

# The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXIV.

NEW YORK, SATURDAY, August 23, 1902.

No. 8.

## THE ENGINEERING AND MINING JOURNAL

(Incorporated.)

261 BROADWAY, NEW YORK.

TELEPHONE. 6866 CORTLANDT. P. O. BOX, 1833.  
CABLE ADDRESS "ENGINJOUR" N. Y.

W. J. JOHNSTON, President. F. J. PRATT, Treasurer.

CHICAGO (Telephone, Harrison 3326) 520 Monadnock Building  
DENVER 206 Boston Building  
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LONDON, ENG. 20 Bucklersbury, 368

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Single Copies, 15 Cents.

United States, Canada, Mexico, yearly, 52 copies, in advance, \$5.00  
Other countries in Postal Union, \$7.00  
By Bank Draft, P. O. Order or Express on N. Y.  
English Subscriptions Payable at London Office, £1 8s 9d

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COPPER PRODUCTION in July, according to Mr. John Stanton, statistician for the producing companies, was the largest of any month this year, aggregating 26,749 long tons. The exports of 11,733 long tons were the smallest made this year. The average monthly production from January 1 to June 30 was 23,408 long tons, and the average exports were 16,328 long tons. Production has increased regularly since January 1, while exports have steadily declined since March, when the foreign shipments amounted to 20,097 long tons.



THE EFFORT being made in certain quarters by possibly well-meaning individuals to bring political influences to bear upon the present anthracite situation should be vigorously condemned. It is not a question for politicians to decide. We are suffering now the consequences of the thrusting of this element into the strike of 1900, and to repeat the mistake would be to invite more serious trouble in the future. But for certain unwise, not to say vicious, laws upon the statute books of Pennsylvania, which have been enacted for purely political reasons, the anthracite mines would have been long before this in active operation.



DURING THE month of July our exports of gold were \$7,670,808, against imports amounting to \$1,594,421. The excess of exports were, consequently, \$6,076,387. The total excess of exports for the seven months ending July 31 were \$13,165,280. The "balance of trade," as shown by the statement of the Bureau of Statistics for July, is still in our favor, but the total value of merchandise imported last month was nearer to the export values than has been noted in any month for several years. The difference in favor of exports (not considering precious metals) for July, 1902, was only \$9,600,000, as compared with \$50,000,000 in January last, and \$36,000,000 in July, 1901.



A LETTER from our correspondent in Greenwood, B. C., which is published in this issue, defends the statistical estimate of the Provincial Mineralogist, which was made to the Minister of Mines about the middle of January, and which covered the calendar year 1901. This letter is in reply to criticisms made by a correspondent of the London *Mining World and Engineering Record*, who took exception to the estimates of mineral productions of the Province. The official statistics just completed show that the preliminary figures were remarkably correct, the comparatively unimportant errors being due to an overestimate of the value of some of the Boundary ores produced in the latter part of the year. The work of the Provincial Mineralogist needs no defense. It has been of great service to the mining industry of the Province, which has shown notable advance during the past year. The actual value of the mineral products of British Columbia in 1901 exceeded that of 1900 by 23 per cent, and attained an aggregate of \$20,700,000.



### MARKET CONDITIONS.

**Iron and Steel.**—The principal feature in the pig-iron trade is the inadequacy of the motive power among the railroad companies which has so interfered with the supply of fuel that many furnaces in Ohio and Pennsylvania have had to go out of

blast. Car supply seems sufficient, and loaded and empty coke cars are stalled on sidings for lack of locomotives. The situation in the East has been relieved somewhat by receipts of considerable quantities of foreign iron. Orders for the first half of next year have already been placed and buying has fallen off to a considerable extent, the principle exception being in structural shapes, Pittsburg particularly, reporting active buying for next year.

**Copper.**—Prices are, if anything, a little easier than last week, owing to pressure to sell, which still exists in some quarters. Buyers appear to be holding off so far as future business is concerned, thinking that electrolytic will reach 11 cents before prices improve. Consumption is steady, however, and considerable business is being done. Some "Lake" copper, which is inferior in quality to the standard brands, has been sold at shaded prices, and in some quarters has given the impression that a decided cut has been made. Standard brands are held at 11½@11¾ cents.

**Other Metals.**—The consumption of lead seems to be fully up to the supply, and prices remain firm. Spelter continues to show remarkable strength, with the high prices noted for the past few weeks well maintained. There is practically no metal available for immediate delivery. Prices for zinc ores are somewhat stiffer than last week. Tin is assuming a firmer tone. It is reported that the members of the Amalgamated Association of Iron, Steel and Tinplate Workers, who refused to allow a reduction of wages which would enable the American Tin Plate Company to accept a large contract, are reconsidering their action, and may accede to the proposition.

