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* Illustrated.

Table listing various sections like 'Personal', 'Obituary', 'Societies and Technical Schools', 'Industrial Notes', 'Trade Catalogues', 'Machinery and Supplies', 'Mining News', 'United States', 'Foreign', 'Markets', 'Coal', 'Slate', 'Chemicals and Minerals', 'Metals', 'Iron', 'Assessments', 'Dividends', 'Meetings', 'Mining Co.'s', 'Mining Stocks', 'Market Reviews', 'Current Prices', 'Minerals, Chemicals, etc.', 'Advt. Rates', and 'Advertisers' Directory'.

We are informed that a demand exists for a method for treating the low-grade ores of the Republic District in Washington, which average about \$10 a ton in gold. So far the ores mined and treated have been those running up to 3 and 4 oz. gold, from the Republic and some other mines; but there are large quantities of the lower grade which cannot yet be profitably handled in the camp, and will not bear the cost of transportation.

It will be remembered that the International Mining Congress, which met for the first time in Denver in 1897, and again in Salt Lake City in 1898, resolved to hold its next meeting in Milwaukee this summer. The announced object was to interest Eastern people in the mines of the West and to establish the Congress on a broader footing.

The eight-hour law which has just gone into operation in Colorado is producing a good deal of temporary disturbance in the relations between miners and employers. Probably matters will adjust themselves in time, but there is a good deal of friction in the process, as seems to be unavoidable in cases of this kind.

In the Leadville District the large mines are generally arranging to work eight-hour shifts, but require that the time shall be taken from the time the miners reach the bottom of the shaft or the face of the drift, thus demanding eight full hours of work, with no time allowance for going down into the mine, or coming out of it.

It will take some time to settle all the questions involved, and there will be a great deal of discussion over details of the various arrangements; but no more strikes are anticipated.

Some remarkable work has been done in California in the utilization of water power for the production of electricity, and the transmission of the electric power over long distances. At Folsom, near Sacramento, and at several places in Southern California, there are large installations in successful operation; while a number of others are in progress or projected.

There is some danger that this will be overdone. We do not mean that there will be too much power provided, for that is hardly possible. There is a probability, however, that the water powers will be over-loaded in many cases and called upon for a larger supply than they can furnish, even in ordinary seasons; while no allowance will be made for dry seasons like those of two or three years past.

There is very little doubt, however, that the mountain streams of California will be able to compensate in some degree for the scarcity of fuel, and that they will furnish power which will be an important addition to the resources of the State.

ANOTHER GOLD FROM SEA WATER PROPOSITION.

Another impudent gold from sea water scheme has sprung into existence, this time in London. A certain R. Sauerwald, who is stated to be a German electrician and chemical engineer, is alleged to have invented an electric process which is specially adapted to be used in the condensers on board ship. It is claimed that this apparatus will recover the gold from the sea water as it is pumped through the condensers, without interfering in any way with the ordinary action of the condensing plant; that the gold so recovered is chemically pure; and that the cost of extraction is estimated not to exceed 5 per cent. of the gold recovered. The inventor, however, as is usual in cases of this sort, has not patented his apparatus and he prefers to keep it secret. All the same he and his friend, Mr. C. S. Walker, of 130 Queen Victoria Street, London, are asking people by private circular to subscribe £1,300 to enable them to conduct preliminary trials, presumably on board some steamer whose owners have allowed them to attach their apparatus to the condensers.

Messrs. Sauerwald & Walker state that there is good scientific authority for believing that sea water contains from $\frac{1}{2}$ grain to 1 grain of gold to the ton, and they calculate on recovering an average of $\frac{3}{4}$ grain per ton in their apparatus. They refer to the successful work of the American Gold Extraction Company of North Lubec, Maine, where they allege a profit of \$50,000 per annum is made. Of course, anybody who can in so barefaced a manner say that the Reverend Jernigan's exposed swindle is in successful operation is capable of perverting the truth in other ways; and we have nothing more to say of the scheme than that it is obviously a rank imposture.

It may be possible that Jernigan, who is in Europe, has given the benefit of his experience to these London operators, and is a partner in their operations. Certainly Jernigan knows how to get gold out of stockholders, if he cannot draw it from sea water.

A DOUBTFUL COPPER PROPOSITION.

We gladly publish the letters of Mr. Weir and Mr. Cohen, which will be found on another page, because they give the results of their experience. We think both gentlemen take a somewhat too favorable basis for their estimates in several particulars. Mr. Cohen is not interested in the Boston Consolidated Company, but the De La Mar mine, which is now being offered, is a portion of the same deposit, and whatever technical criticism will hold against the one will equally apply to the other, so that practically Mr. Cohen is also interested in the question. The Utah papers also take up the question we raised, which we learn from private correspondence is attracting great attention, for it forms the subject of very warm discussions at the clubs and hotels, with the disputants about evenly divided.

In the first place, it is certainly misleading to ignore, as most of our correspondents do, the questions of water supply and dump room. The best authorities are pretty well agreed that the quantity of water required to treat the large amounts of ore called for in the cited estimates of cost of treatment cannot be obtained in Bingham Canyon, and that the ore will have to be hauled to the Jordan River and milled there, where doubtless they could, artificially, get dump room. Carriage to water, according to good authority, would cost 30 to 40 cents per ton of ore. The cost of mining, including stripping, is stated by an experienced engineer as 60 cents per ton of 2,000 pounds, while concentration at the river is placed at 40 cents per ton, the water being pumped into the mill, and tailings taken care of. We believe these three items of mining, transportation and concentrating the ore are counted very moderately at \$1.35 per ton. If the concentrates are sold to the existing smelters Mr. Weir tells us that a price 3 cents per lb. of copper less than New York market price is paid, after deducting smelting charges of \$6 per ton of concentrates and hauling from the mill to the furnace; but certainly it would be pure folly for anyone to invest on the supposition that the present boom prices for copper will continue. On the contrary, an average nominal market price of perhaps 10 or 11 cents per pound for electrolytic copper would be fair, and this would leave 7 to 8 cents per pound of copper at the furnace.

The 22 tons yield in the concentrates 1 per cent. copper or 440 pounds of copper of the gross value (at $7\frac{1}{2}$ cents) of \$33 plus \$2 gold, say \$35; from which must be deducted mining and milling at \$1.35 on 22 tons, or \$29.70; smelting and haulage to smelter, \$8.20; or a total working cost of \$37.90. In addition to these items of costs there are many others, such as general administration, insurance, repairs and depreciation, the latter a very important item when it is considered that progress in the art very quickly renders machinery and appliances out of date and too expensive to use, though they may still be in good repair. On this showing it is very evident that there would be a very considerable loss on the working of such ores with an average market price for copper, and at even the extremely low costs above mentioned. It is

possible to make a somewhat better showing by assuming the company to put up smelting and refining works and counting only actual smelting costs, without profit on these; but a business man asked to invest in a mining enterprise that could make copper and put it on the market without profit when the market price of electrolytic metal was, say, 11 or 12 cents per pound, might smile benignantly, but he would scarcely part with his money.

We are ready to recognize that in cost of treatment the Utah copper bearing porphyries have a considerable advantage over the ores from Montana mines; but we are yet unconvinced that there is any fair profit in treating 1.38 per cent. ore in Utah, and even very skillful bookkeeping, cannot figure out any basis for the prices at which these mines, as represented by their stocks, are being sold.

The "Engineering and Mining Journal" is always desirous of promoting the legitimate development of our mineral resources, but we believe that even one unprofitable mine in which investors have lost their money does great injury to the industry, and the present boom is bringing forward so many of these that words of warning are called for again and again.

UNITED STATES GOLD AND SILVER PRODUCTION IN 1898.

In the "Engineering and Mining Journal" for January 7th, 1899, we gave a preliminary estimate of the production of gold in the United States in 1898, which was necessarily subject to some correction from later returns.

We have now the complete figures of production collected for "The Mineral Industry," Volume VII. (which is now rapidly approaching completion), and these show that the gold production of last year was a very large one, exceeding that of 1897 by 14.4 per cent. Notwithstanding this large gain, the United States did not hold its position as the first producer in the world; yielding that place to the Transvaal, where the opening of a number of the new deep level mines and the general urging of development and exploitation resulted in an extraordinary gain in output.

As usual, our smelters and refiners treated last year a large quantity of foreign ores and bullion, chiefly from Mexico and British Columbia. From our returns we find that the total quantity of gold smelted or refined and put in marketable form in the United States during 1898 was as follows:

Gold Refined in the United States in 1898.			
	Fine Ounces.	Kilograms.	Values.
From domestic ores.....	3,282,742	102,108	\$67,854,277
From foreign ores and bullion.....	965,552	30,933	19,957,960
Totals	4,248,294	132,141	\$87,812,237

According to our usual custom, we have reduced the totals to metric measures, in order to permit a ready comparison with the returns of other countries where that system is in established use. We may again express the hope that before long the reduction will not be needed, because all the returns will be made in metric weights as a matter of course.

The figures above given show the total has been ascertained with great care, and is given with the closest approach to absolute accuracy which is possible under existing conditions. In the following table, which gives the values of the production by States, the figures are necessarily approximate only, since it is not always possible to apportion with entire accuracy the output made by smelters and refiners who treat together ores from several different States. The figures given will, however, approach the truth very closely. The output by States was as follows:

Production of Gold in the United States.			
	1897.	1898.	Changes.
Alaska	\$2,700,000	\$2,820,000	I. \$120,000
Arizona	2,700,000	5,125,000	I. 2,425,000
California	15,000,000	14,900,000	D. 100,000
Colorado	19,579,637	23,534,531	I. 3,954,894
Idaho	2,000,000	2,300,000	I. 300,000
Montana	4,496,431	5,247,913	I. 751,482
Nevada	3,000,000	3,000,000	I.
New Mexico.....	470,000	480,000	I. 10,000
Oregon.....	1,354,533	1,216,669	D. 137,864
South Dakota.....	5,300,000	5,840,000	I. 540,000
Southern States.....	249,937	340,000	I. 90,063
Utah	1,845,938	2,372,442	I. 526,504
Washington.....	449,664	600,000	I. 150,336
Other States.....	64,745	77,722	I. 12,977
Totals	\$59,210,795	\$67,854,277	I. \$8,643,482

The most notable feature of this table is the great advance made in Colorado, which took by far the highest place among the producing States, and furnished nearly 46 per cent. of the increase. The increase over 1897 was 20.2 per cent., and the State supplied last year 34.7 per cent. of the total production of the country. The gain was due in large part to the great output of the Cripple Creek District, but Gilpin County, Clear Creek County, Leadville and several minor districts made substantial contributions to the total.

California, the second State in the amount of its production, showed a small decrease, which was much less than had been anticipated. During three-quarters of the year there was a large falling off in production, due to the long drought which so seriously affected the State. The short supplies of water compelled the closing down of many of the gravel mines, and a number of quartz mines also, where it was impossible to get water enough to run the mills. In the last quarter of the year, however, there was a great improvement, and the output was so large that the decrease for the year was reduced to the comparatively small amount shown in the table.

The very large proportional gain shown in Arizona was due in considerable part to the Commonwealth Mine at Pearce. There was also general activity in the opening and exploitation of mines in many parts of the Territory, which assisted in the increase. In South Dakota the steady working of the Homestake properties and the enlargement of the company's mill were the chief reasons for the gain.

In the North, the gains in Idaho and Montana were distributed over a number of mines, and something was contributed by the dredging operations, which are now showing results. In Washington the new Republic District accounted for most of the increase, and promises to do even more during the current year.

The Southern States show a gain considerable in proportion, though small in actual amount. The greater activity was found in North Carolina, in the Dahlonega District in Georgia, and at one or two mines on the Alabama gold belt.

No other State calls for special remark, except Utah, where the increase came from the large low-grade mines of the Mercur District, notably De La Mar's and the Chloride Point.

In 1898 the United States added to its stock of gold an amount larger than in any year for a long period. In addition to the great amount—\$87,812,237—shown above as produced or refined in the country, the net imports were \$141,841,298; so that there was approximately \$229,653,535 more gold in the country at the close of the year than at its opening. How large a part of this was used in the arts cannot be accurately determined. Probably the amount was greater than for several years previously, as the demand for articles into which gold enters is larger in a year of general prosperity. A notable proportion took the form of coin, however, and now appears in the returns of bank and Treasury reserves.

The quantity of silver produced and refined in the United States in 1898, ascertained in the same way as the gold given above, is shown in the following table in fine ounces—that is, in Troy ounces of pure metal:

Silver Refined in the United States.			
	Fine Ounces.	Kilograms.	Values.
From domestic ores.....	60,358,127	1,877,397	\$35,164,645
From foreign ores and bullion.	33,784,000	1,237,422	23,178,158
Totals	100,142,127	3,114,801	\$58,342,803

The same remarks apply to this table as to that of gold production; and also the table below, showing the approximate division by States. The larger part of the foreign silver refined in this country was from base bullion brought from Mexico, and from lead bullion and copper matte from British Columbia.

The table of production by States is as follows, in fine ounces:

Silver Production in the United States, in Troy Ounces.			
	1897.	1898.	Changes.
Alaska	250,000	300,000	I. 50,000
Arizona	1,332,292	3,750,000	I. 2,417,708
California	757,300	750,000	D. 7,300
Colorado	21,278,202	23,502,601	I. 2,224,399
Montana	16,807,346	14,818,662	D. 1,988,684
Idaho	6,000,000	6,629,744	I. 629,744
New Mexico.....	350,000	650,000	I. 300,000
Nevada	1,500,000	1,550,000	I. 50,000
Utah	6,689,754	6,570,256	D. 119,498
Oregon	84,802	128,326	I. 43,524
South Dakota.....	500,000	600,000	I. 100,000
Texas	600,000	650,000	I. 50,000
Washington.....	242,781	350,000	I. 107,219
Other States.....	64,815	108,533	I. 43,723
Total	56,457,292	60,358,127	I. 3,900,835

The increase in our production of silver from domestic ores last year was 6.9 per cent., and the gain as compared with previous years is still larger. The total for the year is greater than for any year since 1893, and is only 141,873 ounces less than in that year.

The changes in the production of the different States do not call for extended remark. The largest increase shown was in Arizona, which was partly from the smaller mines, but largely from the copper mines. The heavy increase in Colorado was much more generally distributed, coming from many different sources, though Leadville contributed a large share. On the other hand, there was a large decrease in the Montana production, which was also in silver obtained from copper as a by-product, much of the loss being in the Anaconda output.

It will be seen that the greater part of the States show gains, the only losses being that in Montana above mentioned; a small decrease in

Utah, due to the inactivity of the group of mines about Park City; and a small change in California, whose silver production is not important.

During 1898 the net exports of silver from the United States were approximately 42,500,000 ounces. Of the total silver refined here we retained therefore about 57.5 per cent., and probably nearly the whole of this large quantity was consumed in the arts. The uses of silver for ornamental and domestic purposes are constantly increasing, and the consumption was rather favored by the consolidation of a number of makers of silver ware, as the combination at once began to advertise and extend its business. How large the stocks of silver unsold at the end of the year were cannot be ascertained exactly, but it is probable that they were not very much larger than at the close of 1897. Large as was the production, it was very nearly equalled by the consumption.

NEW PUBLICATIONS.

"Geological Map of West Virginia." Compiled by the Geological Survey of the State; I. C. White, State Geologist. Morgantown, W. Va.; issued by the Survey. Scale, 10 miles to 1 inch.

This map is a preliminary one, and is not to be considered strictly accurate, as a complete map could not be compiled until the labors of the Survey have been carried much further. It is, however, approximately correct, and will be of much service to those who want to acquaint themselves with the general and economic features of the State.

The foremost interest of the State at present is coal, and the map shows the coal fields. A student will be somewhat impressed by the large areas of coal lands yet untouched, and a most valuable resource of the State. Petroleum is also an important product, and some interesting details of its occurrence and the working of deposit. In its work thus far, the State Geological Survey has tried especially to do all that is possible to make clear the economic geology of the State; and the map has been changed from earlier records, wherever such alterations appear to be needed.

The map shows how extensively coal and petroleum are distributed in the State. A very large part of the deposits are still undeveloped, and can be used in the great future which is before West Virginia.

"Map of Smyth County, Virginia." Compiled by C. R. Boyd. Wytheville, Va.; published by the Author. Price, \$1.

This is a complete and excellent map and cross section, showing the economic geology and mineralogy of Smyth County, Virginia, on the line of the Norfolk & Western Railroad, on a scale of 1 mile to the inch. The topographical lines are also a feature of importance; though no strictly accurate topography of any section can be pretended without a very expensive survey. This topography, however, is more complete and full than any that has so far been given of this section; as well as the great faults, or dislocations, the railroads, roads, post offices, streams, mountains, mountain passes and lines of approach, and the position of each individual landowner or company shows with names just where they may own, with few if any names of owners neglected. The ores and minerals treated are gypsum or plaster, salt brine, iron, manganese, zinc, lead, gold, copper, fluorspar, the ruby and abrasive materials, hydro-carbons, limestone, sandstone, marble, glass sand, granite, clays and mineral waters; also timber and coal. The principal towns are enlarged on the margin, giving very complete directories of all business in each, and the names, also, of all mining, railway, telephone and other companies operating in the county. Mr. Boyd is an engineer of much experience, and he knows his country thoroughly. He has made a very serviceable map of a region which is now attracting much attention.

"Map of the Atlin Gold-fields, British Columbia, Showing the Skaguay Route." Compiled by F. L. Crampton. Seattle, Wash.; the O. P. Anderson Map and Blue-print Company. Blue-print, in cover. Price, 50 cents.

This is a map of the latest placer gold-field in British Columbia, to which a considerable movement begun last summer, and is the first map of the region issued. Atlin City is located on the east side of Atlin Lake, and about midway of the lake north and south, and is the natural landing-place for the gold-field of Pine Creek and surrounding country, which is a part of the Cassiar Mining District of British Columbia, and lies almost east of Skaguay, Alaska, 75 or 80 miles.

The best and shortest route, according to the map, is from Skaguay, over the White Pass trail, to Log Cabin, where the Canadian and United States custom officers are located, 35 miles; from Log Cabin the trail leads southeast to the Big Horn River, 22 miles; down the Big Horn to head of Otter Lake, 6 miles; across Otter Lake, 12 miles; from foot of Otter Lake to Taku Lake, 8 miles; across Taku Lake and up Taku Arm to Taku Landing, 30 miles; across Portage from Taku Arm to Lake Atlin, 1 1/2 miles; across Lake Atlin to Atlin City, 10 miles. A saving of about 10 miles can be made by branching off from the White Pass trail at Brook's Camp and coming into the trail again about 15 miles below Log Cabin.

The country around Atlin Lake is covered with timber—pitch pine and spruce. There is no underbrush or logs, which makes it very accessible either for man or beast, and packing is light compared to some parts of the North. The soil is very sandy and easily worked, and miners were working and sluicing on their claims the last of November. Bedrock is found on many of the creeks at from 6 to 8 ft. The trails from White Pass City and via the East Fork of Skaguay River pass over the mountains and down the Big Horn River, cross 18 miles of a glacier, and can only be traveled a couple of months during summer.

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.

"Michigan Engineers' Annual, 1899." F. Hodgman, Secretary. Climax, Mich.; published by the Michigan Engineering Society. Pages, 216; illustrated.

"Anton von Kerpely's Bericht über die Fortschritte der Eisenhütten-Technik im Jahre, 1894." Prepared by Theodore Beckert. Leipzig, Germany, 1899; Arthur Felix. Pages, 224; illustrated. Price, in New York, \$4.20.

"Physikalisches Praktikum; mit Besonderer Berücksichtigung der Physikalisch-Chemischen Methoden." Von Eilhard Wiedemann und Hermann Ebert. Braunschweig, Germany, 1899; Friedrich Vieweg & Sohn. Pages, 574; illustrated. Price, in New York, \$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 will only be published when so requested.

Letter should be addressed to the MANAGING EDITOR.

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

Correspondence Schools.

Sir: In a recent issue of the "Engineering and Mining Journal" I noticed an article relating to the order prescribing very stringent rules for the examination of mine surveyors issued by the Prussian Ministry of Public Works. The examination, while severe, does not appear to be unreasonable and must result in considerable benefit to the profession by preventing incompetent men from practicing mine surveying. It is to be regretted that in our own country so many incompetent men are calling themselves mine surveyors—men who were mechanics, who can measure and read angles from an instrument, but cannot plot or calculate the surveys they make. The calculating and plotting is often done in the office by men who could not run a line. That such a state of affairs should exist in this age of enlightenment, with educational advantages never before equalled in the history of the world, is remarkable.

To me this indifferent sort of education seems inexcusable. If a man is unable to attend a college to acquire the requisite theoretical knowledge of his profession, there are other means by which the necessary education can be secured; for instance, thorough institutions like the United Correspondence Schools, which have been developed during the last 10 years. Several cases have come to my attention where young men have taken advantage of this practical system of instruction and have become competent surveyors without the loss of the time and money which the Prussian regulations necessitate. I believe if we had more severe examinations in this country it would result in a higher degree of efficiency among our mine surveyors.

J. Q. McNaughton.

Pottsville, Pa., May 24, 1899.

A Doubtful Copper Prospect—The Boston Consolidated Mines.

Sir: With reference to your article concerning the Boston Consolidated Mine, I beg to state that you do this property a great injustice, and without a thorough and careful investigation have jumped at conclusions. To explain what I mean, you state, because the Anaconda 4 per cent. ore pays its profits mainly out of the gold and silver contents, the 2 per cent. copper ore of Bingham cannot pay under the existing conditions in Utah; but I have made similar Bingham ores pay. The Boston Consolidated property has not been examined by me, and I do not know its average value, but if they have a vast amount of 2 per cent. material they can, and will, make it pay largely. One year ago I examined a property which adjoins the Boston Consolidated. In this property I found a very extensive body of material which averaged 2.20 per cent. copper. I concentrated this material, sold the concentrates in the market for 7 cents per pound for the copper contents, and paid \$9 per ton working charge, receiving net for these concentrates an amount equaling \$1.69 per ton of ore mined and milled. I can mine (quarry) and concentrate this material for at most 69 cents per ton, leaving a net profit of \$1 per ton, with copper at 7 cents per pound. The mining and metallurgy of this material is quite different, and much less expensive than that of the Anaconda ore. My concentration tests were crude, as I had insufficient machinery, the test being made only to determine commercial possibilities. I learned that much better results were obtained than when the Boston Consolidated tests were made. While I do not at this time attempt to state the amount of material there is of this character in sight, my investigation extended over an area probably 2,000 ft. in width, by a like distance in length, and a varying depth of from 50 to 300 ft., the character of the deposit being everywhere such as to suggest a general distribution of values throughout the entire mass. I am in no manner interested in the Boston Consolidated property, but my investigations of the porphyry belt of Bingham, Utah, convince me that it presents a basis for an important and valuable industry, to which, I believe, you will agree upon investigation.

Salt Lake City, Utah, June 1, 1899.

Hartwig A. Cohen.

Sir: Under head of "A Doubtful Copper Prospect" in your issue of May 27, 1899, you make some very sweeping statements about the Boston Consolidated Mines in Utah. No data are given to support the statements made. As I have had charge of this property for some time, I beg permission to state some facts and give some data covering the subject.

The copper occurs in a porphyritic formation, phenomenal in extent, and as copper pyrites. Of course, near the surface the copper

has been leached. The gold values vary from 20 cents to over \$1 per ton. The ore is easily crushed and the copper concentrates well. A 10-stamp concentration mill was leased for five months and many concentration tests made. All the ore milled was carefully weighed in and sampled and each test consisted of a week's run. The concentrates were weighed and sampled, test by test or lot by lot. The first test showed a saving of about 46 per cent. of the copper. The results constantly improved until we obtained a saving of 79.5 per cent. of the copper on ore assaying 1.4 per cent. copper.

The mill was a very poor device for this kind of work. Crushing such ore by stamps is condemned by all competent mill men. We knew that any results obtained could easily be improved on in a properly designed mill. Only a part of the slimes were treated, as there was no suitable device for handling all this product. The crushed product was concentrated on Wilfley tables, after crushing (finally) through 18 mesh to the inch screen. The best results were obtained by concentrating 22 tons into 1.

You say, "Mr. Weir's report * * * * would give an average of 1.38 per cent. * * * * It would be impossible to mine and treat ores carrying 2 per cent. or less of copper at a profit, under existing conditions in Utah."

Let us see. Taking the results of our experiments, and on basis of ore assaying 1.38 per cent. copper, and concentrating 22 tons (of 2,000 lbs.) into 1, and on the basis of a saving of 80 per cent. of the copper, we have: 1 ton ore assaying 1.38 per cent. copper contains 27.6 lbs. copper; 22 tons of ore contain 607.2 lbs. copper; 80 per cent. recovered equals 485.7 lbs. copper, or about 22 lbs. to the ton.

The gold in the concentrates varied from \$1.25 to \$4 per ton, and the silver from 1 oz. to 2 oz. Assuming the gold at \$2 per ton, and the silver at 1 oz. per ton; estimating the copper at New York quotation, less 3c. per pound, and deducting \$6 per ton for smelter treatment, and the usual charges for hauling and railroad freight to Salt Lake, we have for the value of one ton concentrates, when electrolytic copper is 16c. in New York: 485.7 lbs. copper at 13c., \$63.14; gold, \$2; silver, 1 oz., \$0.57; total gross value of 1 ton concentrates at smelter, \$65.71. From this we deduct: Smelting charges, \$6 per ton of ore; wagon hauling, \$0.70; railroad freight to Salt Lake, \$1.50; a total of \$8.20. This gives the value of 1 ton concentrates or 22 tons crude ore \$57.51; or of 1 ton crude ore, \$2.61.

After the ground has been stripped, the mining is simply a question of working an immense quarry, and the cost should not exceed 40c. per ton. On the basis of concentrating 1,000 tons or more per day, the milling should not cost over 25c. per ton of ore. On this basis we have: Value of one ton crude ore, \$2.61; cost of mining and milling, \$0.65; leaving a net profit per ton of \$1.96.

The above estimate does not include any deterioration of plant, and is based on the assumption that the stripping has been done, and that the mill is erected and ready for work.

By way of explanation, I may say I am off for a little vacation, and have given all the above from memory, but it is substantially correct, so far as it refers to data obtained. This explanation has been made, knowing your desire to be fair and honorable in the management of your esteemed "Journal."

Thomas Weir.

New York, June 3, 1899.

BASIC STEEL MAKING IN ENGLAND.—According to the London "Iron and Coal Trades Review," the cost of making basic pig iron in ordinary times is about \$8.52 a ton in the Cleveland District; but the cost has gone up recently, owing to the very active demand for material, and at the present time it averages about \$10.68 a ton. The increases are 24c. for iron ore; \$1.32 for coke; 12c. for limestone; 12c. for labor and 36c. for incidentals. The cost of converting the pig into basic steel is estimated at \$5.88 in ordinary times, but this has increased to \$8.16 by the recent rises in fuel, labor and other causes. The cost of producing steel has risen therefore from \$14.40 to \$18.84 per ton.

VENTILATING FAN AT XHORRE COLLIERY, BELGIUM.—A Rateau fan, lately put up at the Xhorre pit at Fleny, near Mons, has a diameter of 2.8 m.; and on the fan shaft is keyed a pulley of 1.5 m. diameter, driven by ropes from the pulley flywheel, 6 m. in diameter, of the engine. The latter, fitted with lifting valves and provided with variable expansion, while the exhaust steam is condensed, has a cylinder of 63 centimeters diameter, with a stroke of 1 m.; and generally the engine runs at 50 revolutions per minute, giving out about 100 H. P. Checked trials, with the engine making 50.5 revolutions per minute, showed a mean pressure of 1,338 kgms. per square centimeter, with 91.21 indicated H. P., the fan making 202 revolutions per minute, giving a tip speed of 29.62 m. per second; and the air volume delivered per second was 49.27 cubic meters with a water-gauge of 101.66 mm. observed, and 107.32 mm. calculated, showing a useful work of 66.93 H. P.

FUEL IN KOREA.—United States Consul-General H. N. Allen, at Seoul, Korea, says that Koreans heat their houses by means of flues, laid under a tight stone and cement floor, sealed with a strong layer of oiled paper. The fuel for these flues is wood, grass and brush. This fuel has to be transported on the backs of men, bulls, or ponies for a long distance, and is therefore very expensive. Korea has large deposits of smokeless coal which foreigners have shown is well adapted for use in their heating system, which would be a great saving in expense, while the proper development of these mines would furnish a much-needed coal supply for other purposes. So far, all attempts to obtain a coal-mining concession have failed, and these deposits lie practically neglected, except that a little rotten surface coal is got out each year and sold to foreigners at \$9 gold per ton. As this stuff is mostly dust by the time it reaches its destination, it is mixed with red clay and made up into balls by hand, which burn excellently, but are unnecessarily costly in a country where good coal should be readily available at a low price.

THE ELECTROLYTIC CHLORATE WORKS AT CHEDDE, SAVOY.

Written for the Engineering and Mining Journal by John B. C. Kershaw.

Chemical works have in the past usually been grouped together in close vicinity to coal-fields or salt deposits; and allied with other manufacturing establishments—such as glass works—they have formed great industrial centers. In England such a center exists in South Lancashire. The chemical works of the future will be, however, in many cases, isolated units, placed in mountainous districts, the chief conditions requisite being water-power and railway communication.

Ten years ago the world's consumption of chlorate of potash was wholly produced by the older chemical method. To-day, more than half the chlorate production is the output of electrolytic factories; and the writer has little doubt that ten years hence the proportion of the total production made by the electrolytic method, with the aid of water-power, will be considerably increased.

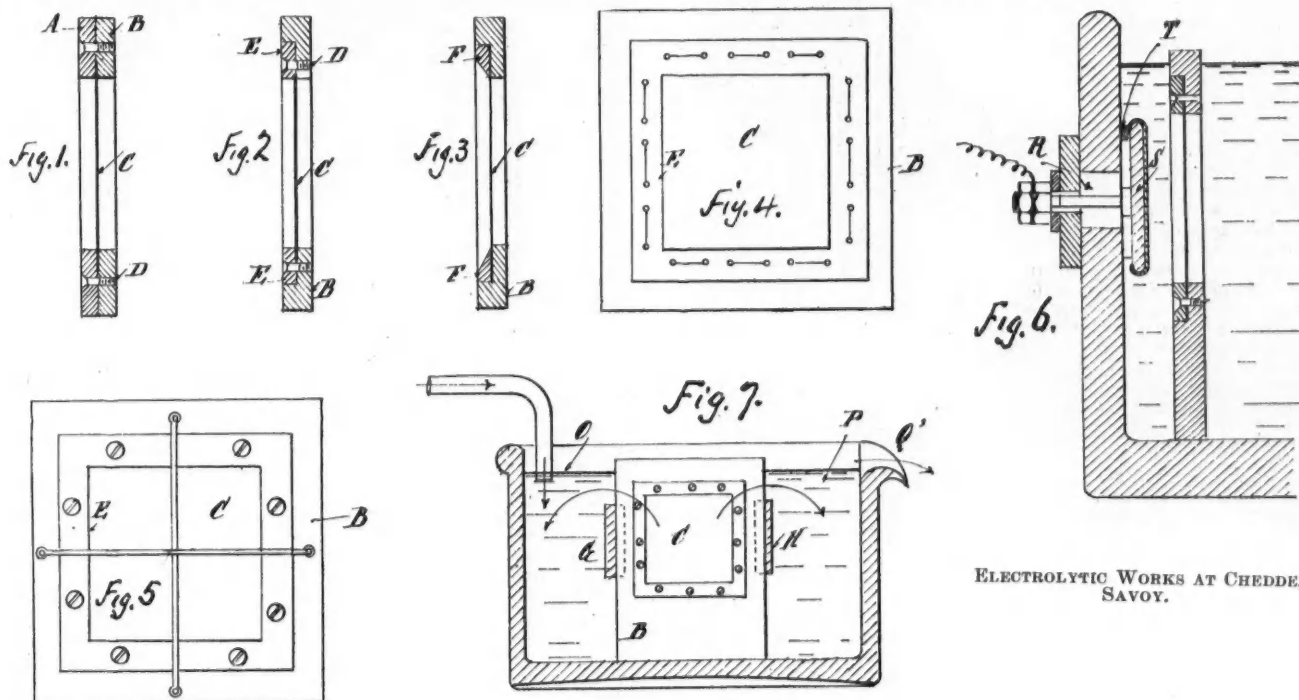
The following facts may be given to show the progress of the new method of manufacture. In 1889 Messrs. Gall & Montlaur started the first electrolytic chlorate works at Villers-sur-Hermes in Switzerland; utilizing a few hundred horse-power from the falls in the neighborhood of the place for this experimental work. At the end of 1898—or nine years later—there were seven electrolytic chlorate factories in operation, all operated by water-power, utilizing 30,000 horse-power, and producing 6,500 tons chlorate per annum. Two new electrolytic chlorate factories were also under construction in 1898; and the fact that one of these is promoted by the United Alkali Company—the chief producer by the older method of manufacture, is highly significant.

