prior leases. Captain S. S. Curry, late of the Norrie Mine, is associated with them for the present.

#### MISSOURI.

##### Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The first week of the new year was fairly favorable for mining operations, and the output and sales of ore were large. The purchase of 1,300 tons of zinc ore at Aurora by the agent of the Iola Smelter and reserved demand for ore for export trade stiffened the market, and the expected break did not occur. The Eagle ore at Belleville and the Midway ore and Bolen ore at Spring City was bought by A. O. Hilseng for export. There is no probability of another drop in prices this coming week, and there is a strong possibility of an advance of at least \$2 per ton. The top price for zinc ore was \$29.50 for fancy grade, and a large amount sold for \$28.50 per ton. Lead ore opened the week at \$22.50 per 1,000 lbs., and closed at \$22.75 delivered. For the corresponding week of 1898 zinc ore sold at \$23 per ton and lead ore at \$22.50 per 1,000 lbs., same as at the first of the past week. The shipments of zinc ore for the first week in 1898 fall below this week's shipments by 2,104,170 lbs., but the lead ore shipments were greater by 338,730 lbs. The value of both ores was less, however, by \$43,812. Following are the sales of lead and zinc ore from the different camps in the district for the week ending January 7th: Joplin, zinc, 1,408,450 lbs.; lead, 186,680 lbs.; value, \$23,965. Cartersville, zinc, 1,047,500 lbs.; lead, 146,540 lbs.; value, \$17,475. Webb City, zinc, 268,030 lbs.; lead, 41,280 lbs.; value, \$4,558. Duenweg, zinc, 340,280 lbs.; lead, 178,380 lbs.; value \$8,469. Oronogo, zinc, 916,280 lbs.; lead, 14,150 lbs.; value, \$12,826. Central City, zinc, 521,590 lbs.; lead, 16,890 lbs.; value, \$6,423. Stotts City, zinc, 341,350 lbs.; value, \$4,990. Galena, zinc, 2,528,410 lbs.; lead, 308,970 lbs.; value, \$42,551. Aurora, zinc, 2,340,000 lbs.; lead, 20,000 lbs.; value, \$31,196. Belleville, zinc, 116,170 lbs. Hell's Neck, zinc, 87,500 lbs.; value, \$1,225. Carthage, zinc, 62,850 lbs.; value, \$927. Alba, zinc, 43,200 lbs.; value, \$626. District totals for the past week, zinc, 10,224,520 lbs.; lead, 914,110 lbs.; value, \$154,947.

#### MONTANA.

##### Flathead County.

(From Our Special Correspondent.)

Montana-Kootenai Gold Mining Company.—This company has been organized by James Higgins, Joseph H. Riley and Henry A. Galloway, who own a group of property in the Yaak River District. The ore is free milling. A 10-stamp mill is to be built in the Spring. The capital of \$10,000 is to be increased to 200,000 shares at \$1 per share.

Snow Shoe.—The winze in the main tunnel has over 2 ft. of shipping ore. The concentrator will not run before spring. Over 200 tons of concentrates which have accumulated are being shipped to the Everett smelter.

##### Granite County.

Combination Mining Company.—Judge Lindsay of Anaconda has granted an injunction against the officers of this company prohibiting them from selling the stock of certain plaintiffs and an order to show cause why a receiver for the company should not be appointed. The injunction is an outcome of a quarrel among the stockholders. Various allegations are made against the president and other officers, who reside in St. Louis, Mo.

##### Jefferson County.

(From Our Special Correspondent.)

Bland.—This claim, on the Little Boulder, belonging to John Shields, who has spent 8 years developing it, as his means would afford, has had his labors rewarded by 6 ft. of ore in the face of his tunnel. The property is about to be bonded to Marysville people.

B. & G.—December shipments amount to 11 cars of ore sent to East Helena smelter, the greatest tonnage of any one month. The management is arranging to ship a car per day. A year's contract has been made with the smelter.

Copper Jack.—Mr. W. J. Miller of New Jersey,

one of the principal owners, has succeeded C. J. Fulton as general manager.

Mocking Bird.—This mine, near the B. & G. and under bond for \$10,000 to Rowen & O'Donnell, has resumed shipments.

Pen Yan.—This property, near Wix, has been bonded for \$50,000 to Davis, Stafford & Company. The carbonate ore near the surface was rich, \$68,000 being taken out of one pocket and treated at the Old Wix Smelter. It is owned by Patchen & Company of Helena.

Quartz Creek Gold Mining Company.—This company, whose claims are near the head of Clancy Creek, have raised by the sale of stock \$20,000 to build a stamp mill. The company is composed of Great Northern Railroad men.

#### Madison County.

(From Our Special Correspondent.)

Golconda.—This property, near Red Bluff, has closed down for the winter.

Kennett & Bertha.—This property, owned by the Millards of Omaha, on which is a 60-stamp mill, has been leased to M. J. Miller of Chicago. Mr. Miller proposes to sink the Kennett shaft to 1,000 ft.

Monitor.—The controversy with the adjoining neighbor, the Revenue, having been settled satisfactorily to all concerned, shipments have been resumed to the smelter.

Tanner Placer.—This property, owned by A. W. Tanner and wife of Red Bluff, is about to be sold at \$100,000, so reported.

Twin Bridges Smelter.—The Colorado Iron Works of Denver has shipped the iron work for the new water jacket furnace ordered by Wm. Owsley, who now has control.

#### Park County.

(From Our Special Correspondent.)

Legal Tender.—This Bear Gulch gold property, which is an asset of the First National Bank of Helena, is under bond to Nova Scotia parties, represented by Harry Bush. The mill has been enlarged and improvements on an extensive scale are taking place. Recent developments on the various claims have opened up quite a large tonnage of free milling ore. Some adjacent claims are proving valuable. A town site has been laid out, and several buildings are going up.

McCauley.—This claim, near Crevasse Mountain, on which was built a 10-stamp mill 3 years ago, has been bought by John Wosk and Thompson Bros., of Livingston.

#### NORTH CAROLINA.

##### Granville County.

(From Our Special Correspondent.)

Boston & Carolina Copper Mining Company.—This company has purchased and leased over 1,000 acres of mineral land, near Virgilina. It is working one of its properties quite extensively and shipping a car load of 15 to 20 per cent. copper ore every 10 or 15 days. The ore is bornite and assays as high as 60 per cent. when selected. The company is capitalized at \$2,500,000. Edward A. Bailey, of Boston, is manager at the mines.

Holloway.—This mine is now some 300 ft. deep, with a strong quartz vein carrying payable copper ore. The mine has been in successful operation for 2 years, and ships about 3 car loads of ore per month. W. Blue is superintendent. On the same vein, just over the State line, in Virginia, is the High Hill Copper Mine, being opened up by Geo. Whitney and other capitalists of Pittsburgh.

#### PENNSYLVANIA.

##### Anthracite Coal.

Mine Inspector John Maguire has finished his report of the Eighth Anthracite District (Pottsville) for the past year. The total coal tonnage for the year was 41,892,000 tons, of which 4,250,000 tons were mined during December. During the year there were 37 fatal and 119 non-fatal accidents.

The 300 miners of the Chauncey Colliery, at Plymouth, have gone on strike, owing to dockage. They claim that the dockage amounts to as much as 17 cars a month for each man.

Lackawanna Iron and Steel Company.—This company's coal lands about Scranton are reported sold to the New York, Ontario & Western. The purchase includes the mineral rights acquired by the Iron and Steel Company from the Lackawanna Coal and Iron Company known as the Pine Brook and Capouse Mines. The property comprises coal in the 8,450 acres. The capacity of the collieries now open is about 800,000 tons per year, and 1,200 men and boys are employed. The hauling of the coal from the mines will be transferred to the New York, Ontario & Western Railroad.

Lehigh Valley Coal Company.—The company has given orders to prepare for closing up the York Farm colliery, at Pottsville. York Farm colliery employs about 350 hands, and its monthly pay roll averages from \$12,000 to \$14,000.

Roberts Coal Company.—The Chance Colliery,

near Upper Newcastle, has shut down indefinitely.

**Susquehanna Coal Company.**—This company has taken the renewal of the William Penn Colliery lease, succeeding Stickney, Cunningham & Company, of New York. The latter company refused to take a renewal because the Girard Estate declined to reduce the rate of royalty.

**Bituminous Coal.**

J. K. Russell has bought the William Bennett farm of 275 acres, near Hillside, for \$22,500. The land is underlaid with coal.

**Slate.**

(From Our Special Correspondent.)

**Bangor Southern Slate Company.**—James Masters, of East Bangor, has assumed full control of this quarry, E. D. Peters and W. K. Peters, of Slatington, having retired.

**Old Delabole Slate Company.**—The case at issue in the Northampton County Court between the above-named company and the Bangor & Portland Railway over the right of way for a branch railroad, was disposed of on Monday, when the preliminary injunction was dismissed. The Bangor & Portland Railroad will now build its branch line through the premises of the Old Delabole Company without further obstruction.

**Pen Argyl Valley Slate Company.**—The boiler and all tools have been hoisted out of the pit and work suspended until spring. Nearly all the quarries in the Pen Argyl region have now suspended operations until more favorable weather on account of the danger from falling ice.

**West Albion.**—The large factory on this property has been leased by W. A. Bolger of East Bangor.

**Wind Gap Manufacturing Company.**—Applications have been received from three different parties who want to lease the idle quarry and factory.

**SOUTH DAKOTA.**

**Lawrence County.**

(From Our Special Correspondent.)

**Detroit & Deadwood.**—This syndicate, represented by Malcolm McCallum and Frank C. Andrews of Detroit, has closed a bond on 100 acres of land, partly within the city limits of Deadwood, known as the Barrett property. A 280 ft. tunnel disclosed a vein of copper ore and a ledge of free milling ore. The latter has given an average assay of \$9.50 a ton gold. The bond is for \$125,000. The Detroit & Deadwood syndicate expects to commence shipping ore in 90 days. This is an important deal.

**Galena Mining and Smelting Company.**—This is the name of the reorganized Edgemont & Union Hill Mining Company. Thirty men have been put on to develop the mining ground. From recent tests made it is shown that the ore on some claims will run from \$10 to \$20, considerable of it being free milling. Some ore bodies have been found which run higher and will pay to ship. It has not yet been decided what process will be used. It is stated that a carload of ore will be shipped to Denver soon for a trial with a new cyanide process. It is said that if the process works successfully it will be installed in the building erected by Francis Grable for a 180-stamp mill. George Luper, of Denver, is general superintendent.

**UTAH.**

(From Our Special Correspondent.)

**Bullion and Ore Shipments.**—During the week ending January 7th the bullion and smelter products forwarded from the different smelteries and camps of the State were: 29 cars, or 1,083,820 lbs. lead-silver bullion; 48 cars, or 1,895,770 lbs. ore and concentrate products.

**Gold Output in 1898.**—In the New Year's issue of the "Engineering and Mining Journal" the statement of Utah's total yield in 1898, of gold, silver, copper and lead was given. The company's statement shows that of the 104,900 oz. gold less than half, or 50,363 oz. is credited to the Mercur region, of which 24,200 oz. was supplied by the Mercur Mine. Park City furnished 5,455 oz. gold; and of the 90,346,160 lbs. lead from the mines of the State, about 1-3 came from that camp. Tintic's gold yield is given as 9,861 oz.

**Smelter Situation.**—The 3 local smelters begin the year with 7 stacks in blast, treating fully 550 tons of ore per diem. The Pennsylvania is following in the lead of the Germania and Hanauer in improving its plant and preparing for more extensive operations. The outlook is for a greater tonnage smelted at home the coming season and also for larger ore and concentrate shipments East each month. The model Highland Boy copper smelter, to treat 250 tons daily, will go into commission early in May.

**Juab County.**

(From Our Special Correspondent.)

**Tintic Shipments.**—In the week ending January 7th the bullion, ore and concentrate consignments sent forward from the 3 shipping points of the district were: 2 bars of bullion, 79 cars of ore and 12 cars of concentrates, contributed as fol-

lows: Mammoth, 2 bars of bullion; Grand Central, 21 cars ore; Bullion Beck, 14 cars; Mammoth, 11 cars; Godiva, 9 cars; Humburg and Uncle Sam, 9 cars; Ajax, 8 cars; Gemini, 3 cars; J. Mor-due, 1 car, and Dragon Iron, 8 cars of hematite for flux. Mammoth shipped 7 cars of concentrates and Eureka Hill 5 cars.