**Coal.**—The demand for bituminous coal is about normal in western points, but heavy in the east. There is much complaint about the inadequate facilities of the railroads, particularly at the lack of motive power enough to get empty cars back to the mines promptly. Lake shipments suffer particularly on this account and the movement to upper Lake points is not nearly as heavy as desired. Coke is in great demand and furnaces in the Pittsburg district are much troubled by the short supply.

The anthracite trade shows no especial change. Retail prices have been advanced at a number of points and there is some inquiry about winter supplies. A few more mines and washeries are busy and the operators are predicting that the strike will end in season for consumers to get what coal they need when the weather becomes cooler. There will be no advance in prices by the producing companies.



### BY-PRODUCT COKE MAKING.

The extent to which the manufacture of coke in by-product retort ovens has developed in the United States is shown in the report of the United States Geological Survey just issued in bulletin form. This is a part of the coke-making industry, which is not yet 10 years old, the first by-product ovens (a battery of 12) having been erected in Syracuse, N. Y., in 1893. At the close of 1901 there were 1,165 retort ovens making coke in this country, while 1,533 more were under construction, most of which will be in blast before the end of this year. The production of coke in 1901 from by-product ovens amounted to 1,179,900, or about 5 per cent of the total coke product. The number of by-product ovens in use, however, was less than 2 per cent of the total. The average yield per oven last year from by-product ovens was 1,000 tons, as com-

pared with 343 tons average yield from beehive and other styles. Some of the by-product ovens made as much as 1,200 tons of coke during the year, the average above including a number of ovens which were not in operation throughout the entire year. The by-products included 12,695,190 gallons of tar, 12,927,627 pounds of sulphate of ammonia and 2,537,510 gallons of ammonia liquor, the aggregate value of which was \$1,029,876. At most of the works the gas produced is not measured or valued, but the product is estimated at 12,000,000 cubic feet, worth \$3,000,000. The value of the coke produced in these ovens is stated at \$2,894,077, showing the value of all the by-products to have exceeded the value of the coke produced by over \$1,100,000.

The report goes on to show that there is a remunerative market in this country for the chemical products derivable from the supply of coal tar obtained and which is now consumed principally in the manufacture of roofing paper, for creosoting lumber and for street paving. Statistics of imports are given which show that the coal-tar products brought into this country last year, with duty added, were worth nearly \$7,500,000 and exceeded \$8,300,000 in 1900. These values are (exclusive of duty) for the products at point of shipment, and do not include freight, insurance and profits, which must be added to the cost to the consumer. These figures indicate clearly that there is a good opportunity for investment in the manufacture of coal-tar products in this country and a steady supply of raw material. There were under construction at the close of 1901 1,533 new by-product ovens (nearly 400 more than those already in blast), while contracts for several other plants had been signed, although actual construction work had not begun.



#### OUR COPPER SUPPLY.

That the suspension of mining and smelting operations in the United Verde Copper Company's mine, at Jerome, Ariz., is merely an incident to our copper market is shown by the large figures of individual mine production in the United States. The copper production of the world in 1900 was 1,093,104,320 pounds, of which the United States, exclusive of copper sulphate derived from ores amounting to 11,313,962 pounds, produced 579,518,543 pounds of fine copper. Taking 1900 as a year when little restriction of output was attempted, the greater copper mines rank in the order of maximum production and percentage of the total United States output according to *The Mineral Industry* as: The Anaconda, Montana, 105,000,000 pounds, 18.1 per cent; Calumet and Hecla, Michigan, 81,403,041 pounds, 14 per cent; Boston and Montana, Montana, 6,200,000 pounds, 11.4 per cent; United Verde, Arizona, 39,970,193 pounds, 6.8 per cent; Copper Queen, Arizona, 34,382,309 pounds, 5.9 per cent; Arizona Copper Company, Arizona, 19,697,086 pounds, 3.3 per cent; Tamarack, Michigan, 18,400,000 pounds, 3.1 per cent; Butte and Boston, Montana, 16,950,000 pounds, 2.9 per cent; Quincy Copper Company, Michigan, 14,116,551 pounds, 2.4 per cent; Osceola Consolidated, Michigan, 11,200,000 pounds, 1.9 per cent; Detroit Copper Company, Arizona, 10,749,258 pounds, 1.8 per cent; total 418,068,438 pounds, 72.1 per cent. During 1901 there were some changes, notably the Copper Queen made 39,781,333 pounds as compared with United Verde 34,520,695 pounds.