In a previous article on this manufacture, the writer was able to give a detailed description of the St. Michel Works of the Societe d'Electro-

and is carried down to the turbine house, in two steel pipe lines, 600 metres in length, each 1.40 metres in diameter, and of metal 15 mm. thick at the lower end of the line. A bridge over the river is necessary to carry the two pipe lines into the turbine house. (See Fig. 8.) The total length of galleries and tunnels carrying the waters of the Arve to the factory is 1,790 metres. The sectional area varies from 5 to 30 sq. metres; while the flow of the water varies between 5 and 8 cubic metres per second. The power available is said to be 12,000 H. P.; the maximum of course being in spring when the River Arve is in flood. At present only a portion of this total is utilized in the works.

The turbine house is a narrow building, 120 metres in length. It contains 12 vertically placed turbines, each of 1,000 H. P. The dynamo house adjoins and is of the same length; it contains 12 direct current Oerlikon dynamos, each directly coupled to one of the 1,000 H. P. turbines; and each capable of delivering 830 E. H. P. The total area covered by the buildings of the Chedde Works is 13,000 sq. metres. The chief building is that containing the decomposing vats, which is 130 metres long, 60 metres broad, and 21.5 metres in height. The vats in which the solution of potassium chloride is submitted to electrolysis are built of cement,* and have the form shown in Fig. 7, which represents a sectional elevation of the vat. Diagrams 1-7 illustrate the details of the chloride cell. The chief features of this form of decomposing cell are a large number of insulated intermediate electrodes—(second electrodes)—and the provision of external cement channels round the vats, for carrying off the electrolysed solution, which flows over its sides.

The secondary electrodes are all of thin platinum foil, held in ebonite or other non-conducting frames, of exceptional width. By use of these wide frames, M. Corbin holds that he has overcome the losses due to lateral dispersion of the electric current, which usually occur when attempts are made to utilize secondary electrodes in industrial oper-



ELECTROLYTIC WORKS AT CHEDDE, SAVOY.

chimie, where the Gall & Montlaur process is operated on an extensive scale.* In the present article he is able to present a similar account of the more recently built factory of the Societe des Forces Motives de l'Arve, which carries on the manufacture of chlorate under the patents of M. Paul Corbin. The works are situated at Chedde, Haute Savoie, close to Chamounix, and almost under the shadow of Mt. Blanc.

The patents of M. Paul Corbin, above referred to, were applied for in 1892 and 1894, and were based on experiments made at M. Corbin's cellulose factory at Lancy, Isere. They relate to the forms and details of electrodes and vats for the electrolytic decomposition of solutions of the alkali metal chlorides. The above named company was formed early in 1895, for development and utilization of the waters of the Arve and for industrial operation of the Corbin patents; and the building of the works at Chedde was commenced in June of that year. Six hundred men were employed upon the various hydraulic, engineering and building works required, and in 13 months from the date of commencement the factory was ready for manufacturing operations. It has been in continuous operation since July, 1896, and is now producing chlorate at the rate of 3,000 tons per annum, in addition to other chemical products, of which calcium carbide is the chief.

The power used in the factory is obtained from the River Arve, the most important hydraulic engineering works being situated at the point where the valley of Chamounix joins that of Sallanches. A dam with the usual flood gates and sluices has been built at this point, just below the bridge of Servoz. From here the water is led by a tunnel 698 metres in length to the foot of the ravine of Chatelard, where the first fall occurs. The power generated at this spot is to be utilized for the electric railway which is to unite Chamounix and Fayet. The water is then led through the valley of Chatelard in two steel pipe lines (each 1.40 metres in diameter), and enters a second tunnel 700 metres in length. From this it emerges at a point 140 metres above the works at Chedde,

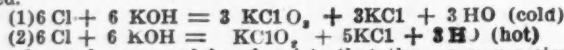
ations. The secondary electrodes are entirely submerged in the electrolyte, and are held in position by two longitudinal guide bars, running parallel to one another in the vat, bearing grooves for reception of the ebonite frames. The distance separating the secondary electrodes is only 12-15 m.m. The two terminal electrodes are alone connected with the external current conductors. They are formed of thick plates of metal covered with platinum foil, and fixed over the openings in the two end walls of the vats, as shown in Fig. 6. M. Corbin lays great stress upon the importance of having both secondary and primary electrodes mathematically in line, and exactly similar in form and surface area. The flow of the electrolyte within the vat is indicated by the arrows in Fig. 7. The current on passing through such a cell as this is confined to the line of the electrodes, by reason of the wide ebonite frames encircling them, and performs electrolytic work between each pair of electrodes. In this case, when a solution of potassium chloride forms the electrolyte, chlorine is liberated at the anode surface, and potassium hydrate at the cathode surface, of the platinum walls forming each separate cell; and these unite to produce potassium chlorate or potassium hypo-chlorate, according to the temperature at which the reaction occurs. The remaining buildings of the Chedde factory comprise the usual recrystallizing, drying, grinding and packing departments, common to all chlorate factories, whether using the old or new process of manufacture.

When an aqueous solution of sodium or potassium chloride is electrolysed by means of insoluble electrodes, without the interception of a diaphragm to prevent the reaction of the chlorine and the sodium or potassium hydrate, two reactions may occur. If the electrolyte is kept cool (under 20° C.) a hypo-chlorite will be formed, according to the equation market (1) below. If, on the other hand, the solution of chloride be warm or be made hot by use of a high current density, the chemical

*"Electrical Review" (London), November 25th, 1898; "Engineering and Mining Journal," December 17th, 1898.

*The description of the decomposing vats used at Chedde is based on that given in French Patents 226,257 of 1892, and 238,612 of 1894. It is possible that modifications of these forms have been introduced as the result of practical work.

change represented by equation (2) is assumed to occur, and chlorate is produced.



It was formerly assumed by chemists that these two reactions represented the secondary changes occurring in the electrolytic cell under the conditions described above; but recent researches by Bishoff & Foerster, by Oettel, by Winteler, and by Merle* have thrown doubt upon this older theory, and there is now strong evidence that the formation of hypochlorite and chlorate in the electrolytic cell is less simple than that described above. The work of Oettel upon this subject is especially valuable, and every manufacturer of chlorate by the electrolytic method ought to be thoroughly conversant with the details and results of this chemist's laboratory investigations. Briefly summarized, his researches prove that chlorate is formed partly by oxidation of the hypo-chlorite in the cell, and partly by the direct union of chlorine and oxygen at the surface of the anode. In neutral solutions of the chloride, the first reaction predominates; in strongly alkaline solutions the second. Wohlwill has also investigated this subject,† and has obtained results which prove that chlorates are formed by reactions between (Cl O) and (O H) "ions."

Whether the intermediate changes be simple or complex, the final result is the same; and six atoms of free chlorine cannot yield more than one molecule of potassium chlorate. As five atoms of chlorine revert to the form of potassium chloride, the general reader may be disposed to regard the process as a wasteful one. It is, however, the only one by which chlorates can be made cheaply upon an industrial scale. Exactly the same loss of chlorine occurs in the older method of manufacture,

Watt, in 1851, noted the advantage of adding alkalis to the electrolyte, and since Oettel has fully investigated the effects of adding calcium hydrate and has published his results* the validity of these patent claims is doubtful.

Though the exact nature of the chemical changes which result from the presence of alkaline carbonate, or calcium hydrate in the cell, is not definitely settled, there is no doubt that an increased yield follows their addition; and it is probable that the use of calcium hydrate or of potassium carbonate in the decomposing cells is now general in all electrolytic chlorate works. Oettel found that when using calcium chloride solution as the electrolyte he could obtain current efficiencies as high as 83.3 per cent.; but his attempt to work this process as a continuous one, and to regenerate calcium chloride, failed, owing to physical changes in the calcium hydrate separated at the cathode. Foerster & Bischoff attributed the better yield obtained when calcium hydrate is present in the electrolyte, to a film of calcium hydrate which forms at the cathode. Oettel likewise considers that such a film is formed, but he inclines to the opinion that it contains calcium oxychloride. Foerster & Bischoff recommend a temperature of 50° C, in order to obtain the best results.

As regards the cost of electrolytic chlorate, the writer gives the following estimate, based on an output of 800 tons per annum, and a cost of electrical energy of 1/5 cent per E. H. P. hour. This latter is, of course, exceeded, where very heavy expenditure has been necessitated upon hydraulic works; but for such installations as those at St. Michael, and at Chedde, he is inclined to think, it is not too low. The power plant

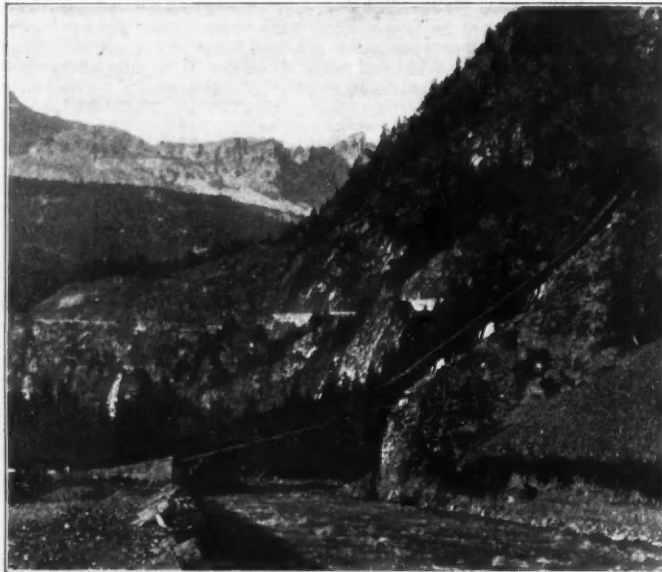


FIG. 8. —PIPE LINE BRIDGE OVER ARVE RIVER, ELECTROLYTIC WORKS, CHEDDE, SAVOY.

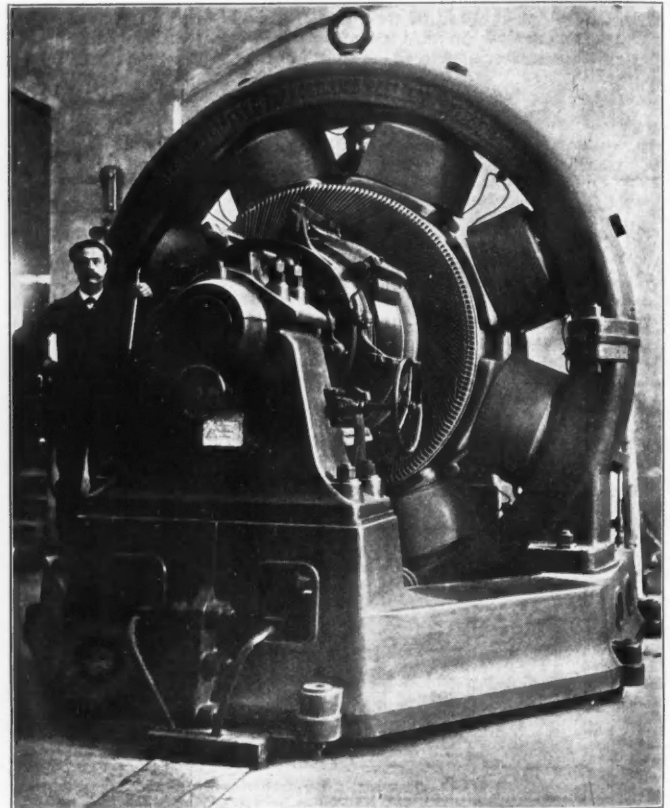


FIG. 9. —OERLIKON DYNAMO, 1,000 HORSE POWER.

which only differs from the electrolytic method in the manner of obtaining free chlorine, and in the use of calcium hydrate in place of sodium or potassium hydrate, as the absorbing medium.

All the electrolytic processes for the manufacture of chlorate are based on this fundamental reaction; and it is interesting to note that this method of producing chlorate in an electrolytic cell was first noted by Stadion in the year 1816† and was patented by Charles Watt in 1851.‡ Later patent claims therefore are valid only, in relation to novel details of the apparatus by which the process is to be carried out on a commercial scale.

The writer is not able to give any figures for the yield of chlorate per E. H. P. hour, or for the cost of chlorate, by the Corbin process at Chedde, since no data of this kind have yet been published by M. Corbin; and direct application has failed to elicit any figures. The following estimates are therefore general ones; but they are based on actual production figures for the chemical and electrolytic processes, and are in consequence worthy of careful consideration by all interested in the future of this new industry.

The low current efficiency is due to several causes, chief of which is the reducing action of the hydrogen liberated at the cathode upon the oxy-compounds of chlorine present in the electrolyte. Gall & Montlaur seek to minimize this action by encasing the cathode in asbestos bags—open above; while Blumenberg seeks to avoid this cause of loss by use of diaphragms and by conduct of the secondary reactions outside the decomposing cell. The low energy efficiency of the electrolytic process is due to the high current density purposely used to maintain the electrolyte at the required temperature. This involves the use of a high E. M. F., much above that theoretically required to decompose the sodium or potassium chloride.

Recently considerable attention has been given to the improvements in the yield of chlorate per kilowatt hour which can be obtained when an alkaline carbonate, or when calcium hydrate is present in the cell; and these additions have been made the subject matter of patents by Schuckert & Cie, by Kellner and by Spilker & Loewe. Since Charles

is 3,000 H. P. = 2,400 E. H. P. The annual output 800 tons.

Capital Expenditure:		
Water power plant.....		\$49,920
Electrical plant		65,280
Total		\$115,200
Working Expenses:		
Power, 3,000 H. P. @ 1-5th cent per E. H. P. hr.....		\$47,520
Depreciation (electrical plant), 10 per cent.....		6,528
Potassium Chloride, 606 tons, \$38.4 per ton.....		23,270
Packages at \$1.80 per ton.....		3,840
Wages, 12 men (four at \$9.60 per week; four, \$7.20; four, \$6) ..		4,742
Repairs, renewals, fuel		4,800
Management and office charges.....		4,800
Taxes, brokerage, etc.....		4,800
Total annual expenditures		\$100,300

Table I.—Efficiencies of Electrolytic Chlorate Processes.

Process.	Volts used.	Grams KClO ₃ obtained.		Efficiency %.		Basis of Calculations.
		Per Amp. hr.	Per k. w. hr.	Current.	Energy.	
Gall & Montlaur.....	5	.273	54.6	35	18	Annual output at Valorbes. Lunge's figures.
"	5	.347	69.4	45	22	
Oettel's Experimental..	3.3	.396	119.0	52	39	Dunlap's figures
Blumenberg	?	?	235.0†	?	77†	
Theoretical	2.5	.762	305.0	100	100	

*"Zeitschrift fur Elektrochemie." Volume 4, page 464; Volume 5, page 1; Volume 5, page 51; "Moniteur Scientifique," 1896.
 †"Zeitschrift fur Elektrochemie," Volume 5, page 52.
 ‡"Gilbert's Annual of Physics," Volume 52.
 §British Patent No. 13,755 of 1851.

*"Zeitschrift fur Elektrochemie." Volume 5, page 1.
 †These figures are certainly untrustworthy, since even Oettel in his laboratory investigations rarely obtained an energy efficiency of 50 per cent.

These estimates are based on European rates of wages and freights. Onan output of 800 tons this equals a net cost of 5.59c. per lb. From figures in the writer's possession, relating to the older chemical method, he believes that the cost by the latter process is about the same. The above estimate is, however, based on a very low energy efficiency (18.8 per cent.) and it is therefore evident that the electrolytic process is in the more favorable position, apart altogether from questions of simplicity and cleanliness.

The price of chlorate in the early part of 1898 had fallen in England to 6c. per lb., and the margin of profit to the manufacturers by either process was extremely narrow. An arrangement has, however, been made between the European producers, and since the autumn of 1898 the price of chlorate of potash in England has advanced to 7.5c. per lb. The price, of course, rules higher in America, on account of the duty, and the prospects of profitable manufacture are correspondingly increased.

The writer in conclusion must express his thanks to M. Paul Corbin for the photographs of the factory at Chedde, which have been reproduced as illustrations, and also for many of the details concerning the hydraulic works given in the earlier portion of this article.

BRITISH COLUMBIA MINES IN 1898.

Written for the Engineering and Mining Journal by W. M. Brewer.

The annual report of the Minister of Mines of British Columbia for the year ending December 31st, 1898, has been published and distributed. It is the first report compiled by Mr. William Fleet Robertson, provincial mineralogist, who was appointed to succeed Mr. W. A. Carlyle when that gentleman resigned to accept the position of chief engineer for the British America Corporation, and is evidently the work of a competent and conservative mining engineer. Because of his late arrival in the Province last year, the territory which he was enabled to personally examine, is comparatively small. The report occupies some 300 pages and is illustrated with about 50 cuts made from photographs, most of them taken by Mr. Robertson during his tour.

The first few pages are filled with statistical tables showing the production of the metalliferous and coal mines of the province since the introduction of these industries. Some interesting comparisons are given below:

The yield of placer gold by years, from 1888 to date, was as follows:

1888.....	\$616,731	1894.....	\$405,516
1889.....	588,923	1895.....	481,683
1890.....	490,435	1896.....	544,026
1891.....	429,811	1897.....	513,520
1892.....	399,526	1898.....	643,346
1893.....	356,131		

The production of metals from lode mines is reported as below:

Year.	Gold. Oz.	Silver. Oz.	Lead. Pounds.	Copper. Pounds.
1888.....	79,780	674,590	165,100	.....
1889.....	53,192	70,427	.....	.....
1890.....	4,500	77,160	808,420	.....
1891.....	.....	.....	.....	.....
1892.....	1,170	227,000	2,135,023	.....
1893.....	6,252	746,379	5,662,523	324,680
1894.....	39,264	1,496,522	16,476,464	952,840
1895.....	62,259	3,135,343	24,199,977	3,818,556
1896.....	106,141	5,472,971	38,841,135	5,325,180
1897.....	110,061	4,292,401	31,693,559	7,271,678
1898.....	.....	.....	.....	.....

The coal and coke production by years, from 1888 to date, was as follows:

Year.	Coal. Tons (2,240)	Value.
1888.....	489,301	\$1,467,903
1889.....	579,830	1,739,490
1890.....	678,140	2,034,420
1891.....	1,029,097	3,087,291
1892.....	826,335	2,479,005
1893.....	978,294	2,934,882
1894.....	1,012,953	3,038,859
1895.....	939,654	2,818,962
1896.....	896,222	2,688,666
1897.....	882,854	2,648,562
1898.....	1,135,865	3,407,595
1895-6.....	1,565	7,825
1897.....	17,831	89,155
1898 (estimated).....	35,000	175,000

The values of the mineral output for two years have been as follows:

	1897.	1898.	Changes.
Gold from placers.....	\$513,520	\$643,346	I. \$129,826
Gold from lodes.....	2,122,820	2,201,217	I. 78,397
Total gold.....	\$2,636,340	\$2,844,563	I. \$208,223
Silver.....	3,272,836	2,375,841	D. 896,995
Lead.....	1,390,517	1,077,581	D. 312,936
Copper.....	266,258	874,781	I. 608,523
Total metals.....	\$7,565,951	\$7,172,766	D. \$393,185
Coal.....	2,048,562	3,407,595	I. 1,359,033
Totals.....	\$10,214,513	\$10,580,361	I. \$365,848

In addition to the photographic illustrations there are three sketch maps, one of a portion of the Cassiar District, showing the Atlin Gold Fields, another showing the southern portion of East and West Kootenay, and the third a map of the entire Province, showing the subdivisions into mining districts.

The reports on the mineral districts other than those visited by Mr. Robertson himself, were furnished by the gold commissioners and mining recorders from the best information in their possession, which is largely derived from the statements furnished to them by owners of properties. That portion of the territory visited by the provincial mineralogist himself comprises East Kootenay and a portion of Texada and Vancouver islands and the west coast of the Mainland.

Referring to the East Kootenay District, Mr. Robertson states that he considers that the most important mining development in that district, if not in the whole province during the past year, has been the opening up of the coal deposits of the Crow's Nest Pass; a development rendered possible by the completion of a railway giving an outlet, not

only to British Columbia markets, but to those as well of the Northwest Territory, and eventually to the Northwestern States. The coal seams, so far known, have for practical purposes been divided in ascending series into: 1. The Elk River basin, bituminous; 12 seams. 2. Michel Creek, bituminous; 7 seams. 3. Michel Creek, Cannel coal; 15 seams.

Actual work has only been performed on the Elk River basin seams. Of this Mr. Robertson says as follows: "This series outcrops along the mountains on the east side of Elk River, from Morrisey Creek to above Coal Creek, at a height of from 1,600 to 2,500 ft. above the valley of Elk River. The beds dip to the east into the mountain at a flat angle. The other edge of the basin is said to outcrop some ten miles to the eastward and near the summit of the mountains. The measurements, etc., of this series of beds, as given to me by Mr. Smith, are as follows:

Designation of Seam.	Thickness in feet.	Work Done on Seam.	Elevation Above Elk River.
12	4	.....	2,500 ft.
11	7	.....	.....
10	5	.....	.....
9	6	.....	.....
8	4	.....	.....
7	7	No. 2 tunnel, south side valley, also exposed in gulch and face stripped.	900 ft. sandstones, conglomerates and shales.
6	30	No. 1 tunnel, north side of valley.	.....
5	6	.....	.....
4	3	.....	.....
3	15	.....	.....
2	30	.....	.....
1	30	.....	1,600 ft.

12 seams 147 Total thickness of coal in 900 ft. vertical coal measure. "The outcrop of this series of beds has been traced and found to cut both banks of Coal Creek, some 4 or 5 miles up from Elk River."

The report continues a detailed description of the workings in the colliery and analyses of the coal and coke. Among these analyses is one made from a strictly commercial sample taken by an expert sampler of one of the first of the regular run-of-mine coal shipments: Water, 1.80%; volatile matter, 18.70%; fixed carbon, 72.08%; ash, 6.70%; sulphur, 0.72%. The Crow's Nest coal compares very favorably with other bituminous coals.

Mr. Robertson next proceeds to give detailed accounts of the location and development work performed on the various mineral claims through the East Kootenay District. It is not at all strange, when it is considered that that district, so far as lode mining is concerned, has only been prospected for a few years, and has been remote from transportation facilities, that there are no mineral claims in the district which are entitled to be designated mines, as that term is understood by mining men; but from a careful reading of Mr. Robertson's report, it is evident that there are a large number of very promising prospects in the district on several of which quite extensive development work has been performed already. Now that the Crow's Nest Railway has been completed, and trails and wagon roads constructed through the district, there is but little doubt that the East Kootenay will in the future receive as much attention from prospectors and mining capitalists as the West Kootenay has since 1892.

Mr. Robertson's personal investigations on Texada Island were confined to the Van Anda and Marble Bay properties; with respect to both of them the same opinion is expressed in Mr. Robertson's report as was formed by myself during a recent visit, and published in a recent issue of the "Engineering and Mining Journal."

The closing pages of this valuable report refer to the reports of inspectors of metalliferous and coal mines, giving a detailed statement of the work performed by the inspectors during the past year, with a list of the accidents which have occurred in the Vancouver Island collieries, and the output, number of hands employed, daily wages paid, etc., are given in full.

An examination of the list of accidents occurring in the collieries shows that while the total for the year from the several causes, was 56, only 19 of these occurred from the explosion of gas, the balance being attributable to falls of coal, mine cars, powder in mine and timber at pit head. This shows clearly that while proper attention is given to ventilation, yet the employment of cheap labor is a false economy when to that policy can be attributed such a large proportion of the accidents which have happened in the collieries during the past year.

The index, occupying 25 pages, is a special feature of the publication, because of its completeness and correctness.

MINING IN CARINTHIA.—In the journal "Carinthia," published at Klagenfurt, Mr. R. Carnaval describes the lead and zinc ore deposits of the Radnig mines near Hermagor, in Carinthia. These ancient mines have recently been reopened. The deposit is of a bedded nature in limestone.

ELECTRIC MOTORS IN SWEDEN.—The manufacture of electric motors in Sweden, more especially those of smaller dimensions, is becoming quite an important industry. The well-known electric company at Vesteros, in spite of large manufacturing facilities, is unable to keep pace with the orders; they have, therefore, arranged for co-operation with the De Laval Electric Company, in Stockholm, about the manufacture of a quantity of small electric motors of their model (under 3 horse-power), and this manufacture of small electric motors is expected to amount to 1,000 to 1,200 per annum.

THE NERNST ELECTRIC LAMP.—The Allgemeine Electricitats-Gesellschaft are about to undertake the manufacture of the Nernst lamp on a large scale. The standard sizes so far decided on are of 25, 50 and 100 candle-power, though some of 480 candle-power will also be supplied. The life is about 300 hours, and it is stated that the simpler type of lamp will be extremely cheap. Those arranged to light up automatically will naturally be somewhat more expensive, owing to the large amount of platinum used in them. The life of this platinum is, however, very much more than that of the Nernst rod which gives the light.

THE MISSOURI-KANSAS ZINC DISTRICT.

Written for the Engineering and Mining Journal by Frank Nicholson.

Since January 1st, 1899, I have been engaged in examining properties in the Missouri-Kansas Zinc District for Eastern investors. My duties necessitated my examination of more than 600 shafts, comprising 12 of the principal properties in the district, aggregating over 60 mills and an output of over 3,000,000 lbs. of zinc ore a week. Beside these properties, I have casually inspected a number of others. In my opinion, this is the greatest known zinc deposit in the world. There are elsewhere single mines, much greater in extent and in quantity and richness of ore exposed than any single mine in this district; notably, the property of the New Jersey Zinc Company, at Franklin, New Jersey; the Malfidano mine in Italy and others; but no country, not even excepting Spain, has a mineral district comparable in extent and richness of its zinc deposits to the Missouri-Kansas District.

In all probability the advent of large amounts of capital into this district will be followed by such active exploitation of these ore deposits that the surface or shallow workings—by which I mean the workings down to a depth of 200 ft. and less—will be exhausted in about 20 years. Before this takes place, some of the strong companies entering this district will undoubtedly have explored the 500 ft. level, where, according to the Crossman chart,* exists an ore horizon containing more zinc ore than all the shallow mines combined.

The engineer cannot often afford to prophesy, but in this special case I feel it incumbent on me to make some statement as to the probable future production of this district. The present year will see an output of at least \$12,000,000; within five years, unless all signs fail, this will have been increased to \$25,000,000, and long before the exhaustion of the shallow ore bodies, an output of \$50,000,000 a year is probable. These figures seem large, but there is every reason to believe that they are well within what will be accomplished facts.

The unique feature of mining near Joplin is the high percentage of net profit to total value of output, and the large number of successful

THE MOUNT PLEASANT PHOSPHATE DISTRICT, TENNESSEE.

Written for the Engineering and Mining Journal by H. D. Ruhm.

The manner in which the Mount Pleasant Phosphate Field has come up to expectations is worth especial note. Discovered in the early part of 1896; opened to the world in July of that year, at a time when the financial depression was at its extremity, it was no wonder that investors were hard to find. Small miners were not slow to realize that here was an easily quarried, loose rock, with comparatively light stripping, which had market value. They immediately began to put up the price of royalty by bidding against each other for the favored lots near the railroad, with the lightest stripping. Then they began to put down the price of rock by again all bidding against each other to the same set of fertilizer manufacturers, instead of hunting other markets. Naturally, with prices continually dropping, sales were light, and yet during the latter half of 1896 something over 40,000 tons were shipped, all of which was for domestic market. The firm of J. M. Lang & Co., of Savannah, Ga., soon realized that a rock, which coming crude from the ground ran as high as 78 per cent. bone phosphate of lime and as low as 4 per cent. iron and alumina, and which was capable of refinement by proper handling to give as high as 84 per cent. bone phosphate of lime and as low as 2/4 per cent. iron and alumina, was bound, sooner or later, to cut a figure in the European market. So, in conjunction with the firm of West & Penrose, of London, England, they succeeded in effecting a trade between Mr. A. Cajot, of Paris, France, an extensive miner in the Sommes District, and T. C. Meadows & Co., who had acquired leases on quite a large territory at Mount Pleasant, and had built a small plant near the depot. Shortly after this Andrew Hunter & Co., of London, England, closed a trade with the Tennessee Phosphate Company for its agency for the European market. Since then other firms have given attention to sales of Mount Pleasant rock for export, chief among whom are H. A. Ford, of Ocala, Fla., and Rogers, Holoway & Co., of Philadelphia, until this branch of the trade now bids fair to take up all of the high grade rock from Mount Pleasant, leaving



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properties out of the total number in which capital and intelligent management have been embarked. Throughout the West it is perhaps fair to say that 90 per cent. of the mines operated with intelligence and ample capital prove failures. In this district at least 90 per cent. of the mines so operated prove successful.

Another interesting feature is the small amount of working capital required by a new company buying developed properties in this district. The usual experience of engineers has taught them that the routine method of investing in mines is, first, to buy the mine; second, to raise working capital; third, to find a competent manager; fourth, to nurse the property along two or three years in the hope of ultimate dividends.

Since January 1st, 1899, my clients have purchased about \$2,500,000 worth of property in this district. In every instance the property purchased is paying dividends at the rate of from 1 per cent. to 3 per cent. a month. As far as I know, no similar record can be furnished by a mining district in any other part of the world.

The accompanying illustration is from an excellent photograph showing the city of Joplin, the center and chief town of the district.

A FLOURISHING SWEDISH CONCERN.—The Stora Kopparberg Bergslag, the largest concern of this kind in Northern Europe, has had a very satisfactory year in 1898. The net profits amounted to 2,937,674 kroner (\$815,000). The directors propose to pay a dividend of 120 kr. per share (12 per cent.), which will absorb 1,152,000 kr., while 1,500,000 kr. is to be applied to the building of a sulphite factory at Skutskov, with a capacity of 15,000 tons annually. This sulphite will partly be used at the company's paper mills at Dornnarfoet, and is partly intended for export. Further 140,000 kr. are to be applied to the building of new dwellings for laborers, and 150,000 kr. to the old-age pension fund. The total value of the company's production amounted to 15,784,172 kr., which shows an increase, as compared with the previous year. The production consisted of: Iron and steel goods, 49,308,425 kgs.; Thomas phosphates, 8,814,850 kgs.; tar, 371,189 kgs.; gold, 109 kgs.; silver, 211 kgs.; copper vitriol, 1,164,599 kgs.; iron vitriol, 109,200 kgs.; sulphur, 50,000 kgs.; sulphuric acid, 892,886 kgs.; sulphite, 7,444,815 kgs.; timber (standard), 43,308 kgs. About two-thirds of the production have been exported, and about one-third sold within the country. A new fine rolling mill has been erected, and the utilization of residue of various kinds is for every year being extended. The company has invested a substantial amount in a new company formed at Falun for the building of locomotives and other rolling stock.

*See "Engineering and Mining Journal," March 18th, 1899, page 321.

only the by product, second grade, for the domestic market. As this second grade fills guarantees of 77 per cent. bone phosphate of lime and 4 1/2 per cent. iron and alumina, it easily satisfies any demands for quality on this side.

During 1897 about 102,000 tons were shipped from Mount Pleasant, of which about 16,000 tons were exported. In 1898 we see the splendid record of 297,000 tons total, of which 70,000 tons were exported. The domestic demand has rapidly increased and the increased export demand is forcing the domestic market to fall back, to some extent, to the lower grade deposits in Hickman, Giles and Sumner counties. In addition to the stimulus given prices by the increased demand, a factor has been the conclusion brought home to all that there is not so much rock at Mount Pleasant, by a good deal, as at first thought. The writer's first estimate was 2,300 acres, averaging 3,000 tons per acre, or about 7,000,000 tons. Taking a maximum annual output of 200,000 tons, I figured 35 years' work in sight. Others estimated as high as 25,000,000 tons. Closer prospecting and exploitation has now brought my estimate down to 1,800 acres at 2,700 tons per acre, or about 5,000,000 tons.