**Manhattan Mining Company.**—Incorporation articles were filed with the Secretary of State on December 16th. Capitalization, \$35,000 in 10c. shares, with 50,000 shares devoted to treasury needs; stock assessable, but no single levy to exceed 10% of capital stock. Principal office is at Salt Lake City; annual meeting first Tuesday in December. Officers and directors are: J. E. Frick, president; S. S. Pond, vice-president and treasurer; F. O. Frick, secretary; G. W. Parks, R. E. Plough, H. C. Edwards, all of Salt Lake City. Realty consists of Southern Eureka Nos. 1 and 2 and Dandy Jim lode claims in Tintic.

**Raymond Mining Company.**—Incorporation articles were filed with the Secretary of State on December 13th. Principal office at Salt Lake City; annual meeting first Monday in December. Capitalization, \$125,000; shares, 50c., with 100,000 shares devoted to treasury purposes. Officers and directors: George W. E. Dorsey, of Fremont, Neb., president; Josiah Barnett, treasurer; William R. Wallace, secretary, both of Salt Lake; John C. Sullivan, vice-president, and Patrick Donnelly, both of Eureka. Realty consists of Rising Sun, Setting Sun and J. R. lode mining claims in Tintic.

**Summit County.**

(From Our Special Correspondent.)

**Park City Shipments.**—During the week ending January 7th the shipments of smelter products forwarded through the Mackintosh sampler aggregated 1,120,565 lbs. They were made up as follows: Silver King, crude, 713,045 lbs.; Anchor, concentrates, 403,660 lbs.; Ontario, crude, 203,869 lbs.

**Blue Bird Mining and Milling Company.**—Incorporation articles were filed with the Secretary of State on December 16th. Capitalization, \$25,000 in 10c. shares, with 83,000 shares set apart for treasury purposes; stock assessable, but no single levy to exceed 1/2c. per share, and assessments may be levied monthly. Officers and directors are C. E. Loose, of Provo, president; S. E. Ware, of Silver City, vice-president; J. W. Hatfield, secretary-treasurer; William Hatfield, both of Salt Lake City; Thomas Harvey, of Diamond. Realty consists of Blue Bird lode claim, a half mile east of Diamond, and directly south of and adjoining the Showers mine.

**Toole County.**

(From Our Special Correspondent.)

**Sumpter Mining Company.**—Incorporation articles were filed with the Secretary of State on December 19th. Capitalization, \$500,000; shares, \$1, with 218,000 shares set apart for treasury needs: Principal office is at Salt Lake City; annual meeting first Monday in July. Officers and directors, Joseph G. Jacobs, president-treasurer; John H. Conrad, vice-president; John H. Book-walter, secretary; Charles M. McEntire, Edward B. Critchlow. Realty consists of an undivided two-thirds interest in 13 claims and an undivided one-half interest in 4 claims, on the northerly end of West Dip in Ophir Mining District.

**WASHINGTON.**

**Stevens County**

(From Our Special Correspondent.)

**Bodie.**—This claim just south of the San Poil carries the San Poil ledge, which shows up 7 ft. wide in a shaft near the north end of the claim at a depth of 2 ft. The ledge was struck at a depth of 12 ft.

**Eureka Queen.**—The superintendent reports the north drift in 65 ft., with a ledge 4 1/2 ft. wide. No assays reported.

**Gladiator.**—A tunnel in 50 ft. on this property has disclosed a big quartz vein. The ore assays \$60.45 per ton. The find is about 400 ft. south of the Alkader group and 600 ft. south of the tunnel on the No. 1 claim, which is being run for the same ledge.

**Gold Leaf.**—The tunnel is in over 300 ft. and going ahead. The surface presents the largest aggregation of broken quartz in the camp. It assays from \$5 to \$310 per ton. This property lies about 300 ft. south of the Jim Blaine ground, in a direct line with the strike of the Republic vein. It is expected the tunnel will intersect this.

**Golden Lilly.**—A ledge said to have been cross-cut 34 ft. is reported on this property. A tunnel has been started to intersect the vein.

**Iron Mountain.**—This locality is about 7 miles southeast on an air line from Republic camp. Slate, lime and porphyry carry veins of quartz, bearing gold, silver and copper. The Hidden Treasure, Frisco Fraction and Baltimore group of claims show a ledge 15 ft. wide between the walls at the surface, which includes 4 1/2 ft. wide of ore. The values run up to 14% copper, a trace of silver and \$3.10 per ton in gold. It is exposed by open cuts along the vein for 1,900 ft. There are 9 distinct mineral locations reported

on the east side of the mountain, those mentioned and the Irish Boy, Evergreen, Lone Star, Eastern Star, Shamrock and Blue Bell, which are owned by the Minnehaha Company, that has run a tunnel 110 ft., with 35 ft. more to tap the vein. There are also iron capped veins which crop out at the top of the mountain and are separated from the others by chlorate schists. These are contact veins of iron, oxides and sulphides, with a slaty gangue, lying between porphyry and slate. They have been prospected sufficiently to show gold, and the Minnehaha and other tunnels will tap them.

**Lilly.**—A tunnel on the Lilly claim is in 188 ft., passing through broken quartz near the entrance and thence through porphyry heavily charged in several places with iron sulphides, with more or less quartz. The tunnel is heading for a shaft down 18 ft. in quartz, underneath which it will gain an estimated depth of 200 ft. The values reported from the quartz in the shaft run from \$2 to \$14 per ton. Another shaft on the company's ground on the Kitty claim shows quartz assaying from \$2 upwards.

**Merrimac.**—A shaft is down 80 ft. and drifts are running east and west to catch the south run of the Mountain Lion west vein.

**Monroe.**—This claim lies west about 1,300 ft. from the Republic Mine. Three ledges run through it, the center one striking N 10° W. It shows in a 10-ft. shaft 4 ft. wide between well defined walls, with the quartz somewhat mixed with porphyry. The assays run from \$1 to \$4 per ton. The east vein is from 2 to 4 1/2 ft. wide, and assays from \$1.60 to \$4.50 per ton. It runs northeast and southwest and dips southeast, as shown by a shaft down 25 ft. At the south end of the claim the west ledge is opened by a shaft down 12 ft., showing a ledge 30 in. wide, having the best value of any ore on the claim, running from \$1.23 to \$12.40. The company, the Monroe Gold Mining Company, has started a 175-ft. tunnel to crosscut the 3 veins and tap the most westerly at 125 ft. Winter quarters for miners have been built at the mouth of the tunnel.

**Morning Glory.**—Situating east of the San Poil vein, it strikes northeast. It shows at the surface about 500 ft., and is traced by sinking through surface debris a few feet. At the shaft the elevation is perhaps 200 ft. lower than at the 6-in. outcropping, and the ledge shows about 5 ft. width at a depth of 10 ft. Considerable excitement was caused by the discovery on this ledge of free gold, visible to the naked eye. Assays are reported to run as high as \$665 per ton, and the latest assay reported from the bottom of the shaft was \$479.54, which was stated to have come from an average sample.

**Palo Alto.**—This is claimed to be on the San Poil vein. A 10-ft. shaft in the croppings exposes a 4-ft. ledge of gold bearing quartz between well defined walls. The ledge crossing Granite Creek, the Palo Alto location runs on it northerly from that stream 1,300 ft. and southerly 200 ft. A tunnel 10 ft. above the bank of the creek is in 42 ft. on the ledge, which most of the distance shows 6 ft. wide. The assay reported run from \$1.03 to \$31.42 per ton.

**Sheridan Camp.**—The shaft on the Zella M. is down 100 ft. through the footwall, the ledge dipping 78 degrees west. It shows 4 ft. wide. The highest values reported run up to \$1,300 per ton in gold, silver and copper.

On the Polar Star a crosscut 100 ft., through porphyritic quartz, shows copper. No values reported.

A shaft on the American Flag, down 18 ft., is reported to show ore carrying gold, silver and copper, assaying from \$18 to \$300 per ton.

On the Polar Fraction a 3-ft. ledge is operated with a shaft 12 ft. deep, showing black sulphurets of silver and some gold and copper. No values reported.

**FOREIGN MINING NEWS.**

**AUSTRALASIA.**

**New South Wales.**

**Broken Hill Proprietary Company.**—For the four weeks ending December 3d this company reports 21,097 tons of ore treated. The refinery return shows an output of 2,523 tons lead, 22 tons hard (antimonial) lead, 374,453 oz. silver, 603 oz. gold, and matte containing 15 tons copper and 11,023 oz. silver. This makes a total of 385,476 oz. silver. The average return was 12.06 per cent lead, 18.27 oz. silver and 0.03 oz. gold to the ton.

**Queensland.**

**Mount Morgan Gold Mining Company.**—This company reports for the month of November a total of 17,400 tons ore treated by chlorination. The result was 16,191 oz. gold, an average of 0.93 oz. per ton.

**Tasmania.**

**Mount Lyell Mining Company.**—During the four weeks ending December 14th this company reports 16,148 tons ore treated. The yield was matte, containing 473 tons copper, 48,327 oz. silver and 1,792 oz. gold; an average of 2.96 per

cent. copper, 2.93 oz. silver and 0.11 oz. gold to the ton.

#### CANADA.

##### British Columbia—Nelson.

Hall Mines, Limited.—This company reports for the four weeks ending December 31st that the smelter ran 21 days, 13 hours, treating 2,575 tons ore. The yield was 48 tons copper, and 42,730 oz. silver; showing an average return of 1.86% copper and 16.59 oz. silver to the ton.

##### British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Output for 1898.—The returns on the mineral production for Slocan, Nelson, Ainsworth, Revelstoke divisions—all of which belong to West Kootenay—are yet incomplete. As the camps there are principally silver producing, the advance during the past year has not been so marked as it was in Trull Creek Division. Returns from the Slocan Division are given for 6 months, showing about 17,858 tons. The greatest tonnage during that period is credited to the Payne, viz., 8,410 tons. Idaho mines follow with 2,315 tons, and the Slocan Star is third with 1,817 tons; the Ruth is fourth with 1,739 tons.

Le Roi.—The second payment by the British America Corporation on account of the recent purchase of the mine has been made. The last and final payment will be made January 31st, and amounts to \$3.12½ per share. The distribution of the proceeds of the ore and matte at the Northport smelter, which, by the conditions of the sale, were to be given to the minority interests, is now going on, and it will, it is stated, be completed about the time of the final payment.

Lily May.—This Nelson property, which has been bonded to an English syndicate, is stated, on the authority of W. J. Harris, who has just returned from California, to have \$75,000 in its treasury for development purposes.

Mascot.—The power plant recently installed at this Nelson mine is now connected with the electric system which is to operate it. The compressor is a 7-drill ore, and 3 drills are about to start under the direction of W. Y. Williams, superintendent.

#### MEXICO.

##### Chihuahua.

(From Our Special Correspondent.)

Seven Stars.—This property, which was recently sold to the Monclova Mining Company, composed of H. C. Lowther, of Pittsburg and Philadelphia; C. B. James, of Silver City, and John N. Duthie, of Colonia Juarez, Mexico, is the scene of a great amount of development work. The property is located 15 miles from Chihuahua, and is said to be one of the richest in the State. Some ore taken out has assayed as high as \$1,200 to the ton. Mr. Lowther has gone to the mines to superintend the work in progress. The company will erect its own smelter in the near future. A contract has been let for the construction of a wagon road from the mines to Chihuahua, which point will be reached by the narrow gauge extension of the Sierra Madre line from Casa Grandes.

##### Michoacan.

(From Our Special Correspondent.)