If our copper market depended absolutely on domestic production, the closing of a mine such as the United Verde, which is now on fire, might affect the market, but, as all but a fraction of the Canadian production, amounting to 40,951,196 pounds in 1901, as compared with 18,919,820 pounds in 1900, is sent here for refining, and of the Mexican production in 1901, 44,309,554 pounds, compared with

23,060,551 pounds in 1900, was shipped here also, the copper market is obviously indifferent to the closure of an individual mine.

The Mexican production is daily becoming a greater factor in the copper situation. The Mochizuma Copper Company, at Nacosari, State of Sonora, produced from June to December, 1901, 8,614,161 pounds, and will probably produce 15,000,000 pounds during 1902. The Greene Consolidated Copper Company, at La Cananea, State of Sonora, produced 13,854,170 pounds during 1901, and is now producing, according to official report, upwards of 3,000,000 pounds of copper per month, with expectation of producing more than 40,000,000 pounds during 1902.

With no restriction of older mine outputs, and with no new producers, the annual copper supply of the United States from North America might be easily upwards of 700,000,000 pounds of fine copper.



#### RESEARCH WORK IN THE CHEMICAL INDUSTRY.

Prof. Charles E. Munroe and Dr. Thomas M. Chatard, in *Census Bulletin No. 210*, call attention to the fact that modern industrial chemistry tends to develop itself more and more along engineering lines; hence the increasing demand for the chemical engineer—a mechanical engineer with a special equipment of chemical science and technology. This remark is quite in accordance with the views expressed by Mr. W. H. Nichols, the president of the General Chemical Company, in the discussion of a paper on "The Teaching of Industrial Chemistry," which was read by Prof. F. H. Thorp, of the Massachusetts Institute of Technology, at the meeting of the New York Section of the American Chemical Society, May 9, 1902. Mr. Nichols said that he was in a position to receive young men after the teachers are through with them, and as a rule was disappointed; in chemical works he would prefer a good engineer with no knowledge of chemistry to a good chemist with no knowledge of engineering. Such a statement from such an authority carries great weight, and we are disposed to believe that most of the commercial and technical leaders of the chemical industry will agree with it. There is, however, a field that has scarcely been cultivated at all by American chemical manufacturers, in which the chemist should be highly useful in accomplishing investigations that would be beyond the capacity of the engineer, though even in this a knowledge of engineering principles and practice would surely enhance the value of the chemist. We refer to the prosecution of research work for the development of new processes, of which very little is done in the United States, as Messrs. Munroe and Chatard remark in the publication that we have quoted from.

The German chemical manufacturer is far in advance of those of all other nations in recognizing the value of specialized chemical skill in the conduct of the works and in employing trained chemists in laboratory investigations. In 1900 the six largest coal tar color firms in Germany employed about 500 chemists and 350 engineers and technical men. Sir Henry Roscoe stated that at the German works which he had visited highly trained chemists were employed in original researches with a view to new discoveries. "One employee, who received \$5,000 a year, worked for several years without producing any results, but eventually he made a discovery which repaid the firm ten times over and placed an entirely new branch of manufacture in its hands."

The results of this broad and enterprising policy are well exemplified by the experience of the Badische Anilin-und-Soda Fabrik, one of the great chemical companies of Germany, which it will be remembered has been among the foremost in developing the contact-process for the manufacture of sulphuric

acid. The present paper by Herr R. Knietsch in the *Berichte der deutschen Chemischer Gesellschaft*, 1901, p. 4069, of which we have already published an abstract in our columns, describes the methods by which in that particular case the apparently insurmountable difficulties were overcome by patient, persistent and scientific investigation, and a process of the greatest commercial importance was finally evolved. The Badische Anilin-und-Soda Fabrik employs a chemical staff of over 100 men, many of whom are engaged in research work, the results of which, when promising, are at once put into operation on a sufficiently large scale to determine their practical value. That such a course pays in a strict business sense is shown by the enormous dividends that the company pays, and by the practical monopoly which it has long maintained in certain lines, simply because it has been a little ahead of its competitors in knowing just how a given thing should be done, and then at once protecting the discovery by patents.



#### THE ANTHRACITE STRIKE—WHAT DID CARROLL D. WRIGHT REPORT CONCERNING IT?

Shortly after the beginning of the present strike in the anthracite regions, Hon. Carroll D. Wright, United States Commissioner of Labor, was appointed by President Roosevelt to investigate its causes and conditions, and to make a report thereon, for the President's guidance. Circumstances lent special significance to this event.