Basing calculations on the past year's business with allowances for reasonable increase, 10 or 15 years will see the field exhausted. Contrasting with this season in 1899, the similar season of 1897, where it was then next to impossible to sell rock at as low figures as \$1.25 to \$1.45 per ton, it is now a very hard matter to buy rock at \$2 to \$3 per ton. Land that was then going begging at \$100 per acre has been sold for \$172 per acre. In 1897 three-fourths of the operators engaged had nothing invested (nor to invest) but their nerve; now four-fifths of them have very large amounts of money at stake.

The Central Phosphate Company, incorporated in South Carolina, A. Cajot, of Paris, France, president, has about \$100,000 invested at Mount Pleasant and at Beaufort, South Carolina. The company has leased the Ernest Kittrell property, the Harry Harlan property, and 45 acres of the Man Dawson property. They own in fee simple the Rufus Long place, 52 acres, Henry Long place, 40 acres, and the Wash. Long place, 40 acres. The company has a small plant at the depot and is erecting a new and complete one on the Rufus Long place. It shipped during 1898 about 25,000 tons, of which 16,500 tons were exported.

The Tennessee Phosphate Company has about \$220,000 invested at Mount Pleasant, and \$100,000 in Hickman and Lewis counties in the blue rock field. Mr. Attila Cox, of Louisville, is president, and Daniel Breck, of Louisville, is general manager. This company owns in fee simple the Orr place, 170 acres; the Man Dawson place, 460 acres; the R. L. Goodloe place, 50 acres, and the Jackson place, 207 acres; total, 887 acres. It has a complete washing, drying, crushing and grinding plant at Attila, one mile from Mount Pleasant, and a dry shed at

Mount Pleasant. They shipped during 1898 65,000 tons, of which 30,000 tons were exported. Figures are approximate.

The Blue Grass Phosphate Company, the Columbia Phosphate Company and the Petrified Bone Mining Company are all operated under the management of Mr. G. W. Killebrew. Mr. G. M. Fogg, of Nashville, is president of the first, and Mr. M. E. Wheeler, of Rutland, Vermont, of the two latter. Mr. Wheeler has personally invested here considerably over \$100,000. The Blue Grass Company operates under a lease on all of Mrs. M. G. Frierson's property, consisting of about 1,000 acres. Mr. Wheeler owns in fee simple the Mrs. Temple Barrow place, 120 acres; J. Edman places, 120 acres; J. A. Bratcher place, 220 acres; McClinchey place, 69 acres; W. D. Gillespie place, 350 acres; W. D. Cooper place, 100 acres; F. M. Ricketts place, 80 acres; Pulliam place, 70 acres, and controlling interest in Columbian Phosphate Company, 60 acres; making a total of 1,189 acres.

The Blue Grass Company has a drying and crushing plant at Mount Pleasant, and the Petrified Bone Mining Company has a drying plant at the same place. These three companies have shipped during 1898 about 58,000 tons, of which 3,000 tons were exported.

The International Phosphate Company, J. H. Carpenter, president; E. Strudwick, of Richmond, Va., vice-president, has about \$125,000 invested. It owns the Solita mine, or Frierson place, 107 acres, and Arrow mine, or W. P. Ridley place, 701 acres; total, 808 acres. It has a spur track and drying plant at Solita and is putting in spur track and complete washing, drying, crushing and grinding plant at Arrow, which it expects to have in operation in April, 1899. This firm has shipped during 1898 about 40,000 tons, of which 12,500 tons were exported. This includes shipments of the General Phosphate Company, whose lease on the Carpenter place expired in August, 1898.

The Read Phosphate Company, of Nashville, originally of South Carolina and New York, and the Birmingham Fertilizer Works own jointly in fee simple the W. B. Giddens place, 200 acres, investment, \$11,000. The National Acid Company, of New Orleans, La., owns the M. A. Goodloe place, 38 acres, investment, \$4,500.

The Mount Pleasant Phosphate Company, J. R. Bryan, lessee, has

phosphate of lime. In this area the rock is found in belts around the slopes of hills, sometimes running clear over the hills, and in a few isolated instances being found in the level flat or bottoms.

The overburden consists of from 1 to 14 ft. of easily removable clay dirt, and the rock lying in a seam of loose, broken plates, easily raised with a pick, varies in thickness from 1 ft. to as high as 13 ft., though the average of the field is approximately 3 ft. The rock in places in the ground will yield approximately 1,000 tons per acre for each foot in thickness. Where the covering is very deep, a large part of the vein is likely to be decomposed, and in places it entirely disappears, leaving a stratified clay in its place.

The general process gone through with is to remove the overburden by scrapers, mine the rock by picks, put large plates of rock in the trams going directly to the dry kilns, and shovel the small rock and dirt into trams going to the washer. The drying process is simple in the extreme. The floor of the shed is covered with a layer of rock about 1 ft. thick; on this are placed three or four layers of cordwood and rock dumped on this to height of 8 or 10 ft. The wood is set afire and the whole business burns in from 24 to 48 hours, so it can be loaded. Green rock contains 10 to 20 per cent moisture. When the rock is dry it is crushed and screened, preferably by machinery, frequently by hand, with hammer and fork. The degree of care exercised in the crushing and screening determines the final grade of the product. As an illustration, the writer has analyses, obtained from samples treated in the following manner:

1. Taken from the ground in crude condition, covered with dirt, a large plate of rock was broken in two and after ordinary drying on a stove the following result was obtained from one-half: Bone phosphate of lime, 78.03; iron and alumina, 4.21; moisture at 212° F, 3.26.

2. The other half was placed in the stove and thoroughly burned for two or three hours. It was then broken into 2-in. pieces, shaken up in a bag and the dust screened out. The result then obtained was: Bone phosphate of lime, 83.06; iron and alumina, 2.51; moisture at 212° F, 0.61.



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about \$15,000 invested, owning the Clifford Long place, 53 acres, having dry sheds and spur track. It shipped 23,500 tons during 1898, of which 3,000 tons were for export. F. Hardy & Co. buy and ship rock at the depot and have invested about \$7,000. They have a considerable amount of rock stored and own a lot, spur track and drying plant at the depot. They have shipped only 1,830 tons so far.

Roughly summing up, there has been invested in actual money in the field somewhere near \$600,000; of this amount not over \$15,000 has come from Tennessee.

The Mount Pleasant field occupies a unique position. The rock is of finer quality so far as bone phosphate of lime is concerned than the Florida hard rock, running 78 to 84 per cent., while the Florida runs 75 to 80 per cent. Of course the iron and alumina run higher (2 to 4 per cent. as compared to 2 to 3 per cent. for Florida rock), but this cannot have any material effect under present conditions. It can be mined, prepared and put on the cars in condition for the export trade for \$1.50 to \$2 per ton. The one thing necessary to putting the field in a sure place is a consolidation of all the existing interests here, some form of which will undoubtedly be effected during the next six months. Fortunately there has been little tendency to wild speculations and imprudent investments so far, and as very little opportunity for such is left, the field bids fair to bring to all investors the sure return always accompanying steady and legitimately growing business. The labor question is the most serious problem confronting miners at present, as there is never a time when any company is able to get all the labor wanted, and what there is of very inferior sort. Wages are now uniformly fixed at 10c. an hour, with monthly payments. Most of the companies have comfortable houses, which they rent to employees at very reasonable figures. Labor-saving machinery for stripping, mining and hauling rock is becoming a necessity.

A few words on the general aspect of the field may not be amiss. The Mount Pleasant Phosphate Field is located in the southwestern portion of Maury County, Tennessee, on the waters of Sugar Creek and East Fork of Bigby Creek. It is triangular in outline with the base about 4½ miles long, central at the junction of the two creeks and about perpendicular to the course of the lower part of East Fork, and passing through the town of Mount Pleasant, which is about a third of the distance from the southwestern end of the base. The apex of the triangle is between the sources of the two creeks and about six miles southeast from Mount Pleasant, the figure containing a total of some 9,000 acres. Outside the triangle, the same formation of rock may be found but it invariably runs high in silica and from 40 to 60 per cent. bone

This affords very conclusive evidence of what can be done for the rock by proper machinery to properly prepare it. The Louisville & Nashville Railroad has treated this industry with manifest unfairness, notwithstanding the fact that its earnings are increased by over \$600,000 per year by shipments of phosphate alone. Not one dollar has been spent by the railroad company except for the absolutely necessary track room and scales at the depot, and for the depot itself. All shippers who want a track must grade it, pay cash for switch points, frog, cross ties, spikes, rail chairs, etc., and pay a rental equal to 6 per cent. of value of rails and splices, giving a deed for right of way. It takes from one to three months to get track put in, even at this price. This is in marked contrast with the policy of the road at Birmingham, where it has been known to put in tracks to get freight, without even waiting to get shippers' consent. But Mount Pleasant is on a branch without competition.

GOLD IN BOHEMIA.—In a paper read before the Geological Institute of Vienna, Mr. A. Irmier described the occurrence of gold at Brazna in central Bohemia. The veins, which are of a promising character, course east and west in granite for 1,000 meters, and contain antimonite and antimony-glance with a considerable proportion of gold. Mining was actively carried on 100 years ago.

ALUMINUM FOR ELECTRICAL WORK.—The Pittsburg Reduction Company has received an order from the Chicago Northwestern Elevated Railway Company for 150,000 lbs. of aluminum to be used as feed wires on that road. This will be the first electric road in the country that has attempted the use of aluminum for feed wires. Three sizes of aluminum cable will be used. The largest feeder is about 1½ in. in diameter, and the railroad company is buying over 10 miles each of the two larger sizes. The feeders will be placed in a wooden box, or trough, covered by the board walk between the tracks of the elevated. They will be supported on vitrified clay blocks, about 9 ft. apart and designed with an umbrella drip. Every 100 ft. a special malleable iron chair will be used, the cable being carried in split spool insulators to hold the slack.

It is estimated that 47 lbs. of aluminum wire will answer the same purposes as 100 lbs. of copper wire, while the difference in cost, considering the conductivity, will make the aluminum cheaper. The copper costs about 20c. a pound, while the aluminum can be had for about 36c. a pound. The installation in Chicago was caused by the rising price of copper.

ABSTRACTS OF OFFICIAL REPORTS.

Hall Mines, Limited, British Columbia.

The report of this company for the year 1898, as published in London, shows that the value of the production of matte and bullion (copper and silver) for the year was £184,306; Government bounty on ore smelted, £7,259; miscellaneous, £2,998; total receipts, £194,563. The expenses were: Ore and purchased matte, £53,426; mine, smelter and general expenses in British Columbia, £108,786; London expenses, £3,490; total, £165,702, leaving a profit of £28,861.

The total development work for the year was 3,237 ft. driving, sinking, etc. The total rock handled was 63,186 tons, of which 11,215 tons were waste and 51,971 tons ore shipped to smelter. The ore in sight at the close of the year was estimated at 59,000 tons.

The directors' report says: "This balance sheet shows a gross profit amounting to £28,861, which, together with £48 brought forward from 1897, makes a sum of £28,909. Out of this amount the directors have already (on the 21st April last) appropriated the sum of £12,500 to the payment of an interim dividend of 5 per cent., being 1s. per share on the ordinary shares and £1,750 to the payment of a dividend of 7 per cent. on the preference shares. After deducting these two amounts there remains a balance of £14,659, from which the board have thought it advisable to write off the sum of £6,052 for depreciation on buildings, plant and machinery, and £7,362 for cost of prospecting work at the mine, prior to October 1st, 1897, and on a copper claim since abandoned, leaving a balance of £1,245 to be carried forward to the credit of the account for the current year.

"Although the result of the year's business is disappointing, the board has reason to believe from indications shown by the development work which has been in progress for some time past, and from the report of the mine superintendent, as also from the report of Mr. John E. Hardman, a mining engineer of high repute in Canada, who has recently inspected the company's property, that the output from the mine will shortly be increased in quantity and value, although temporarily diminished during the last few months. Mr. Hardman's report will be found to fully confirm the confident opinion that the board have all along felt in the management of the company's property, and in its economical working; and Mr. Hardman is able to express a very high opinion of the prospects; the only exception that he makes being that the development is too much behind, and consequently the cost of working has been higher than it need be if the mine were more fully opened out.

"Hitherto the object of the board has been to so work the mine that it should be practically self-supporting, that is to say, that development and output should be carried on concurrently, and so long as the ore continued of a fairly high grade, that course was possible, the yield being sufficient to meet the working expenses and pay dividends, but the loss of connection with the richer deposits in the mineral zone, temporary only though it is believed to be, has for the present made the continuance of that plan impracticable, and rendered it necessary to adopt the course which Mr. Hardman recommends, to make the output for the time being subservient to a more extensive development of the mine. To do this, however, more capital is needed, and in order to provide this the board has decided to issue first mortgage debentures to the amount of £50,000, bearing interest at 6 per cent.

"The insufficiency of copper in the ore in the new south ore body has been a disappointment, but the board has reason to expect that in the property called the True Blue mineral claim, at Kaslo, which is at the head of the Kootenay Lake, and within easy reach of the company's smelting works, they have secured a property carrying a high percentage of copper which will serve as a useful flux to the Silver King ore. Owing to the difficulty of keeping up a full supply of ore from the mine while there was so much development work going on, the large blast furnace was in blast for 261 days only, but its working continues to give great satisfaction. The second reverberatory furnace and roasting oven were completed in January, and the refining works have continued to give satisfaction. With a view to still further economize the cost of tramming ore from the mine to the smelter the board has adopted improvements which, when the mine is more extensively developed and a full and continuous supply of ore obtainable, will reduce the cost to about 25c. per ton, as against the present cost of 44c. a ton."

Mount Morgan Gold Mining Company, Queensland.

The report of this company for the half year ending November 30th, 1898, shows total receipts as follows: Gold sales, £333,808; miscellaneous, £386; balance from previous account, £74,709; total, £408,903. The payments were: Working expenses, £184,795; dividend duty and royalty, £12,705; total, £197,500, leaving a surplus of £211,403. From this there was £977 carried to reserve and £175,000 (or 20 per cent. on paid-up stock) paid in dividends; a total of £175,977, leaving a balance of £35,426 to current account.

The total development work done during the year was 1,670 ft. The total rock removed was 131,810 tons, of which 47,725 tons (36.3 per cent.) was waste, and 84,087 tons (63.7 per cent.) ore sent to the reduction works. The results at the works were as follows:

	Ore treated. tons.	Gold won. ounces.	Av. per ton ounces.
Mundic.....	14,870	37,359	2.57
Oxidized ore	21,065	19,761	0.94
Low grade oxidized ore	69,081	25,129	0.36
Tailings	2,787	1,778	0.64
Slimes	67	60	0.90
Totals	107,860	84,087	0.78

The tailings and slimes treated were recovered from some old pits around the battery, which has been covered up for several years.

The report of Mr. H. A. B. Leipner, the chemist, says: "Considering the necessarily large expenditure incurred in the manufacture of chlorine, various investigations have been conducted with a view to economize, as far as possible, consistent with satisfactory work being accomplished in the different works. As the consumption of chlorine to a certain extent depends on the efficient calcination of the ore, numerous

analyses of both the unroasted and roasted ore have been made; and taking into consideration the fact that the reverberatory furnaces employed for roasting the mundic were not designed for the purpose, and, moreover, their capacity being somewhat limited, the calcining has to be forced in order to maintain the output. The consumption of chlorine per ton of ore may be considered, under existing circumstances, very satisfactory, but this will no doubt be reduced to a minimum when the shaft furnaces at present being erected at the new mundic works are in operation.

"The working of the chlorine stills having been subjected to investigation, has resulted in a slightly better efficiency being obtained from them; but when a few details of minor importance have received attention, and the crushing and mixing plant for the manganese and salt at the new mundic works is completed, I anticipate a return from the stills approaching theory as close as practicable. In order to regulate the working of the stills, and also to obtain a solution of fairly constant strength, numerous quantitative tests are taken during each shift, and from data so obtained the amount of chlorine consumed per ton of ore is arrived at. A quantity of manganese, which is necessarily not decomposed in the stills, has been recovered for re-use. Several alternative processes for the manufacture of chlorine are receiving consideration, also the recovery of the manganese from the still liquors, but the margin of profit possibly accruing from any such recovery process is of course somewhat narrowed now owing to the cheaper freights consequent on the opening of the railway.

"The manganese ore supply is chiefly being obtained from Gladstone, and latterly the quality of same has considerably improved. The quantities of manganese, salt and sulphuric acid consumed at the different works for the half-year were: Manganese, 473 long tons; salt, 441 tons; sulphuric acid, 1,464 tons. To prevent any possible loss of gold in the waste liquor running from the charcoal filters, daily samples are secured and assayed, supplementary to the usual tests performed by the works' testers, and as a check on the same."

The report of the manager says, concerning the new mundic works: "The erection of these works has proceeded very satisfactorily on the whole, and is now getting pretty close to completion. As the plant embodies several new features of very great importance, exceptional care and time has been devoted to it, particularly as very large quantities of this ore will have to be treated in the future, so large that it is the biggest problem in connection with future operations. The steam engine and all the crushing plant are in position, and the steam boilers are being bricked in, the furnaces nearly completed, and the chlorination plant in a very forward state. An exceptionally high stack had to be erected for this plant, as the sulphur gases from the new furnaces are particularly dense, and would otherwise be liable to interfere with the efficiency of the employees at their work. All the connections and arrangements have been made in order to provide for the duplication of this plant, so its construction can be commenced immediately it is decided to go on with it. As the very large bodies of mundic ore of various grades opened up in the mine are awaiting treatment, it will be necessary to duplicate this plant within the next few months, by which time the result from the portions being constructed at present will be sufficiently known to justify it and indicate where is the saving that might be effected by developing various details. At no very distant date it will be necessary to entirely alter the upper works and suit them to the treatment of sulphide ores, or else shut them down entirely and construct an entirely new plant. The latter course appears to me at present to be the most advisable, as it will be necessary to handle very much more ore than is put through, and as the class of ore to be contended with would be the low grade mundic, such rigid economy will be necessary that any alteration would need to be so radical that it will probably be better and cheaper to construct an entirely new plant."

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

WHEN EMPLOYEES WILL NOT BE HELD LIABLE FOR TRESPASS.—One owning a coal mine, adjoining another's mine, employed a son as bookkeeper and office man, and another son to look after the surface work in the field and around the shaft; but the underground work was wholly in charge of a pit boss. The court held that conditions were insufficient to establish the liability of the sons for coal taken beyond the line of their father's mine, it not being shown that they were bound to know at their peril that such coal was being taken.—*Sholl vs. Straesser* (78 Illinois Appellate Court Reports, 101), Appellate Court of Illinois.

DITCHES OVER ANOTHER'S LAND UNDER MONTANA MINING LAW.—A petition by a mine owner, under the laws of Montana (Division 5, Compiled Statutes, section 1497), for a right to construct a ditch over another's claim must allege that he attempted to come to an agreement regarding same with the owner thereof, and this is not shown by merely stating that there has been no agreement, and that petitioner offered to do a certain thing to allay such owner's apprehensions of damage to him in case such ditch was constructed.—*Glass vs. Basin Mining & Concentrating Company* (55 Pacific Reporter, 1047); Supreme Court of Montana.

LABOR LIENS IN MICHIGAN TAKE PRECEDENCE OVER PRIOR MORTGAGES.—Under the laws of Michigan (Howard's Annotated Statutes, section 8408), providing that laborers in mines shall have liens for wages due, which shall take precedence of all other debts, liens or mortgages, and that such liens may be enforced in the same manner, and under the same limitations and regulations, as are provided for the enforcement of other liens, a labor lien is superior to a mortgage lien, although the latter is prior in time.—*Atlantic Dynamite Company vs. Ropes Gold and Silver Company* (77 Northwestern Reporter, 938), Supreme Court of Michigan.

THE BUFFALO DOUBLE CRANK HAND BLOWER.

For temporarily ventilating tunnels and underground passages, where steam or electric power is not available, the blower shown in the engraving has found wide favor. It was designed especially for such work as dispelling smoke and fumes resulting from blast operations in mining drifts, etc. It has been used for this service for several years and is claimed to be the only practical hand blower made adequate for such services. This fan is of extra large capacity and operates with a minimum amount of power. The arrangement is such that both cranks may be operated at the same time, or separately, as desired. Among the many claims for this blower are the easy operation, caused by large bearing surfaces and evenly proportioned geared parts; power of blast, because of the large, powerful fan used on it. It has been improved from time to time by careful study, coupled with the experience of practical operation.

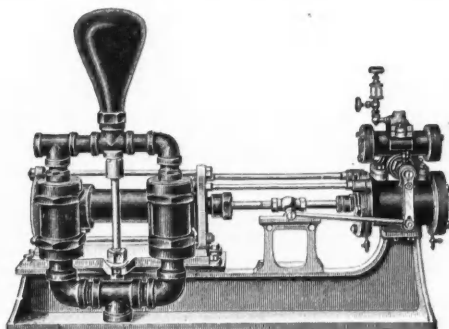
For special heavy blacksmithing or any situation requiring a strong blast, this blower, it is believed, also excels any hand-power machine yet produced. The steel frame and cast-iron base are so heavily constructed as to withstand any possible working strain. An illustration of the strength is shown by noting that the material of which this machine is made makes it possible to pass through a severe fire and have nothing injured but the belt and wood handles. The blowers are furnished with or without tuyere as may be ordered. The material and construction are excellent, as well as the design.

PORTABLE ASSAY BALANCES.

The accompanying illustrations show two very neat and convenient forms of portable assay balances made by Mr. Herman Kohlbush, of New York. The value of such balances is thoroughly appreciated by



BUFFALO HAND BLOWER.



RUBBER-LINED PUMP.

prospectors and by mining engineers who have occasion to make assays in the field and away from their offices.

The first form shown in Fig. 1 is an assay balance for traveling. This has a new attachment to keep the beam in place, which does not need to be removed when traveling, and which can be set in working order in 10 seconds. The balance has a rider attachment and aluminum hangings. The needle deviates 20 divisions for 1 milligram. All the bearings are of agate, and the workmanship is of the best quality. The balance is furnished with a set of platinum weights from 1 gram to 0.1 milligrams. Fig. 2 shows the outside case in which it is carried, furnished with handle and strap.

Fig. 3 shows a pocket assay balance for use when traveling or prospecting. When closed the outside dimensions are 6 in. long, 2 3/4 in. wide and 1 1/4 in. high. The balance is raised and lowered by a drop lever. The pointer shows four divisions for 1 milligram. The weights supplied are from 10 grams down to 1 milligram, and are neatly fitted in the box, as shown in the engraving.

A large number of these pocket balances are already in use. Where it is desired the makers supply a 1/2 assay-ton weight in place of the 10 gram weight, making it complete for a palp scale, or for assaying where 1/4 milligram is sufficient.

These balances seem to furnish very complete arrangements for assayers who have occasion to travel.

THE HARD RUBBER PUMP.

The accompanying illustration shows a pump of special design intended for use in chemical works and other places where it is necessary to pump acids, acid solutions and liquids of any kind which will corrode iron or other metals. In this pump, which is made by the Goodyear Hard Rubber Company, of New York, all the parts which come in contact with the liquid are made of the best quality of hard rubber. These parts are held by and mounted on iron parts, which take the strains incident to the head of water pumped against. The rubber serves as a lining and complete protection against corrosion or other action on the metal.

The pumps of this type are made in a variety of patterns. That shown in the engraving is provided with a steam cylinder; but they are made also to be operated by pulleys, by gearing, or by an electric motor. In each of the types the pump is mounted on a substantial iron bed-plate and is complete in itself, ready to be placed on timbers or other foundation.

These pumps were designed in the first place for chemical works; but, as will readily be seen, they find many applications in mines and mills. In copper and other mines where acid waters have to be pumped which corrode iron and steel in a short time, and in mills where acid and other solutions are handled, their utility is apparent, and they will find an acceptable place.

The Goodyear Company also manufactures pump valves, check valves, strainers, pipes, cocks, couplings and other fittings of hard rubber, to be used in connection with these pumps.

THE METRIC SYSTEM IN ENGINEERING WORK.

Our contemporary, "Bridges and Framed Structures," well says: "The metric system of weights and measures should be in use for bridge and structural work, more especially than in any other class of engineer work. The measurements for a steel structure are usually sent to a bridge company in feet and decimals of a foot, and all dimensions can be conveniently retained in that form in making the original design and the estimate, but when the detail drawings are made, they must be translated from decimals of a foot into inches and fractions of an inch, down to thirty-seconds and occasionally to sixty-fourths. The progress of the detailing requires frequent conversions of lengths into decimals for the purpose of making calculations, and the resulting dimensions must be converted back again. The spacing of rivets, for example, requires frequent additions, for checking up, of dimensions in feet, inches, half, quarter, eighth, sixteenth and thirty-second inches, which is accomplished with great mental weariness by the draftsman. He becomes used to it, as one can to some kind of severe sickness; even becomes expert at adding a great number of different fractions, but, aside from the severe labor, there is a needless amount of time so consumed.

"One of the first drawings to be made for any piece of work is the masonry plan, with dimensions in feet, inches and fractions of an inch.

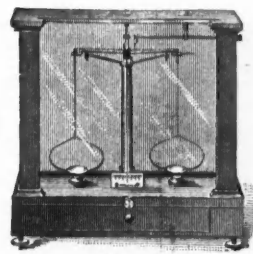


FIG. 1.

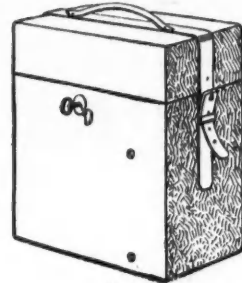


FIG. 2.

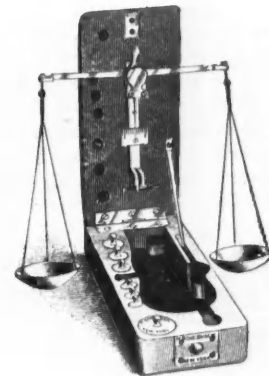


FIG. 3.

KOLBUSH'S PORTABLE ASSAY BALANCE.

This is sent out to be used in locating the foundations, and these figures must all be reduced back to the decimal form. Ridiculous, is it not? Is this to be one of the benefits of civilization which we are to inflict on our new colonial possessions, where to some extent the metric system has already been used?

"The increase in the foreign business of the structural steel mills has made it convenient, if not absolutely necessary, for one of the large mills to publish tables of shapes, round and square bars and plates, with the dimensions in millimeters, areas in square centimeters and weights in kilograms per meter. The values in feet, inches and pounds were readily reducible to these metric units without the use of more than two decimal places to give the accuracy desirable. This may be accepted as a beginning of a very much desired change. No matter what legislation may be enacted by Congress with reference to the compulsory use of the metric system, it is only the matter of a very short time until all tabular work will require conversion, and some steps should be immediately taken toward the systematic prosecution of it. A committee might be appointed by the American Society of Civil Engineers, to consist of members engaged in structural work, to co-operate with similar committees from the Association of Engineering Societies, and the Association of Railway Bridge and Building Superintendents, to promote the change under an agreement from the persons directly interested, to apportion the work among them so as to avoid duplication of labor, and, finally, to arrange for the publication of tables of common value in some way similar to that of the "German Engineers' Handbook."

"There is little trouble to be apprehended in having the persons who are directly interested come to an agreement respecting a change to the metric system, but there will be a chance for considerable missionary work with those indirectly interested, but whose co-operation must be had.

"The argument of most weight must be the great saving in time—and, consequently, in money—that will be effected when the dimensions from start to finish will be in decimal form for fractional values, to say nothing of the lessened chance for error and consequent loss. Let those who are vitally interested begin the movement at once."

SALT IN RUSSIA.—In addition to the celebrated salt mines in the Crimea, Russia possesses a salt deposit of great extent in the Bachmut district, in the Donetz basin, whence salt has been raised in constantly increasing amounts since 1881. The output in 1897 was 306,000 tons. The Russian salt industry practically dates from November, 1880, when the tax on salt was repealed. With the repeal of the tax the production was doubled, and the price fell in proportion.

QUESTIONS AND ANSWERS.

(Queries addressed to this department should relate to matters within the special province of this periodical, such as mining, metallurgy, chemistry, geology, mineralogy, machinery, supplies, etc. As it is manifestly impossible to devote space to all the questions and notes constantly received, preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot here undertake to give professional advice on problems requiring special investigation and which should be obtained from a consulting expert. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers should send their names and addresses. Anonymous questions will not be answered.—Editor E. & M. J.)

Phosphate Mining.—Where can I find any article relating to the mining of pebble phosphate rock either in South Carolina or Florida? I want a complete description.—E. N. S.

Answer.—The most complete description of the phosphate deposits both of South Carolina and Florida is given in Wyatt's "Phosphates of America," published by the Scientific Publishing Company. (Price \$4.)

Silicon-Copper.—Can you tell me if silicon-copper or copper silicide is made in the United States? If so, where?—M. S. S.

Answer.—Silicon-copper, as it is called by the makers, is used in certain special bronzes and in wire, having a very high tensile strength. It is made in the United States by two concerns, the Waldo Foundry Company, of Bridgeport, Conn., and the John A. Roebling's Sons Company, of Trenton, N. J.

Blanc Fix.—Can you give us some particulars about blanc fix; what it is used for and who are the consumers?—J. A. B.

Answer.—Blanc fix is prepared by adding sulphuric acid to a solution of barium chloride, or some other barium salt. It is a barium sulphate purer than the natural sulphate (barytes); it is amorphous and not crystalline, and when used as a pigment has a greater covering power than barytes. It is used as a pigment entirely, chiefly in mixture with zinc white or white lead. The consumers are the dealers in paints.

Barytes.—What is the average consumption of barytes in this country? Who are the large dealers in New York?—J. P. S.

Answer.—The production of barytes in the United States in 1898 was 28,247 short tons; the imports were 1,914 tons, giving a total approximate consumption of 30,161 tons. For 1897 the total was 28,448 tons, 2,018 tons being imported and 26,430 tons mined in this country. Among large dealers in New York are Gabriel & Schall, 205 Pearl Street; A. A. Robins, 180 South Street.

Saving Platinum.—Is there any established method of saving platinum from black sand?—B. N. O.

Answer.—Platinum workings are so limited that there can hardly be said to be any "established methods" of saving it, further than washing and concentration, which are generally sufficient, owing to the high specific gravity of the metal. Sluicing is used in the Oural placers in Russian and in Colombia, and has been tried in Oregon and British Columbia. In this connection you might consult "The Mineral Industry," Volume I, article on the "Platinum Group of Metals," especially pages 379-382. See also the "Engineering and Mining Journal," March 25th, 1899, page 350.

Joplin Zinc Region.—Where can I obtain some reliable information about the zinc ore region of Missouri and Kansas?—G. G.

Answer.—News from reliable correspondents in the zinc ore region of Missouri and Kansas is given in each number of the "Engineering and Mining Journal." If you want more detailed accounts of the region, we would advise you to consult "The Mineral Industry," especially Volume II. An account, descriptive and historical, is also given in "Lead and Zinc Mining Industry in Missouri and Kansas," by John R. Hollibaugh; published by the Scientific Publishing Company (price 50 cents).

Silica.—Can you give the names of parties who buy silica in large quantities in the rough state, that is unground?—J. M. S.

Answer.—Ordinary silica is too common a material to find buyers in the rough state, except for purely local purposes. To be sold at any distance from the quarry it must be of exceptional purity, and must be ground before shipment. Its selling price would be too low to pay for shipping it any considerable distance. Broken up to suitable size it is good material for road-making, if there is any demand in your neighborhood for such material. Otherwise it could not be shipped so as to obtain any considerable return.

Lepidolite.—Would there be any commercial use for lepidolite if it could be obtained cheaply in large quantities? Where are the principal deposits of lepidolite found?—J. A. C.

Answer.—Lepidolite is found in various localities in the Eastern States, especially in Maine. Recently deposits have been found in California. A large supply can be furnished from the deposits mentioned, as soon as required. The chief use of the mineral is as a source

of supply of lithia, which is now largely used in medicine. The California deposit mentioned is worked for this purpose. The demand for lithia is on the increase, but how much it can be extended by cheapening the supply is a question rather difficult to answer.