Inguaran Copper Mines.—One of the largest and most important concessions ever granted to a mining company by the Mexican Government has just been given to the company owning the copper mines in the State of Durango, in which the Paris Rothschilds are the largest stockholders. A contract has just been entered into by Manuel Fernando Leal, Minister of Encouragement, and Pablo Macedo, the representative of the company. The following are some of the important sections of the contract. The Inguaran Company shall at once proceed to thoroughly examine and prospect the mining camp of Inguaran and shall within 3 years tell the Department of Encouragement the result of their prospect. They are to undertake the operation of the mines after the region has once been prospected on a scale sufficiently extensive to permit of the extraction during the first year of at least 100,000 tons of ore. They are to treat in the Republic of Mexico at least ¼ of the ore taken out. In consideration of the above the Inguaran company is granted: Exemption for 10 years, counted from the time operations commence, from all federal taxes. Exemption during 40 years from all taxes imposed on copper ore or copper that is manufactured from the product of the mines. Exemption from import duties and all other duties, except port and sanitary duties, on the introduction of machinery or articles intended to be used in the work of prospecting and operating the mines, concentrating the ores or treating it by smelter or any other process. In addition to these privileges, which are very important when it is considered the hundreds of thousands of dollars of machinery the company will bring into Mexico, they are given great grants of water power and are allowed to take without payment the land and building material which may belong to the Government which it may need for any purpose connected with the erection of works and buildings.

## COAL TRADE REVIEW.

### Anthracite.

#### New York.

Jan. 13.

(From Our Special Correspondent.)

The first half of January finds the trade in decidedly better shape than a year ago, but it must be remembered that this improvement is not due to any concerted action among the companies. Better times West and an unusually early winter are the factors, and the trade is far from being on a satisfactory basis. The December production was about 4,225,000 tons. The January production is undetermined, but with continued cold weather and the resulting brisk demand for coal, it is probable that January will see a tonnage of close to 4,000,000 tons. Weather has not interfered of late with shipments from the mines, nor has ice hindered vessels much yet at seaboard shipping ports. The market in the West is in good condition. Retail business at Chicago showed improvement, the orders from country points are often urgent, and at the head of the Lakes, where prices have been advanced 50c., stocks are reported smaller, while business remains good.

In the East broken, egg and stove sizes are in liberal supply. Sales agents talk more confidently to prospective buyers, and prices are undoubtedly firmer, though there is no general advance in quotations. Sellers simply try to get as near circular figures as they can. Chestnut and the steam sizes are scarce all around, and bid fair to remain so till spring. We quote: Broken, \$3.25; egg, \$3.40; stove, \$3.55; nut, \$3.50.

### Bituminous.

The seaboard bituminous trade is running along in fair shape. The demand from all points is heavy and in excess of transportation facilities. Nothing definite is given out regarding the control of freight rates from mines to tide next year, and consequently there is as yet little talk about coal for the coming season's contracts. The stocks at the seaboard shipping ports are reported short, the cold weather is stimulating consumption by manufacturing plants and all prospects favor higher prices. There is little chance that vessel freights will be easier for some time. The Atlantic Transport Company has gone into the hands of receivers as the result of the November storms, and the vessel problem is consequently even more out of shape than it has been. Rates are firm and vessels scarce. We quote from Philadelphia as follows: Providence, New Bedford and the Sound, \$1.10; Boston, Salem and Portsmouth, \$1.40; Portland, \$1.50; Bath, \$1.50; with 10c. @ 20c. above these rates from the further lower ports. Practically all the coal going forward is from New York Harbor ports, the lower ports being out of business.

Prices are firmly maintained and we quote Clearfield at Philadelphia, best grades, \$1.80; poor grades, \$1.30; George's Creek at Baltimore, \$1.70; Pocahontas at Norfolk, \$1.70; New River at Newport News, \$1.70; best grades at New York, \$2.25; poor grades, \$1.60.

### Birmingham, Ala.

Jan. 9.

(From Our Special Correspondent.)

There have been no changes recently in the coal trade in this section of the country. The mines are still working hard and at some places, notably Pratt City, the mines are working with two shifts, day and night. The operators are receiving some handsome orders from the Government and from ship-owners. The new mines at Coalburg, North Birmingham and at New River, in Marion County, are not yet getting out coal. Work resumes this week at the Sumter mines, where the tippie and hoisting machinery were burned a few weeks since. The output at this place amounts to several hundred tons a day and will help out a great deal. These mines belong to the Tennessee Coal, Iron and Railroad Company. Thirty of the coke ovens, operated by the Semet-Solvay Process Company at Ensley City, are now making coke, notwithstanding the fire which destroyed the buildings of the by-product plant.

There are no indications of any trouble in this district. The State is represented at the convention of the United Mine Workers of America, now in session at Pittsburg. It is not believed the representatives will return with any requests to be made of the Alabama miners.

The mine foremen in this State are up in arms against the State mine inspector on a suggestion made by him in his recent report to the Governor of Alabama, in which he suggested that the foremen be put under an examination every two years, intending that those holding a first-class certificate now be required to undergo another examination. A big meeting of foremen was held here and the inspector, Mr. J. deB. Hooper, was invited to address them. A motion prevailed that whenever the State mine inspector discovered an incompetent foreman in charge of the mines he be cited to appear before an examining board, consisting of 10 foremen holding first-class certificates for examination. The State mine inspector stated that in a gaseous mine in this State he discovered an incompetent foreman in charge and that he made complaint. The foreman was not relieved, he having no power to oust him,

and the result was that there was an explosion of gas, several men being hurt. The matter was reported to the Governor, who has ordered the State solicitor to take the matter in hand.

### Pittsburg.

Jan. 12,

(From Our Special Correspondent.)

Coal.—The demand for coal was active; this, however, has been the situation for some time. The first week in January opened with good coal boat water; the amount of coal ready for shipment being small, the run will not exceed 4,000,000 bushels; the largest portion will go to the Southern markets. Cincinnati for some time has been a poor market for Pittsburg coal; the prices being extremely low. In the Pittsburg District a good many mines have been idle.

B. A. Roseberry has leased to Pittsburgers 205 acres of coal lands at Kings Creek, W. Va. The Pittsburg capitalists will begin developing during this month.

Captain S. S. Brown of Pittsburg, has received a contract from the Laclede Gas Works at St. Louis and calls for 40,000 tons of first put coal, deliveries to extend throughout 1899. Captain Brown's interests have held this contract for several years.

The Stockdale Coal Company of this city is opening a new mine on the Redstone branch of the Pittsburg, Virginia & Charleston Railroad, near Brownsville, and expects to be soon in operation.

Report says the miners will demand an advance of 10c. a ton.

Connellsville Coke.—The car supply continues to be very annoying to the operators. With the advantage of an accumulation of cars on Christmas day, the supply was still short last week. Heretofore the Pennsylvania and Baltimore & Ohio have suffered most from a lack of cars, but the last week or two the Lake Erie lines have been the worst off. Because of the great scarcity of cars, coke had to be thrown on the yards at many coke plants. Shipments in general trade usually show a falling off with the beginning of the year and the same results are expected to follow this year. There are exceptions to the general rule sometimes though, and in this year of great business prosperity the exceptions may rule and car supply remain short. The chances, however, favor a better supply.

The coke trade is entering upon the new year under favorable conditions. Those who keep a close watch on the ups and downs of the trade are free to predict an unusually good business and feel confident that 1899 will be a record-breaker.

Summary for the week shows 18,904 ovens in the region, with 15,431 ovens in blast and 3,473 ovens idle. Production amounted to 156,791 tons; decrease, 3,318 tons.

In the running order of the ovens in blast 2,374 ovens made six days; 13,007 ovens five days, and 50 ovens, the Semet-Solvay by-product plant, seven days.

All the plants in the region made five days except the plants of W. I. Rainey and the Cambria Iron Company, which made six days.

Shipments were as follows: To Pittsburg, 3,032 cars; sent West, 4,137 cars; sent East, 1,415 cars. Total, 8,584 cars.

Prices of coke for the first half of 1899 have not yet been decided on; \$1.50@1.60 a ton f. o. b. at ovens will be about the figure.

### San Francisco.

Jan. 7.

(From Our Special Correspondent.)

The approximate deliveries of coal in the California coast towns and cities in 1898 were as follows, in short tons:

	Tons.
San Francisco, by water.....	1,436,375
San Diego and Wilmington, by water.....	154,202
California and Rocky Mts., by rail.....	230,796
Total .....	1,821,373

This does not include deliveries of California and Rocky Mountain coal by rail at interior points. The San Francisco receipts were from the following sources: Eastern, anthracite and Cumberland, 35,990 tons; Oregon and Washington, 617,814; total domestic, 653,804 tons. British Columbia, 499,382; Australia, 181,866; Great Britain, 101,323; total imported, 782,571 tons. Receipts of coke were 41,530 tons, chiefly from Great Britain. The light imports from Europe in 1898 are noteworthy, being only 101,323 tons, against 140,153 tons in 1897, that total including 101,260 tons Welsh anthracite from Swansea. Last year there were only 19 cargoes from Swansea, aggregating 43,078 tons.

### Shanghai, China.

Nov. 28.

(Special Report of Wheelock & Company.)

Coal.—Japan coal has been particularly dull, and Cardiff shows a small inquiry. Sydney Wollongong has advanced in price, and more business has been done. Arrivals of all kinds of coal during the fortnight amounted to 17,851 tons. Quotations, per ton, are as follows: American anthracite, 15 taels, nominal; Welsh Cardiff, 19 taels; Australian, Wollongong, steamer cargo, 12 taels, and other sorts, 6.75@7 taels; Japan, all contracted for; China, Kaiping, lump,

7@8 taels, nominal; mixed, 5.80@6.50 taels, and dust, 6 taels.

Kerosene Oil.—Business in American oil has not been brisk; at the tea shop a fair quantity changed hands from 1.65@1.69 taels, and we have heard that first hands have sold as high as 1.75 taels per case for delivery in two months, minus 2 per cent. commission. Stocks amount to 1,121,433 cases.

Russian Batum does not show an important business; stocks are 621,980 cases.

In Sumatra Langkat business has not been large; stocks are 92,000 cases. Quotations, per case, are as follows: American Devoo's, 1.75 taels; Russian Batum, Anchor and Horse Chop, 1.65 taels; and bulk oil, 1.55 taels; Sumatra Langkat, 1.65 taels; all for two months' delivery, less 2 per cent.

SLATE TRADE REVIEW.

New York. Jan. 13.

The list of prices per square for No. 1 slate, standard brand f. o. b., at quarries, is given below:

Prices of Roofing Slate.

Table with columns: Size, inches; Monson or Br'n ville; Bangor; Bangor Ribbon; Alb'n. or Jackson Bangor; Lehigh; Peach Bottom; Sea Gr'n; Unflag Green; Red. Rows list various slate sizes and their prices.

A square of slate is 100 sq. ft. as laid on the roof. In Brownville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bangor are 50c. extra when full 3-16 in. thick. Purple sizes run 24x12 and 14x7, and vary from \$3.75 to \$4 per square. Variegated and mottled, \$3.25@3.90 per square, according to size. Intermediate sea green, sizes 24x14 to 18x10, \$2.25@2.35; 16x12 to 16x10, \$2.10; 16x9 to 14x8, \$2 per square. Intermediate red, 14x7 and larger, \$6; 12x6, 12x7 and 12x8 in., \$5 per square, net.

The market has settled down quietly, and will probably remain so until the winter is passed. Many of the quarries have been closed, and will not be opened until spring.

Now seems to be an opportune time for considering prices of roofing slate for 1899. At Bangor the members of the Manufacturers' Association are in conference, hoping to revive that body and to fix a schedule of prices. At least one leading concern has made known its prices for the first quarter of the year, and it is expected others will soon follow. The prices in some cases have been changed, and we note genuine No. 1 Bangor, sizes 12x6, 7 and 8 in., have been put up 25c. per square, while 14x7, 8 and 14 in., 16x10 and 16 in., 18x18 in., are 25c. less per square. No. 1 Bangor ribbon, sizes 14x7 and 8 in., are up 5c. per square; 14x10 in. 15c. up, and 24x12 in. 10c. less per square. No. 1 Pen Argyl (Albion or Jackson, Bangor), sizes 12x6, 7 and 8 in., 14x7, 8 and 10 in., 16x8, 9 and 10 in., 18x9 and 10 in., 20x10 in., 22x11 in., 24x12 and 14 in., are quoted 25c. higher than a year ago. Sea green, sizes 12x7, 8 and 9 in., and 14x7 in., are 5c. up; 16x8 and 9 in., 15c. more; 16x10 and

12 in., 18x9 and 12 in., 20x11 and 12 in., 22x12 and 14 in., 24x12 in., 26x14 in., and 28x14 in., are 10c. less than was quoted early in 1898.