1. In the first place, Col. Wright's previous history gave assurance that his report would be intelligent and, so far as his purpose and endeavor were concerned, impartial. If his sympathy with either side should lead him to be less than just to the other, the National Mine Workers would not be the party to suffer.

If I remember correctly, Col. Wright's first public function was that of a Commissioner of Labor Statistics in Massachusetts, in which State, as in others, this position was given to a candidate approved by the labor unions. In most cases, the result has been an annual mass of almost worthless statistics, more or less manipulated in the interest of "labor." But Col. Wright speedily showed a perception of the relative importance of different lines of inquiry, and a skill and fairness in the compilation and discussion of pertinent data, which made his reports really valuable to students and statesmen. To the manner in which he discharged that duty he owes his subsequent promotion to the position which he now occupies, and the special ratification of that promotion in his election to the presidency of the American Statistical Association.

2. It will be remembered that Col. Wright took part in an investigation ordered by President Cleveland, after the Debs strike of 1894. His opinion of the system of the Pullman Company and its model village for workmen was a disappointment to the friends of Mr. Pullman, who, indeed, went to his grave in 1897 broken-hearted at the failure of his cherished philanthropic plans, and the manner in which his earnest endeavors had been misunderstood and misrepresented. But no one doubted the sincerity of Col. Wright, the eminent authority of whose name added weight to the censure less cautiously and conscientiously uttered by others. At all events, it was made clear that Col. Wright was not likely to be biased in favor of "capital."

3. Again, it will be remembered that the Hazleton convention, which voted this strike over Mr. Mitchell's head, was "stampeded" into that tumultuous action by a telegram announcing that an inquiry into the "anthracite trust" would be made by the Presi-



dent. This telegram was intended to have the effect of delaying precipitate action by the convention; but it was skillfully used by the opponents of Mr. Mitchell as an intimation that the President was on the side of the strikers, and would do something or other to aid them. So the strike was ordered "with a whoop," and the subsequent investigation by Col. Wright was loudly greeted as an evidence of the President's friendly intentions.

Well, Col. Wright made his investigation, and transmitted his report to the President, who has kept its contents to himself, as he had a perfect right to do. He was not bound to print it at once, as Mr. Cleveland had printed the Pullman report, and I have no right to conjecture any motives on his part for keeping it from the public. Yet I cannot help feeling that such a report, from such a source, would greatly clarify the situation, even at this late day.

But it is, perhaps, not surprising that Mr. Roosevelt keeps this report to himself, in view of the fact that, so far as I am aware, no strong desire for its publication has been communicated to him through the press. The absence of such a demand from Mr. Mitchell and his party is most significant, following, as it does, their vociferous welcome of Col. Wright's mission as a measure in their favor. What makes them suddenly dumb on the subject? It is a reasonable guess that they do not wish this report to see the light, knowing that it would condemn their pretenses and assertions.

Why the impartial press has not loudly called for the report I will not undertake to explain. THE ENGINEERING AND MINING JOURNAL is equally derelict with all the rest, and perhaps the explanation in our case may apply to all—namely, that, by reason of the weekly changes of the situation, we have been absorbed in dealing with immediate questions, and have clean forgotten that there was in existence an official verdict on the merits of the case.

But it is never too late to get real news, and I can conceive of nothing more worthy at this time, even of the yellowest journalism, than the procurement and publication of Carroll D. Wright's report.

How say you, Brethren of the Fourth Estate? Shall we, without distinction of color, make known our sovereign will, in earth-shaking choruses, at which even Presidents may well, without shame, strenuously tremble? That smothered report would be *News*. Can we endure the thought that it exists, and not for *Us*? Answer, Oyster Bay! Shall we have it?

Something like that might be said with effect. But my experience in the latest journalistic methods makes me modest, and I freely admit that greater experts might devise better phrases. I hope, nevertheless, that they will not scorn my humble suggestion.

R. W. RAYMOND.

**MEETING OF THE LAKE SUPERIOR MINING INSTITUTE.**

(BY TELEGRAPH.)

DULUTH, Minn., August 21, 1902.