Calcspars.—I have a deposit of approximately 1,000,000 tons of calcspars with a little fluorspar mixed with it, say 1½ to 2 per cent. It can be delivered f. o. b. cars for \$1 to \$1.25, expenses of mining, etc., all told. At the low price named, has it any commercial value? If so, where it can be used?—H. V. G.

Answer.—We do not think that the material you describe has any commercial value. A small quantity might be used as a flux, if there are any furnaces using flux within a short distance, where a low freight rate can be had. No other use for it occurs to us.

Perhaps some of our readers may know of a use for the material, or can suggest one. If so, we shall be pleased to hear from them.

Zinc Reduction Works.—Can you give me the location of zinc reduction works and the buyers of zinc ores?—C. H. H.

Answer.—The zinc reduction works in the United States are divided into three groups. In the East there are the works of the New Jersey Zinc Company in New Jersey, the Bertha and the Wythe companies in Virginia. These companies all use ores from their own mines. In Illinois and Indiana there is another group, the principal companies being the Mattheson & Hegeler Zinc Company at La Salle, Ill.; the Illinois Zinc Company at Peru, Ill.; Humphrey, Chipman & Co., at Wenona, Ill.; the Swansea Vale Zinc Company at Sandoval, Ill.; the Ingalls Zinc Company at Ingalls, Ind. The third group of smelting works is found in Southwest Missouri and the adjoining district of Kansas. In this district, however, the supply of ores from local mines is so abundant that the smelters do not buy ores from other localities. The most probable buyers for your ores would be found among the Illinois smelters, provided freight rates could be secured on a reasonable basis.

COAL PRODUCTION IN PRUSSIA.—The output of coal in Prussia for the quarter ending March 31st was as follows in metric tons:

	1898.	1899.	Increase.
Coal	21,816,581	23,238,298	1,421,717
Brown coal (lignite)	6,311,138	6,671,563	360,425
Totals	28,127,719	29,909,861	1,782,142

At the close of the quarter this year there were 271 shafts where coal was produced, and 380 shafts or pits where brown coal was mined.

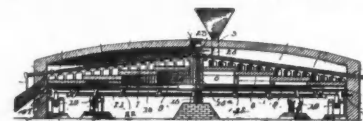
PATENTS RELATING TO MINING AND METALLURGY.

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 May 23d, 1899.

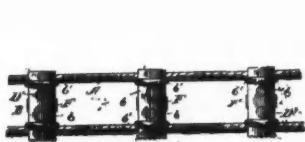
- 625,313. UNINFLAMMABLE NITROCELLULOSE PRODUCT. Lucien L. Bethisy, Paris, France. This unflammable cellulose product comprises a base of nitrocellulose with a binder, alcohol, essential oil, vaseline oil, acetic ether, zinc chloride and white gelatin, the matters being incorporated in about the proportions specified.
- 625,324, 625,325. VALVE FOR AIR-MOTORS. James Craig, Jr., New York, N. Y. Combination of the reducing valve, valve-stem operating the same, toggle mechanism controlled by the operator, and a member connected with the valve-stem and arranged to engage with the toggle mechanism whereby the reducing-valve is closed and held on its seat.
- 625,332. DEODORIZED COMPOUND OF MINERAL OILS AND PROCESS OF MAKING SAME. Ludwig O. Helmers, Hamburg, Germany. Assignor to Ichthyol Gesellschaft, Cordes, Hermann & Co., same place. The process consists in treating the aqueous solutions while kept cool, with an oxidizing agent and then concentrating the same by heating.
- 625,336. ORE ROASTING FURNACE.—John F. Kelper, Everett, Wash. An ore-roasting furnace having a rotary stepped hearth, means for depositing material upon, and receiving the same after the roasting operation from the hearth, and a feeding device for advancing



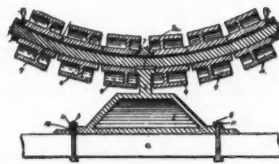
625,336.

the material upon the hearth from the point of deposit to the point of discharge, the means consisting of a series of blades, disposed diagonally with relation to a radial line of the hearth, and in operative relation with the several steps of the hearth surface, and a radial spindle, supporting a plurality of the blades, mounted for revolvable movement to provide for swinging the blades toward and from the surface of the hearth.

- 625,340. POWER TRANSMITTING BELT. Benjamin A. Legg, Columbus, O. Assignor to Joseph A. Jeffrey, same place. The belt consists of strands of wire rope having their ends rigidly fastened in a sprocket attachment or bar, whereby the belt becomes endless, bars arranged intermediate of the ends of the rope, and each having a portion above the rope and a similar portion integral therewith below the rope, and clamping or gripping devices movably supported in the cross-bars and adapted to hold the rope firmly between themselves and the body of the bars, whereby the frictional engagement between the rope and sprocket-bars can be controlled without varying the positions of the upper and lower parts of the bars.
- 625,342. ROLLER SUPPORT FOR BELT CONVEYORS. Martin Lynch, Stoneco, N. Y. The combination of an adjustable base, secured to the usual framework, a post forming part of the same, an upwardly-curved shaft securely fastened to the upper end of the



625,840.

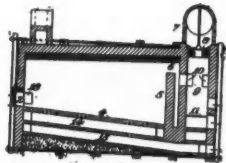


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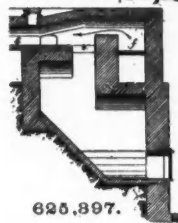
post, and rollers or pulleys, having the ends of their hubs beveled, mounted on the shaft.

625,365. **PROCESS OF MAKING EXPLOSIVES.** Ernest A. G. Street, Paris, France. The process consists in dissolving pitch or tar and an azo or nitro derivative in oil while the latter is heated, and adding a chlorate.

625,367. **METALLURGICAL FURNACE.** William Swindell, Pittsburg, Pa. Combinations of a heating-chamber, means for applying heat from gaseous fuel thereto, a system of tortuous waste-flues extending alternately forwardly and rearwardly in a substantially horizontal



625,367.

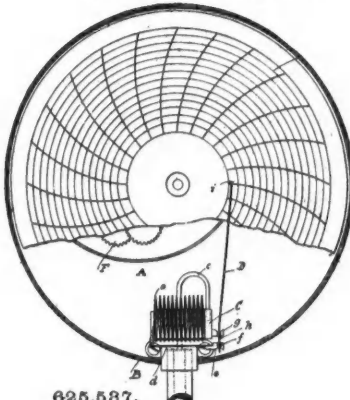


625,397.

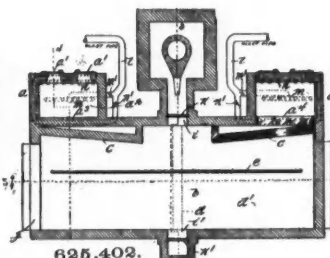
plane beneath the floor of the heating-chamber, and communicating at opposite ends so as to admit of the traverse in opposite directions of outgoing waste products of combustion beneath the floor of the heating-chamber, and a corresponding system of substantially horizontal air-admission flues underlying the waste-flues, and communicating at opposite ends so as to admit of the traverse, in opposite directions, of incoming air beneath the walls of the waste-flues.

625,397. **PROCESS OF CHLORINATING ORES.** William B. Jackson, Pueblo, Colo. The process consists in roasting the ore under a low heat, adding to the heated ore a chlorinating material consisting of a sulphide ore and salt, continuing the heat at a bright red, allowing the chlorination-fumes to attack the ore, and thereafter allowing the mixture to cool while in the chloridizing fumes.

625,402. **FURNACE.** David H. Lentz, Joliet, Ill. Assignor to the McKenna Steel Working Company, Milwaukee, Wis. The combination of a heating-chamber, a fire-box, a communicating flue connecting the fire-box and heating chamber, and a fire-bridge disposed before the flue, the bridge extending approximately to the top of the central portion of the flue-opening and sloping downwardly at either end



625,537.



625,402.

and adapted to direct the flame and heated gases upwardly and laterally within the heating-chamber, whereby an equal temperature is maintained in the different portions thereof.

625,424. **PUMPING APPARATUS FOR OIL-WELLS.** James Sheridan, Mars, Pa. The combination with a stirrup comprising two parallel members connected by a cross-bar, of a wearing-bar removably disposed between the parallel members of the stirrup and held in place thereby, the removable wearing-bar bearing against the cross-bar of the stirrup.

625,433. **PROCESS OF TREATING SULPHURETED ORES.** Michel Body, Brussels, Belgium. The process consists in converting the metallic sulphides in the ore or mineral into polysulphides by means of heat in the presence of carbon and of an alkali metal salt, washing out the polysulphides and treating the alkaline polysulphide solution without destroying its alkalinity, with a suitable precipitant to precipitate therefrom all of the metallic sulphides except those of arsenic, antimony and tellurium.

625,462. **ELECTRODE FOR DRY STORAGE BATTERIES.** Leonard Paget, New York, N. Y. Assignor to the Reliance Lamp Electric Company, of New Jersey. This electrode consists of a working plate and attached thereto in conductive connection therewith a vertical perforated electrically-conducting tube.

625,469. **HAMMER HAND-SLING.** Henry H. Schepers, Sandon, British Columbia, Canada. A hammer hand-sling for retaining a hammer and relieving the hand at intervals from grasping the handle while striking an upward blow, comprising a U-shaped clutch to fit the hammer-handle, a strap having the ends fastened to the clutch and forming a loop to receive the head of the hammer, a buckle connected to the clutch, and a strap passing through the buckle and forming a loop to fit on the wrist of the user.

625,489. **HOLDER FOR ELECTROPLATING.** William Y. Buck, Bristol, Conn. A bar of conductive material, perforated from top to bottom, at right angles with its longitudinal axis, by a number of holes, which are arranged from end to end of the bar at a convenient distance apart, and are alternately inclined in opposite directions from the vertical and from each other, in combination with a conductive handle, which is rigidly united with the bar, and is adapted to hold the same suspended in bath in a horizontal position.

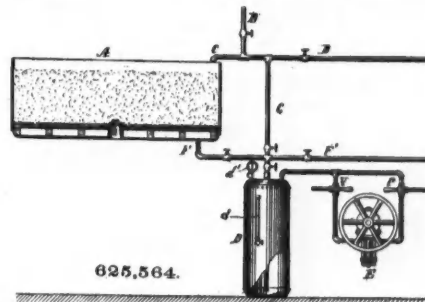
625,509. **ROOFING TILE OR SLATE FASTENING.** Mark A. Jackson, Philadelphia, Pa. A fastening device consisting of two metal strip members crossing each other beyond the middle of their lengths and pivoted together, the longer portions of which are provided with perforations for inserting bolts or rivets into a tile or slate

and the shorter portions provided with beveled bearing or engaging edges.

625,537. **MULTIPLYING DEVICE FOR RECORDING INSTRUMENTS.** William H. Bristol, Hoboken, N. J. Combination of two relatively-movable members each provided with a V-groove, the sides of the groove of one member diverging in a direction directly opposite to those of the groove of the other member and the meeting-line of the sides of one groove being parallel to that of the other and at right angles to the direction of the relative movement of the members, a thin plate provided with a recording or indicating arm rigidly secured thereto and having oppositely faced, parallel bearing edges formed therein and fitted to the V-grooves in the two members respectively and also lateral bearing edges touching the sides of the members at the extremities of the meeting-lines only, and means for moving one or both of the members, whereby the plate is turned by the relative movement of the members and the recording or indicating arm is correspondingly moved.

625,543. **CLAM-DREDGE.** Otis L. Davis, Vinton, Iowa. Combination with a boat provided with scraping and elevating mechanism, of a power-driven windlass arranged upon the fore part of the boat for advancing the dredge through the water to its work, a transversely-arranged cable, independent of the dredge and provided at its ends with suitable anchors, and a draft-cable having a trolley or running connection on the transverse cable to allow for lateral movement and adapted to be wound upon the power-driven windlass to propel the boat forward.

625,564, 625,565. **PROCESS OF TREATING GOLD OR SILVER ORES AND COMPOSITION OF MATTER FOR SAME PURPOSE.** Edward D. Kendall, New York, N. Y. Assignor to himself and Edward N. Dickerson, same place. The composition of matter to be used for



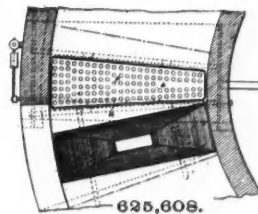
625,564.

the extraction of precious metals from ores, tailings or other bodies, consists of a suitable thiocyanate and hydrogen dioxide in watery solution.

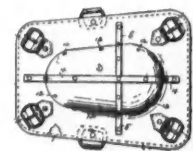
625,575. **APPARATUS FOR ROLLING METAL.** Michael J. Loughran, Pittsburg, Pa. The combination with a rotatory socket or holder having an angular cavity arranged to receive metal of angular cross-section, of mechanism for positively rotating the holder, a pair of platens arranged to act upon the projecting end portion of the metal held in the socket, and mechanism for moving at least one of the platens longitudinally past the other while operating upon the metal.

625,588. **APPARATUS FOR MANUFACTURING OIL OR WATER GAS.** James F. Moynihan, Stoneham, Mass. An upright gas-generator provided with an air-inlet and a gas-outlet and having a grate-surface upon which the fuel is supported, an upright retort located within the generator and extended above and below the grate-surface, an inlet for the retort, and a gas-outlet for the retort extended to the outside of the generator.

625,608. **COOLING ATTACHMENT FOR ORE-ROASTING FURNACES.** John E. Rothwell, Bulder, Colo. Assignor to the Stearns-Roger Manufacturing Company, Denver, Colo. The combination with an ore-roasting furnace, the flat hearth thereof and means to discharge the ore from such hearth, of the herein-described ore-cooling attachment, arranged at the discharge end of such hearth and with its entrance substantially level with the floor



625,608.



625,714.

of the hearth, and comprising the shell or casing containing a series of tubes which open at both ends outside of the shell and through which tubes the ore passes by gravity as it is fed thereto, and means to circulate the cooling agent, such as water, through such shell or casing and around the tubes.

625,656. **PRODUCT-FROM BLAST-FURNACE SLAG.** Alexander D. Elbers, Hoboken, N. J. Pulverulent desulphurized blast-furnace slag combined with and containing three-fourths of one per cent. and upward of sodium or potassium oxide in the fritted state.

625,682. **PROCESS OF MAKING EXPLOSIVES.** Frederick W. Jones, Barwick, England. The process for producing a gelatinized smokeless gunpowder of a nitro-cellulose base, which consists in granulating and subsequently swelling the resulting grains by acting on them with an aqueous solution of a nitro-cellulose solvent.

625,683. **ELECTRODE FOR SECONDARY BATTERIES.** Jules Julien, Brussels, Belgium. In a Plante accumulator, the combination of a negative electrode formed by the horizontal superposition of a series of thin finely grooved or corrugated rolled sheets of lead or lead alloys, having any suitable contours, the bands of lead surrounding the block of superposed plates and electrically connecting them together, such electrode being provided with a series of vertical channels or passages, and a positive electrode comprising a corresponding number of pencils or positive material connected in a group, the pencils being inserted respectively in the channels, with the object of reducing to a minimum the space occupied by the battery and the quantity of electrolyte in which it is immersed.

625,684. **EXPLOSIVE AND METHOD OF MAKING SAME.** John Karstals, Dartford, England. As a new article of manufacture, the compound for use in the manufacture of explosives consists of a crystalline body soluble in water, with a specific gravity of 1.8 and having the empirical formula CH₃N₃O₅.

625,714. **PROTECTIVE PAD FOR MULES USED IN COAL MINES, ETC.** Thomas V. Wallace, Monongahela City, Pa. Combination with the leather sheets cemented together and having their central portions bulged outwardly and formed with a series of perforations, and the buckles secured to the sheets at opposite sides, of the metal braces crossing each other at right angles on the outer side of the bulged portion and secured thereto and to the sheets.

PERSONAL.

Mr. Charles M. Henrotin, of Utah, is on a business trip to Chicago and New York.

Ex-Senator Frank J. Cannon has returned to Utah from a visit to Chicago and Denver.

Mr. Leonard Lewisohn, of Lewisohn Brothers, New York City, sailed for Europe on June 8th.

Mr. William Orr arrived in Salt Lake City on June 3d from a 3 weeks' sojourn in Idaho.

Mr. Werner Meyer, of Rheinische Stahlwerke, Meiderich, b. Ruhrort, Germany, is visiting this country.

Mr. Chas. B. Gibson, of Chicago, is inspecting gold and copper properties in Ontario and Upper Michigan.

Mr. R. H. Terhune has returned to Salt Lake City, after a week of professional work in Colorado.

Prof. James E. Talmage, the Utah geologist, is on the Atlantic, and will remain abroad for three months.

Mr. Spencer W. Clawson, of the Copper Queen, Bisbee, Ariz., has been devoting several days to Utah districts.

Mr. A. F. Holden, managing director of the United States Mining Company, was due in Salt Lake City this week.

Mr. J. C. Searight, of New Castle, Pa., is now superintendent of Thomas Furnace of the National Steel Company, at Niles, O.

Mr. T. B. Mellon, of Pittsburg, has succeeded the late Alfred E. Hunt as president of the Pittsburg Reduction Company, at New Kensington, Pa.

Mr. John Dern, president of the Mercur Company, Utah, passed this week at his old home in Nebraska. He is to return to Salt Lake City in a few days.

Mr. A. G. Smith, of Deadwood, S. Dak., has accepted a position in Central America with an English syndicate. He will erect a stamp mill near Bluefields.

Mr. F. H. Mason, a mining engineer, left Halifax, Nova Scotia, on May 27th to examine mineral lands along the coast of Labrador for an English company.

Mr. Geo. A. Baird, formerly of the Sharon Iron Company, Limited, at Sharon, Pa., is general sales agent of the Republic Iron and Steel Company, with headquarters in Chicago.

Mr. Willet G. Miller, professor of geology in the School of Mining, Kingston, Ont., has been spending the last few weeks in an examination of the deposits of the Sudbury nickel-copper belt.

Mr. E. A. Uehling, of the Uehling casting machine, of Pittsburg, Pa., has sailed for England, where he will be connected with the Uehling Company, Limited, of England, with headquarters at Middlesborough.

Mr. Robert A. Barrell has resigned his position as superintendent and resident engineer of the Galena Mining and Smelting Company at Galena, S. Dak., and is now assistant manager of the St. Louis Sampling and Testing Works at St. Louis, Mo.

Mr. C. I. Rader, formerly furnace manager for Pickands, Mather & Company, at Sharpsville and West Middlesex, Pa., has been appointed general manager of all the blast furnaces of the Republic Iron and Steel Company, with headquarters at Youngstown, O.

Mr. William Davies, assayer and mining engineer of Sierra City, Cal., passed through New York this week on his return from a visit to England. Mr. Davies is engaged in the investigation of some interesting problems in relation to the treatment of tailings.

Mr. E. E. Loomis, superintendent of the Susquehanna Railroad, has resigned to take charge as superintendent of the coal mining properties of the Delaware, Lackawanna & Western. He was formerly superintendent of the Blossburg Coal Company and the Toga division of the Erie.

Mr. M. Sakigawa, of the smelting department of the Ashio Copper Mine at Shimotsuke, Japan, wishes us to note that he is now attending to the reduction work at Ashio Copper Mine, having finished his course in the Mining and Metallurgical department of the Imperial University last year.

Mr. Walter Gaston, who for 11 years has been manager of the Hazard Manufacturing Company, of Wilkesbarre, Pa., will resign that position shortly, to become general manager of the Taylor Iron and Steel Company, of High Bridge, N. J. Mr. Gaston began his business career as a boy with this company.

OBITUARY.

Frank Thomson, president of the Pennsylvania Railroad Company, died of heart disease at his home in Marion, Pa., on June 5th. He was born in Chambersburg, Pa., 57 years ago, and his career is a striking commentary on the manner in which the Pennsylvania Railroad Company advances those of its employees who show merit. Mr. Thomson, at the age of 17, entered the company's shops at Altoona. Here he came under the notice of Thomas A. Scott, then general manager of the line, who at the breaking out of the Rebellion, was appointed an Assistant Secretary of War. Scott made young Thomson his chief aide in the field. In June, 1864, Mr. Thomson was appointed superintendent of the Eastern division of the Philadelphia & Erie Railroad, which post he held till 1873. Then he was made superintendent of motive power of the Pennsylvania Railroad at Altoona and the next year was appointed general manager of the entire Pennsylvania system east of Pittsburg and Erie. It was while he held this place that the "block signal system" was introduced. He was the author of many improvements, and brought about a general betterment of the organization and equipment of the Pennsylvania system. Mr. Thomson became second vice-president in 1882, and in 1888 its first vice-president. On February 3d, 1897, he was chosen to succeed George Brooke Roberts as president.

Thomas Fales Mason, president of the Quincy Mining Company, died at his home in New York City on June 1st. He was 84 years old. Born in 1815, in Swansea, Mass., the home of several branches of the Mason family, his early life was devoted to farming, the occupation of his father. His mother was Sarah Warren, a member of that well-known New England family. The work of the farm not being to his taste, at the age of 16 he left it, taught school for a time and then entered a grocery store. At 19 he formed a partnership with a friend and opened a clothing store in Woonsocket, R. I., where he achieved moderate success. His next move was westward, to Rochester, N. Y., where he opened a general dry goods business. In 1848 he became interested in mining, and with a party of friends went on a prospecting tour to upper Michigan. There Mr. Mason and two of his friends purchased a tract of land on which there were indications of copper. On this land they developed the Minnesota Mine, in Ontonagon County, one of the richest known at that time. Later, Mr. Mason bought and developed from a prospect the Quincy, which is still productive, with a record of \$10,470,000 in dividends. He was also interested in many other mining enterprises. At his death Mr. Mason was one of the oldest copper miners in the country. He leaves one son, Thomas Henry Mason, vice-president of the Quincy Company. Mr. Mason always had an active interest in the Quincy Company except for 3 years, when Horatio Bigelow was in charge.

SOCIETIES AND TECHNICAL SCHOOLS.

Engineers' Club of Cincinnati.—At the regular meeting on May 18th, 18 members and 11 visitors were present. Two new associate members were elected. A committee presented a memoir of Mr. Fred. C. Weir, who died April 1st, which was entered on the records of the club. The paper of the evening was read by Mr. John F. Earhart, on "Color."

Columbia University.—The summer school of mining, held each year under the auspices of the Department of Mining, will be attended this year by a class of 16 students. The 5 weeks' work will be carried on in the lead mines of eastern Missouri, about 60 miles south of St. Louis. The first 3 weeks will be spent at the mines of the Central Lead Company, near Flat River, St. Francois County. Visits will be made also to the Bonne Terre, Des Loge, and other properties of the district. The latter part of the time will be devoted to the smelting and concentrating plants of the mines. The summer school is in charge of Prof. Robert Peel and 2 assistants.

INDUSTRIAL NOTES.

The Urie Mining Machinery Company, of Kansas City, Mo., is shipping a complete gold dredging plant to Red Rock, Mont., to be used in the Stanley basin placers, in Idaho.

The Hussman Crucible Company, of St. Louis, has moved its offices to the Monadnock Building, Chicago. This company manufactures graphite crucibles and has a factory at Mascoutah, Ill.

The New Columbus Bridge Company, Columbus, O., through its New York office, is about to ship 6 steel railroad bridges valued at \$8,000 to the Bogota & Magdalena River Railway Company, Columbia.

C. A. Stickney, of St. Paul, Minn., has completed plans for a factory for making gasoline engines. The building will be of brick, 50x150 ft.

and 2 stories high. The gasoline engines are to be of a new pattern designed by Mr. Stickney. Work will begin September 1st.

The Jeanesville Iron Works Company, of Jeanesville, Pa., through its Denver branch, A. Middlebrook, manager, has shipped one of its high lift, solid end pattern station pumps to Leadville. The firm reports its trade at Denver increasing very rapidly.

The Wheeler & Wilson Manufacturing Company is making extensive improvements in its plant and has placed a contract with the Berlin Iron Bridge Company, of East Berlin, Conn., for a new foundry building and also for a building covering a portion of its present yard.

The Lidgerwood Manufacturing Company, New York City, manufacturer of improved hoisting engines and suspension cableways, states that it has recently established a branch at Atlanta, Ga., with offices in the Prudential Building. The branch will be in charge of Mr. J. H. Dickinson, sales agent.

The Weber Gas and Gasoline Engine Company, of Kansas City, Mo., states that for 15 years it has been making engines and hoists, and over 2,700 of its machines are in constant use. The company builds 4 to 150-H.P. engines, hoists and pumping plants for gasoline, gas, kerosene and crude oil.

At a recent meeting of the Tidewater Steel Company, which is to operate the Wellman Steel Works, at Chester, Pa., the following directors were elected: Geo. H. Stickney, Evans R. Dick, Chas. A. Porter, R. H. Rushtan, R. A. Williams, Jr., Isaac N. Solis, F. W. Wood, Geo. S. Graham and Geo. McCall.

The Union Steam Pump Company of Battle Creek, Mich., is making steam engines of peculiar shape that can run at very low speed, and are well adapted for mechanical stokers. The firm is about to send some of these engines to Europe. These motors are also used for handling link belt machinery.

The Denver Boiler and Sheet Iron Works Company, Denver, Colo., has completed its third 100-H. P. high-pressure boiler for the Denver Sewer Pipe and Clay Company, of Denver. The firm is also building a 60 x 18 boiler for the Greenback Mine at Leadville and two 80-H. P. boilers for the Ixex Mining Company, of Leadville.

The E. P. Allis Company, of Milwaukee, Wis., has the contract to build a blowing engine for the Sulin Iron and Steel Company, to be erected in the company's blast house at Sulin, on the River Don, Russia. The engine will weigh 350 tons and cost \$50,000. The company received orders recently for 4 engines each for Bristol and London, and 2 for Cork.

The 16 by 16 Buffalo Forge Company center-crank "A" engine running in oil, winner of the gold medal awarded for the best high speed engine at the Omaha Exposition, has been purchased by Messrs. B. O. Ellis Company, of New York City. The engine at 125 lbs. boiler pressure, making 250 revolutions per minute, is stated to give 279 H. P.

The Ludlow Valve Manufacturing Company has secured the contract for the large 24, 36 and 48-in. valves for the Stainer's Reservoir Works of London, Eng. These valves are made to order. The sizes are the opening of the valves, while the body of the valves are several feet higher. The company has orders on its books from Moscow and Odessa, Russia.

The Denver Engineering Works Company, Denver, Colo., recently took orders for a complete 50-ton concentrating mill for the Mountain Pride Mine at Breckenridge, Colo., together with boiler, engine, etc.; a 50-ton mill for the Ault-Wiborg Company at Frisco, both plants to use the Cammett concentrator; and a 300-ton Loder pyrite smelter for erection at Leadville. The firm has placed an order for \$15,000 worth of additional tools and machinery.

The Guggenheim Exploration Company has been incorporated at Trenton, N. J., with a capital of \$6,000,000. The incorporators are: Edward P. Matthewson, of Perth Amboy; I. Guggenheim and Morris Guggenheim, of New York. The company proposes to prospect, explore and deal in lands, mines and minerals. The Guggenheims, in addition to their Mexican mines, have large properties in Colorado, and it is understood that these are to be developed more extensively. It is stated that the Corralites Company, at Juarez, Mex., has sold to the Guggenheims its smelting plant, which will be closed down temporarily till the Guggenheims have perfected their plans for its operation.

The George V. Cresson Company, of Philadelphia, for which C. G. Buchanan is consulting engineer, states that it is very busy in all departments and is running overtime. It has received a large order from Europe for several hundred tons of shafting, with corresponding amount of hangers, bearings, couplings, etc., and in its crushing and concentrating department has a number of contracts for crushers, crushing rolls

and magnetic separators. The company has secured a contract for a large plant in Ontario, employing 15-in. Buchanan crushers and 3 sets of Buchanan 36-in by 22-in. steel crushing rolls, with screens, shaftings, elevators, etc., complete. Of the 36-in. by 22-in. rolls the firm has 7 sets ordered ahead.

The We Fu Go Company, of Cincinnati, O., states that it recently erected an enlarged water softening plant for the Weir Frog Company, Cincinnati, O., making the capacity 48,000 gals.; an enlargement for the McDougall Steam Laundry of Denison, Tex., capacity 14,400 gals.; enlargement for the Brenham Compress, Oil and Manufacturing Company, of Brenham, Tex., capacity 72,000 gals.; a water softening plant for the Beckett Paper Company, of Hamilton, O., capacity 33,600 gals.; for Westinghouse, Church, Kerr & Company, a water softening plant at the Galesburg Artificial Ice Company, Galesburg, Ill., capacity 28,800 gals.; for the Peerless Laundry, Carthage, Mo., a plant having capacity of 7,200 gals.; for the Temple Cold Storage and Ice Factory, of Temple, Tex., capacity 19,200 gals.

The Nordberg Manufacturing Company, Milwaukee, Wis., reports that it is running its shops day and night. A large cross-compound engine is under way for South Africa, and a cross-compound for the American Thread Company, at Holyoke, Mass. The firm also has under way an 8,000,000 gal. pump for Sheboygan, Wis., and an 8,000,000 gal. pump for St. Joseph, Mo., while a duplicate of the quadruple expansion pump at Wildwood, Pa., will go into the same station. A test of this pump conducted by Professor Carpenter of Cornell University showed a duty of approximately 163,000,000 ft.-lbs. of work per 1,000,000 B. T. U. A large cross-compound two-stage Nordberg air compressor was destroyed at the Bunker Hill & Sullivan Mines, Wardner, Idaho, and this is to be replaced as quickly as possible.

Pawling & Harnischfeger, of Milwaukee, Wis., state that since the first of the year the firm has sold over 100 traveling cranes, distributed to the United States, Russia, Austria, England and Hawaii. Among some of the larger orders recently received are: 7 electric traveling cranes for the Midvale Steel Company, Philadelphia; 2 for Fraser & Chalmers, Chicago; 2 for the Aetna-Standard Iron and Steel Company, Bridgeport, O.; 5 for the Lukens Iron and Steel Company, Coatesville, Pa.; 4 for the Bethlehem Iron Company, South Bethlehem, Pa.; 2 for the Gisholt Machine Company, Madison, Wis.; 4 for the Honolulu Iron Works, Honolulu, Hawaii; 2 for the Copper Queen Consolidated Mining Company, Bisbee, Ariz.; 2 for the Birmingham Foundry and Machine Company, Birmingham, Ala.; 10 for the Baltic Works of the Russian Government at St. Petersburg, Russia; 2 for Schuchardt & Schutte, Vienna, Austria; 2 for the Pennsylvania Steel Company, Steelton, Pa.; 5 electric hoists for the Carnegie Steel Company, Pittsburgh, and 8 electric traveling cranes, each equipped with auxiliary hoist, for Dick, Kerr & Company, London, Eng.

TRADE CATALOGUES.

"Hoists that Hoist" is the title of a little pamphlet published by the Weber Gas and Gasoline Engine Company, of Kansas City, Mo. It contains reproductions of letters received by the Weber Company from mining and smelting companies testifying to the strength and efficiency of Weber hoists.

Catalogue No. 228, published by the Westinghouse Electric and Manufacturing Company of Pittsburgh, Pa., describes the type "C" Tesla polyphase motors. These motors are built in sizes from 1 H.P. up with voltages of 100, 200 and 400. The construction and merits of this type of motor are set forth and prices are given.

Geo. B. Paxton, of Joplin, Mo., has compiled and published a little folder giving a schedule of zinc ore values in the Joplin District, based on the price of spelter at St. Louis. The schedule is for ores running from 50% to 65% zinc and a selling price for spelter of from 4c. to 7c. per lb. by advances of .05c. The folder is a handy thing for the pocket of any person interested in zinc mining at Joplin.

Steel ore and mine cars in great variety are described in an illustrated 48-page catalogue, No. 28, published by Kilbourne & Jacobs, of Columbus, O., who manufacture small cars of all kinds. The cars shown in the catalogue are for contractors, railways, mines, smelters, quarries and tramways. They are furnished in a variety of styles and are equipped, when desired, with the McCaskell wheels and axle. Complete specifications regarding capacity, size, weight, gauge of track, etc., are given and the catalogue, though unpretentious, is very complete.