A favorable feature of the industry to-day is that stocks of roofing slate at many of the quarries are smaller than for a number of years. On the other hand, it is understood that some of the largest roofers have laid in a good supply of slate in anticipation of higher prices. Nevertheless quarrymen manifest a more hopeful feeling for this year's business, expecting a revival in building operations at home, in addition to a good export trade. In speaking of our foreign business it may be noted that the prices of Portmadoc, North Wales, roofing slate are unchanged, while the Penrhyn have not yet been considered. According to private advices from London the stocks of slate in the hands of some merchants and afloat are large.

Exports are being interfered with by the stormy weather. Of late there have been large quantities of roofing slate exported to London from New York, one leading shipper reporting 36 car-loads, including sizes 14x10 in., 16x8 in., 18x9 and 10 in., and 20x10 in. There are also on lighter waiting shipment many car-loads of roofing slate from New York for the British market. We also understand that a concern in Bangor, Pa., has booked orders for about 20,000 tons to be exported during 1899, some of which will extend to September. Other large orders have also been taken, but the high freight has rather discouraged the movement. Spot business to London is quoted at 14s. 6d., while contracts are offered at 13s. 9d. The exports from New York for the week ending January 10th included: To Leith, Scotland, 97 tons roofing (\$2,000); Australia, 151,755 pieces roofing (\$4,135); Africa, 28 cases (\$98); Hong Kong, China, 18 cases school slates (\$54); British East Indies, 30 cases (\$90); British Guiana, 29 packages (\$87); British West Indies, 33 cases school slates (\$104); Venezuela, 6 crates (\$140); total value, \$6,798.

The shipments of roofing slate from Slatington, Pa., for the week ending January 5th amounted to 2,903 squares, and from Walnupton to 60 squares.

CHEMICALS AND MINERALS.

(For current prices of chemicals, minerals and rare elements, see also page 76.)

New York. Jan. 13.

Heavy Chemicals.—Deliveries are being made on some of the new contracts. Already the sales for this year's delivery are in excess of 1898, especially for bleaching powder and alkali. In chlorate of potash the speculators are quoting from 1/2c. to 3/4c. less per lb. for crystals than the regular dealers.

Imports at New York during the week were light, and only a small export movement is noticeable. Domestic receipts included 737 packages soda ash.

Quotations are: Caustic soda, domestic, high test, \$1.40@1.45 per 100 lbs. f. o. b. works; \$1.50@1.65 delivered. Foreign caustic soda, high test, \$1.60@1.70 delivered, according to test and quality. Powdered caustic soda, 2 3/4@3c. Alkali, domestic, 55@60c. f. o. b. works; 65@70c. delivered; foreign, 70@75c. Bleaching powder, English prime brands, \$1.50@1.65 per 100 lbs.; other brands, \$1.40@1.50; Continental F. prime, \$1.60@1.65. Bicarb. soda, domestic ordinary, \$1.15@1.25 per 100 lbs. f. o. b. works. Natrona brand, \$1.65; "Arm and Hammer" brand, \$3.25@3.50, less the usual discount; foreign, \$2.12 1/2@2.25 per 100 lbs., according to brand and style of package. Sal soda, domestic, 50c. per 100 lbs. f. o. b. works, less the usual discounts; English, 60@62 1/2c. per 100 lbs. Concentrated sal soda, foreign (crystal carbonate) \$1.60@1.70 per 100 lbs.; domestic (mono-hydrate crystals), \$1.25@1.35 per 100 lbs.; "snowflake," \$1@1.12 1/2 f. o. b. Syracuse. Chlorate of potash, crystals, 9 1/4@9 3/4c.; powdered, 9 1/4@9 3/4c. per lb.

Acids.—The demand for sulphuric and muriatic acids has been good, and the new contracts booked exceed those for a number of years past. Blue vitriol is being exported in a fair way, and of the recent shipments from New York we note 300 kegs were for the Argentine Republic.

Quotations per 10 lbs. for New York and vicinity are as follows: Acetic acid, commercial, No. 8, \$1.30@1.40; muriatic acid, 18°, \$1.10 for drums, and \$1.65@1.75 for carboys; 20°, \$1.20@1.87 1/2; 22°, \$1.35@2.25, according to quantity and brand. Nitric acid, 36°, \$3.50@4.75; 38°, \$3.75@4.62 1/2; 40°, \$4@4.87 1/2; 42°, \$4.62 1/2@5.25. Oxalic acid, \$6.25@6.50. Mixed acids, according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@1.75 for carboys. Chamber acid, 50°, in a jobbing way, \$11.50@12 per ton f. o. b. factory. Blue vitriol (copper sulphate), \$3.75@4 per 100 lbs. for best grades.

Coppers.—The combination has put up its price for car-load lots to 6 1/2c. per 100 lbs.

Brimstone.—No arrivals are noted. Best un-mixed seconds are quoted at \$21.50@22 per long ton, while thirds are worth about \$2 less.

Nitrate of Soda.—There were 16,154 bags received at New York this week. Spot nitrate of

soda has been quoted at \$1.60 per 100 lbs., while futures have been offered around \$1.57 1/2.

Pyrites.—Business quiet, and prices unchanged. No arrivals at this port.

Spanish pyrites contain from 46% to 51% sulphur, the American from 42% to 44%, and Pilley's Island, N. F., about 50%. Quotations are: American lump ores (basis 52%), \$3.25 per long ton f. o. b. mines, Mineral City, Va.; \$5 per long ton f. o. b. mines, Charlemont, Mass., and \$6.50 per long ton for Pilley's Island, delivered in New York. Fines are \$3 per long ton, f. o. b. Mineral City, Va.; \$4.25 at Charlemont, Mass., and \$4.50 for Pilley's Island, delivered in New York. Spanish pyrites, 10@13c. per unit, according to percentage, delivered ex-ship New York and other Atlantic coast ports. We note that a British steamer of 1,248 tons has been chartered abroad to carry ore from Huelva, Spain, to Savannah, Ga., or Charleston, S. C., at 10s. 6d., sailing in January.

Fertilizing Chemicals.—Talk of a combination between manufacturers of fertilizers in the East has been renewed. Leading animal ammoniates have dropped off in an export way, owing to the higher vessel rates from the West. Sulphate of ammonia is firm, and deliveries in January will be made on a basis of \$2.70. The Association of Sulphate of Ammonia Manufacturers in England has been succeeded by the Sulphate of Ammonia Committee. The old association's principal object was to disseminate information relating to market prices and to imports and exports of this article. The members of the new combination will pay a small sum per ton of sulphate produced. The yearly income from this source is expected to be large, and from it a prize of £500 will be offered for the best essay on the use of sulphate of ammonia in agriculture.

Quotations are: Sulphate of ammonia, gas liquor, \$2.70@2.75 (basis of 25%) per 100 lbs. Dried blood, high grade Western, \$1.77 1/2@1.80 per unit; New York, \$1.65@1.70 per unit. Azotine, \$1.70@1.75, basis New York. Concentrated phosphates (30% available phosphoric acid), 57 1/2c. per unit. Acid phosphates, 13@15%, av. P2O5, 60@65c. per unit at sellers' works in bulk. Dissolved bone black, 17@18%, P2O5, \$16@16.50 per ton. Acidulated fish scrap, \$10@10 1/2; dried, \$18 1/2@19 f. o. b. fish factory. Ammonia superphosphates, high grades, \$25@26 per ton. Tankage, high grade, \$14.50@15 per ton f. o. b. Chicago, \$18.50@19 at New York. Concentrated tankage, \$1.45@1.50 per unit f. o. b. Chicago; low grade, \$1.30@1.35 per unit. Bone tankage, \$19.50@20.50; ground bone, \$24@24.50 delivered. Bone meal, \$1.40@1.50 f. o. b. Chicago.

Phosphates.—Export trade is again looking up, and of the charters taken we note a British steamer of 1,254 tons from Tampa to Bordeaux, France, at 21s. 9d., January sailing; an Italian bank of 1,094 tons from the same port to Melbourne at 25s. 6d.; a British steamer of 1,077 tons from Fernandina to Rotterdam at 19s., January sailing, and another of 1,854 tons to Rotterdam or Glasgow, at or about 18s. 3d., January sailing. In December the shipments of phosphates from Punta Gorda, Fla., amounted to 2,869 tons domestic, and 2,415 tons, making a total for the year of 42,225 tons domestic and 26,653 tons foreign, or a grand total of 68,878 tons; all by the Peace River Phosphate Company. The shipments of high grade rock from Savannah in December were 6,015 tons; all foreign.

Quotations at New York are: Florida high grade, 75@80% rock, \$8.50@8.75 per long ton f. o. b. Fernandina. The freight rate to New York is about \$1.80 per ton. Florida land pebble, 68@73%, quoted at \$5.50@6 per ton, delivered in New York. South Carolina ground rock is worth \$5.50 to \$5.75 per short ton, delivered in New York; sun dried, \$3 per 2,240 lbs. f. o. b. Ashley River; hot-air dried, \$3.25@3.45 f. o. b. same place. Tennessee phosphate, \$2.20@2.30 f. o. b. Mt. Pleasant, according to quality.

Charleston, S. C.—Our special correspondent writes us that the shipments of Florida phosphate rock from Brunswick, Ga., from January 1st to November 30th, 1898, amounted to 56,570 long tons, principally to Liverpool and Bremen.

Valparaiso, Chile. Dec. 3.

(Special Report of Jackson Bros.)

Nitrate of Soda.—During the first days of the fortnight but little interest was evinced to operate at our last quotations; but on receipt of a better feeling ruling in consuming markets a demand set in and several cargoes changed hands for December-January delivery at prices ranging between 4s. 8 1/2d. @ 4s. 9d., alongside terms. At the same time there was a fair inquiry for deliveries during 1899, 4s. 3d. being accepted for the earlier months, 4s. 9 1/4d. for monthly parcels from April-September, and 4s. 10 1/2d. from July-December; offerings, however, were limited to two or three producers. Some refined quality changed hands at 4s. 10d. @ 4s. 10 1/2d., alongside, for delivery February-March. The exports for November are advised as exceeding 4,600,000 qtls., making a total for the 11 months of this year of 24,100,000 qtls. At the close the heavy exports have influenced the Eu-

ropean market, and buyers show no anxiety to go on. We quote: 95%, December-February, 4s. 8d.; 96%, 4s. 10d., both sellers. The price of 4s. 8d., with all-round freight of 30s., stands in 6s. 8½d. per cwt., net cost and freight, without purchasing commission. Sales for the fortnight were 1,059,000 qtls.

### IRON MARKET REVIEW.

#### NEW YORK, Jan. 13, 1899. Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending		From Jan., '98.		From Jan., '99.	
	Jan. 14, 1898	Jan. 13, 1899.	Tons	Tons	Tons	Tons
An'racite	28	18,825	30	23,400	37,650	43,460
Coke.....	146	202,950	150	215,700	405,900	400,590
Charcoal.	16	5,375	20	6,120	10,750	11,370
<b>Totals..</b>	<b>190</b>	<b>227,150</b>	<b>200</b>	<b>245,220</b>	<b>454,300</b>	<b>455,420</b>

The market is comparatively quiet this week, and comparatively few new orders or sales are to be noted. This is the natural pause after the rush of the latter half of December, and sellers are taking it very easily. They have plenty of orders on their books and are confident as to the future, feeling sure that plenty more are coming in due time. Prices are generally a little higher, but only moderately so, and no considerable rise is expected. Speculative holdings in pig iron are not large, but there is understood to be a considerable block of steel billets held for higher prices, and this is somewhat of a weight on the market, which rather doubts the ability of the holders to carry the load long.

Export trade continues active, and is, apparently, to be limited only by the freight question, as new inquiries continue to arrive, in addition to the large orders already taken.

There is a great deal of talk about the reorganization of the American Steel and Wire Company, and especially the taking in of the Washburn & Moen plant, which is announced this week. The stockholders of that company have done well, as it is understood they received \$215 in cash per share for their stock.

The American Tin Plate Company has bought the Bellaire (Ohio) Steel Company, paying \$133 1-3 per share of \$50 par value. The purchase was made nominally to secure a steel plant and mill to supply steel; but really, it is said, because the company proposed to put in a tin-plate plant. The Bellaire stockholders have made an uncommonly good thing out of it; but the question is, how long can the trust go on buying plants on the mere hint of their competition. There is a limit to that sort of thing, as the wire nail pool found out some time ago.

#### Birmingham, Ala. Jan. 9.

(From Our Special Correspondent.)