Chilian roller quartz mills are described in catalogue No. 6, published by the Trent Engineering and Machine Company of Salt Lake, Utah. The catalogue set forth the special advantages of the Chilian mill, such as its simplicity, cheapness of erection, durability, small

power required and texture of product. The mills illustrated are made with either top or bottom drive, the top drive mills being from 2 to 8 ft. in diameter, requiring from 2 to 25 H. P. and having a capacity of 2 to 160 tons of gold ore through 24 or 30 mesh screens. The bottom drive mills are made in 3 sizes, 4 ft. to 6 ft. diameter.

The Stokesbury rotary stamp mills and the "Enterprise" concentrator are described in a neat little 16-page pamphlet that has been sent out by the Enterprise Machine Works, of Denver, Colo. The advantages claimed for the Stokesbury mill are that it is self-contained and can be quickly erected, will mill cheaper, has a larger screen surface and delivers a product better suited for amalgamation than stamp mills of the regular type. The "Enterprise" concentrator has a steel frame and table, with all wearing parts interchangeable, and is said to be very light and strong. The methods of adjustment are stated to permit of a very accurate grading of the ore, and the tables are recommended for low-grade propositions.

The Brown Hoisting and Conveying Machine Company of Cleveland, O., with offices in New York, Pittsburg and London, has issued a finely illustrated catalogue of cranes, containing 175 pages. The cranes are of various types. Locomotive cranes, electric traveling cranes, high speed balanced cantilever and gantry cranes (Brown's patent), hand traveling cranes, jib cranes (hand power, electric, steam, hydraulic or compressed air), stationary hand bridge cranes, pillar and wrecking cranes, hand truck cranes, overhead tramrail and trolleys and Weston's safety crabs and winches are shown. Names of prominent users include the United States Government and many American and foreign steel works and foundries. Brief specifications supplement the cuts and the merits of the various cranes and conveying devices are concisely set forth. The catalogue is well printed on heavy paper and is really a work of art.

The Buffalo Forge Company, of Buffalo, N. Y., publishes a cloth-bound book of 142 pages, finely illustrated, entitled, "American Schools of Mechanical Technology." The book contains some introductory remarks about down-draft forges and about the company's great plant at Buffalo. This takes but a few pages, the rest of the book consisting of a remarkably well-chosen series of views in or about the mechanical buildings of technical schools, colleges and universities. These views are noticeable for the happy manner in which the difficulties of photographing large rooms with numerous windows have been surmounted. The views of exteriors are also clean cut and in every way worthy of praise. The book ends with cuts of typical industrial establishments with Buffalo Forge Company equipment, some of the company's high-speed engines, Buffalo fans as applied to mechanical draft ventilating or pressure blowing and typical samples of Buffalo stationary forges and Buffalo blacksmith tools.

Catalogue No. 29, published by the Sullivan Machinery Company of Chicago, Ill., describes the Sullivan diamond drills for prospecting mines, quarries and mineral lands. The catalogue contains 104 large octavo pages, and sets forth at length with the aid of numerous cuts the construction and good points of the drills, backing up the statements by a long list of testimonials from many users. The drills are made in various sizes, the size "K" being capable of bringing up 1 1/2 in. cores from a depth of over 5,000 ft., while size "M," weighing 90 lbs., is stated to be capable of bringing up 1 5/16 in. cores from a depth of 300 ft. by hand power. Sizes "R" and "R S" are of compact design for underground prospecting, using electricity as motive power. The catalogue gives tables showing complete cost of outfits for the different sizes and gives full directions regarding prospecting and the use and care of drills, including the proper manner of setting the diamonds in the bits. The catalogue also describes the Sullivan rock drill, giving specifications and prices, and the prices of various supplies, also a description of the Sullivan channeller and the Sullivan coal mining machines. As the diamond drill is a recognized part of the outfit of mines all over the world, this catalogue will doubtless have a wide circulation. It is well illustrated and has a good index.

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.

ARIZONA.

Cochise County.

Commonwealth Gold Mining Company.—The Bonanza Mine of this company at Pearce is to be improved. Thirty stamps are to be added to the mill, as well as a larger engine, and the main shaft will be enlarged to 3 compartments. The ore body at the bottom of the shaft is reported both larger and richer than it is above.

Daly.—This group of 4 claims at Bisbee, which has been in litigation for some years, by a recent decree of the United States Supreme Court is declared to be the property of Martin Costello, of Tombstone. The group originally belonged to an Irish miner, James Daly, who was obliged to leave the country after murdering W. W. Lowther, once sheriff of Gila County.

Toughnut.—At this old silver mine near Tombstone investigation has shown there yet remain above water level many small bodies of rich silver ore and these, it is thought, will give employment to nearly 100 lessees for several years. The main workings of all Tombstone mines are deep in water, and there appears no disposition among the interested companies to combine for drainage.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Amador Queen.—At this mine, about 2 miles south of Jackson, sinking, drifting and cross-cutting progresses rapidly. The shaft is down over 1,150 ft.

Doyle.—This mine, 2 miles south of Jackson, is being pumped out. The shaft is to be continued down to the 500 ft. to reach the ledge at the hanging wall. Some of the assays run very high.

Valparaiso.—At this mine, 4 1/2 miles south of Jackson, 5 men are searching for rich pockets between the 2 veins which average about \$5 per ton. Only ore that will go \$25 and upwards is mined.

Zelle.—At this mine, in Jackson, new drifts are being run on the 1,080 and 1,300 ft. levels, but very little ore is being hoisted, consequently a portion of the stamps are idle. W. F. Dert is superintendent.

Calaveras County.

(From Our Special Correspondent.)

Utica.—A wheel weighing about 5 1/2 tons, cast in one solid piece by the Union Iron Works, of San Francisco, has been delivered at the mine at Angels to take the place of the one recently broken.

El Dorado County.

(From Our Special Correspondent.)

Darling.—This mine, near Georgetown, after being idle several years on account of litigation, is to be reopened by an English company. The double compartment shaft, down 190 ft., will be continued to the 500-ft. level. The mine was equipped with a 10-stamp mill and 2 concentrators. The ore yielded about \$6 free gold and carried cellulurides of gold and silver.

Mount Hope & Falstaff.—These mines, on the south bank of the North Fork, of the Consumes River, 3 miles north of Grizzly Flat, are to be reopened by the eastern owners after being idle for more than 10 years. The 10-stamp water power mill will be repaired and men put at development.

Kern County.

(From Our Special Correspondent.)

Butte.—This claim, 1 mile north of Ransburg, which has produced about \$140,000, is reported sold to the Little Butte Mining Company for \$50,000.

Nevada County.

(From Our Special Correspondent.)

German.—This old mine, on the South Yuba River, 3 1/2 miles east of Washington, comprising 2 quartz claims, 80 acres of placer ground and 160 acres of farm land, is to be opened up on a large scale under the management of M. D. Cooley, who has had charge of the property for several years.

Orleans Mining Company.—This Grass Valley Company has decided to resume operations under the superintendency of C. H. Brockington. The 5-stamp mill premises is busy on custom rock and 8 tributaries are taking out quartz.

South Yuba Water Company.—This company is to increase its storage capacity to enable it to supply all the water required during the driest season. Twenty men under Fred Whitten have begun building a new regulating reservoir at the lower end of Bear Valley. A large reservoir will also be constructed at Soda Springs, in Summit Valley. An earth dam 40 ft. high and 1,400 ft. long will be thrown across the south fork of the South Yuba River, making a lake having a capacity of 150,000 miners' inches.

Shasta County.

(From Our Special Correspondent.)

Alfred Onn Claims.—These 29 copper claims, about 7 1/2 miles northwest of Copley, above the

Balacalala Mines, are said to have been bonded by A. A. Wheeler, of San Francisco, for \$150,000 in consideration of \$2,000 cash and the agreement to expend \$11,250 in development work before July 1st, 1900.

Black Bear.—This property opened 8 years ago, before the smelter was built at Keswick, has been reopened and a 2-ft. ledge of \$20 ore uncovered which will yield a fair margin after hauling 7 miles to the smelter.

Black Spider.—This claim, near Keswick, is producing ore that averages \$15 a ton. The shaft is down 75 ft.

Eureka.—J. M. Basset is reopening this mine and taking out ore that assays from \$23 a ton upwards. J. F. Coleman, of New York, is developing a large group of copper claims near Kennet with good results. Lewisohn Brothers, of New York, are developing some copper claims about 4 miles from Kennet.

Mt. Shasta Mining Company.—This company employs about 80 men. It is sinking a 500-ft. shaft down about 300 ft. The ore is hauled 9 miles to the smelter.

Sierra County.

(From Our Special Correspondent.)

Comet.—This mine, in Jim Crow Canyon, is being prospected under the management of G. F. Taylor, for New York parties who hold the bond; 10 men are employed.

Siskiyou County.

(From Our Special Correspondent.)

White Star.—On this claim, 6 miles from Etna, in the Patterson Creek District, a ledge of low-grade ore carrying gold and silver, over 100 ft. wide has been uncovered. Kranshaar, Holzhauser & Fell are the owners.

Yreka Mining Company.—This company is operating the Blue Drift Gravel Mine, about 1½ miles south of Yreka. Water is obtained from Greenhorn Gulch and the Yreka Ditch. A shaft is down to bedrock. Work is carried on day and night under John Garvey, manager. The clean-ups are said to run from \$250 to \$600 per day.

Trinity County.

(From Our Special Correspondent.)

Copper Queen Mining Company.—This company is making arrangements to erect a smelter on its property. Besides smelting the ore from the Copper Queen, the company will do custom work for the miners in the district.

Wagner.—At this mine, on Coffee Creek, a stamp mill, an air compressor and machine drills are being put in. Development work is progressing rapidly.

Tuolumne County.

(From Our Special Correspondent.)

Drehsam.—An upraise is being made from the 230 ft. to connect with a shaft from the surface. The crosscut tunnel is in 415 ft. and 35 ft. more will probably reach the east vein.

Little Laurel.—A company has been organized with a capital of \$100,000 to work this property, 2½ miles from Summerville. There are 3 veins averaging 15 to 20 in. wide. Considerable development work was done on the property several years ago, the yield being about \$60,000.

COLORADO.

Gilpin County.

(From Our Special Correspondent.)

Stamp Mills.—The Petersen Mill, 15 slow-drop stamps, at Gilpin, has been leased by the Gold Dirt Mining Company and will be run on ore from the Gold Dirt Mine. The mill has been overhauled and remodelled. The Stanley Mill, 5 quick-drop, 850-lb. stamps, erected at Gilpin by the St. Louis Mining and Milling Company has been started up. It was built by McFarlane & Company, of Denver. A 7 by 10 Blake crusher is used and an improved automatic feed made by the Colorado Iron Works, of Denver. The mill is automatic throughout on the gravity system and will treat 15 tons every 24 hours. A Woodbury concentrator has been put in. The Perigo Mill equipped with 30 rapid-drop 800-lb. stamps, 90 times per minute, treats from 90 to 100 tons of ore every 24 hours. Double concentration is used, below the plates 2 Gilpin County gilt edge bumping tables being used, while below those Burtonshaw or Shine tables are used with success. The mill is equipped with its own electric plant and was erected by McFarlane & Company at a cost of nearly \$25,000. J. Powers is in charge.

Lake County—Leadville.

(From Our Special Correspondent.)

Ore Output.—The tonnage is over 2,000 tons per day, while the output for June will be in the neighborhood of 70,000 tons, the greatest tonnage in the history of this camp.

Eight-Hour Law.—A number of the leading Leadville mines have announced their intention of accepting the 8-hour law recently passed by the Legislature, if the smelters do not raise the price of treatment. Notices have been posted stating that workmen will be required to do 8 hours of straight work by tallying in the breast and will also be required to use their own time

for eating. The Penn, Ballard and several others start in to try this scheme on the 10th. The miners work 2 shifts; the first from 7.30 a. m. to 4.30 p. m., taking 1 hour for lunch on its own time; the second from 4.30. At the smelters notices were posted that the workmen would be paid by the hour after June 14th, but would be allowed to work 8, 10 or 12 hours. A number of men at the Bimetallic Smelter expressed their willingness to work 10 hours. At the downtown properties, where most of the miners receive \$2.50 per day, it is not announced what action will be taken.

The local manager of the Arkansas Valley Smelter, J. H. Weddle, and of the Bimetallic Smelter, Franklin Ballou, announced on June 3d that they have advanced wages 10%, but that from June 15th the men would work by the hour. The lowest wages paid are \$2 for 10 hours' work and from that up to \$3.50. With the increase the men can make from 22c. an hour up. If the men desire to work 8 hours they can, and if they want to work 10 hours the managers will stand by them.

Big Four Gold and Copper Mining Company.—The copper values in the shipments increase. The new officers are: J. H. Remick, Detroit, president; J. I. Case, Chicago, vice-president; J. W. Henney, Freeport, Ill., secretary; L. Z. Farwell, Freeport, treasurer. Mr. J. W. Walsh, of Leadville, is retained as manager. He is also manager of the Fanny Rawlings, which is shipping heavily through the Big Four workings.

Black Prince.—Lessee P. W. Breene is shipping through the Waldorf Shaft about 6 tons daily from the 300-ft. level. The mineral is in quartz and is from 4 to 5 ft. wide and 7 ft. high. It averages ½-oz. gold, 25% lead, 6 oz. silver and 15% iron excess.

Fanny Rawlings.—This Breese Hill property, worked through the Big Four under the management of J. F. Walsh, is doing well. From Oct. 1st, 1898 to May 1st, 1899, it is reported the mine produced 5,557 tons of ore, the gross return being \$209,100. The company received \$40,000 in royalties; \$120,000 went to the lessees for mining expenses and profit.

Ibex Mining Company.—From 300 to 350 tons daily are being handled, mostly from No. 2 and No. 3 shafts. A magnificent air compressor, the largest in the camp, has been put in.

Lake Park Ores.—While the Hahnwald Brothers, of the Hap Hazard Mine, and the lessees of the Nanticoke have encountered and shipped some very rich gold ore, later development work shows that there is a large tonnage obtainable of honey-combed quartz, with values averaging from \$4 to \$8 a ton, and a milling proposition looks most feasible for handling it.

Lathe Placer.—The Cady Mining Company, Thos. Owens, manager, which is working the Four Per cent and O. K. Claims of this ground, on Fryer Hill, in addition to mining from 40 to 50 tons of ore daily, is preparing to sink a new shaft to the lower contacts.

Mahala Mining Company.—Shipments continue at 100 tons daily from the sulphide body in the 230-ft. winze from the 900 ft.

Monte Christo.—At this claim, in Low Pass Canon, Granite Section, ore was caught in a cross-cut tunnel in 300 ft. The vein is 5 ft. wide; two of it shipping ore running \$100 gold to the ton; the other 3 ft. will have to be concentrated.

Revenue Mining and Leasing Company.—Boston people are at the head of this syndicate recently formed to work 140 acres between California and Iowa Gulches, including the Alhambra Placer of 30 acres, and a lease on the Oscar and the McGregor and Reconstruction lodes embracing 70 acres. The company will push development by a new shaft near the north line of the Oscar Placer, while another 500-ft. shaft will be sunk southwest of it. The work is on southwest bounds of the mineralized area and on the trend of some of the richest ore shoots in the district. The company has begun work in earnest. One new shaft has started on the Alhambra Placer and 2 others will be started before July 1st. R. B. Estey is in charge.

Starr.—The strike in this property of the Home Mining Company has opened into a body of ore 6 ft. wide. The entire run will average 50 ozs. silver and 25 per cent. lead.

Mineral County.

Last Chance.—The Nelson Tunnel, at Creede, which is now half completed, has tapped the water in the Last Chance workings and the mine will soon be dry and men getting out ore from stopes idle for 3 years.

Amethyst.—The lower levels of this mine at Creede are to be drained by a tunnel driven from the Last Chance. The work is expected to be completed within a month or so.

San Juan County.

(From Our Special Correspondent.)

Hidden Treasure.—The 900-ft. cross-cut discloses an extensive ore body.

Boston & Silverton.—Superintendent R. F. Ba-

ker of Boston is in Silverton to erect a 75-ton concentrating mill at the mouth of the company's tunnel, the machinery having been ordered from Chicago.

Crystal.—E. L. Roberts has given a bond and lease on the Crystal and Crogan Mines for \$30,000.

Empire Tunnel.—The lower tunnel at Silverton is now 1,000 ft. long and will cut the Little Dora vein within the next 100 ft. and the Hercules at 2,300 ft. The old cross-cut will tap the Hercules in 400 ft., 1,300 ft. from the mouth. Two shifts are working in each level with air drills.

Esmeralda.—A ½ interest in this property belonging to Mrs. J. Church of Durango, Colo., has been bought by J. B. Blizzard. Some needed improvements will be made and the mine worked on a larger scale.

Idaho No. 1 and 2.—A company of Eastern and local capitalists has taken a lease and bond upon these mines. Suitable machinery will be added to the old Reed mill in lower Silverton for treating the ores.

Silver Ledge.—This company has been reorganized and new buildings and machinery added. J. B. Warner is again superintendent. Both mill and mine are working.

Silverton & Gladstone Railroad.—Last fall incorporation papers were filed for a railroad between Lake City and Silverton. The road will be finished between Silverton and Gladstone, 9 miles, by July 15th. Cyrus W. King of Waterville, Me., one of the heavy stockholders in the Gold King Mine, with other capitalists, is backing the enterprise.

Sound Democrat.—Lessee J. T. Terry will add 15 stamps to the old Sunnyside mill and begin crushing the winter's product soon. About 600 ft. of tunnel work and 175 of shafting has been done to date. The vein is large and well filled with milling ore.

Sunnyside Mill and Mine.—A force of 51 men is employed at present. The new 160-ton mill at Eureka is completed and has made 2 satisfactory trial runs. With the completion of a new elevator regular work will begin with an increased force.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Colorado City & Manitou Prospecting and Mining Company.—This company has men drifting on its Iron King Group on Tenderfoot Hill to catch the rich shoot of the Hoosier. The company owns considerable property on Tenderfoot and Bull Hills, and in Grassy Gulch.

Colorado Electric Power Company.—The work of putting in electrical machinery goes on, and now there are over 60 electric hoists in the camp supplied with power by this company. So far the largest run by electricity is 30 h. p., but it is understood that one of 50 h. p. is to be installed. The stockholders are mostly Colorado Springs people. Mr. Conkle is in charge here.

Matoa Gold Mining Company.—It seems very probable that the Johnson lease on the Half Moon will soon be given up. It has been very profitable, and is estimated to have cleared the operators at least \$200,000. The shaft is about 600 ft. deep. It is understood that the company will work the property. The company is working the Gold Pass Claim on Globe Hill, which is equipped with an electric hoist.

Midway.—This company has added the Mosquito and Fern to its holdings on Bull and Ironclad Hills.

Moon-Anchor.—The big Snow pump recently purchased from the C. O. D. is running smoothly on the 6th level. It is about the largest in the district, and can raise 1,000 gals. per minute 800 ft. At present, however, it is only handling about 400 gals. 300 ft. The pump station is 44 by 70 ft. and very well timbered. The electric pump on 5th level is held as reserve. No ore is at present shipped, but development work is pushed. Edgar Rickard is in charge of the mine.

Pinnacle Gold Mining Company.—It is again reported, and on good authority, that the ore shoot has been struck on the second level on the Whipp and Glenn lease on the Lansing Claim. This property has been one of the sensations of the past 6 months, and is on the north slope of Bull Hill, near the station of Grassy.

IDAHO.

Idaho County.

Buffalo Hump District.—The payment on the large bond on the Big Buffalo group of 3 claims has been paid by Mr. S. Silverman, of Spokane. A shaft is down 50 ft., with a drift 58 ft. long from the bottom. It will be July 1st before the ground is clear of snow. A large number of prospectors are at Grangeville, waiting for the snow to go.

Owyhee County.

De Lamar Mining Company.—According to the April report of Manager Huntley, the mill at De Lamar treated 4,894 tons of ore in the month, assaying \$9.53 gold and 94c. silver. The tails assayed \$2.22 and 57c. silver. The product

amounted to \$36,940 and the expenses \$30,705, leaving a profit of \$6,235.

Shoshone County.

Mining Conditions.—There is little change in the attitude of the union miners, who sullenly remain opposed to the present attempt to restore law and order. The Bunker Hill & Sullivan Company is rushing work to replace its concentrating mill, having over 250 men at work. Miners from outside are coming in, attracted by the wages of \$3.50 a day for miners and \$3 for laborers underground offered by the companies. About 800 permits to work underground have been issued by the authorities, and if the operators remain firm it is likely that all the mines will be worked by men who have said they are opposed to the cruel and illegal acts of the leaders of the Miners' Union. The testimony taken by the coroner's jury has led to further arrests. Martial law is likely to prevail for some months.

Standard Mining Company.—This company at Wallace is rebuilding its flume that brings water to its mill from South Fork.

MAINE.

Hancock County.

Douglas Consolidated Mining Company.—This company, with \$1,000,000 capital, has been formed by the old copper mines at Bluehill, Daniel Dunn, of Bluehill, being the chief promoter. A large amount of money was sunk in development and the erection of a smelter some 20 years ago, but high prices for copper have led to the formation of this new company.

MICHIGAN.

Copper.

Calumet & Hecla.—No. 16 shaft has been started on the Osceola amygdaloid lode, near the mine hospital. The company has purchased lands of the Florida Mining Company, comprising 320 acres in the north half of section 25, adjoining the village of Larium; consideration \$100,000. While the property is on the mineral range, it is not known to have any mineral value.

Tamarack.—The big hoist at No. 5 shaft is about ready for business. There are 4 engines, with cylinders 44 by 84 in. The face of the drum is 25 ft. and it will hold 6,500 ft. of 1½-in. rope. The machinery is installed in a fine sandstone building.

Iron—Gogebic Range.

(From Our Special Correspondent.)

Davis.—At this mine the stripping is completed and shipments will soon begin.

MISSOURI.

(From Our Special Correspondent.)

Joplin Ore Market.—The week ending June 3d was excellent for mining operations and there was a large output, but the market was slightly weaker, with a drop of 50c. per ton on all low grade ores. There is a surplus of 1,200 to 1,500 tons of zinc ore in the district which will have a tendency to further weaken the market unless disposed of by the Missouri & Kansas Zinc Miners' Association, which has a large fund on hand derived from the assessment of 25c. per ton on all ore sold by members of the association. A. O. Ihseng is again in the market for ore for export and loaded 240 tons at Oronogo this week for shipment abroad. Should the surplus increase the association will no doubt make a heavy foreign shipment under the contract made by its agent a few weeks ago.

The ore from the Eagle Mine, at Belleville, sold at \$49.50 per ton; the Laura S., on the Get There, at Cartersville, sold 2 cars at \$48 per ton and Charles Hume and James Gladden, on the Eleventh Hour ground, at Cartersville, sold a car each at \$48. Outside of these sales the top price was \$47 per ton and Oronogo sold 17 cars at this figure; Joplin, 14; Belleville, 6; Alba, 2, and Hells Neck, 2 cars. Lead sold all the week at \$26 per 1,000. During the corresponding week last year jack sold at \$28.50 per ton and lead at \$22.25 per 1,000; the lead turn-in was greater by 221,040 lbs., the jack turn-in less by 3,502,120 lbs. and the value less by \$140,269. For the first 22 weeks of 1898 the lead sales were greater than this year by 4,199,820 lbs., the zinc sales less by 42,182,530 lbs. and the value less by \$2,347,655. Compared with the previous week the lead sales fell off \$8,200 lbs., but the zinc sales were greater by \$58,900 and the value greater by \$13,337. Following is the turn-in by camps:

	Zinc pounds.	Lead pounds.	Value.
Joplin	1,772,100	222,390	\$46,539
Webb City	439,210	58,390	10,474
Cartersville	1,425,830	172,510	36,210
Oronogo	1,456,200	2,200	29,781
Duenweg	290,680	94,300	8,265
Galena-Empire	2,783,930	300,000	65,567
Aurora	1,540,000	20,000	27,686
Stotts City	338,970	.....	7,881
Central City	506,070	8,370	11,478
Belleville	449,840	2,680	10,641
Hells Neck	74,510	41,500	2,830
Alba	89,700	.....	2,113
Wentworth	44,000	.....	880
Granby-Newton Co.	290,000	13,000	5,413
Total for week	11,501,040	915,810	\$265,958
Total 22 weeks	225,649,600	20,114,330	\$4,899,952

Mining Land Sales.—The Hayseed Mine and 165 acres of the W. M. Meely land northwest of Carthage was sold this week to Benj. Cook, Samuel Ward, Wm. B. Young, Chas. S. Young and Hawes Norris, of Boston, acting for the Massachusetts Lead and Zinc Company, for \$50,000. An option to purchase for \$10,000 has been given on the Red Lion Mine and lease of 7 lots on the Phoenix ground at Belleville. Adam Scott is the principal owner. H. S. Clark and others, of Lawrence, Kan., have purchased through Adam Scott, the Bald Hornet Mine and lease of 4 lots on the Three Friends lease at Belleville for \$20,000. The new owners will erect a 150-ton mill. A. B. Wilgus has sold the Harrison lease of 40 acres on the Pinkard land at Joplin and also the Lively & Allison lease of 20 acres on the Free Coinage lease at Midway, just north of Joplin. The price was not made public. The old Columbia Mine, in Leadville Hollow, formerly worked by Col. John R. Holmes, has been sold to S. E. H. Priddy, of Washington Court House, O., for \$3,400 and a new plant is being erected. Circuit Clerk F. B. Norton, purchased from Dr. McClurg an additional 40 acres a mile southeast of Joplin for \$4,000. Grant Ashcraft, of Webb City, has purchased 160 acres of land 3 miles north of Diamond, in Newton County, and is having it prospected with a steam drill. The Cripple Creek Mill and a 10-acre lease at Galena, owned by Myers, Fahlenbach & Weber, was sold last week to Smith & Andrus, of Kansas City, for \$15,000. The Arkansas City lease of 80 acres at Central City was sold last week to the Kansas City Mining and Milling Company for \$50,000. The deal was made by E. D. Nix, of Joplin. Three mines on the Kentucky lease at Aurora were sold this week for \$9,500. Colley & Company, of Boston, purchased the Get There lease at Cartersville this week of Col. Jas. O'Neill, paying \$150,000 for the property. The deal was made by J. W. Baker & Company. The Joplin and district agents for Colley & Company and J. W. Baker took charge on June 1st. The Get There is one of the most valuable leases in the district and with the biggest mine on the tract shut down while a new mill is building, has produced for months past at the rate of \$500,000 per year. Colley & Company have also purchased the Minor & Rogers land at Aurora of 80 acres and the Flournoy farm of 458 acres, ½ mile northeast for \$500,000. The land was purchased 10 years ago by Messrs. Minor & Rogers for \$8,000 and developed into one of the greatest producing properties in the entire district.

MONTANA.

Broadwater County.

Black Hawk.—In this mine at Radersburg, 3 ft. of Galena are exposed in the 180 ft. level.

Easterly.—At this Radersburg mine 5 men are working in an 18 in. seam of shipping ore.

Silver Bell.—The mill on this claim, under bond to the Kleinschmidts of Helena, is nearly completed.

Carbon County.

Carbon Coal Company.—This company, at Carbonado, has developed a 4 ft. seam of coal through a 3 compartment shaft over 900 ft. deep. Double deck cages are used. From the bottom of the shaft 4 entries have been run 600 ft. each. A series of 9 railroad tracks extends under the steel tippie and 8 cars can be loaded at the same time. The plant has a capacity of 2,400 tons every 24 hours and the present output of the mine is 15 carloads a day. The mine is worked by a day and a night shift and some 230 men are on the pay roll, with Mr. Dickson as superintendent and Jonathan Sewell as mechanic.

Rocky Fork Coal Company.—At this company's mines, at Red Lodge, a steel tippie is to be erected and a complete electric plant installed. The main No. 4 slope is down at an angle of 18° some 2,400 ft. A rock tunnel is being driven to cut 2 other seams of coal at a depth of 1,700 below the surface. The new electric plant will comprise six 125-H. P. boilers, one 325-H.P. engine, 1 multipolar dynamo, electric mining machines, an electric locomotive for haulage on the levels and a 60-H. P. electric motor for driving the large Deane pump. The company is putting in 2 large hoisting engines at the entrance to the new slope on the No. 2 vein, and a large ventilating fan. The engine and fan houses will be fireproof, as will the new boiler house. The steel tippie will be equipped with 2 shoots, Phillips dumps, elevators, conveyors and rotary screens. All the new buildings, including the mine sheds, are to be absolutely fireproof. A box car loader is to be added to the plant. It is expected that the new machinery will be in running order by July 1st. The plant will have a capacity of 3,000 tons of coal every 10 hours. The mines now produce an average of 1,200 tons daily and employ 450 men. The present manager is Dr. J. M. Fox. The New York officers of the company are C. A. Spofford, president; C. W. Wetmore, secretary, and G. Ulbricht, treasurer.

Cascade County.

Diamond R.—Work on this concentrator at Nelhart has begun. The building will be about 200 by 135 ft. and the actual elevation about 100 ft. The machinery will require about 600 H.P.,

which will be generated by Pelton wheels. The lowest floor will be traversed by a railroad spur, capable of admitting 6 or 7 cars at once to receive the concentrates without handling or hauling. The mill will be on the gravity system throughout.

Jefferson County.

Alta and Comet.—The Helena & Livingston Smelting & Reduction Company will, it is stated, reopen these mines at Corbin, idle since 1896. The shaft on the Alta will be sunk 600 ft. and that on the Comet 400 ft. The mines will be worked on a large scale, and special attention will be given to saving the values in the low grade ores.

Madison County.

Mayflower.—On this property an extension of the Madisonian, a ledge 3 ft. wide is reported cut in a winze, the ore assaying over \$30 gold. Frank Turner of Revenue, is the owner.

Park County.

Hidden Treasure.—E. H. Cowles, representing outside capital, is erecting a 10-stamp mill on this claim on Boulder River, 40 miles southeast of Livingston.

NEVADA.

Carson County.

Silver Peak.—At Hawthorne recently United States Marshal Emmet sold this property at auction. It was bid in for the holder of the mortgages, J. I. Blair, of Blairstown, N. J., for \$665,000, the amount of the mortgages and costs.

Lincoln County.

(From Our Special Correspondent.)

Capital.—These mines, about 70 miles north of the Needles and 6 miles from the Colorado River, owned by Monahan & Murphy, are producing some rich ore; 8½ tons recently shipped to the Selby Smelting and Lead Works returned about \$615 per ton as follows: Silver, 12 oz.; gold, 29.9 oz., and lead, 22½%.

Storey County—Comstock Lode.

Comstock Pumping Association.—On May 29th the water in the C. & C. shaft was 188 ft. below the 1,750-ft. level and 214 ft. below the Sutro tunnel drain boxes.

NEW HAMPSHIRE.

Grafton County.

Boston & Bristol Lead Mining Company.—This company, with 200,000 shares of \$5 each, has been organized in Boston to work the old lead mines on New Found Lake, near Bristol. The ore is galena.

NEW MEXICO.

Grant County.

Santa Rita.—J. P. Whitney, of Boston, recently sold his option on these mines, 16 miles from Silver City, to an Eastern corporation. The group embraces 46 patented and 33 unpatented claims. The price is reported as over \$1,200,000.

Beragaw Group.—W. A. Tennant of Santa Fe, has sold these claims at Hanover to C. W. White and H. Cummins of New York City, for a stated price of \$25,000. It is said a concentrator and smelter will be erected at once.

NEW YORK.

Franklin County.

Chateaugay Ore and Iron Company.—About 400 men are employed at the mines at Lyon Mountain. The daily output averages about 450 tons of ore, but the company finds it difficult to get men; at least 100 more are needed. At the Standish Forge 8 fires are running, 4 under each hammer, and burning over 2,000 cords of wood every 24 hours. More fires will start as soon as the kilns are rebuilt.

Livonia Salt and Mining Company.—The company's salt block at Livonia, in operation since 1893, has shut down indefinitely, and about 100 men are out of work. The salt was mined. Some of the men are going to the mine at Retsof, and others to Avery Island, La.

NORTH CAROLINA.

Cabarrus County.

(From Our Special Correspondent.)

Whitney Reduction Company.—This company has organized and bought the Mack Mackin Mine for \$12,000 from the late E. Manney of Gold Hill. The company propose to develop the mines and erect a complete reduction plant, making sulphuric acid as a by-product. George I. Whitney of Whitney & Stephenson, of Pittsburg, Pa., is President, Col. E. B. C. Hambley vice-president and general manager. The office of the company is Salisbury, N. C.

Guilford County.

(From Our Special Correspondent.)

Empire Steel and Iron Company.—The furnace at Greensboro is doing well. The ore comes from the mines in Moore County. It is a hematite ore of a good quality and runs over 50% iron. The production will be over 100 tons of pig iron per day.

Montgomery County.

(From Our Special Correspondent.)

Russell.—This mine is developing a large low-grade gold ore body that will have to be worked

in a systematic manner by milling, concentrating and chlorinating. The mine has a good record and is capable of producing many years yet.

Tebe Saunders.—This mine has been purchased by Providence, R. I., parties, and will resume work. Once \$23,000 was taken from 1 pocket.

Uwharrie Dredging Company.—This company is running its dredge on the Uwharrie River with what results is not known, as there has been no regular clean up.

Rowan County.

(From Our Special Correspondent.)

Union Gold and Copper.—This mine is shipping every week to the Orford Copper Company of New York City. It is reported that the last car load produced 11% copper and \$25 in gold and silver to the ton, and that it was selected ore. The mine is capitalized at \$3,000,000. F. Schmerber, for several years with the Ingersoll-Sargent Drill Company, is superintendent in charge. Walter G. Newman of New York City is President.

Stanly County.

(From Our Special Correspondent.)

Crawford.—This gold mine is being worked with a few hands. This property has in the past produced several ½ lb. and 1 lb. nuggets, together with one 10-lb., besides thousands of dollars in smaller gold.

North Carolina Power Company.—C. I. Young, representing J. G. White & Company, New York City, is at New London making plans and specifications for 3 dams and power plants on the Yadkin River.

Parker.—This gold mine at New London is down 120 ft. and a cross-cut shows up well in sulphurets. At the surface the vein is white quartz with nugget gold. This property has produced gold from the surface since 1830.

Thompson.—This mine is operating a 10-stamp mill on low grade gold ore. H. C. Berlin of the Berlin-Jones Paper Company, of New York City, is president.

OHIO.

Harrison County.

Scio Oil Field.—The boundaries of the Scio pool are now defined quite accurately. Holes put down outside the producing area are proving dusters of the dryest kind.

PENNSYLVANIA.

Anthracite Coal.

New York & Scranton Coal Company.—This company recently bought for \$140,000 the Blue Ridge Colliery, near Scranton. The Blue Ridge Company is composed of Dr. J. N. Rice, Stephen Rice, Nicholas Rice, F. H. Clemons, H. C. Reynolds, F. P. Christian, C. B. Penman, Chas. Sisk, A. J. Colborn, Dr. L. M. Gates, Dr. H. D. Gardner, Ezra Finn's Sons and M. D. Brown.

North American Coal Company.—The company's new washery at Luzerne, near Raub Coal Company's colliery, is the largest in the Wyoming Valley. The coal comes from the old Waddell culm bank. It is first flushed to elevators which convey it into another inclined chute and another set of elevators carry it to the top of the breaker. The coal then passes to Anthony patent shaking screens, one placed above the other. The coal passes off the screens to the Roberts patent slate pickers, invented by Allen H. Roberts, of Bernice. The machine is on the rotary angle bar system and handles the coal piece by piece. A machine 20 in. wide will handle 15 tons an hour. The picker consists of a series of rotary disks. Leading to the disks and in alignment with them is a series of corrugations which turns the thin, flat slates edgewise and guides them directly into an open space between the disks, kept open by a series of cleaners between each disk. Practically all the slate is removed. The Lehigh Valley jigs take out the heavy impurities and the coal passes to the pockets. The refuse is forced through a centrifugal pump 1,000 ft. through a 6-in. pipe to a bore hole into W. G. Payne & Company's mines, where it fills up abandoned workings. A. R. Anthony, of Wilkes-Barre, is president of the company.

Pennsylvania Coal Company.—The large washery near the No. 6 breaker at Inkerman was recently destroyed by fire. The plant was built last fall and had a capacity of 500 tons of coal daily. The loss was estimated at \$25,000.

The Schooley Colliery at Sturmerville has been temporarily abandoned on account of an extensive cave-under of about 20 acres of land, to await developments. A flood, supposed to be from the river, had kept an extra force of pumps busy for several weeks before work stopped.

Raub Coal Company.—This company recently bought the Mill Hollow Colliery in Luzerne Borough, which belonged to the late Thomas Waddell.

Slate.

(From Our Special Correspondent.)

Hower Slate Company.—This Danielsville company is shipping 100 cars for export in lots of 5 cars a day.

Imperial Slate Company.—A reorganization of the Wind Gap Imperial Slate Company, whose property was recently sold at forced sale, has been effected. It is to be bonded for \$50,000, \$25,000 of which is already subscribed. The Bangor & Portland Railway Company is a large subscriber. A resumption of operation is expected shortly.

New Diamond.—Sand, Kellow & Cann, who are opening this Pen Argyl quarry, put up a swing derrick and 80-H. P. engine and boiler this week. They are nearly ready to make slate.

Old Bangor Quarry.—Nothing but mill stock is being quarried. J. S. Moyer & Company, the lessees, are ready to work several ropes, but a labor boycott prevents the production of roofing slate.

William Lobb & Sons.—May production of roofing at this Pen Argyl quarry was 1,355 squares from 4 ropes.

SOUTH DAKOTA.

Custer County.

(From Our Special Correspondent.)

The Carr strike of free gold 9 miles southwest of Custer has been bonded by the Wabash Gold and Silver Mining Company, of Custer, for something over \$100,000 through John J. Sidey, vice-president and general manager of the company. The first payment was \$7,000. Active development work has begun. Every mine owner and prospector is now looking for quartz veins.

Lawrence County.

(From Our Special Correspondent.)

American Mining Company.—This company has the Dacy Shaft, in Ragged Top District, down 505 ft.

Black Hills Gold and Silver Extraction Company.—The company will start up its cyanide plant in Deadwood on ore from the company's Blacktail property and custom ore.

British-American Company.—J. M. Sweeney, of Detroit, Mich., has 6 men at work on the company's mining claims in Butcher Gulch, near the head of Strawberry Gulch.

Chicago & Two Bit.—This company, in Two Bit Gulch, has pulled its pumps and will close down indefinitely. The Two Bit boom of last year seems to have had a very small foundation, for none of the companies apparently found anything of value.

Colorado Company.—The company, which has a bond on about 100 acres of mining ground between Kirk and Lead, has put 30 men at work grading for a hoisting plant. The company's mining ground bonded is valued at about \$150,000.

Detroit & Deadwood.—The contract let to 3 Deadwood men to run a 700-ft. tunnel for \$8 a foot has been thrown up. Work has been resumed by day labor.

Galena Mining and Smelting Company.—H. H. Armstead, of Philadelphia, now has charge of the company's property at Galena. It is believed that work may begin on an extensive scale. A test run is to be made on a new strike of ore at the head of Strawberry Gulch.

Manchester.—P. N. Hanson, of Minneapolis, has resumed shipping ore from this group at the head of Squaw Creek.

Norwich.—The test run on ore from this mine, in Strawberry Gulch, in the stamp mill, at Galena, was satisfactory. The new lessees, C. M. Swan and B. H. Kingsbury, of Sioux City, Ia., are superintending work.

Ulster.—Messrs. Allen, Small and States, who have had a lease on this claim for some time, at Ragged Top, have thrown up the lease and will erect a cyanide plant of 25 tons capacity. The Spearfish cyanide plant, which is being enlarged at present to 50 tons capacity, is treating Ragged Top ore for about \$1.50 per ton, using water power.

Pennington County.

(From Our Special Correspondent.)

Bullion.—This old mine, north of the Keystone, and the Ingram custom stamp mill, have been taken on bond and lease by J. Barker, of Omaha.

Golden Slipper Mining Company.—This company has begun work again at the main shaft east of Hill City. Mark Dodge is local representative. The company is to sink the incline deeper. A number of test runs have been made in the J. R. Mill.

Holly Terror Consolidated Company.—P. M. Ranney is now general manager, with W. D. Parker, superintendent of the mills and mines.

TENNESSEE.

The annual report of the Commissioner of Labor for Tennessee for 1898, just issued, shows that the total number of coal mines in that State is 76, of which 15 were idle during the year. The mines produced 3,084,748 tons of coal. The maximum number of men employed during the year was 7,820. The amount of coal converted into coke was 736,280 tons. The production of other minerals was as follows: Iron ore, 597,777 tons; pig iron, 263,439 tons; copper ore, 89,721 tons; zinc ore, 454 tons; manganese,

1,250 tons; and phosphate, 272,191 tons. All minerals have shown increases over the previous year, those most marked being in coal and iron ore. The increase in coal was 203,754 tons, and in iron ore 69,013 tons. The phosphate industry, which is comparatively new, also showed a very large gain.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—In May the bullion and ore products sent East from the different smelteries and camps of the State were: 75 cars, or 3,080,800 lbs. lead-silver bullion; 13 cars, or 417,308 lbs. copper bullion; 156 cars, or 4,428,945 lbs. For the week ending Saturday, June 3d, the shipments Eastward were: 24 cars, or 998,285 lbs. lead-silver bullion; 3 cars, or 124,143 lbs. copper bullion; 44 cars, or 1,783,945 lbs. ore. Up to June 3d no copper from the Utah Consolidated smelter has been shipped.

Net Yield of Mines.—The law relative to net yield of mines has been changed to make the year end on first Monday in February, and all filings are made with the State Board of Equalization by May 1st, rather than with County Assessors. For 10 months ending February 6th, 1899, net earnings were reported aggregating \$1,669,806, which total is increased by the equalizing board to \$1,782,902, or \$460,000 above the prior schedule. Silver King leads with \$485,273; followed by Grand Central, \$384,089; Mercur, \$142,164; Mammoth, \$100,486; Swansea, \$89,669; Eureka Hill, \$87,616; Old Jordan & Galena, \$82,400; Humbug & Uncle Sam, \$80,000; Pleasant Valley, \$73,577; Bullion Beck & Champion, \$68,616, and the other contributors are each assessed on net earnings under \$50,000. De La Mar's Mercur Mines do not figure in the 1898 returns, owing to very large expenditures for improvements.

Portland Cement Company.—The current output is 4,200 bbls. a month, hardly enough to supply one-half of the orders. Manager Cairns says that the plant's capacity will be doubled, so soon as the machinery ordered can be installed.

Box Elder County.

(From Our Special Correspondent.)

Copper Mountain.—A strong north and south ledge in limestone, boldly outcropping on ridge for fully ½ mile, is being explored under Edgar G. Tuttle for the Salt Lake Copper Company, in which Lewisohn Brothers are chiefly interested. Near the surface are malachite, cuprite, native, and shipments were made by former owners. There is considerable marketable ore on hand. It is a straight copper proposition, with little or no gold or silver. Vein is being tested at 200 ft. depth. It is just east of the Nevada boundary, and the nearest rail point is Tecoma, 7½ miles distant.

Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week ending June 3d there were sent from the 3 railroad points of the district 81 cars of ore and 2 cars of concentrates, contributed as follows: Bullion Beck, 23 cars of ore; Humbug and Uncle Sam, 8 cars; Gemini, 7 cars; Swansea, 8 cars; Ajax, 6 cars; Centennial Eureka, 6 cars; Godiva, 5 cars; South Swansea, 5 cars; Northern Spy, 3 cars; Four Aces, 2 cars; Joe Bowers, 1 car; Dragon Iron, 8 cars hematite for flux. The Mammoth shipped 2 cars of concentrates.

Eagle & Blue Bell.—A car of first class rock is being loaded which is expected to return \$200 per ton. The 3 ft. ore shoot in level below the tunnel gives signs of widening.

Net Revenue Tax.—According to the State Board of Equalization the net yield of the mines, for purposes of taxation, for 10 months to February last, is placed at \$1,782,902, and of this amount the properties of Juab County afford \$880,257. Of the \$460,392 increase over the prior year Juab County is credited with \$394,631.

Sioux Mill.—Frank Peyton has contracted with the Bullion Beck for 6,000 tons of milling ore, and soon will put the Sioux mill in commission. Probably sufficient custom work can be had to keep the plant running through the season.

Piute County.

(From Our Special Correspondent.)

Annie Laurie.—In Senator Stewart's ground bodies of \$12 gold ore are exposed, which manager McLean says will give a milling profit. The rich seam in Annie Laurie vein holds well. Desert.—Fifteen men are at work. The vein is not cut. C. M. Henrotin is manager.

Holland.—The 700-ft. crosscut is finished, and another contract is to be let to extend it. Senator Cannon and W. F. Snyder are the moving spirits.

Mammoth Breckenridge.—Manager James Long, Jr., states a new tunnel to cut the ledges at greater depth is to be driven. He intends to install an air drill plant, the first in this part of the State.

Snyder Improvement Company.—The company has broken ground for a deep tunnel to cut the extension of the Annie Laurie ledge.

Salt Lake County.

(From Our Special Correspondent.)

Mackintosh Group.—Further concentrating tests of this copper porphyry are to be made, under the direction of H. A. Cohe, for which the Rogers' Mill is secured and 2 Wilfleys and a Vanner are being put in.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending June 3d the total smelter products sent forward through the Mackintosh sampler were 2,936,880 lbs., as follows: Silver King, crude, 994,540 lbs., concentrates, 358,850 lbs.; Anchor, concentrates, 305,410 lbs.; Daly West, crude, 320,160 lbs.; Cooney, concentrates, 57,920 lbs.

Daly West.—On May 29th the first ore was hauled to the Mackintosh sampler. Six teams now make 2 trips daily. Hereafter a steady output will be maintained.

Marsac Mill.—Ontario tailings are being handled by this Park City plant. The plan is to treat 100 tons daily.

Silver King.—The initial shipment of concentrates from the new mill was made June 2d. From all accounts everything is moving satisfactorily.

WASHINGTON.

Ferry County—Republic.

(From Our Special Correspondent.)

Anaconda.—The tunnel is in 260 ft. and has been running on the vein for 60 ft. At 140 ft. in the vein was 4½ ft. wide, with the quartz looking well, but low grade.

Adela.—On this claim south of the Gold Hur work is just started to find the extension of the Gold Hur veins.

Ben Hur.—The shaft is down 50 ft.

Bevis & Crozier.—This property, 7 miles southeast of Republic, shows a ledge of white quartz. The only assay yet had was 82c. in gold and 1½ oz. silver per ton. A tunnel in 60 ft., in 10 ft. further will strike the ledge at 45 ft. Another lead, about 300 ft. west, shows an 8 in. streak of quartz in a shaft 10 ft. deep, which assays \$5.17 in gold. The country rock is blue and gray porphyry, very similar to that of Republic.

Black Tail.—The northeast drift from the 40-ft. shaft is on quartz 42 in. wide. The average value is \$21 per ton, \$1.50 of which is in silver. A crosscut has started from the main tunnel, which is expected to intersect the main longitudinal vein and to strike the cross vein 125 ft. in at a vertical depth of 208 ft. below the top of the 40-ft. shaft.

Bodie.—Two shifts are employed and the shaft is down 152 ft. on the vein. The steam hoist is running smoothly.

Eclipse Group Mining Company.—The company has been prospecting its 6 claims south of the Golden Harvest all winter. The manager thinks there are 3 veins. A shaft is down on one 50 ft. A contract is to be let for 200 ft. on a tunnel to intersect finally the vein at 400 ft. in, and about 500 ft. deep.

Fresno Gold and Little Tom Thumb Mining Companies.—These companies each owning two claims adjoining one another, are to sink a combination shaft to develop both properties. The claims are ¾ mile northeast of the Tom Thumb. The shaft is down 10 ft. on a 3-ft. quartz vein that runs from \$2 to \$6 in gold.

Georgie Reed Group.—This property is bonded to Messrs. Graham, Garrett & Company of Spokane, Wash., who will incorporate it under Kentucky laws. It comprises the Georgie Reed and Bull Dog and Mobile and "S." claims on 2 separate veins, 12 miles south of the Republic Mine. The upper vein has been opened by a cross-cut tunnel and a drift. The lowest assay taken recently ran \$4.60 and the highest \$44.60 in gold. The property will be stocked on a basis of 1,500,000 shares of a par value of 10c. each.

Gold Hur.—This property consists of a full claim and a fraction 1,000 ft. long by 600 ft. wide on a hill, southeast of the Kate Hayward, an incline shaft has been sunk a few feet on a quartz vein 1 ft. to 5 ft. wide which contains iron and arsenical sulphides and assays from \$1.03 to \$1.65 per ton. From the east side of the hill a tunnel is in 20 ft.; the last 10 ft. of quartz shows free gold, assaying from \$7.44 to \$15.70 per ton. The veins are traceable 800 ft.

Gold Ledge.—The shaft is down 100 ft. in white quartz. The ventilation of the shaft has been improved by an air pipe. The vein will be cross-cut on the 100-ft. level.

Good Luck Consolidated.—The local manager reports the shaft down 100 ft. On the 50-ft. level a cross-cut shows values varying greatly. In the 100-ft. level a cross-cut in 18 ft. east, cut a quartz stringer assaying from \$119 to \$19 per ton. The company contemplate driving a 250-ft. tunnel to cut the vein at 175 ft.

Granite Point Group.—Two men are to open this property, about 4 miles west of Republic.

Herbie Moore & Good Will.—This property, about 2,000 ft. north of the Tom Thumb, shows a quartz vein traceable 1,200 ft. on the surface. A shaft down 26 ft. shows the vein 6 in. wide at

the top to 30 in. at the bottom. The assays run from \$4.34 to \$6.19 in gold. The vein is exposed about every 100 ft. by open cuts.

Iowa.—A shaft is down 16 ft. on a fissure, the filling of which is principally calcite. The management states that the calcite assays from a trace to \$2 or \$3 per ton in gold.

Jumbo.—A 6-ft. pit within 30 ft. of the Noble 3 Company's south boundary shows the vein from 4 to 5 ft. wide; 16 to 18 in. is quartz, assaying \$2.06 in gold. A tunnel at the south end of the claim shows quartz 5 ft. wide, with values about as at the north end. Work has been resumed in the main crosscut tunnel in 135 ft.

Last Chance.—This claim belongs to the Lone Pine Group and shows an outcrop of several hundred feet. Surface prospecting has exposed fine looking quartz, but this may be on a cross vein.

Lone Pine.—The main tunnel is in 110 ft. past the east vein, or 220 ft. in all. The ground is very hard with quartz stringers.

Looking Backward.—Surface prospecting is suspended, and work will be resumed in the shaft, now down 50 ft.

Lucky Choice Gold Mining Company.—At Gold Hill, 3 miles east of Republic, there has been considerable controversy over the stakes, boundaries and titles, and in order to settle the question, as far as this company is concerned, a patent has been applied for upon the Lucky Choice claim. This shows an immense north and south outcrop of blue quartz. A tunnel will crosscut the vein 150 ft. deep, from the west.

Morning Glory.—The president of the company says there are 3 veins developed in the tunnel, 2 of them producing very rich ore. Visitors are kept out of the tunnel, but the president says stockholders can get in whenever they want to.

Mountain Lion.—A steam hoist is in transit for the new vertical shaft.

Monarch Group.—This property is in Summit Camp, 12 miles west of Republic. Big quartz ledges are opened on the surface by pits and cuts. The veins are contacts between granite, limestone and porphyry, the highest values in the limestone and porphyry contact running \$86 in gold and \$2 in silver per ton. A tunnel is in 200 ft. to crosscut all of the veins.

Pearl.—A shaft is down 10 ft. No assays have been given out for publication.

Quilp.—The new crosscut on the tunnel level is in 24 ft. without reaching the hanging. The daily samples run from \$10 to \$20 per ton. Another crosscut has been started.

San Poil.—The north drift shows 5 ft. of ore, with ore on the foot wall side. The values run close to \$20 per ton.

Surprise.—The shaft at the south end of the ground is producing some very fine quartz, 5 days' sampling showing an average value of \$34.61, main gold. This vein is being thoroughly prospected along the cropping and if the values hold out in depth the Surprise will be one of the most valuable mines in the district. The sampling is very thorough.

Toronto Fraction.—A strike is reported on this claim, near the Mountain Lion, of quartz that has been traced by surface stripping 80 ft.

Zella Consolidated Mining Company.—The manager of this claim, at Sheridan, says the south drift on the 150-ft. level is in 55 ft. on a face of quartz 4 ft. wide. There is a very rich streak in the ledge, which varies considerably in width. Some specimens from this streak show chalcocopyrite, malachite and argentite.

Kittitas County.

Crystal Butte Gold Mining Company.—The trustees are L. R. Notbohm, L. Bertonneau, Henry Seiffert, R. A. Freese and W. H. Hosler, and the officers are as follows: President, J. D. Farrell; vice-president, R. W. Nuzum; secretary, Henry Seiffert, and manager, R. A. Freese. The Crystal Butte Group comprises 12 claims in the Myers' Creek District. Six carloads of machinery have been at Wenatchee, and Charles Thomas, manager for the Ohio Company, which is operating the mine under lease, is superintending the shipment of the machinery to the mine. The plant comprises a 10-stamp mill and concentrator and a sawmill.

Okanogan County.

(From Our Special Correspondent.)

Annie May.—This Mount Ellmeham claim has a remarkable surface showing of iron probably a cap, on which a shaft is now being sunk.

Bull Frog.—This property consisting of 41 claims, on the northwest slope of Palmer Mountain, has acquired the Wyandotte Mill and cyanide plant and starts work with ample capital under the management of Adelbert Harp.

Utica.—This Douglas Mountain property has 3 well defined veins in a porphyry dyke 90 to 120 ft. wide. On the center vein a 100-ft. shaft has been started. The surface showings run high in copper and gold.

Review.—On Myers Creek this claim, near Loomis, has a 200-ft. tunnel on a 6-ft. vein and several hundred tons of ore on the dump ready for treatment. The ore averages \$45 in gold.

Triune.—C. C. May, president of this Palmer Mountain property, near Loomis, says that Eastern parties have examined the property and negotiations are pending for the sale of a ½ interest. The company intends to enlarge the mill and deepen the shaft.

FOREIGN MINING NEWS.

AUSTRALASIA.

New South Wales.

Broken Hill Proprietary Company.—This company's statement for the four weeks ending May 25th shows 24,473 tons of ore worked. The production of the refinery was 562 oz. gold, 352,197 oz. silver, 2,925 tons lead and 44 tons hard (antimonial) lead.

Queensland.

The Mines Department reports for April a total production of 72,125 oz. gold, of which 70,471 oz. came from quartz mine workings, while only 1,654 oz. came from alluvial or placer workings. As compared with April, 1898, there was a decrease of 1,706 oz., or 2.3%.

CANADA.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Miners' Strike in Slocan.—The mine-owners in the Slocan recently issued an ultimatum that if the 8-hour law were enforced the prevailing wages of \$3.50 per day would be changed to 35c. an hour. The miners have struck, and all of the mines, with the exception of the Slocan Star and Whitewater, shut down. These two mines are under agreement to pay the higher wages until June 12th, when the Government will enforce the 8-hour rule throughout the Province. The members of the Miners' Union and Western Federation of Miners have been gathering in the Slocan. The union intends to stand firm at \$3.50 for 8 hours. The mine-owners are equally firm. As yet the utmost order prevails. It is believed that a strike will also take place in Nelson. In Rowland the miners are willing to work 8 hours without any reduction of wages, but it is not yet known what will be the fixed policy of the future.

Rossland Ore Shipments.—The shipments of ore from Rossland mines for the 5 months ending May 31st amounted to 50,000 tons, or nearly two-thirds of the entire output for 1898.

Slocan Ore Shipments.—The shipments of ore from the Slocan mines for the 5 months ending May 31st amounted to 15,000 tons, of which the Royal Consolidated contributed 5,000 tons, Last Chance 2,300, Idaho 1,300, Rambler 350, Whitewater 1,200, Slocan Star 200, the Wakefield 700, and Bosun 600. About 16 mines were producers.

Nelson Ore Shipments.—Those from Nelson Division for 5 months of the present year amounted to 4,000 tons.

City of Paris Gold Mining Company.—From 15 to 20 men are constantly employed on this company's claims near Central and a great deal of work has been done.

Evening Star.—The up-raise connecting the upper and lower tunnels of this Rossland property is not yet complete. The manager expects a fair showing of ore in the workings.

Gertrude.—The station at the 200 ft. level of this mine at Rossland is completed and work is now in the 65 ft. sump. According to Hugh C. Baker, superintendent, the electric hoist is working satisfactorily.

Iron Horse.—The north cross-cut at this Rossland mine is 230 ft. from the shaft, which is down 300 ft. The east cross-cut is 90 ft. from the shaft, but the ledge has not been reached.

Iron Mask.—According to a special report of Manager J. F. Herrick the ore exposed above the 350-ft. level is upwards of 600,000 tons and only about 10,000 tons of this is claimed by the Center Star. Power is supplied by a 12-drill electric compressor which is to be trebled immediately. The litigation has left the company in possession of the ore bodies it is developing.

Jumbo.—M. R. Galusha, manager, reports that the tunnel is in 245 ft., and that it will be extended 200 ft. further.

Jumbo.—The crosscut tunnel is now in 247 ft. It is to be driven 200 ft. further.

Mascot.—Tunnel No. 2 is in 685 ft. Tunnel No. 3 is in 680 ft. Three cross-cuts have been made to the south from this tunnel and in each the ledge has been cut. A force of 26 men is at work.

Velvet.—Crosscuts are being run from the 160 and 250 ft. levels of this Rossland mine. The ore body found on the 160 ft. is expected to be met on the 250 ft. The main tunnel is now in 260 ft. Reports recently published that the mine had been purchased by the parent company have been denied.

Victory-Triumph.—The ownership has been transferred to the Trail Creek Mining Company of London, England.

War Eagle.—The new hoist is not yet running. The pipes are being laid along the tram. The storage capacity is 300 tons at the siding, 600 tons on the hill at the head of the tramway and 100 ton in the gollows frame.

Whitewater.—The water has been pumped out of the shaft, which is to be sunk to the 300 ft. level.

Ontario—Sudbury District.

(From Our Special Correspondent.)

Nickel Mining.—There is more activity on the nickel range this spring than for 7 or 8 years. The Canadian Copper Company's mines are worked as usual. The McConnell properties in Denison, claimed to be among the largest in the district, are being opened under the direction of agents of Dr. Ludwig Mond, of London, Eng. It is said. The Worthington mine of the Blezard Company is to be pumped out. Work has been done on the properties of Mr. Clergue, of Sault Ste. Marie, in Creighton, and on properties belonging to other parties in Blezard as well as on the well-known Stobri-Tough properties in Levack. Some important finds of nickel are reported near the Vermilion River, where prospectors are in the field.

Bruce Mines.—These old mines west of Sudbury on which Dr. Hatch, of London, reported last autumn, have been sold and are kept pumped out evidently to be worked soon. A promising copper deposit is also being opened up north of Thessalon.

Lake Temagami District.—This adjoins the Sudbury District on the east and is attracting considerable attention on account of finds of gold and other metals there last year, some of which are being developed. A plant has been taken into the placer gold region.

Vermilion River.—Most of the gold occurs in a very fine state of division and bedrock lies some distance beneath the surface. As in many places the water of the river is above the upper surface of the bedrock, these placers are not poor men's deposits.

Yukon District.

Navigation on the Upper Yukon is reported open. It is also stated that a cut rate war among the transportation companies has resulted in a great drop in passenger rates from Lake Bennett to Dawson.

Reports of horrible distress and all manner of suffering continue to come from those prospectors straggling back to civilization over what was boomed by unscrupulous newspapers as "the overland route to the Klondike." A stretch of country along the Peace River, a succession of tamarack swamps and muskegs caused the greatest hardship.

MEXICO.

Coahuila.

Panuco Copper Company, Limited.—This company, with 500,000 shares of £1 each, has been formed in London to acquire the Panuco Copper Mine, including 138 acres of ground, 36 miles east of Monclova on the Mexican International Railroad. According to the prospectus of the company, the country rock is granite. The ore body, mostly chalcopryrite, is elliptical in shape. It has been opened to the 410 ft. level, though the main shaft is down 630 ft. The ore is said to average, with some gold and silver, 6% copper.

Michoacan.

(From Our Special Correspondent.)

Inguaran Mining Company.—C. Lafarge, general manager of the company, accompanied by J.L. Phillips' direction by 2 mining engineers from Paris and 1 from the Boleo Mines, in Lower California, has returned to Mexico City from a fortnight tour of inspection of this company's mines. Mr. Lafarge is now busy negotiating for concessions from the Mexican Government, but soon returns to Paris. The development of the Inguaran Mines is progressing rapidly and the work of erecting large smelter and refining plants will be vigorously pushed. The company will build a railroad from the mines to the Pacific coast and treat the Inguaran ores in connection with the Boleo Mines, owned by the Rothschilds, of Paris. The Inguaran Company has a capital of 3,500,000 fr. and its stock is owned in Paris.

SOUTH AMERICA.

British Guiana.

The gold produced in the month of April, on which royalty was paid, amounted to a total of 9,041 oz., which compares with 8,778 oz. in April of last year, showing a gain of 263 oz., or 3%, this year.

Bolivia.

(From Our Special Correspondent.)

Establishment Obrajes.—This plant, belonging to Mr. Mackenzie Penny and Ex-President Alonso, was burned down by the Indians of the revolutionary party. No foreign capital is interested. The plant was about 18 miles northeast of Oruro, the end of the Antofagasta Railway.

Challana River.—A thousand hectares have been asked for by Gerard Scott, on behalf of an

American syndicate. The location is about 100 miles north of La Paz, but there are no roads in that part of the country. There is gold in the river, but there are difficulties in getting it, and the Challana Indians will not allow any work done unless some 80 or 100 of them are shot. They recently shot the manager of a rubber establishment at Pauchinta and burned the houses there. An expedition of government troops was talked of, but has never been sent.

Kaka River Steam Navigation.—A concession was granted in 1898 to Messrs. Murphy and T. Chambers, Americans, in Lima, to run without guarantee a 20-ton steamer between Mapiri and Guanay, and a 50-ton steamer from Guanay to Rurenabaque on the Beni River. Although the scheme is good, there was little possibility of raising the necessary capital in the United States or England, and now, on account of the present revolution, there is less chance. The owners of the concession expect to carry it through with about \$120,000.

COAL TRADE REVIEW.

New York.

June 9.

Anthracite.

The weather has done its best to kill off any interest in next winter's coal supply, and the retail demand for anthracite has been light at all points except Boston, where low prices have continued to call out orders ahead of the regular season. The movement of coal up the lakes, though heavier, has not been up to expectations. The Lake freights have been firm, and a rate of 40c. from Cleveland to Duluth is reported. At Duluth and Superior the receipts last week were light. In Chicago territory prices have been held pretty close to circular figures. Inasmuch as stocks at upper lake ports were wiped out last winter, and the great activity in all lines of industry must mean higher wages and more money to spend, it is pretty plain that this winter consumption of anthracite coal in the West should be very large indeed.

At New York and Philadelphia conditions show little change. Independent operators have been offering coal at below schedule rates, and the differences between quotations and selling prices have not decreased perceptibly, though the large producers maintain a firm front on prices, except toward favored concerns. Still with June production held down to 3,000,000 tons and a consumption this—unless the weather proves unusually mild, that should be considerably in excess of last—winter, the outlook for producers is favorable enough. An advance of 25c. a ton on prepared sizes announced for July 1st will probably go through. Its effect on prices remains to be seen, but should be felt first in the West.

At present free mining white ash continues to be quoted f. o. b. New York at: Broken, \$3.25; egg, \$3.40; nut and stove, \$3.75. Broken and egg are of course dull, and nut continues in most demand.

Bituminous.

The demand for soft coal along the Atlantic seaboard continues brisk. Long Island Sound ports are calling for considerably less, but far Eastern ports are taking much more than they have been, and in some cases extending limitations indicating fears of a shortage. New York Harbor trade is fair, and all rail trade is holding up very well.