The pig iron market in Alabama is just as bright to-day as it was at any time during the past year. The story of most significance that was circulated started from an Associated Press dispatch dated Cincinnati, wherein it was stated that President Gates of the American Steel and Wire Company had succeeded in getting a controlling interest in the Tennessee Coal, Iron and Railroad Company and would, therefore, control the big steel plant being constructed at Ensley City by the Alabama Steel and Shipbuilding Company. The higher officials of the Tennessee Company here, including General Manager G. B. McCormack, denied the rumor at once and stated emphatically that Gates had nothing whatever to do with the steel plant going up at Ensley City. The other part of the story was also denied. The other stories which caused much comment were concerning the big iron pipe manufactory in Bessemer, formerly belonging to the Howard-Harrison Iron Company, but now controlled by the American Pipe and Foundry Company. It is stated that the plant at Bessemer will be enlarged and made the largest pipe plant in the United States, something like \$200,000 to be spent on it. The American Pipe and Foundry Company will open an office to Birmingham also. It is also stated that a couple of iron furnaces will be built near the pipe works in order to manufacture its own pig iron.

There are no changes to note in the quotations. The miners' committee has examined the books in order to fix the prices for coal mining wages and report that there is no change, and so coal mining wages will remain as they have been during the month of January.

The following are the quotations: No. 1 Foundry, \$8; No. 2 Foundry, \$7.75; No. 3 Foundry, \$7.50; Gray Forge, \$6.50 to \$6.75; No. 1 Soft, \$8; No. 2 Soft, \$7.75.

The finished iron market is as good as the pig iron trade, everything considered. Both the mills in this district are in blast, while the mills at Anniston, Ala., are also going and much product is being made.

The smaller iron industries are doing their share of work and are using their usual quantities of pig iron from the big iron makers.

Mr. D. McLauren, president of the Addyston Pipe and Foundry Company of Ohio, which con-

cern will build a third plant for the manufacture of pipe and special steel castings in the South, is here again. The stockholders of that company will meet January 19th in Cincinnati for the purpose of considering the new plant which will be built in the Birmingham district. Mr. McLauren stated that last week three-fourths of the amount necessary to construct the plant had been subscribed, but the exact place is yet to be settled on.

#### Buffalo, N. Y. Jan. 11. (Special Report of Rogers, Brown & Co.)

The market in this vicinity during the past week has been of a rather quiet nature. Owing to the heavy advances and the extreme scarcity of the most popular brands and grades, sales have been light as compared with those of the past few weeks. Prices remain exceedingly firm, and local furnaces are taxed to their utmost to take care of the immediate wants of their various customers. There is practically nothing doing in Lake Superior charcoal, owing to the fact that most consumers have laid in their winter's supply. We quote for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$12.25; No. 2 strong foundry coke iron, Lake Superior ore, \$11.75; Ohio strong softener, No. 1, \$11.75; Ohio strong softener, No. 2, \$11.25; Jackson County silvery, No. 1, \$14; Southern soft, No. 1, \$12.25; Southern soft, No. 2, \$12; Lake Superior charcoal, \$12@12.50; coke malleable, \$11.75.

#### Cleveland, O. Jan. 10.

(From Our Special Correspondent.)

Iron Ore.—The volume of business transacted during the past week has been very small. The only start toward new business for the current year reported up to date is the sale of a few tons of the ores already on the Lake Erie docks. Undoubtedly, however, an earlier start will be made this year than for several years past. Although the agents of the ore companies have held several conferences with reference to what may be done this year, there have as yet been no definite conclusions of any kind reached. It is the general belief that the outlook for the whole iron business is much better than it was 12 months ago. Prices will probably be slightly higher than those of 1898. The advance, it is estimated, will be from 15c. to 25c. per ton. Following are the prices for ore still prevailing: Specular and magnetic ores, Bessemer quality, \$3.25@3.65; specular and magnetic ores, non-Bessemer quality, \$2.50@2.75; hematite ores, Bessemer quality, \$2.55@3.25; hematite ores, non-Bessemer quality, \$2.10@2.25.

Pig Iron.—The market has been very quiet during the past week, very few tons of any kind or grade having been sold. A firm market still exists, however, and the producers are not willing to part with what they have at any less money than heretofore. The quotations therefore remain unchanged, as follows, f. o. b. Cleveland: Lake Superior charcoal, \$11.75; Bessemer, \$10.75@11; No. 1 foundry, \$11@11.25; No. 2, \$10.65; No. 1 Ohio Scotch, \$11@11.25; No. 2, \$10.65; Gray Forge, \$9.75.

#### Philadelphia, Jan. 13.

(From Our Special Correspondent.)

Pig Iron.—There is a generally uneasy feeling in iron trade circles growing out of the uncertainty as to the course of prices in the near future. Prices are hardening in all directions, despite the fact that the rush of demand is over for the present. When makers and brokers come to find out the actual condition of their neighbors they are surprised at the amount of forward production that has been contracted for. More furnaces will be blown in just as soon as the work can be done. No one has any iron to offer, but needy purchasers can get iron if they must have it. The difficulties created thereby will be settled with the large consumers later on, when they find the furnace men have been selling iron they should have kept for them. To-day's quotations are: No. 1 foundry, \$12@12.50; No. 2 foundry, \$11.50@11.75; No. 2 plain, \$11@11.25; standard mill iron, \$10.75@11; basic, \$10.75@11; iron phosphorus, \$16@16.50.

Billets.—Quotations to-day are \$19, and makers' agents give buyers to understand this is a low price, and quotations may move up any time. Sales have been made within a week at a trifle less, but the wants of consumers are very large.

Merchant Bars.—Prices have advanced all around, and to-day common is quoted at 1.07½c., although it sells at a little less. Refined bars are 1.15c., and test bars at 1.20c.; steel, 1.20@1.25c. The mills are all running, and a good business is in sight. The local retail demand at mills is better than for months.

Sheets.—The manufacturers have been figuring on requirements recently presented covering every kind and quality of iron made, but have not closed yet. They think it will be possible to realize better margins, but quotations on best makes are still 1.40@2.80c.

Pipes and Tubes.—All mills are doing well, particularly in tubes, the call for which is increasing. Prices are very firm, and large contracts are promised in the near future by users who want to guard themselves.

Merchant Steel.—All kinds are quoted a shade higher under the improvement in raw material. There is an excellent outlook, and consumers now recognize the advisability of having liberal stocks under their control as a protection.

Plates.—Matters are getting into bad shape for some parties who did not buy and who took big work. The mills are stalled. Every plate-using concern is wanting more plate, and some buyers who contracted weeks ago are not getting delivery in all cases as fast as they desire. Quotations are: Tank, 1.40c.; flange, 1.50c.; fire box, 1.90c. and upward.

Structural Material.—The present new demand consists mostly of that sort which comes from small buyers. The mill people here are in communication with purchasing interests which it is estimated will want ten to twelve thousand tons in all; but only small preliminary orders will be placed; much of it is for bridges. Angles are 1.40@1.50c., and beams 1.50@1.70c. There is a probability of an advance of \$2 per ton above these figures.

Steel Rails.—The steel rail situation is very strong, and new orders are sent to mill on a basis of \$18@19. There is a rumor that an attempt will be made to mark prices up a trifle, and that some correspondence to this end is in progress, but no affirmation can be had.

Old Rails.—Iron rails have advanced. One quotation to-day is \$14. The usual figure is \$13 @13.75. More are needed than can be possibly had, and buyers have to submit or go without. Steel rails are up to \$11.50, and all are sold that can be delivered.

Scrap.—All kinds of scrap are very firm. To-day's figures are \$15 for iron axles; \$12 for steel; railway scrap, \$13.50; car wheels, \$10.50; heavy steel scrap, \$11.50, but some has sold at less.

#### Pittsburg, January 12.

(From Our Special Correspondent.)

The new year shows a degree of prosperity and a magnitude of business totally unprecedented in the history of the iron and steel trade. Prices continue to show a heavy advance all along the line. The home trade is by far the largest that has ever been known, while the export trade has assumed very important proportions. It may be a little too soon to say to what extent we have exported iron and steel during the past year, but at this time two years ago we estimated on a total of about half a million tons for 1897, which proved to be about correct, which, however, is less than for the first nine months of 1898, so that we are still the victims of expansion. With such data as can be made available at this time, it seems that the increase over 1897 will be more than 50%; say, for export something over 800,000 tons all told, which from present appearances is likely to be again largely exceeded during 1899.

The position of the market is a good deal stronger than it was a year ago, however, because we have produced very close to 2,000,000 tons more than we did in 1897, while our stocks are about 180,000 tons less, showing conclusively that we are now getting rid of over 1,000,000 tons of pig iron per month. This, of course, gives a basis for higher prices during 1899; while a reference to our report at this time a year ago indicated that although the demand at that time was increasing, prices were not strong and as a matter of fact they made a gradual decline until about July, at which time they were about 75c. per ton below the January figures.

Finished material.—It does not require many words to review the various movements during the past year, but on the whole, business has been fairly satisfactory to manufacturers, and if the first half of the year had been as good as the last half it would have been entirely satisfactory. The market for the present year is in excellent shape, with an advance since last report of \$1@ \$3 a ton; the demand is active with sufficient orders booked to run the mills for some time.

Wire Rods.—The market is very firm with an increased demand; prices advanced with sales \$23.60.

Steel Rails.—The market is very firm; all plants being well supplied with orders; prices are to \$19, an advance of \$1.

Wire Nails.—The market rules firm, with a good demand; the advance to \$1.40@1.45 a keg being maintained.

Wrought iron and steel pipe are both firm and active; the advance maintained with the mills running full.

Muck Bar.—Market ruled firm; neutral, sales \$19.25.

Sheet bars are firm and in good demand; prices advancing.

Latest.—The market rules very firm, with an active inquiry for most descriptions. Prices current one day may be advanced the next. The volume of business is holding up exceedingly well for the first month in the year. Bessemer at Pittsburg, \$11.15@11.25; Valley Bessemer, \$10.40@10.50. Mill iron firm, tending upward. Foundry iron firm, more inquired for; holders gen-

erally ask an advance. Skelp iron advancing. Sheet bars firm and advancing. Steel wire rods advanced to \$23.60 firm.

Table with multiple columns listing prices for COKE SMELTED LAKE AND NATIVE ORE, SKELP IRON, STEEL WIRE RODS, SKELP STEEL, CHARCOAL, OLD IRON AND STEEL RAILS, FERRO-MANGANESE, BLOOMS, BILLETS, SLABS, MUCK BAR, SHEET BARS, and BILLET ENDS.

New York. Jan. 13.

The New York market, so far as prices are concerned, reflects the general upward movement in all branches of the iron industry.

Pig Iron.—Buyers that looked ahead have saved money. Prices are firm, with iron in demand.

The American Pig Iron Storage Warrant Company reports for 1898: Stocks on December 31st, 1897, 275,800 tons; receipts, 67,900; deliveries, 192,900; on hand December 31st, 1898, 150,800 tons.

We quote: Northern brands, tide-water delivery, No. 1 X foundry, \$11.50@12; No. 2 X foundry, \$11.25@11.75; No. 2 plain, \$11@11.50; gray forge, \$10.50@11.75; Southern brands, New York delivery: No. 1 foundry, \$11.50@11.75; No. 2 foundry, \$11.25@11.50; No. 1 soft, \$11.50@11.75; No. 2 soft, \$11.25@11.50; No. 3, \$10.75@11; basic, \$11@11.25.

Bar Iron and Steel.—There is but a small demand here, and we continue to quote: Common, 1.05@1.10c.; refined, 1.15c. Soft steel bars, 1.15@1.20c.

Structural Material.—The local market is quiet and unchanged. We quote for large lots at tidewater: Beams, 15-in., 1.35@1.45c.; angles, 1.25@1.30c.; tees, 1.45@1.50c.; channels, 1.40@1.50c. flange, and 3.25c. for firebox. Rivets are 2.25c. for iron and 1.75@1.85c. for steel.

Plates.—The local market is quiet enough, but prices reflect the demand elsewhere, and quotations are firm. We quote: For sheared plates at tidewater, in large lots: Tank, 1/4-in. and heavier, 1.45c.; 3/16-in., 1.45@1.55c.; Nos. 8, 9 and 10, 1.55@1.60c. Shell is quoted for 1.40@1.45c; flange, 1.50@1.60c.; marine, 1.60c.; firebox, 1.70@1.75c., Universals, 1.35c.; charcoal iron plates, 2.25c. for shell.