The only disturbing feature in the trade is the agitation for higher wages by miners in different fields. The recent advance announced in the Clearfield regions appears on investigation to be really less than announced, and the miners are not altogether satisfied. There are also possibilities of a strike in the Pocahontas District. The operators would doubtless be willing to advance wages if coal were to sell for more. It is stated that several meetings have been held by representatives of large operators in New York and Philadelphia recently to see if some joint agreement to advance prices could be made. The meetings, it is said, amounted to little, for the very good and satisfactory reason that this year's movement of coal is nearly covered by contracts, and higher prices on possible transient business would not make very much difference in receipts. The best grades of coal continue to be quoted at \$1.60@1.65 f. o. b. Philadelphia and Chesapeake Bay ports.

Birmingham, Ala.

June 5.

(From Our Special Correspondent.)

The coal trade in Alabama to-day is better than it ever was during the month of June. There are no mines whatever in the State running slack. The private mines are filling orders turned over to them by the larger producers. June 1st there was an advance in wages by the Sloss Iron and Steel Company and the Tennessee Coal, Iron and Railroad Company, and the miners now receive 50c. per ton for digging. It is not believed there will be any trouble experienced in settling on a contract this month, the meeting having been called for that purpose by President Young, of the Mine Workers' organization for June 19th.

Mr. W. E. Leake, president of the Alabama

Block Coal Company, which handles the Walker County coal, states that during the summer no less than 150,000 tons of coal will be sent down the river.

Chicago.

June 7.

(From Our Special Correspondent.)

Anthracite Coal.—The buying of anthracite coal is not very extensive, small orders being characteristic of the market. Buyers generally fight shy of placing business until something is determined as to prices. As yet the May circular rules and no change is expected for a few weeks yet. Until a change is made the buying of hard coal will continue to be small. There is, however, a deal of strength in the situation, the present circular prices on hard coal being well maintained. The receipts of anthracite coal are large, the shipments by Lake increasing the supply here every day. Quotations are \$4.75 for broken and \$5 for domestic sizes.

Bituminous coal continues to be bought freely, the manufacturing interests taking coal right along. There are large quantities of soft coal coming to the city, which is beginning to tell on the space of the tracks and yards; about every producing mine in Illinois and near-by States is sending in coal, but a stop will have to be made very soon or demurrage will eat up profits. Prices continue fairly firm, but with some sign of a lower range.

Pittsburg.

June 7.

(From Our Special Correspondent.)

Coal.—Combines are the order of the day. The Kanawha is the last; the scheme now under way is to consolidate all the interests in the Kanawha Valley, organize a company with a capitalization of \$6,000,000 and build a 50-mile railroad into the basin so as to connect with the Baltimore & Ohio Railroad. It is expected that the combine of the rail coal mine interests of the Pittsburg District will be practically completed about July 1st. Property appraisement results are expected to be in within a week or ten days. About 95% of the business in the district has been optioned. The constituent properties are to be taken in on a strictly cash basis. It is said no stipulations regarding the stock of the combine are being made in the transfers. Present holders will simply have the privilege of subscribing to the stock.

The miners of the Hicks Coal Company, on the West Penn Railroad, had their wages increased for the last half of May; the increase was voluntary.

At Uniontown, Pa., another big sale was closed on Friday, 3,500 acres of coal changing hands at a consideration of \$525,000. The property will soon be developed.

District Secretary William Dodds, of the coal miners' organization, announces that the thick and thin vein coal operators will be ready with facts and figures to present to the miners in regard to the river differential dispute at a conference to be held next Friday morning at the Monongahela House. The hope is still held forth that a definite settlement of this vexed dispute may be made. Local unions have sent in requests to the district officials to call a convention in Pittsburg on June 12th.

Connellsville Coke.—Coke production last week in this region showed a slight increase, while shipments dropped off a few cars. The detailed report shows 16,574 ovens active out of 18,653.

Isaac W. Semans and James R. Gray, of Uniontown, Pa., have purchased a large tract of coal from Hamphires Brothers and a part of the S. G. Britt farm and will commence the erection of 40 coke ovens on the tract at once. The coal was tested several weeks ago and showed a good analysis.

The active list was only increased by ovens because of the scarcity of cars, but will be largely increased this week if the car supply makes a better showing. The production of the region amounted to 172,768 tons, increase over previous week 286 tons. The shipments for the week were as follows: To Pittsburg, 3,207 cars; sent West, 4,685 cars; shipped East, 1,572 cars; total, 9,464 cars.

Shanghai, China.

May 1.

(Special Report of Wheelock & Co.)

Coal.—Japan is offering a little more freely; Cardiff is without inquiry, and Sydney Wollongong is very firm and higher prices are looked for. Arrivals of all kinds of coal during the fortnight amount to 25,228 tons. We quote, per ton, as follows: American anthracite, 15 taels, no stock; Welsh Cardiff, 17 taels; Australian Wollongong, steamer cargo, 13 taels, and other sorts, 6.50@7.75 taels; Japan, all contracted for; Chinese, lump, 7 taels; dust, 5.60 taels, and mixed, 5.60@6.50 taels.

Kerosene Oil.—In American very little business has been done at much lower rates, and we believe sales have been made at 1.61½ taels per case, but only in small quantities. Three arrivals brought 185,000 cases in all, making stocks 697,625 cases. In Russian Batum a few sales of Anchor Chop have been made at 1.52 taels per case; stocks are 263,000 cases. Sumatra Langkat, no market; stocks, 105,000 cases. We quote, per case, as follows: American Devoe's 1.62 taels; Russian Batum, Anchor Chop, 1.52

taels, and Star and Crescent Chop, 1.50 tael. For Russian bulk oil in two tins we quote 1.56 tael, and for Sumatra Langkat 1.50 tael.

SLATE TRADE REVIEW.

New York. June 9.

Trade continues to improve and prices are more stable. The shipments of roofing slate from Slatington, Pa., in May were 28,806 squares, an increase of 9,578 squares over April. For the first five months of this year these shipments aggregated 78,693 squares. The movement of blackboards in May also showed a large increase over the previous month, but school slates fell off about 20%. The shipments of roofing slate from Walnutport, Pa., in May amounted to 894 squares, an increase of 482 squares over April and 571 squares over March. For the five months this year these shipments amounted to 2,276 squares. Walnutport also moved a quantity of school slates in May and its shipments of blackboards were much larger than for any of the three preceding months.

Export business may expect a reaction unless the trouble existing in the building trades of Great Britain are soon settled. During last month several large shipments of roofing slate were made from New York to that country, and though the statistics for May are not yet compiled, we estimate the total movement from this port at over 12,000 squares, principally to London. The exports of all kinds of slate from the United States in April were valued at \$117,933, making a total for the four months of this year of \$434,676, showing an increase of \$25,544 over the corresponding period in 1898, and \$173,044 more than in 1897. Reports received from Great Britain give the shipments of all kinds of slates from Portmadoc for the quarter ending March 31st, 1899, at 26,872 long tons, and from Carnarvon there was exported in the same time 19,047 tons, against 20,087 tons in the corresponding period in 1898. A large quantity of this slate went to Hamburg, Germany. It is said that the exports in April were very heavy.

Freight rates from New York are as follows: To London, 12s. 6d. (\$3), or about 86c. per square roofing slate; Liverpool, 12s. 6d.; Manchester, Bristol, Leith and Glasgow, 15s. (\$3.60), or \$1 per square; Hamburg, 12s. 6d. prompt, and 15s. near future; Copenhagen, 16s. 3d. (\$3.90), or \$1.11 per square; Newcastle and Hull, 17s. 6d. (\$4.08), or \$1.17 per square; Denmark, Stettin, 17s. 6d., all with a 5% prime per ton weight. To Bremen the rate is 15s. net (\$3.60), or \$1 per square. To Sydney, New South Wales, 15s. net is asked for roofing slate in cases or in bulk.

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

Prices of Roofing Slate.

Size, inches	Monson or Br'n Vile	Bangor.	Bangor Ribbon.	Alb'n or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unf'd Green.
24 x 14...	6.10	3.40	3.00	3.50	3.50	4.85	2.65	3.50
24 x 12...	6.60	3.40	3.00	3.50	3.50	5.00	2.75	3.50
22 x 14...	6.10	3.40	3.00	3.50	3.50	5.00	2.60	3.50
22 x 12...	6.60	3.40	3.00	3.50	3.50	5.00	2.75	3.50
22 x 11...	6.50	3.60	3.25	3.50	3.75	5.00	2.75	3.75
20 x 14...	6.40	3.60	3.25	3.50	3.75	5.00	2.60	3.50
20 x 12...	6.90	3.60	3.25	3.50	3.75	5.00	2.75	3.75
20 x 11...	6.80	3.60	3.25	3.50	3.75	5.00	2.75	3.75
20 x 10...	6.80	4.25	3.25	3.50	3.80	5.10	2.90	4.00
18 x 12...	6.80	3.60	3.25	3.50	3.75	5.00	2.75	3.50
18 x 11...	7.00	3.60	3.25	3.50	3.75	5.00	2.75	3.75
18 x 10...	7.20	4.25	3.25	3.50	3.80	5.10	2.90	4.00
18 x 9...	7.10	4.25	3.25	3.50	3.80	5.10	2.75	4.00
16 x 12...	6.80	3.60	3.25	3.50	3.75	5.00	2.60	3.50
16 x 10...	7.10	4.00	3.25	3.50	3.80	5.10	2.60	4.00
16 x 9...	7.00	4.00	3.25	3.50	3.80	5.10	2.60	4.00
16 x 8...	7.20	4.25	3.25	3.50	3.80	5.10	2.60	4.00
14 x 10...	6.60	3.60	3.25	3.50	3.75	5.00	2.50	3.75
14 x 9...	6.50	3.60	3.25	3.50	3.40	4.85	2.50	3.75
14 x 8...	6.60	3.60	3.25	3.50	3.40	4.85	2.50	4.00
14 x 7...	6.40	3.60	3.25	3.50	3.40	4.85	2.40	4.00
12 x 10...	5.80	3.60	3.25	3.50	3.40	4.60	2.40	3.25
12 x 9...	5.60	3.60	3.25	3.50	3.40	4.60	2.40	3.25
12 x 8...	5.50	3.25	3.25	3.50	3.25	4.60	2.40	3.25
12 x 7...	5.00	3.25	3.25	3.50	3.25	4.60	2.40	3.25
12 x 6...	4.80	3.25	3.25	3.50	3.25	4.60	2.40	3.25

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, and Peach Bottom 25c. extra per square. Purple sizes run 24x12 and 14x7, and vary from \$3.75 to \$4 per square. Variegated purple, \$2.25 to \$2.90 per square, according to size. Intermediate red, 14x7 and larger, \$6; 12x7 and 12x8 in., \$5 per square, net. Intermediate sea green, \$2.15 to \$2.35 per square according to size.

CHEMICALS AND MINERALS

New York. June 9.

(For further current prices of chemicals, minerals and rare elements, see page 692.)

Heavy Chemicals.—For domestic goods much business has been booked for the near future and prices are firm, especially for the alkalies.

Bleaching powder is also in better request, but actual selling prices are a little lower. Chlorate of potash is also easier. The imports at New York this week included 113 bbls. and 122 casks bleaching powder and domestic receipts were 865 sacks, 300 kegs, 355 bbls. and 292 drums soda ash and 150 kegs, 5 bbls. and 59 casks potash. In April the imports into the United States were: Bleaching powder, 11,434,226 lbs. (7,679,755 lbs. in 1898); chlorate of potash, 33,600 lbs. (340,984 lbs. in 1898); caustic soda, 680,038 lbs. (1,739,047 lbs. in 1898); sal soda, 597,540 lbs. (537,600 lbs. in 1898); soda ash, 5,304,837 lbs. (8,171,746 lbs. in 1898). Foreign exports in the same month were: Chlorate of potash, 20,787 lbs. (3,123 lbs. in 1898); caustic soda, 86,710 lbs. (132,684 lbs. in 1898); soda ash, 47,320 lbs. (146,160 lbs. in 1898). There were in warehouses on April 30th: Bleaching powder, 185,600 lbs. (nothing in 1898); chlorate of potash, 18,354 lbs. (7,837 lbs. in 1898); caustic soda, 1,201,723 lbs. (1,404,750 lbs. in 1898); soda ash, 8,697 lbs. (90,198 lbs. in 1898).

Quotations are as below, per 100 lbs.

Articles.	Domestic.		Foreign,
	F.o.b. Works.	In New York	In New York.
Alkali, in bags.	62½@65c.	.....	75@80c.
Caustic Soda, high test	\$1.42½@1.45	.....	\$1.60@1.70
98% powd.	\$2.75@3.00	.....	60@62½c.
Sol Soda conc.	1.00@1.35	.....	1.60@1.65
Bicarb. Soda.	1.12½@1.25	.....	2.12½@2.25
" " extra.	3.25@3.50	.....	.....
Bleach. Pdr. Eng. prime.	.....	.....	1.42½@1.50
other br'nds.	.....	.....	1.25@1.35
Chl. Pot cryst.	.....	9.00@9.25	9.25@9.50
powd.	.....	9.25@9.50	9.50@10.00

Prices are generally for large quantities, and in many cases depend upon make, test and package.

Acids.—The warmer weather has increased the demand, especially for sulphuric acid. The contract deliveries of sulphuric acid last month are reported to have exceeded those for many months past. Blue vitriol is quiet and practically unchanged in value. In April the United States exported 5,756,046 lbs. copper sulphate, valued at \$4.39 per 100 lbs., as compared with 1,774,443 lbs. valued at \$3.12 in April, 1898. Exports of other acids were valued at \$17,536, against \$6,155 in April, 1898.

Quotations are in large lots delivered in New York on a vicinity, per 100 lbs. unless otherwise specified.

Acetic, com. No 8.	\$1.45	Nitric, 38°	\$3.75@3.80
Blue Vitriol, best.	5.25@5.30	Nitric, 40°	4.90@4.05
Chamber, 50° ton.	11.50@12.00	Nitric, 42°	4.62@4.63
Muriatic, 15°	1.10@1.15	Oxalic	6.25@6.50
Muriatic, 20°	1.20@1.25	Sulphuric, 66°	1.10@1.15
Muriatic, 22°	1.35@1.40	Sulphurous, 100%	.....
Nitric, 38°	3.50@3.55	SO ₂ anhydrous.	8.00@10.00

Brimstone.—An arrival of 1,000 tons is noted at this port. Spot best unmixed seconds are \$21.75 to \$22 per ton and shipments, \$20.50 to \$20.75, while thirds are \$2 less. The United States imported in April 18,908 tons brimstone, against 15,088 tons in the same month last year.

Fertilizing Chemicals.—Stocks of the leading animal ammoniates in hands of Western packers are limited, consequently prices are firm. Sulphate of ammonia is strong, but business is small. We understand during the past month Central and South America have imported quantities of sulphate of ammonia from Great Britain, while a comparatively small amount has come to the United States direct. Quotations are as below:

Articles.	F. o. b. Wks.	In N. Y.
Potash, muriate, 80@85% 100 lbs.	.....	\$1.78
" " 95% "	.....	1.81
" " sulphate, 93% "	.....	1.98½
" " 96% "	.....	2.10½
" d'ble m're salt, 48@53% 100 lbs.	.....	66c.
" " 30% "	.....	89c.
" " kainit, 12.4% long ton.	.....	8.70@8.95
" " sylvanit, per unit.	.....	37@38c.
Sulph. Am, gas (25%) 100 lbs.	.....	3.20
" " bone	.....	3.00
Blood, dried, h. gr. Chl per unit	\$1.85	.....
" " " N. Y., "	.....	1.85@1.90
Azotine	.....	1.85@1.95
Bone black, diss., 17@18% ton	.....	16.00@16.50
Fish scrap, acid	11.00	12.50
" " dried	19.50@20	21.50
Tankage, h. gr. Chicago	17@17.50	21.00
" " concentrated unit.	1.60@1.65	1.90@1.95
" " bone. "	.....	20.00@21.00
Bone, ground	.....	23.50@25.00

The quotations on potash are on the basis of foreign in voice weights, tares and analysis, in quantities of not less than 500 tons bulk salts or 50 tons concentrated salts.

Pyrites.—Demand continues good. The imports into the United States in April were 21,626 tons valued at \$2.68 per ton. The new use for pyrites mentioned last week should have read "for the manufacture of phosphate of ammonium," instead of "phosphide of sodium," as was inadvertently stated. Phosphate of ammonium is used in making fabrics unflammable. Spanish pyrites contain from 46% to 51% sulphur, the American from 42% to 44%, and Pilley's Island, N. F., about 50%.

Quotations on American are: Mineral City, Va., lump ores, \$3.25 per long ton (basis 42%), and

finer, \$3; Charlemont, Mass., lump, \$5, and fines, \$4.25 per long ton; Pilley's Island, lump, \$6.50, and fines, \$4.50 per long ton, delivered in New York. Spanish pyrites, 11@13c. per unit, according to percentage delivered ex-ship New York or other Atlantic coast ports.

Nitrate of Soda.—Spot market is firmer and some holders ask \$1.62½ per 100 lbs., but \$1.60 can be bought at. In future inquiries are limited, while quotations are \$1.57½ to \$1.60 per 100 lbs.

Salt peter.—The consumption of salt peter in May is reported at 3,268 bags, showing a falling off of 1,289 bags as compared with May, 1898. The total consumption for the first five months of the present year is 22,015 bags, a decrease of 12,654 bags, as compared with the corresponding period last year and 9,464 bags in 1897. Stock on hand June 1st, 1899, was 7,556 bags, against 3,298 bags last year. Cargoes expected amount to 13,264 bags, making an apparent visible supply of 20,820 bags, against 19,745 bags last year and 53,022 bags in 1897. Crude salt peter is quoted to-day at 3½@3¾c. per lb. and refined at 4@4¼c.

Phosphates.—New deposits are reported to have been discovered in Tennessee and in Florida older ones are being reopened, owing to a continued good demand. South Carolina is also increasing her shipments. From September 1st, 1898, to May 26th, Charleston shipped 82,186 tons, against 73,455 tons in the previous period. The shipments of Florida high-grade rock from Savannah in May amounted to 5,554 tons, against 8,545 tons in April; all foreign. In April and May the shipments from Punta Gorda, Fla., were 6,421 tons to domestic and 15,247 tons to foreign ports, a total of 21,668 tons, all by the Peace River Phosphate Mining Company. A charter is noted of a British steamer, 1,583 tons, from Fernandina to Ghent at 17s. 6d. Completed statistics show that the exports of phosphates from the United States in April were 91,138 tons, against 73,475 tons in March. We imported in April 8,955 tons of phosphates, as against 1,719 tons in the corresponding month last year. The latest quotations for American phosphates, c. i. f. United Kingdom or North Sea ports are as follows: Florida hard rock, 77@80%, 9½d. per unit, all positions (about \$15 per long ton); Florida land pebble, 68@73%, 7¼d. (\$11 per ton); Florida Peace River, 58@63%, 7¼d. (\$8.40 per ton); Tennessee, 78@80%, 7¼d. per unit, or about \$12.64 per long ton. South Carolina rock is about 6¼d. per unit, while Algerian, 58@63%, is held at 7d.

We quote: Florida high grade, 75@80% rock, \$9.50 to \$10 per long ton f. o. b. Fernandina. The freight rate to New York is about \$2 per ton. Florida land pebble, 68@73%, quoted at \$7 to \$7.50 per ton delivered in New York; South Carolina ground rock, \$6 per short ton, delivered in New York; sun dried, \$3 per 2,240 lbs. f. o. b. Ashley River; hot-air dried, \$3.25 f. o. b. same place, and \$3.45 f. o. b. Charleston, S. C. Tennessee phosphate rock, \$4 to \$4.50 f. o. b. mines for export, guaranteed 78% bone phosphate of lime and 3% to 4% iron and alumina, and \$3 to \$3.50 for domestic brown, and \$1.90 to \$2 f. o. b. for blue or Hickman County rock; ex-vessel, New York, \$9 to \$10 for high grade rock. Domestic Tennessee rock averages 75%, while for export it runs as high as 83% bone phosphate. The difference in the price of this phosphate and Florida high grade is owing to the higher percentage of iron and alumina in the Tennessee rock. Concentrated phosphates, 13@15% av. P₂O₅, 60@62½c. per unit at sellers' works. Acid phosphates, 60c. per unit at sellers' works in bulk.

Liverpool, May 31.

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

The market for heavy chemicals is very quiet, while at the same time a steady business is reported, and prices are firmly maintained.

Soda ash is in good demand for home consumption, and in fair export request at varying prices as to destination. We quote maximum range for tierces about as follows: Leblanc ash, 48%, £4 5s. @ £4 10s.; 58%, £4 10s. @ £4 15s.; per ton, net cash; ammonia ash, 48%, £4 @ £4 5s.; 58%, £4 5s. @ £4 10s. per ton, net cash. Bags are 5s. per ton under price for tierces. Soda crystals find a ready sale, and for barrels £2 17s. 6d. per ton, less 5%, is generally quoted, although lower figures taken for certain favored markets. Bags are 7s. per ton under price for barrels. Caustic soda is receiving a fair amount of attention from buyers, and holders are very firm in their ideas. Spot quotations are as follows: 60%, £6; 70%, £7; 74%, £7 10s.; 76%, £7 15s. per ton, net cash.

Bleaching powder keeps steady at about £4 17s. 6d. @ £5 per ton, net cash, for hardwood, but without any special activity.

Chlorate of potash is firm at 3½d. @ 3¾d. per lb. for crystals, and 3¼d. @ 3½d. per lb. for powdered, and rather more doing.

Bicarb. soda is selling at varying prices, according to market, ranging from £5 5s. @ £6 15s. per ton, less 2½%, for the finest quality in 1 cwt. kegs, with usual allowance for larger packages.

Sulphate of ammonia is still very scarce, and rather dearer again, at £13 @ £13 2s. 6d. per ton, less 2½%, for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is in moderate request at from

£8 5s. @ £8 10s. per ton, less 2½% for double bags f. o. b. here, as to quality and quantity.

IRON MARKET REVIEW.

NEW YORK, June 9, 1899.

Pig Iron Production and Furnaces in Blast

Fuel used	Week ending		From Jan., '98.		From Jan., '99.	
	June 10, 1898	June 9, 1899.	Tons.	Tons.	Tons.	Tons.
An' racite	26	17,690	37	32,450	423,816	649,399
Coke.....	144	202,223	190	215,900	4,775,896	4,785,345
Charcoal.	20	6,925	20	4,325	136,021	117,433
Totals..	190	226,750	217	251,275	5,335,733	5,553,377

The buying of new material for the second half of the year at advanced prices has now become so general that the higher standards must be accepted as ruling for some time to come. There have been large transactions in pig iron. Several blocks of Bessemer pig have been placed in Pittsburg at about the prices quoted last week. In Southern iron there have been some large sales of No. 2 foundry at \$13, while gray forge has brought \$12, both f. o. b. Alabama furnace. A large block of basic pig has been placed at \$13 at furnace.

Steel billets are in demand and sales have been made at \$31 and even \$32 Pittsburg. These prices are exceptional, however, representing a pressure for early deliveries. About \$30 is nearer the current quotation.

Finished material quotations are beginning to represent more nearly the advances in raw material. Advances in different kinds have been made this week, varying from \$3 to \$5 a ton, and further increases are talked of.

There continues to be many new contracts on the market, and people are beginning to think that there is no use in holding back for lower prices. All business, in fact, continues on a very large scale.

Birmingham, Ala. June 5th,

(From Our Special Correspondent.)

As was predicted, the pig iron market took on a spurt again the last of the week, and the quotations went up from 25 to 75c. on the ton. The price of No. 1 foundry has been advanced from \$12.50 to \$13; and for No. 2 soft also to \$13. The same day another 25c. was added, and the following day another 25c., the last figures given being \$13.50. The furnacemen will not corroborate the figures given out, but small buyers in the district show their bills. The shipments are as heavy as they can be, almost. The blowing in of two more furnaces in this district is looked for the near future. The Vanderbilt Furnace is nearing completion, and orders for at least 4,000 tons of iron have been placed on the books.

The following are the quotations given: No. 1 foundry, \$12.50@13.50; No. 2 foundry, \$12.50; No. 3 foundry, \$11.50; No. 4 foundry, \$11; Gray forge, \$10.50@10.75; No. 1 soft, \$13@13.25; No. 2 soft, \$13.

There is a good demand for charcoal iron, the price paid for it being something over \$3 a ton more than for coke iron. Mr. T. G. Rush, president of the Shelby Iron Company, whose furnaces near Columbiana, Ala., manufacture charcoal iron, has taken up his residence in Birmingham. That company declared an 8% dividend last year.

The Talladega furnace, which was built during the boom days 10 years ago, and which has been out of blast for a few years, will be sold this month. President Zimmerman, of the Cincinnati, Hamilton & Dayton Railroad, is said to be a bidder for the property. Already the plant is being investigated and estimates being made on its repair.

Scrap iron is active and scarce, being quoted at \$8@9.50 per ton.

Finished iron is still in demand. The rolling mills here are not running as full as they have been on account of a scarcity of men for the puddling department.

It is announced that a factory for the manufacture of steam radiators will be located at Ensley. It is further stated that a deal is on for the location of a factory for the manufacture of mineral wool also at Ensley.

Buffalo. June 6.

(Special Report of Rogers, Brown & Co.)

About the only change that can be noted in this vicinity is a further advance in some of the leading brands, caused by continued buying for forward delivery. The scarcity of foundry iron is causing more and more trouble. In some cases foundries have been compelled to close down and await the tardy delivery of their raw material, while a great many are running so "close to the wind" as to cause considerable uneasiness. Practically no immediate shipment iron can be purchased and the little that is offered for later delivery this year is quickly taken. We quote for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$17@17.50; No. 2 strong foundry coke iron, Lake Superior ore, \$16.50@17; Ohio strong softener, No. 1, \$17.75@18.25; Ohio strong softener, No. 2, \$17.25@17.75; Jackson County silvery, No.

1, \$20.50; Southern soft, No. 1, \$17.50; Southern soft, No. 2, \$17; Lake Superior charcoal, \$19@20; Coke malleable, \$17@17.50.

Chicago.

June 7.

(From Our Special Correspondent.)

Pig Iron.—The buying of both Northern and Southern pig iron continues heavy, sales being made all around for small and large quantities, most of it for future delivery, and at prices 50 or 75c. above last quotations. Freight rates on Southern iron have been advanced and are now \$3.65 instead of \$3.50 to Chicago. The demand is such that contracts are being made for deliveries as much as a year ahead, though many do not care to go so far, trusting that the developments of the next five or six months will make the situation somewhat easier. The quotations are: Lake Superior charcoal, \$18@20; local coke foundry No. 1, \$16.50@17; No. 2, \$16@16.50; No. 3, \$15.50@16; local Scotch foundry No. 1, \$17@17.50; No. 2, \$15.50@16; No. 3, \$15@15.50; Southern coke No. 1, \$16.50@16.75; No. 2, \$16@16.25; No. 3, \$15.50@15.75; Southern No. 1 soft, \$16.50@16.75; No. 2 soft, \$16@16.25; Southern silveries, \$16.50@16.75; Jackson County silveries, \$19@20; Ohio strong softeners, \$19@20; Alabama car wheel, \$18.50@19; malleable Bessemer, \$17.50@18; coke Bessemer, \$18@18.50.

Bar Iron.—The buying of bar iron continues brisk; wagon makers and implement manufacturers are the largest buyers at the present time. Quotations on common iron are 1.70@1.80c.; soft steel bars, 1.85@1.90c.

Structural Material.—There is not a great deal of new business in the market, but deliveries on former contracts are heavy, and inquiry would denote heavy buying soon. Universal plates have been advanced \$5 per ton. Prices are: Beams 15 in. and under, 1.35@1.45c.; 18 in. and above, 1.75@1.80c.; angles, 1.65@1.80c.; tees, 1.70@1.75c.; universal plates, 2.65c.

Cleveland, O.

June 7.

(From Our Special Correspondent.)

Agents for the iron ore companies are not ready to make further sales of ore worthy of note. The estimated production of the year is so nearly sold up that they will not offer more than small amounts of certain kinds or grades during the present month and may not even dare to offer the first of July. All will depend upon future developments. If in the future it is shown that more ore will be mined than is at present estimated they may have a few fair-sized lots to offer, but not otherwise.

Ores already sold are being shipped from upper to lower lake ports as rapidly as possible. There is now a good movement of vessels engaged in contracts and wild tonnage is being freely taken. Demands for vessels for single trip loads are so strong that charters are being made at advanced rates, 65c. per ton being the figure for cargoes from Escanaba and 70c. and 75c. from Marquette and the head of Lake Superior.

The quotations are as follows: Specular and magnetic ores, Bessemer quality, \$4@4.25; specular and magnetic ores, non-Bessemer, \$3.25@3.75; red hematite ores, Bessemer quality, \$3.75@4.25; red hematite ores, non-Bessemer quality, \$2.75@3.25.

Pig Iron.—The demand for pig iron continues very active. Much increased prices are being offered, but this is partly true because it cannot be had at any price. The question asked by those who wish to buy is therefore not the price as whether there is any on the market. There is especially a scarcity in foundry irons for which there is a marked advance in prices. The market for every kind and grade of iron is very firm and still more money than the present quotation is likely to be asked in the near future. The following are the present quotations for iron f. o. b. Cleveland: Lake Superior charcoal, \$20; Bessemer, \$18.15; No. 1 foundry, \$17.75; No. 2, \$17.25; No. 1 Ohio Scotch, \$17.25; No. 2, \$17; gray forge, \$15.

Philadelphia,

June 8.

(From Our Special Correspondent.)

Pig Iron.—In the absence of large dealings the only matter of particular interest is the degree of anxiety manifested on the part of a great many consumers as to the supply of iron for the closing months of the year. The course of Bessemer is taken to indicate further advances in foundry and forge. Consumers are trying to get at the probable effect of the increased output on the market during the last quarter, but no conclusions can be reached. There is a little more movement in low phosphorus. Standard mill iron is held at \$16; No. 1 X foundry, \$17@17.50. The absence of pig iron for summer delivery deprives the market of interest. Efforts are now under way to close two or three deals for Alabama irons.

Billets.—Large quantities are arriving here. New contracts are of rare occurrence. Consumers are low in stocks. Latest telegraphic information from mills unsettles quotations and places them somewhere around \$32@32.50 nominally.

Merchant Bars.—The bar demand in a retail way is excellent, and prices are maintained at 1.50@1.65c. respectively for common and refined.

Special steel bars sold as high as 2c. to-day. Further inquiries are here from car builders.

Skelp.—Skelp quotations, given to-day, in response to urgent inquiries from the West, reveal an advance amounting to \$2 per ton.

Nails.—Nails are active for city and country delivery, at the advance made last week.

Sheets.—There is seemingly as much unsatisfied demand as ever for all kinds of sheet iron.

Pipes and Tubes.—The combination has not created any change or new conditions, but the general opinion is that higher prices are sure to come from the market conditions.

Merchant Steel.—The merchant steel agents report a great deal of business as easily to be had when their principals say they are ready. Prices show a strong upward tendency.

Plate and Tank.—Prices can hardly be quoted because it is so difficult to place orders, and they have so much to do with conditions. Boiler plate is wanted by many small buyers, and they are unable to get supplied in many instances.

Structural Material.—Prices are firm at the advance made in New York last week, and a good deal of business is offered, particularly from bridge builders who are under contract to do work that admits of no delay.

Steel Rails.—Quotations range from \$25 to \$28, and there are further rumors of an early advance.

Old Rails.—There is a great demand for old rails at the last advance to \$19@19.50. Large deals are likely to go through.

Scrap.—The observatory on Lemon Hill, in Fairmount Park, which cost \$50,000, was knocked down at auction on Tuesday for \$1,025 for scrap iron.

Pittsburg.

June 7.

(From Our Special Correspondent.)

Prices of iron and steel continue to advance; in fact, there is no fixed price for any of the leading products. Scarcity all along the line is the rule, not the exception. June 10th, 1898, ferro-manganese sold in this city \$49@49.50 delivered; to-day we note sales \$95.80; prices nearly doubled and the end is not yet. Some descriptions of finished material show an advance of \$5 a ton; how long this condition of affairs will continue is uncertain. The end will come, but when is the question that cannot be answered. At present all business departments have a rosy outlook. Many predictions have been made that Bessemer will soon reach \$20 a ton. Steel billets have exceeded \$30 a ton; one year ago that amount would purchase two tons in this market. The past month will go into history on account of the remarkable advance of 1899 in the iron trade. Reports estimate the market stronger than at any time since the upward movement commenced. Chicago has made purchases of pig iron extending until July next year. The demand is simply overwhelming, and buyers hardly know which way to turn to get their requirements covered. Bidding up prices does not help them much, because it is not a question of price, but of supply. Everything that can be produced appears to be sold in advance, and almost everything that can be produced during the remainder of the year is either taken or would be taken if sellers were disposed to make contracts of that kind. Under present conditions, however, there is a marked conservatism on both sides, so that new engagements are mostly for 60 or 90 days' deliveries; beyond that sellers are unwilling to name any price that would be acceptable to buyers.