Steel Rails.—There is little new domestic business in sight, but numerous foreign orders. We continue to quote: Standard sections, \$18 f. o. b. mills, with girder rails \$22. Lighter rails are quoted: 12-lb., \$24; 16-lb., \$22; 20-lb., \$22; 25-lb., \$20; 30-lb., \$20; 35-lb., \$20; up to standard, \$10; with the usual 10% advance for smaller orders; all f. o. b. mills. Track fastenings are quoted: Angle bars, 1.05@1.10c.; fish plates, 1.15c.; spikes, 1.40@1.50c.; bolts, 1.60@1.75c.

Nails.—As a result of the recent action of the American Wire and Steel Company, prices at New York are now \$1.60 for wire nails on dock, with cut nails \$1.35. The consumptive demand is moderate.

Old Material.—The market for scrap continues good. Quotations are: Old steel rails, \$10.50; old iron rails, \$12.50; old car wheels, \$10; axles, \$15@16; wrought iron scrap, \$10; machinery, cast, \$9.50; borings, \$5; turnings, \$6; burnt iron, \$5.25; all New York deliveries.

METAL MARKET.

New York, Jan. 13, 1899.

Gold and Silver.

Gold and Silver Exports and Imports At all United States ports, November and year from Jan. 1.

Table showing Gold and Silver Exports and Imports for November 1897 and 1898, and for the eleven months ending in 1897 and 1898.

This statement includes the exports and imports at all United States ports, the figures being Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending Jan. 13th, 1899, and for years from January 1st, 1898, 1897, 1896, 1895.

Table showing Gold and Silver Exports and Imports for the week ending Jan. 13th, 1899, and for the years 1898, 1897, 1896, and 1895.

The gold exported went to the West Indies; the silver to London. The imports of gold were in small parcels, from various sources; the silver was from Mexico and South America.

The United States assay office in New York reports the total receipts of silver at 82,000 oz. for the week.

Financial notes of the Week.

The year opens without special event, though the volume of business continues to grow steadily. The effects of general prosperity and large purchases are evident in many directions.

The total receipts of the United States Treasury for the six months of the fiscal year from July 1st to December 31st, were \$245,961,889; the payments were \$329,681,311, leaving a deficit of \$83,719,422.

Silver shows more firmness, owing to smaller offerings, but no great change seems to be in sight. There has been some Continental buying.

The Treasury Department's estimate of the money in the United States on January 1st is as follows:

Table showing Treasury Department's estimate of money in the United States on January 1st, categorized by denomination and type (Gold coin, Silver dollars, etc.).

The circulation per capita was \$25.19. The total circulation showed an increase of \$10,421,908 during December; and of \$176,200,772, as compared with January 1st, 1898. On January 1st the Treasury held also \$142,074,889 in gold bullion, and \$92,192,207 in silver bullion.

The statement of the United States Treasury on Thursday, January 12th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date of last week:

Table comparing Treasury balances on Jan. 12, 1899, with Jan. 12, 1898, and Dec. 29, 1898.

Treasury deposits with national banks amounted to \$89,087,688, a decrease of \$5,288,450 during the week.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending January 9th gives the following totals, comparison being

made with the corresponding weeks in 1897 and 1896:

Table comparing bank statistics for 1897, 1898, and 1899, including Loans and discounts, Deposits, and Circulation.

Total reserve \$181,001,000; \$193,662,700; \$230,250,800. Legal requirement.... 137,009,550 171,398,125 206,720,425

Balance surplus ... \$43,991,450 \$22,264,575 \$23,530,375

Changes for the week, this year, were increases of \$3,844,000 in deposits, \$3,685,800 in specie, \$1,624,600 in legal tenders, and \$4,349,400 in surplus reserve; decreases were \$4,504,900 in loans, and \$412,400 in circulation.

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 dates last year:

Table showing specie holdings of leading banks worldwide for 1898 and 1899, categorized by bank and type of specie.

The returns for the Associated Banks of New York are of date January 7th, the Banks of England and France January 12th, and the others are of date January 5th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports gold only.

Shipments of silver from London to the East for the year up to December 29th are reported by Messrs. Pixley & Abel's circular as follows:

Table showing shipments of silver from London to the East for 1897, 1898, and 1899.

Totals ..... £6,831,502 £5,481,915 D. £1,349,587

Arrivals for the week, this year were \$85,000 in bar silver from New York, and £36,000 from Chile; total, £121,000. Shipments were £87,500 in bar silver to Bombay, £25,000 to Calcutta, and £10,000 to Shanghai; total, £122,500.

Indian exchange continues at a high level, and all the Council bills offered in London were taken at an average of 16d. per rupee. India is out of the silver market for the present

The coinage at the mints of the United States during December, and the fiscal year beginning July 1st, 1898, is reported by the Bureau of the Mint, as follows:

Table showing coinage at the mints of the United States during December and for the six months ending in 1898.

T't'l gold, 614,806 \$9,492,045.00 3,428,519 \$42,262,160.00 Dollars ..... 2,006,260 2,006,260.00 8,248,335 8,248,335.00

T't'l silver 8,283,040 \$3,275,481.00 33,802,397 \$14,941,145.45 5-ct. nickels. 903,645 45,182.25 5,801,798 290,089.90 1-ct. bronze. 1,377,645 13,776.45 25,348,420 253,484.20

T't'l minor 2,281,290 \$58,958.70 31,150,218 \$543,574.10

T't'l coinage 11,179,135 \$12,826,484.70 74,381,134 \$57,746,879.55

As compared with November, the total coinage was \$4,980,574 more in December, of which \$4,485,345 was in gold and \$520,230 in silver. The minor coinage, on the other hand, showed a decrease of \$25,001, principally in nickels.

Daily Prices of Metals in New York.

Table showing daily prices of metals in New York, including Silver, Copper, Tin, Lead, and Spelter, with columns for Dec-Jan, Sterling Exchange, and various metal types.

Average Prices of Metals per lb., New York.

Table with columns: Month, COPPER (1898, 1897), TIN (1898, 1897), LEAD (1898, 1897), SPELTER (1898, 1897). Rows include Jan, Feb, March, April, May, June, July, August, Sept, October, Nov, Dec, and Year.

Average Prices of Silver per oz. Troy.

Table with columns: Month, Lond'n Pence, N. Y. Cents, Lond'n Pence, N. Y. Cents, Lond'n Pence, N. Y. Cents. Rows include Jan, Feb, March, April, May, June, July, August, Sept, October, Nov, Dec, and Year.

The New York prices are per fine ounce; the London quotation is per standard ounce, 925 fine.

Prices of Foreign Coins.

Table with columns: Bid, Asked. Rows include Mexican dollars, Peruvian soles and Chilean pesos, Victoria sovereigns, Twenty francs, Twenty marks, Spanish 25 pesetas.

Other Metals.

Copper.—The market has been extremely excited, with prices moving upward day by day, the closing figures being 14 1/4 @ 14 1/2 c. for Lake; 13 1/2 c. for electrolytic copper in cakes, wirebars or ingots; 13 1/2 c. for cathodes, and 13 1/2 c. for casting copper. Manufacturers, encouraged by the satisfactory manner in which orders are being placed with them, have been buying quite freely.

The foreign market, which closed last week at £58 15s. for spot, and £59 for three months prompt, has since then advanced steadily to £60 15s. for spot, and £61 2s. 6d. for three months, but closes slightly lower at £60 12s. 6d. for spot, and £61 for three months prompt.

Tin has been treated as a sort of a football, but much more so abroad than in this market, where the stocks of spot tin are extremely small, and where, under the circumstances, prices could be more easily controlled and not be affected to the full extent of the temporary decline witnessed in the foreign market.

The London market, which closed last week at £92 10s. for spot, advanced on the 11th to £98, declining on the 12th to £97, but opened to-day at £98 15s., though immediately afterwards dropping to £97 12s. 6d. for spot and £98 2s. 6d. for three months prompt, which are the closing figures.

Lead.—The improvement has made still further progress, the market to-day closing firm at 4.10c., notwithstanding the fact that supplies have been coming forward much more liberally during this week than for several weeks previous.

The foreign market, too, has improved further, the price for Spanish having advanced to £13 10s., and that for English to £13 12s. 6d., and this in the face of unusually heavy shipments which are said to have arrived from Australia, and more still on the way.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is strong and fairly active at the late advance. Common lead selling at 3.90c., and corroding metal 3.92 1/2 c. The outlook appears to be for a still further advance.

Spelter has shared in the general improvement, the price having advanced to 5.25c. New York, and 5c. St. Louis. The demand is very brisk, not only at home, but also from Europe.

Abroad the market has again developed considerable strength, closing to-day at £24 15s. for ordinary brands, and £25 for specials.

Nickel continues on unchanged lines, and no alteration in prices can be reported. We quote for ton lots 33@36c. per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14@16d. per lb., according to size and order.

Platinum.—Demand is steady. The metal can be had in large lots at \$14.40; for smaller orders it is quoted at \$15@16 per oz. in New York. The London quotation is 58@60s. per oz. Prices are firm.

For chemical ware (crucibles and dishes), best hammered metal, current prices in New York are as follows: In lots of 250 grams or more, 56c. per gram; in lots of 100 grams, 58c. per gram; less than 100 grams, 60c. per gram; unmanu-

factured platinum will be supplied in small quantities at 2c. less per gram.

Quicksilver.—The New York price has been advanced \$1, and is now \$42 per flask. The London price has also been advanced and is £8 per flask, with £7 18s. 9d. quoted from second hands.

The Minor Metals.—Quotations are given below for New York delivery:

Table with columns: Metal, Price per lb. Rows include Aluminum, No. 1, 98% ingots, Bismuth, No. 2, 90% ingots, Phosphorus, Rolled sheets, Tungsten, Nickel alloy, Ferro-tungsten.

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

MINING STOCKS.

Complete quotations will be found on pages 72, 73 and 74 of mining stocks listed and dealt in at:

Table with columns: City, Stock Name. Rows include Baltimore, Boston, Butte, Cleveland, Colo. Springs, Denver, Spokane, New York, Philadelphia, Pittsburgh, St. Louis, Salt Lake, San Francisco, London, Mexico, Paris, Rossland, Shanghai, Toronto, Valparaiso.

New York.

Jan. 13.

Though the new year has opened quietly, speculators, nevertheless, anticipate more activity in mining shares.

In the Comstock group buying has been done, mainly by insiders who await the outcome of the Pumping Association's operations. Meantime, holders of these stocks may look for further assessments. Consolidated California & Virginia has sold at \$1.30, about \$1 less than a year ago. Hale & Norcross has fallen to 9c.; Chollar, Crown Point, Potosi and Utah Consolidated have been asked for around 14c.; Occidental Consolidated was bid for at 40c.; Ophir at 45c.; Yellow Jacket at 32c., and Mexican at 30c.

The Comstock Tunnel Company securities hold around 4c., at which some sales of stock have been reported.

Of the California, Standard Consolidated has been bid for at \$2. A special meeting of the stockholders has been called for February 27th in San Francisco, to vote on a reduction in the capitalization of the company from \$20,000,000 to \$2,000,000, or 200,000 shares, at \$10 each. The war tax on stocks has been mainly responsible for this diminution. Brunswick Consolidated holds at 15c.

In the Colorado stocks there have been a few sales. The Leadvilles do not show wide fluctuations, and of the Cripple Creeks the lower-priced shares are the most active.

The industrial shares are receiving most attention just now, especially those of the "combination" iron and steel group.

A press dispatch from Chicago states that ten stockholders of the Klondike, Yukon & Copper River Company, of which the Rev. Frank Buffington Vrooman is president, have filed a bill in the Circuit Court, asking for a receiver, as the company is insolvent. It is charged that there has been misappropriations of about \$40,000 of the corporation's money. Among the directors and stockholders of the company are named Assistant Secretary of War Meiklejohn, General John C. Black, Congressman James H. Lewis, and the Rev. Dr. H. W. Thomas, of Chicago.

Boston.

Jan. 12.

(From Our Special Correspondent.)

The market through the week has been what our people like to call "broad;" that is, prices have been high and dealings larger. The dividend payers do not show much change, and Calumet & Hecla ranges between \$640 and \$650. The older speculative stocks show a steady advance, Boston & Montana selling up to \$249; Butte & Boston, \$88@90; Centennial, \$40 1/2; Old Dominion, \$39.