Finished Material.—The demand is as unsatisfiable as ever, and a large amount of business has been declined from sheer inability to meet the requirements as to deliveries. Prices in most cases have been further advanced, and as much as \$5 advance has been bid to secure June and July deliveries.

Steel Rails.—We note a continued good demand for rails. Standard are still quoted at \$25. The Carnegie Company continues to make large shipments when the water will permit.

Muck Bar.—Prices are firm and advancing; supply light.

Wrought Tubes and Pipe.—Companies of the country have been consolidated and represent 90% of the producing capacity. There are seven plants independent, including A. M. Byers & Company and Spang, Chalfant & Company, of this city. Prices very firm and orders abandoned.

Wire Nails.—Market remains firm without any further advance, although one may be announced at any time.

Sheet bars are very firm with further sales \$30.50@30.65.

Scrap Material and Old Rails.—Market firm, with a good inquiry; iron rails the highest for years.

Latest.—The market may be said to be waiting to see what the balance of the week will do; the scarcity of raw material makes transactions restricted; there is no falling off either in demand or prices. In fact, a further advance

is hinted at and may take place at any time. In July production of raw iron will no doubt increase, as several furnaces are making arrangements to resume operations in that month.

COKE SMELTED LAKE AND NATIVE ORE. SHEET BARS. Tons. Cash. 5,000 S. to J. P. \$30.50

BLOOMS, BILLETS, SLABS. 10,000 Billets, J. to O. P. 29.25

New York June 9.

The iron market continues very firm in tone, both buyers and sellers feeling that there will be no decline in the present level for 6 months yet.

Pig Iron.—Prices for pig continue nominal; they are according to the size of the order and how badly a man wants iron.

Warrant iron took another advance during the week, Alabama foundry No. 2 going to \$12 3/4.

Plate.—The local demand continues light, with demand at other points keeping mills filled with orders for months ahead.

Bar Iron.—The demand continues strong, with refined iron 1.80c. in large lots on dock and common 1.70c.

Structural Material.—Spite of the high prices a number of good sized contracts for office buildings have been placed recently.

METAL MARKET.

NEW YORK, June 9, 1899. Gold and Silver.

Gold and Silver Exports and Imports At all United States ports in April and year.

Table with columns for April 1898, 1899, Year 1898, 1899. Rows for Gold Exports, Imports, Silver Exports, Imports, and Excess.

This statement includes the exports and im-

ports at all United States ports, the figures being furnished by the Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending June 8th, 1899, and for years from January 1st, 1890, 1898, 1897, 1896.

Table with columns for Period, Gold Exports, Imports, Silver Exports, Imports, Total Excess, Exp. or Imp.

Of the gold exported \$1,000,000 went to London and the balance to the West Indies; the silver went chiefly to London.

The United States Assay Office in New York reports the total receipts of silver at 66,000 oz. for the week.

Prices of Foreign Coins.

Table with columns for Mexican dollars, Peruvian soles, Victoria sovereigns, etc.

Average Prices of Silver per oz. Troy.

Table with columns for Month, 1899, 1898, 1897. Rows for January, February, March, etc.

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

Average Prices of Metals per lb., New York.

Table with columns for Month, Copper, Tin, Lead, Spelter. Rows for Jan, Feb, March, etc.

The price given in the table is for Lake Copper. The average price of electrolytic copper in January was 14.26c.

Financial Notes of the Week.

The stock market fluctuations, which have shown an upward reaction again this week, have little effect on the general course of trade.

The shipment of \$1,000,000 gold noted last week has been followed this week by \$2,500,000 more, all by the City National Bank of New York.

The silver market has been extremely dull this week, with a dropping tendency, owing to lower market from India.

The statement of the United States Treasury on Thursday, June 8th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date of last week:

Table with columns for June 1, June 8, Changes. Rows for Gold, Silver, Legal tenders, Treas. notes, etc.

Imports and Exports of Metals

Large table with columns for Port, Week, June 7, Year, 1899. Rows for New York, Baltimore, Philadelphia, Galveston, Boston, Newport News, Norfolk, Va., New Orleans, La., San Francisco, Cal.

*New York Metal Exchange returns. †By our Special Correspondent. ‡Not specified. †Week ending June 1st.

The duties on metals under the present tariff law are as follows: Antimony, metal or regulus, 3/4c. a lb. Lead, 1/2c. a lb. on lead in ores; 1/2c. per lb. on pigs, bars, etc.; 2 1/2c. on sheet, pipe and manufactured forms. Nickel, 6c. per lb. Quicksilver, 7c. per lb. Spelter or zinc, 1 1/2c. per lb. in pigs and bars; 2c. on sheets, etc. Copper, tin and platinum are free of duty.

Treasury deposits with national banks amounted to \$81,380,222, a decrease of \$756,512, during the week.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending June 3d, gives the following totals, comparison being made with the corresponding weeks in 1898 and 1897:

Table with 4 columns: Year, Loans and discounts, Deposits, Circulation, Reserve, Specie, Legal tenders. Rows for 1897, 1898, 1899.

Total reserve... \$35,320,825 \$52,249,700 \$42,710,600. Changes for the week, this year, were in creases of \$678,800 in loans and discounts, \$356,500 in deposits, and \$47,300 in legal tenders; decreases of \$125,800 in circulation, \$1,181,800 in specie, and \$1,223,125 in surplus reserve.

Shipments of silver from London to the East for the week ending May 25, 1899, reported by Messrs. Pixley & Abell's circular as follows: India, China, The Straits, Totals.

Arrivals for the week, this year, were £174,000 in bar silver from New York, and £11,000 from the West Indies; total, £185,000. Shipments were £75,000 in bar silver to Bombay, £36,332 to Hong Kong, and £11,600 to Shanghai; total, £122,932.

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 with 4 columns: Banks, Gold, Silver, Total. Rows for N.Y. Ass'n, England, France, Germany, Aus.-Hun., Spain, Netherlands, Italy, Russia.

The returns for the Associated Banks of New York are of date June 3d, and the others are of date June 1st, 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.

Indian exchange continues steady and the Council bills offered in London were taken at an average rate of 16d. per rupee. Very little silver is now being taken for India.

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

Table with 4 columns: Circulation, Treasury, Totals. Rows for Gold Coin, Silver Dollars, Subsid. Silver, Gold Certificates, Silver Certif's, Treasury Notes, U. S. Notes, Cur'y Certif's, Nat. Bank Notes.

Totals ... \$1,955,501,000 \$698,265,154 \$2,563,766,163. The estimated circulation per capita is \$25.73. During May there was a net increase of \$21,633,117 in circulation. As compared with June 1st, 1898, the increase is \$115,902,753.

The coinage at the mints of the United States in May and the five months ending May 31st, is reported as below by the Bureau of the Mint:

Table with 4 columns: Denom., Pieces, Value, Five Months. Rows for Double Egs, Eagles, Half Eagles, Qt. Eagles, Total Gold, Dollars, Half-dollars, Qt. Dollars, Dimes, T'l silver, 5c. Nickels, 1c. Bronze, T'l minor.

T'l coinage... \$1,225,847 \$7,804,566.70 \$3,213,837 \$68,629,893.71. A comparison with April shows a decrease in the May coinage of \$3,091,075 in gold, but increases of \$719,968 in silver, and \$108,680 in minor coins.

Other Metals.

Daily Prices of Metals in New York.

Table with columns: June, Sterling Exchange, Silver (Fine oz., Lon. Pnce, Lake cts., Elec-tro-lytic, Lond'n stand-ard), Copper (Lond'n stand-ard), Tin, Lead, Spelter.

The quotations given for electrolytic copper are for cakes, ingots and wirebars; the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—The dullness in the market continues and hardly any transactions have taken place. Buyers refused to make purchases even at some concessions, and any pressure to sell means somewhat lower prices. Lake copper is freely obtainable at 18c., but this price does not offer any inducement. For electrolytic copper, prices have been shaded somewhat and sales have been made at 16½c. for cakes, wirebars or ingots and 16¼c. for cathodes, while casting copper remains nominal at 16½c. There have been some inquiries for export, but hardly any business resulted, as the prices asked here appear to be above the ideas of foreign buyers.

The London market has been very irregular and in the main rather weak. The opening was somewhat higher than the close of last week, at £76, but on the same day the market quickly declined to £75 10s., and 12s. 6d. less for three months prompt. On June 6th, spot remained steady at £75 10s. and £75 12s. 6d., but three months copper found more support, and dealings took place at £75 5s. and £75 7s. 6d. On June 7th a further decline set in, and spot copper was £74 15s. and £74 17s. 6d., and three months prompt 5s. lower. These were the lowest prices for the week. On June 8th spot delivery sold at £75 7s. 6d. and £75 10s. and three months copper 2s. 6d. higher, this being the first time in several weeks that spot copper was lower than forward, the latter a short time ago selling as much as £2 below the price of spot. With this quotation a somewhat healthy state of affairs has been established and the closing prices to-day are firm at £76 5s. and £76 7s. 6d. for both spot and three months.

Fine copper abroad was very much pressed for sale, and in most cases lower quotations have been established. We have to quote: English tough, £77 10s. @ £78; best selected, £78 5s. @ £78 15s.; strong sheets, £84 15s.; India sheets, £84 10s.; yellow metal, 6½d.

Tin.—Somewhat lower prices have been established, in sympathy with the foreign markets, at which there was a good consumptive demand. We quote 25½ @ 25¼c.

In London there was some weakness observable, and after a steady opening at £117 5s., prices gradually sagged off until £116 was reached on June 7th. After this a reaction set in and the closing quotations are £117 @ £117 2s. 6d. for spot, and £117 15s. @ £117 17s. 6d. for three months prompt.

Imports of tin at all United States ports in April are reported by the Treasury Department at 5,232 long tons, against 2,017 tons in 1898. For the 10 months of the fiscal year from July 1st to April 30th the imports were 26,522 long tons, against 21,154 tons in the preceding year.

Lead.—Reports from the West regarding production are not satisfactory. The Idaho lead mines are practically idle and there are serious signs of labor troubles in Colorado, which have already resulted in the closing down of the Durango smelting plant, and it is feared that others will have to follow. This has made consumers more anxious to lay in supplies, but the offerings are rather limited; otherwise transactions might have been large. In New York the ruling prices are still 4.40 @ 4.45c.

The London market is firmer, Spanish lead being quoted £14 5s. @ £14 6s. 3d. and English lead £14 10s. There has been more demand at these prices.

The Treasury Department reports that the imports of lead in April were 4,724 long tons, all in ores and base bullion. Exports of foreign lead were 5,320 long tons for the month.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Our market during the past week, in sympathy with the seaboard market, has been very tame. Sales have been light, prices ranging from 4.3c. for common soft Missouri metal to 4.32½ @ 4.35c. for corroding and chemical lead, according to brand and time of delivery.

Spelter.—Considerably lower prices have been established during this week. There has been a slight accumulation of spot metal, and producers not being willing to pile up stocks at the present high prices, were willing to make concessions, which brought prices down quite quickly. Sales are reported in New York at 6¼c. and in St. Louis at 6¼c. At these lower prices considerable business has been done.

The London market also is very flat and good ordinary brands declined to £27 10s., and specials to £27 12s. 6d. @ £27 15s.

The Treasury Department reports that the exports of zinc ores in April were 1,523 tons, against 74 tons last year. Exports of metallic zinc or spelter for the month were 1,277 long tons, against 9 tons last year.

Antimony continues unchanged at 10½ for Cookson's; 10c. for Hallett's, "C," and U. S. Star.

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 35½ @ 38c. London prices are 14 @ 16d. per lb., according to size of order.

Platinum.—Demand is active and prices continue high. For large lots \$15.50 per ounce is now quoted in New York; for smaller orders, \$16 @ \$17. The London quotation is 62 @ 64s. an ounce.

Quicksilver.—The New York quotation remains \$42 per flask. The London price is unchanged at £8 2s. 6d. per flask, with the same figure quoted from second hands.

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

Table with 2 columns: Aluminum, Per lb. (No. 1, 99% ingots, No. 2, 90% ingots, Rolled sheets, Alum-bronze, Nickel-alum.), Bismuth, Magnesium, Phosphorus, Tungsten, Ferro-tungsten.

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

LATE NEWS.

By Telegraph.

(From Our Special Correspondent.)

Leadville, Colo., June 8th.—A deal has just been closed by which \$200,000 paid up Boston capital is invested here and two very important new mining enterprises on the Leadville gold belt are put under way. The Comstock Company, a corporation with a paid-up capital of \$100,000, begins sinking a new 700-ft. shaft on the Comstock Group, near the old Antioch Mine. The new company is headed by A. W. Lawrence and Geo. H. Flint, of Boston, as president and secretary, respectively. There are five well located claims in the group.

By the second deal the Revenue Company, also a Boston concern, headed by R. C. Surbridge and G. M. Speer, has secured 140 acres of excellent territory in California Gulch on the trend of the Crown Point and Pinnacle ore shoots. The new company has started two new deep shafts, both on the Alhambra Placer in their combination. As both properties are deep shafts, they are of the utmost importance to the entire Leadville gold district.

By Telegraph.

(From Our Special Correspondent.)

Durango, Colo., June 8th.—As previously reported, on June 2d the 150 men employed at the smelter here stopped work, leaving the furnaces in fair shape, though the management was given but 5 hours' notice. This action was due to the announcement posted the day previous that hereafter the men will be paid by the hour and not by the day, the men to work as many hours as they choose. The eight-hour law does not take effect till June 15th, so no change in pay would have occurred for two weeks; but the men of a sudden determined to take this initiative. Following their action the smelter trust made known an advance of 10% in the rate paid per hour over the current schedules to all its plants. Previously, however, the Guggenheims had announced a 15% increase in the rate per hour. There were three stacks in blast here, treating 180 tons daily. The coal mines at Porter and the coke ovens are also affected; the latter are out of commission. The men supplying limestone are also affected by the strike. In all the closing of the smelter puts 600 men directly out of employment. To-day it is learned that the Silver-ton Mines are to close, as this smelter has contracts for their ores; and word has been sent to all the mines to stop shipping ores. About 4,000 tons per month were received from Silverton. The Telluride and Rico Mines supply fully one-fifth of the ores marketed at Durango, but their closing is problematical, as they are more readily in reach of Pueblo and Denver smelting works. At Silverton the feeling is intense, as that camp is thriving apace, with a brighter outlook than for years past, and row work may be stopped. Quite half of the Durango's business comes directly and indirectly through the smelting works, and local sentiment largely disapproves the hasty action of the men. About a month ago the men organized a union, and their leaders urged this premeditated move. It may result in a long period of idleness for this up-to-date plant, though on this point nothing can be gleaned. To-day the forecast is ominous for the town. As far as the San Juan Mines are concerned, no trouble is threatened in the change from the 10 to the 8 hour shift, the miners generally accepting the necessary changes without demur.

MINING STOCKS.

Complete quotations will be found on pages 698, 699 and 700 of mining stocks listed and dealt in at:

Baltimore.	New York.	Mexico.
Boston.	Philadelphia.	Paris.
Butte.	St. Louis.	Rossland.
Colo. Springs.	Salt Lake.	Shanghai.
Denver.	San Francisco.	Toronto.
Spokane.	London.	Valparaiso.

New York. June 9.

The market is quiet and prices easy. Anaconda Copper sold as low as \$51½@52½, and Amalgamated Copper on June 1st broke on the curb to \$85@88½, at which it is estimated 1,500 to 3,000 shares changed hands. Later sales were reported around \$95, but on June 7th the stock was again bid down to \$91, with holders asking \$92½. British Columbia Copper brought \$10@12 on the curb. Tennessee Copper was sparingly dealt in at \$19@20½. American Smelting and Refining common sold at \$36@40, and the preferred at \$81½@84.

Ontario of Utah sold at \$8, and Quicksilver common, of California at \$2½.

A little was done in the Colorado stocks, while the Comstocks were featureless. The Morenci Copper Company, of the Copper Mountain Mining District, Graham County, Ariz., was listed on the Industrial Exchange June 7th. This company has, it is said, taken over the entire property of the Gold Cliff Mining and Reduction Company, at Morenci, Ariz. The Morenci Copper Company's preferred capital stock (the only capitalization mentioned in the prospectus) is 200,000 shares, of \$2.50 each, full paid and non-assessable. The officers are identified with the stock brokerage business. The opening quotation of Morenci stock on the exchange was \$1.50½@1.50¾ per share.

Miscellaneous dividends declared include National Steel Company, 1¼% on preferred stock, payable June 30th; American Steel Casting Company, 3½% on preferred stock, June 29th; Maryland Coal Company, semi-annual, 2%, July 1st; Russell-Irwin Zinc Company, 1%, June 12th; Boston-Duenweg Zinc Company, 1%, June 15th.

Boston. June 8.

(From Our Special Correspondent.)

The market has been dull this week, following the general break up of last week. Prices have recovered part of the drop, but are still low compared with those of two weeks ago. People seem to be afraid of another break; and the very hot weather has also had a depressing effect. Upon the whole we have had a narrow market and the copper stocks have been rather neglected.

The special speculative stocks recovered slowly. Amalgamated sold at \$91@92½; Butte & Boston at \$72; Old Dominion at \$37½; Arcadian, \$49. Some people will give you pointers on a sharp recovery; but it looks a good deal as if the boom was out of the market for the present, and perhaps until the summer is over.

The death of Mr. Thomas F. Mason, president of the Quincy Mining Company, has started some talk about that company. It is generally believed that his stock will be sold, and the talk is that the Amalgamated Copper people will buy it to get a better foothold in Michigan. Mr. Mason's age has kept him from taking an active part for some time past, but he held his Quincy stock very closely.

The directors of the old Florida Mining Company have voted to sell the realty of the company to the Calumet & Hecla for \$100,000, which will give a dividend of 5¢ per share to stockholders in winding up the business. The property comprises 320 acres diagonally adjoining Calumet & Hecla on the southeast. The surface is worth the amount paid for building lots, as it lies immediately to the south of the town of Laurium.

The May shipments of the Dominion Coal Company were 165,300 tons, or 40,110 tons more than in 1898. There were 10,000 tons shipped to the coke plant at Everett this year; and shipments there will increase each month now.

3 p. m.—There was more activity in the market to-day, but the general tone is still narrow. Some prices were: Calumet & Hecla, \$790; Montana, \$355; Tamarack, \$210; Butte, \$73; Osceola, \$82½; Arcadian, \$50½; Amalgamated, \$94; Old Dominion, up 1¼ at \$38½; Franklin, \$18½; American Zinc, \$38; British Columbia, \$11½; Parrot, \$54; Utah, \$40½; United States, \$22; Isle Royale, \$42; Copper Range, \$44½; Cochiti, \$13½; Centennial, \$34½; Bonanza, \$2¾; Arnold, \$12; Adventure, \$10½; Bingham, \$11½; Santa Fe, \$12.

Salt Lake City, June 3.

(From Our Special Correspondent.)

The softening of prices is taken advantage of by a few, but for the most part trading is perfunctory. It was a sensible move of the new exchange to decide to take a vacation during July and August.

Ajax says, though offerings find ready buyers. Bullion-Beck and Centennial-Eureka hold firm, and each will pay its June dividend. Eagle &

Blue Bell is recovering; Four Aces offers nothing new. Grand Central is strong around \$8; the dividend will be paid on the 10th. Lower Mammoth is seemingly less in favor. Mammoth is again at \$2. Star Consolidated is somewhat stronger.

Chloride Point failed to hold last week's advance. Daisy drops, as the public now learns that at no time did the mill make a profit. Geyser Marion is lower. Mercur did considerable business at \$7.50. In spite of shipments, Northern Light fails to brace up. Omaha is firmer and higher. Sacramento paid the \$5,000 dividend June 1st; shares are stationary. Sunshine holds around 60c.

Dalton & Lark does not budge. Unwatering the mine under the Whittemore option has begun. Daly West is being quietly bought. Daly weakened a few points on announcement that active mining will not occur soon. Ontario is unchanged. Silver King will pay the usual \$50,000 to shareholders next week.

San Francisco. June 3.

(From Our Special Correspondent.)

The market continues dull and the holiday helped to reduce trading, but prices have been a little better on the small transactions which made up the business of the week. The pumping operations on the Comstock are going on steadily, but the public takes no interest in them; nor in the reports of new explorations in certain mines which are industriously circulated.

Some quotations noted are: Consolidated California & Virginia, \$1.70@1.75; Ophir, \$1.10; Sierra Nevada, 73c.; Best & Belcher, 50c.; Potosi, 35c.; Hale & Norcross, 35c.; Chollar, 31c.; Gould & Curry, 29c.

The project for obtaining water power and building an electric plant to operate mills on or near the Comstock Lode is gradually taking shape. As a preliminary step the water rights for three miles of the Truckee River have been taken up.

Sales of mining stocks on regular call at the San Francisco Stock Exchange for the year to date compare as follows:

	1898.	1899.
January, shares	157,360	121,955
February	151,065	350,800
March	166,260	272,625
April	203,355	209,215
May	119,535	164,580
Total	797,575	1,119,235

Although the year shows an improvement over last, the total is still small. In May the average was only 6,583 shares a day.

London. May 27.

(From Our Special Correspondent.)

Though business on the Stock Exchange has been considerably hindered by the Whitsuntide holidays, yet the people who remained at home have had plenty to occupy their attention. The arrest of alleged political conspirators in the Transvaal and the much debated prospective meeting of the High Commissioners of South Africa and President Kruger have given speculators plenty of opportunities in the South African market. The West Australian market has also been very active, especially in the Kalgoorlie series of mines, the shares of which—such as Lake View, Horseshoes, Chaffers, etc.—are being forced up to absurdly high prices. The British Columbian market attracts more attention on the Stock Exchange than it has done for some time, for there are now some dividend payers on the market. Le Roi £5 shares are up to £8, while Ruths, Whitewaters, Ymir, Velvets and others are in request.

A fortnight ago I gave details of the flotation of Stratton's Independence Mine at Cripple Creek and mentioned that though no shares were offered for sale in the prospectus, yet we might expect vendors' shares to appear on the market shortly. This has now happened and the £1 shares are being offered at from £2 to £2½, and I find that considerable numbers have been sold at these prices.

A copper company of more than usual interest nowadays has appeared this week. This is the Panuco Copper Company, Limited, and it is being floated by Matheson & Co. on much the same lines and with much the same clientele as they floated the Mountain Copper Company of Shasta, Cal., two years ago. The Panuco mines are in the Candela Mining District in the State of Coahuila, Mexico, just over the border from Texas. The mine has been a shipper for some time and has large reserves of ore which are figured to contain 6 per cent. of copper with small contents of gold and silver. The properties have been reported on by Mr. C. H. Palmer, late of the Butte & Boston Company, and by Mr. Thomas Down of the Tharsis Company. The capital of the company is £500,000, of which £166,666 in shares and £208,334 in cash goes as purchase price; while £125,000 is available as working capital for further developments. Anything coming from Matheson's house is pretty sure to be a good thing.

A few weeks ago I mentioned that the Elmore copper depositing process has at last got out of

the unfortunate position in which it was landed by the unscrupulous character of the original promotion. The people behind the company that took over the French patents some years ago have completed the purchase of the patents and properties of the English companies and a new company has been formed called the English Electro-Metallurgical Company, Limited. This company has a capital of £700,000, divided into £300,000 6% preference shares and £400,000 ordinary shares. Messrs. L. Hirsch & Co., who have effected this deal, have subscribed for 200,000 of the preference shares in order to provide working capital, while the remaining capital will be distributed, credited as fully paid, among the shareholders in the old companies. The directors of the new company will be Marquis d'Hautpoul, MM. Demmler, Chaumier and Bethmont, who are connected with the French Elmore Company, the French Bank of South Africa and other important companies; Messrs. Lewis Firth (of Thomas Firth & Sons, the steel makers of Sheffield); and two of the Elmore. MM. Demmler and Bethmont are sons-in-law of the late M. Secretan. It is very gratifying that the courage and persistence of the Elmore should be rewarded with success at last.

Paris. May 28.

(From Our Special Correspondent.)

Business in mining stocks continues active and there is what may be called a strong market. Activity extends to the Transvaal gold stocks, which are more in evidence than for a long time past.

The copper stocks are still the leading feature in speculation, and there seems little limit to their possible advances.

The metallurgical stocks show many fluctuations, but are strong on the whole.

The Boleo Company has reported a prosperous year in 1898. The dividend paid will be 107fr. a share, an increase of 12fr. over last year.

Under date of May 5th the French Minister of Public Works addressed a circular to the prefects of the departments respecting the law of April 9th, 1898 as to accidents occurring in work, which law should by virtue of its article 63 come into force on June 1st. He points out that mines, open workings and quarries come under its operation, and that general instructions will be given by, or must be asked of, the Minister of Commerce and Industry, with whose department this law is more particularly connected; but some matters, such as the agreements that may be made between mine-owners and provident societies, come exceptionally within the province of the Minister of Public Works. The circular calls attention to the fact that the new law has fixed the nature and proportion of the compensation, and that a distinction must be drawn between the annuities to be paid to the dependents in the case of a fatal result or permanent incapacity, either total or partial, on the one hand, and on the other the medical expenses with pecuniary compensation for temporary invalidation. In order to guarantee the pensions, recourse should be had to combinations of the largest number possible of those interested; but, on the contrary, experience has shown that medical care and compensation for temporary invalidation can only be ensured under good conditions, taking all the interests into consideration, when their regulation depends upon local organizations exercising their action over a relatively restricted area. It is this idea, he continues, which inspired Articles 5 and 6 of the new law, the relief societies constituted by the law of June 29th, 1894, being specially indicated as regards mines, etc., because they offer their members every guarantee for the protection of their interests; and, if the agreements made between them and the mine-owners be rationally drawn up, they will prevent—a capital point for all—disagreements as to the date when temporary invalidation ceases.

This new law is much feared by many employers. It will be oppressive, without doubt, especially to the small employers, who are still numerous in France. A blacksmith, for instance, might be called on to pay his helper a large sum when he himself might be disabled by the same accident. It will certainly do much harm, especially to the workmen.

Toronto, Ont. June 7.

(From Our Special Correspondent.)

The mining market this week was fairly active. Golden Star advanced to 73½c., being an advance of 20 points in 10 days. The company is to be reorganized under an Ontario directorate, the Duluth directorate retiring. The Minnehaha Company has purchased a milling plant, and as a result the stock has advanced. The Hammond Reef Company meets to-day to decide on the reorganization of four properties into one new company. They expect to have 200 stamps dropping on this property inside of a year. The money for the plant has already been provided, the stock having been underwritten. Van Anda has advanced and closed firm. The cheaper stocks have been inactive, especially Trail Creeks. War Eagle is very firm, selling around \$3.87.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams, Alliance, Anaconda, and others with columns for location, par value, and dates from June 2 to June 8.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stock quotations, listing companies like Am. Sm. & Ref., Am. S. & W. Co., and others with columns for location, par value, and bid/ask prices.

BALTIMORE, MD. June 8.

Table of stock quotations for Baltimore, MD, listing companies like Atlantic Coal, Big Vein Coal, and others with columns for location, par value, and bid/ask prices.

PHILADELPHIA PA.

Table of stock quotations for Philadelphia, PA, listing companies like Bethlehem Iron, Cambria Iron, and others with columns for location, par value, and bid/ask prices.

ST. LOUIS, MO. June 7.

Table of stock quotations for St. Louis, MO, listing companies like Am. Gold, Atz. Refine, and others with columns for location, par value, and bid/ask prices.

BOSTON MASS.

Table of stock quotations for Boston, Mass., listing companies like Aetna, Adams, and others with columns for location, par value, and bid/ask prices.

*Official quotations Boston Stock Exchange. Total sales, 181,767 * Ex-dividend.

BUTTE MONT. April 30.

Table of stock quotations for Butte, Mont., listing companies like Alice, Am. Dev. & M., and others with columns for location, par value, and bid/ask prices.

* Specially reported by the Hewett-Slaley Company.

COLORADO SPRINGS COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo, Anaconda, and others with columns for location, par value, and bid/ask prices.

* Official quotations Colo. Springs Mining Stock Exchange. Sales: Listed stocks, 1,238,071 shares; unlisted, 1,245,200 shares; total, 2,503,271 shares; cash value, \$ 75,369.77.

By Telegraph.

Table of stock quotations by telegraph, listing companies like Ancheria-Leiland, Elkton, and others with columns for par value, no. of shares, and bid/ask prices.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various mining companies and their share prices across multiple dates from May 29 to June 3.

SALT LAKE CITY, UTAH.

June 3

Table of stock quotations for Salt Lake City, Utah, listing various mining companies and their share prices as of June 3.

*From Our Special Correspondent. † Utah companies. ‡ Mines in Vanderbilt, Cal. § Mines in Tuscarora, Nev.

SPOKANE WASH.

May 27.

Table of stock quotations for Spokane, Washington, listing various mining companies and their share prices as of May 27.

*Specially reported by the British-Canadian Investment and Mining Syndicate. Total sales, 2,075,300 shares.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various mining companies and their share prices across multiple dates from June 1 to June 7.

Official telegraphic quotations of San Francisco Stock Exchange.

ROSSLAND, BRITISH COLUMBIA.

June 1.

Table of stock quotations for Rossland, British Columbia, listing various mining companies and their share prices as of June 1.

* From Our Special Correspondent.

VALPARAISO, CHILE.

April 22.

Table of stock quotations for Valparaiso, Chile, listing various mining companies and their share prices as of April 22.

* Special report of Jackson Bros.

Values are in Chilean pesos or dollars.

TORONTO, CAN.

Table of stock quotations for Toronto, Canada, listing various mining companies and their share prices across multiple dates from June 1 to June 6.

* Official quotations of the Standard and Toronto Mining and Industrial Exchanges. Total shares sold, 263,778.

MEXICO.

June 1.

Table of stock quotations for Mexico, listing various mining companies and their share prices as of June 1.

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.

May 8.

Table of stock quotations for Shanghai, China, listing various mining companies and their share prices as of May 8.

*Special report of J. P. Bissett & Co.

The prices quoted are in Shanghai taels.

STOCK QUOTATIONS.

Main table containing stock quotations for LONDON (May 25) and PARIS (May 18). It lists various companies, their countries, products, capital, and prices. Includes a 'MEETINGS' section at the bottom right.

* Dividend pending. † Ex-rights.

DIVIDENDS.

Table of dividends for various companies, listing the company name, date, amount, and total. Includes a 'Grand Total' row and an 'ASSESSMENTS' section at the bottom right.

*New Assessment.

Vertical text on the far right edge of the page, likely a page number or index reference.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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). Rows include companies like Alma Cons., Alaska Mexican, Alaska-Treadwell, etc.

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). Rows include companies like Ada Cons., Alliance, g. s. l., Alliance, g. s. l., etc.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable.

Note.—This table is corrected up to May 10. 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 May 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 chemicals and minerals such as Abrasives, Acids, Alcohols, Aluminums, Ammonias, Antimonies, Asphalts, Barytes, Bauxites, Benzolites, Bismuths, Borax, Bromines, Cadmiums, Calciums, Carbonates, Chromes, Cobalts, Coppers, Creams, Cryolites, Explosives, Fuller's Earths, Graphites, Gypsums, Kaolins, Lead Acetates, Limes, Magnesites, Manganeses, Marbles, Mercuries, Micas, Nitrates, Oxides, Potashs, Potassiums, Silicas, Sulphates, Sulphides, Sulphur, Tar, Tin Chlorides, Uraniums, Zincs, and Zirconiums. Each entry includes a description, quantity, and price.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

Table listing rare elements including Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Osmium, Palladium, Rhodium, Rubidium, Rutherfordium, Selenium, Silicon, Strontium, Tantalum, Tellurium, Thallium, Thorium, Titanium, Uranium, Vanadium, Wolfram, Yttrium, and Zirconium. Each entry includes a description, quantity, and price.