The big speculation has been in the new stocks. With Arcadian selling at \$72, Isle Royale at \$44, and others in proportion, almost anything can be expected. No one stops to think whether these new companies will ever have anything more than a prospect; everyone keeps on buying in the hope of holding and selling out at a profit. The question is, how long will the present boom last? No one can say; but most people act as if it was a permanent condition.

The Union Canal and Land Company, after successfully launching the Old Colony, is preparing to bring out other companies on its property. It is understood that the St. Mary's Canal Mineral Land Company will co-operate with the Union in several cases where the two own adjoining lands.

The Michigan Mining Company, which has taken the old Minnesota property, and which offered its stock for subscription recently, has been largely over-subscribed, and it is said that the allotments will not be over 25% of the amounts asked for.

We are to have new stocks without end, it seems. The Rhode Island on the Pewabic Lode has begun work. To say nothing of the com-

Imports and Exports of Metals

Table with columns: Port, Week, Jan. 12 (Expts, Impts), Year, 899 (Expts, Impts). Rows include New York, Aluminum, Antimony, Chrome ore, Copper, Ferro-chrome, Ferro-manganese, Ferro-silicon, Iron, Lead, Manganese ore, Metals, old, Composition, Nickel, Rail'd material, Spiegeleisen, Steel billets, rods, hoops, nails, not spec'd, Tin, Wire, Zinc, Philadelphia, Antimony, Chrome ore, Copper, Ferro-manganese, Iron, Lead, Manganese ore, Spiegeleisen, Steel, Tin, Zinc.

\*New York Metal Exchange returns. †By our Special Correspondent. ‡Number of bars or pigs of lead.



panies which have already begun to sink shafts—and sell stock—the Old Colony will soon be on the market. The Mendota on Keeweenaw Point is getting ready. The Pawnee is to have capital raised, C. D. Hanchette having charge of the promotion. The Mattapan has consolidated the old Frue and Dodge properties near the Isle Royale and will be brought out before long. The Highland property, next to the Arcadian, is under option to A. S. Bigelow, and will doubtless be turned over to a company soon. The Tri-Mountain Company is to bring out a property adjoining the Baltic tract.

The gold stocks are also feeling the effects of the boom, which had previously passed them by. Nearly all of them have risen considerably. The sensation of the week is the Cochiti Gold Mining Company of New Mexico. Its stock was listed this week and starts out at \$12½@13.

The New England Gas and Coke Company offers for subscription this week \$8,640,000 of its 5% first mortgage bonds. The total issue is \$17,500,000, of which \$3,500,000 are reserved by the trustees; \$2,000,000 have been paid for property, and \$3,360,000 sold at private sale. The subscription closes Friday.

3 P. M.—Centennial again weakened from \$39½ to \$35½, rallying to \$37, and Arcadian fell from \$69 to \$65; Butte off from \$87 to \$83½. Isle Royale off \$2½ to \$40½; Adventure, \$9½; Calumet, \$64½; Quincy, \$148½; Franklin off \$½ at \$21½; Osceola \$31; Tamarack, \$197; Montana, \$270; Arnold, \$10; Old Dominion off \$1 to \$36½; Wolverine, \$37; Baltic, \$32½; Old Colony, \$15½; Union, \$12½; Michigan, \$15½; Atlantic, \$33½; Allouez, \$7; Tecumseh, \$7; Mohawk, \$22; Winona, \$14½; Parrot, \$37; Cochiti Gold, \$10½; Pioneer, 6½; Ysabel, \$13½; Bingham, \$9 bid; Victor, \$4½; Utah, \$25½; Bonanza, \$13.

Prices of copper stocks rallied after early trading. There was new buying at the reaction, and the general list held firm with good demand.

**Salt Lake City. Jan. 7.**

(From Our Special Correspondent.)

Predictions of a holiday upset in Utah mining shares were not fulfilled. For a few days prior to Christmas and following the market assumed a squally phase during a brief falling away of outside orders and an effort at local profit-taking. Before New Year's, Eastern buying orders began to flow in, resulting in a general strengthening of prices and at the call this morning the tone of the market was unusually healthy and buoyant. Later in the day there was an exceptionally brisk demand for several of the favorites and the outlook is bright for continued activity.

Mammoth is firm around \$2. Swansea will pay the usual \$5,000 dividend on the 10th. Four Aces has furnished a surprise, advancing from 44 to 64c. In two weeks, and the shares are very strong. Bullion Beck is a little higher. Tetra holds well around 13c. Homestake well holds up and steadily gains, though exploration will not be resumed till February. Grand Central retains its firmness and there are outside orders at about the bid quotation. The customary \$31,250 dividend will be distributed next Tuesday. Sunbeam is strong and unchanged. Eagle & Blue Bell has again overtopped \$2, and good shipments from the mines are looked for. South Swansea stands as firm.

Mercur closed in good form \$7.67½ bid, \$7.80 asked. The \$25,000 dividend will be forthcoming on the 20th. Five days later the annual meeting will be held at the company's office in this city. The not altogether satisfactory financial statement which will then be shown will not be a general surprise. Sacramento is lower and slumpy. It is the first to pay a dividend in 1898, having distributed \$5,000 on the 3d. Chloride Point is several points off, attributable to difficulties with the electric power, which has prevented the mill from running steadily. Daisy is strong at about 63c. Ingot is a new flotation promoted by the Mercur folk. The realty is the Cannon 85-acre tract joining Mercur territory. The capitalization is \$250,000, in shares of 50c., which are selling at 60c. The local demand was so great, I am told, that less than two-thirds of the Eastern orders could be filled from the first allotment of 125,000 shares.

Dexter holds around \$3.25, and is in good demand at that figure. Galena is strong at 56c. bid, 59c. asked. Utah is an offering under \$1.

Daly West jumped to \$6.50 bid, \$6.75 asked, on the probability of the friction between the incorporated Daly one-half interest in the property, and the Haggin et al. unincorporated one-half are on the eve of adjustment. It is proposed to increase the capital stock from 75,000 to 150,000 shares, and it is semi-authoritatively given out that operations will be resumed at the mines in the early spring. Ontario has climbed to \$6.25 bid, \$6.60 asked, on the reports of more activity at the mines before the season is far advanced.

**San Francisco. Jan. 7.**

(From Our Special Correspondent.)

Business was resumed very quietly this week after the holiday break. There was no special movement in mining stocks, but trading went

on in the usual way, on a small scale and on small margins. The fluctuations were not important, and at the close the market was rather heavy.

We do not see yet any of the outside buying which was promised with the new year. There is speculation enough going on, but it does not turn to mining stocks—and it will not, until some of the old, worn-out Comstocks are out of the way and something new is offered to buyers.

For the North End Comstock some quotations noted are: Consolidated California & Virginia, \$1.25@1.30; Sierra Nevada, 90c.; Ophir, 56c.; Best & Belcher, 40@41c.; Mexican, 32c.; Union Consolidated, 30@32c.; Gould & Curry, 27c. Of the Gold Hill stocks, Yellow Jacket sold at 24c.; Belcher, 19c. In the South End Occidental Consolidated was quoted at 48c.; Justice, 14@15c.

Outside of the Comstocks, the only dealings were in Standard Consolidated, which was quoted at \$2.25, with a few sales.

The sales on regular call at the San Francisco Stock Exchange compare as follows:

	1897.	1898.
January, shares .....	274,280	157,360
February .....	166,695	151,065
March .....	188,745	166,260
April .....	239,765	203,355
May .....	189,395	119,535
June .....	190,690	129,780
July .....	211,450	55,900
August .....	292,600	105,030
September .....	490,185	187,510
October .....	460,310	158,690
November .....	238,960	202,045
December .....	159,365	173,890
Totals .....	3,102,350	1,801,330

In July sales were almost stopped by the imposition of the tax on stock transfers, and the volume of business was the smallest on record. Only four months of 1898 exceeded the business done in the poorest month of 1897—and 1897 was not a good year.

The Hale & Norcross Company, having paid out all the cash accruing from the Fox suit judgments, has now levied an assessment of 15c. a share, to pay its share of the expenses of the Comstock Pumping Association.

The Yellow Jacket Mining Company has varied the monotony of Comstock assessments by actually declaring a dividend; but it is not a cash dividend by any means. It consists of a distribution of the stock accumulated in the treasury, which has been forfeited from time to time by stockholders for failure to pay assessments. The division is at the rate of 35 shares for each 100 shares outstanding, and the payment is set for January 12th.

The Troy Mining Company of Seward, Alaska, has levied an assessment of 6¼c. a share, delinquent February 6th.

The annual meeting of the Pacific Coast Chemical Company has been called for January 15th.

**London. Dec. 27.**

(From Our Special Correspondent.)

The past and present weeks are very busy times for those shareholders in mining companies who make a practice of attending annual meetings. It is a custom in London to hold meetings just before Christmas, because it is an inconvenient time for the ordinary shareholder to attend. Directors always regard the shareholders as nuisances, even if they do not consider them their natural enemies. This is the case even with the most straightforward and successful companies, while with unsatisfactory and bogus companies it is, of course, much more so. In all cases, however, they are glad to see as little of their shareholders as possible, and hence the practice of holding general meetings at such times as this.

Your readers will perhaps remember the Galena Mines, Limited, a company floated two years ago by Mr. Comiskey and Mr. C. W. Callahan, to work the Galena Farm properties, two miles from Silverton, on Slocan Lake, West Kootenay. At the time, everybody except the directors knew that the properties were the reverse of hopeful, and the directors could have found this out before flotation if they had wanted to. After the company had been floated they found it out, and blamed Mr. Callahan for foisting worthless properties on them. They excused the delay in finding out the truth by referring to the great distance between London and Slocan, as if everybody but themselves did not know that you can get from one place to another in a fortnight, if you only try. However, at last they dismissed Mr. Callahan from his position as director of operations at the mines, and appointed Mr. E. B. Fraser in his place. The duty of this gentleman was to hunt for the lode, but as the lode was not there, he did not find it. The directors have at last come to the conclusion that they had better abandon the property and wind up the company. So some £50,000 of shareholders' money has been squandered to no purpose.

A London company which appears to be doing fairly well in British Columbia is the London & British Columbia Goldfields, Limited. This company was formed in the summer of 1896 by Mr. Arthur Fell, in conjunction with the Stoneham & Morein group. Though somewhat

heavily loaded with promoters in London, the company secured the valuable services of Mr. S. S. Fowler in British Columbia. This gentleman has carefully selected promising properties in various parts of the province, and obtained among others the White Water Mine at Slocan, the Ruth at Sandon and the Ymir Mine. The company has also obtained in conjunction with other promoters a group of copper claims in the Pyramid District, on St. Mary's River, East Kootenay, and the work done so far is very promising, though the claims are by no means the pick of this important district.

**Paris. Jan. 1.**

(From Our Special Correspondent.)

The mining stock market has felt the effects of the Christmas holidays, and has been extremely quiet, without fluctuations worth recording. The festivities of the "Jour de l'An" will also shorten the period of business, and will doubtless leave us only a very dull market during the coming week.

Some of our financiers are watching with interest the great speculation in copper stocks which is going on in your markets. The reports which come to us are that some of your capitalists who have grown so enormously rich in the oil trade are buying shares, with the intention of controlling the copper trade as they have done that in petroleum, and of organizing a Standard Copper Company on the plan of the Standard Oil Company. It is even reported that they have made overtures to capitalists here—the Rothschilds chiefly—for an international agreement. They could probably secure this, if they really control your mines, since you have now a preponderating influence in the copper trade of the world, owing to your enormous production.

Can they do it? You can answer the question better than we can here. It appears, however, that the production of copper is to be on a great scale, since the high prices will serve to start up all the mines which have been idle, and to stimulate the search for new ones.

The Societe d'Economie Politique had a very interesting debate last week on the "Intervention of the State in Foreign Commerce." MM. Raffalovich, Jacques Siegfried, Leroy-Beaulieu, Neymarck and other distinguished speakers took part. It seems to me that the discussion was inconclusive, for none of the speakers brought out the real point—that in France we have grown to rely entirely too much on the intervention of the State. Our colonies languish and our foreign commerce declines, because we want to make everything an affair of some bureau, and so private enterprise is smothered. We lack now—it was not always so—the initiative which alone can secure success. No bureau of the State can make trade; the marchand must do it.

The Bank of France, while it has not advanced the discount rate, is making a great many difficulties over advances. The expressed motive is to prevent further discounting of German bills, which has already been done on a large scale, in consequence of the very high rates of interest in Berlin. The ulterior motive is to keep money at home, in view of possible complications. It seems to be answering that purpose, in part, at least. It serves, also, to make the money market here very uncomfortable, and too sensitive to admit of free speculation.

The condition of affairs as the year opens is not encouraging. To say nothing of domestic matters, which are still in a disturbed state, owing to the continued agitation of the unhappy Dreyfus affair and the unfortunate attitude of the army—or, at least, of some of its representatives—there is still the possibility of trouble with England, which some of our politicians seem to desire, rather than otherwise. It may be that the situation will improve as time passes, but the present feeling is one of great doubt.

Azote.

**LATE NEWS.**

By Cable.

(From Our Special Correspondent.)

London, January 13th.—The total gold production of Victoria (Australia), in 1898, was 837,258 crude oz., against 822,605 oz. in 1897; an increase of 14,653 oz., or 1.8%. At the usual rate for Victoria gold, the product in 1898 was equal to 766,090 fine oz., or \$15,835,950.

London, January 13th.—The gold production of the Witwatersrand and of the whole Transvaal for December, and the year 1898, was as follows, in crude ounces:

	Witwatersrand.	Other Transvaal.	All
December, crude oz. ....	419,504	21,170	440,674
Year 1898, crude oz. ....	4,295,599	259,410	4,555,009
Year 1898, fine oz. ....	3,554,746	229,528	3,784,274
Year 1898, value. ....	\$73,476,600	\$4,744,350	\$78,220,950

The December production was the largest monthly output yet made.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams Con., Alamo, Alice, etc., with columns for location, par value, and prices for various dates from Jan. 7 to Jan. 13.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Adven'ture Cons., Actina Cons., Allouez, etc., with columns for location, par value, and prices for various dates from Jan. 6 to Jan. 12.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stock quotations, listing companies like American Coal, Am. S & W Co., Central of N. J., etc., with columns for location, par value, and prices.

CLEVELAND, O.

Table of stock quotations for Cleveland, Ohio, listing companies like Aurora, Champion, Chandler, etc., with columns for location, par value, and prices.

BUTTE, MONT.

Table of stock quotations for Butte, Montana, listing companies like Alice, American Dev. & M., Anaconda, etc., with columns for location, par value, and prices.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colorado, listing companies like Alamo, Anaconda, Argonaut, etc., with columns for location, par value, and prices.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pennsylvania, listing companies like Cambria Iron, Carborundum, Charters, etc., with columns for location, par value, and prices.

PITTSBURGH, PA.

Table of stock quotations for Pittsburgh, Pennsylvania, listing companies like Allegheny, Carborundum, Charters, etc., with columns for location, par value, and prices.

BALTIMORE, MD.

Table of stock quotations for Baltimore, Maryland, listing companies like Atlantic Coal, Big Vein Coal, Consolidation Coal, etc., with columns for location, par value, and prices.

ST. LOUIS, MO.

Table of stock quotations for St. Louis, Missouri, listing companies like Am. Gold, Am. Nettie, Central L. Mo., etc., with columns for location, par value, and prices.

By Telegraph.

Table of stock quotations received by telegraph, listing companies like Alamo, Anchor-land, Eikon, etc., with columns for location, par value, and prices.

STOCK QUOTATIONS.

DENVER, COLO.:

Table of stock quotations for Denver, Colorado, listing various mining and industrial companies with their share prices and sales figures for January 2nd through 7th.

Official Quotations Denver Stock Exchange. Sales: Mines, 79,633 shares; Prospects, 216,000 shares; grand total, 295,633 shares. \* Holiday.

SAN FRANCISCO, CAL.:

Table of stock quotations for San Francisco, California, listing various mining and industrial companies with their share prices and sales figures for January 6th through 12th.

Official telegraphic quotations, San Francisco Stock Exchange.

ROSSLAND, BRITISH COLUMBIA.:

Table of stock quotations for Rossland, British Columbia, listing various mining companies with their share prices and sales figures for January 5th.

\* From Our Special Correspondent.

VALPARAISO, CHILE.:

Table of stock quotations for Valparaiso, Chile, listing various mining companies with their share prices and sales figures for December 3rd.

\* Special report of Jackson Bros. Values are in Chilean pesos or dollars.

SALT LAKE CITY, UTAH.:

Table of stock quotations for Salt Lake City, Utah, listing various mining and industrial companies with their share prices and sales figures for January 7th.

\* From Our Special Correspondent. † Utah companies. ‡ Mines in Vanderbilt, Cal. § Mines in Tascara, Nev.

SPOKANE WASH.:

Table of stock quotations for Spokane, Washington, listing various mining and industrial companies with their share prices and sales figures for December 29th.

† Telegraphic quotations of the British-Canadian Investment and Mining Syndicate. \* Under Republic management.

TORONTO, CAN.:

Table of stock quotations for Toronto, Canada, listing various mining and industrial companies with their share prices and sales figures for January 6th through 12th.

\* Official quotations of the Toronto Mining and Industrial Exchange. Total shares sold, 97,133.

MEXICO.:

Table of stock quotations for Mexico, listing various mining companies with their share prices and sales figures for January 5th.

NOTE.-In most of the older Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Many newer companies have a nominal par value, usually \$50 or \$100. Prices are in Mexican dollars.

SHANGHAI, CHINA.:

Table of stock quotations for Shanghai, China, listing various mining and industrial companies with their share prices and sales figures for December 5th.

\* Special report of J. F. Bissett & Co. The prices quoted are in Shanghai taels.

STOCK QUOTATIONS.

Main table containing stock quotations for LONDON and PARIS. Includes columns for Name of Company, Country, Product, Capital Stock, Par value, Latest divs., and Prices. Lists various mining and industrial companies like Alaska-Mexican, Colorado, and others.

MEETINGS.

Table listing company meetings. Columns include Name of Company, Location, Meeting Date, and Place. Lists companies like Battle Mtn. Con., Bus-whacker, and others.

DIVIDENDS.

Table listing dividends for various companies. Columns include Name of Company, Current dividends, Paid since Jan 1, 1899, and Total to date. Lists companies like Aetna Con., Ancharia-Leland, and others.

ASSESSMENTS.

Table listing assessments for various companies. Columns include Name of Company, Location, No., Delinq., Sale, and Amt. Lists companies like Andes, Arrastraville, and others.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last), Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last).

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ‡ Bodie, Bulwer and Mono transferred to Standard Cons., January, 1897. Previous to consolidation Bodie paid \$1,677,572, Bulwer \$190,000, and Mono \$12,500. \*\* Capitalization reduced September, 1898. \*\*\* Reincorporated in September, 1898. § The old War Eagle Company paid \$240,000 in dividends to July, 1897, and levied \$33,500 in assessments. ¶ Lillie transferred to an English company in October, 1898; old company paid \$134,110 in dividends to September 1, 1898. | Dividends paid since consolidation. NOTE.—This table is corrected up to December 12. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT PRICES.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to Dec. 1st. Readers of THE ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Review of Chemicals and Minerals.

Table with multiple columns listing various chemical and mineral products (e.g., Abrasives, Acids, Alums, Ammonia, Barium, Barytes, Benzene, Borax, Calcium, Carbonates, Chromes, Copper, Cream of Tartar, Cryolite, Explosives, Feldspar, Fluorspar, Fuller's Earth, Gypsum, Infusorial Earth, Iron, Kaolin, Lead, Lime, Magnesite, Manganese, Marble, Mercury, Mica, Mineral Wool, Monazite, Nickel, Oils, Oxides, Potassium, Potash, Potassium-Sulfate, Prussiate, Red, Sulphate, Silica, Sodium, Strontium, Sulphur, Talc, Zinc, Zirconium) along with their respective units and prices.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

Table listing rare elements and their compounds (e.g., Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucinum, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Osmium, Palladium, Radium, Rubidium, Ruthenium, Selenium, Silicon, Strontium, Tantalum, Tellurium, Thallium, Thorium, Titanium, Vanadium, Wolfram, Zinc, Zirconium) with their units and prices.

**MACHINERY FOR SALE.**

**FOR SALE.**—A Number of Second-Hand Split Switches for 30-lb. Rail, (3 ft. gauge of track), including 4 ft. Frog, Ground Lever, Switch Points and Connecting Rods. New and Relaying STEEL RAILS BOUGHT AND SOLD.

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(See Pages 754, 769 and 19 of Engineering and Mining Journal, Dec. 24, 1898.)

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For plant of 200 tons capacity per 24 hours add another \$15,000.

For a Smelting or Mining Plant alone, take half of the above figures.

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**SUDBURY,**  
**ONTARIO, CANADA.**

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**New—FOR SALE.—First Class**

ore crusher 7x10, 8,000 lbs.; two sets crushing rolls, 4x20, with heavy countershaft and fly wheel, 13,000 lbs.; engine, 30 H. P. and boiler, 40 H. P., with fixtures complete, 14,000 lbs.; all new, on cars, at four cents lb. cash, STICKNEY, Assignee, Antelope, Idaho.

Received Too Late for Classification.

**GRADUATE C. E., WITH SOME KNOWL-** edge of mine surveying, assaying, etc., desires position. Salary low if chance of advancement good. Address STILSON, 112 Fourth St., New Bedford, Mass. No. 18,355, Feb. 4.

**ASSAYER AND CHEMIST, EXPERIENCED,** desires position. Mexico or South America preferred. First-class references. Address X, ENGINEERING AND MINING JOURNAL. No. 18,356, Feb. 18.

**YOUNG MAN DESIRES POSITION AS** Assayer and Chemist. Formerly chemist for zinc smelter. Understands gold and silver extraction. Best of references. Address A. B. C., ENGINEERING AND MINING JOURNAL. No. 18,357, Jan. 28.

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Write for particulars and illustrated pamphlet of large dividend paying properties. Address **E. HEDBURG & CO.,** Joplin, Mo., U. S. A.

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Wanted, party to invest \$3,000 to \$5,000 in Developed Zinc Mine in Southwest Virginia, for half interest and management of property. Guarantee 200 per cent. per annum on amount invested. For full particulars, address VIRGINIA, ENGINEERING AND MINING JOURNAL.

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A group of Gold and Silver Mines which have shipped over \$350,000 worth of ore during the last two years is on the market.

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**A PAYING MINE**

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**Chemical Works and Valuable Real Estate FOR SALE OR TO RENT.**

Sulphuric acid, sulphate of lime, phosphate, alum and paris green plants, including pyrites burners, lead receiving tanks, boilers, engines, crushers, mixers, etc.; extensive frontage on Cooper's Creek, Camden, N. J. Excellent facilities for shipping by rail or water, and seven and a half acres of valuable land, late the property of the United States Chemical Company. Apply to **S. EDWIN MEGARGEE,** 502 Walnut St., Philadelphia.

**IRON MINE LEASE.**

Have lease to very valuable Limonite Iron Ore Mine, in Cripple Creek District, Virginia. Want \$2,000 to \$3,000 to put mine on paying basis, and party investing that amount can have half interest and management of property. Will agree to refund amount invested out of profits. Have contract for all we can mine at profit of 75 cents per ton. For further information, address **IRON MINE,** ENGINEERING AND MINING JOURNAL.

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Copper-ore Lands, including valuable Slate Quarry. About 60 miles from Montreal—close to Railway. For full particulars address **W. W. STUART,** P. O. Box 1034, Montreal, Canada.

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**PEN TO ENGAGEMENT,**

A Chemist, thoroughly familiar with the manufacture of pigments and dry colors by the newest methods. Chromium colors, paris green, ultramarine, etc.; Barium sulphate, chloride, carbonate, blanc fix, lytophon and zinc-baryte. Would join capitalist in establishing a new industry, which would require but a small amount of capital and would yield large profits. Highest references furnished. Address "CHEMICALS MANUFACTURER," ENGINEERING AND MINING JOURNAL.

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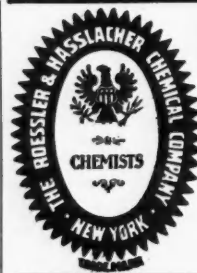
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