The eighth annual meeting of the Lake Superior Mining Institute began here at noon Tuesday with the largest attendance in the history of the institute. About two hundred members were present, including President W. J. Olcott. Among other prominent men here are observed Thomas F. Cole, N. P. Hulst, Hon. Page Morris, C. P. Munger, J. V. Sebenius and Peter White, from Duluth; J. Parke Channing, New York; W. G. Mather, Cleveland; A. M. Wilmott, Sault Ste. Marie; Secretary A. J. Yungbluth, Ishpenning; Walter Fitch, Harry Hulst, C. C. Jones and W. H. Johnston, Marquette; Judge A. S. Llewelling, William Kelly, O. W. Johnson and B. W. Jones, Menominee; D. M. Philbin and Kirby Thomas, West Superior; T. W. Dento, J. F. Jack-

son, F. W. McNair, G. Pope, A. E. Seaman and F. W. Sperr, from the Lake Superior copper regions; Prof. C. R. Van Hise, Geological Survey at Washington; Prof. C. K. Leith, Madison, and a large number of other practical mining men. Tuesday afternoon was occupied by a sail on the steamer Iroquois around the harbor, which was much enjoyed by all. A reception in the evening at the Kitchi Gammi Club was enlivened by an excellent concert and interesting reminiscences by White, Pope and others. The reception was followed by a supper. At 10.30 Wednesday morning special trains conveyed the delegates to the Missabe and Vermilion ranges, visits being made to the Stevenson, Mahoning, Mountain Iron, Biwabik, Duluth, Savoy, Sibley, Zenith, Pioneer, Chandler and Minnesota mines. Business meetings of the institute were held in Duluth Wednesday evening and at Soudan Thursday evening.

Besides papers by Kelley, Drake, Hulst and Channing, which had been already announced, the following were read and discussed: "The Geology of the Lake Superior Region," by C. R. Van Hise; "The Mine Machine Shop," by J. F. Jackson; "Comparison of the Developments in Messabe and Gogebic Districts," by C. K. Leith. J. M. Sherrerd, of the Taylor Iron and Steel Company, of High Bridge, N. J., represents the most distantly located manufacturer present. Franklin Moeller is representing Webster, Camp & Lane. The Roebbling Company is represented by its Chicago agent, Mr. Bailey. The Allis-Chalmers Company and the Sullivan Machinery Company have also local representatives present.

**PRODUCTION OF PHOSPHATE ROCK.**

The total production of phosphate rock in 1901, as reported in Mineral Resources of the United States,<sup>1</sup> was 1,483,723 long tons, valued at \$5,316,403, as compared with 1,491,216 long tons, valued at \$5,359,248 in 1900 a decrease of 7,493 in tonnage and of \$42,845 in value.

The industry in Florida, which has been the chief producing State since 1894, continued to show an improvement, the total output and value for that State in 1901 being the largest yet recorded. The production of hard rock and land pebble was greater than in 1900, though the quantity of river pebble was appreciably less than the output of the previous year, and but slightly greater than one-half that of 1899. The increase in the production of hard rock and land pebble, however, more than offset the large decrease in the quantity of river pebble produced, so that the total production of phosphate rock in Florida during 1901 was greater than in 1900, being 751,996 long tons, valued at \$3,159,473, as compared with 706,243 long tons, valued at \$2,983,231, in 1900. Soft rock has not been produced in Florida since 1897, in which year a small output of 2,800 tons was reported.

In South Carolina there was a slight decrease in the output of land rock, which was nearly offset by the increased output of river rock, the total being 8,000 long tons less than in 1900; the respective outputs reported are 225,189 long tons of land rock in 1901, as compared with 266,168 long tons in 1900, and 95,992 long tons of river rock in 1901, as compared with 62,987 long tons in 17900.

The total output of phosphate rock in Tennessee decreased from 454,491 long tons in 1900, to 409,653 long tons in 1901, which is equivalent to nearly 10 per cent decrease.

Pennsylvania contributed 893 long tons of phosphate rock during 1901, as compared with 900 long tons in 1900.

There was no reported production for Alabama, Arkansas, or North Carolina, although in the last-named State a few thousand tons of low-grade rock were mined, which was used for macadamizing streets in Wilmington.

The average price per long ton of Florida hard rock continued practically the same as in 1900, being \$5.23; the price of land pebble decreased from \$2.77 in 1900 to \$2.67 in 1901; and the price of river pebble declined from \$2.36 in 1900 to \$2.25 in 1901.

<sup>1</sup>Now in press, U. S. Geological Survey.

The price of South Carolina hard rock in 1901 was \$3.18 per long ton, as compared with \$3.30 in 1900, and the average price of South Carolina river rock was \$2.56 in 1901, as against \$2.61 in 1900.

The price of Tennessee phosphate rock advanced from an average of \$1.62 in 1898 to \$2.91 in 1901, the reason being the better preparation of the material for the market and the consolidation of competing producers.

The imports of fertilizers, including guano, crude phosphates and other substances used for fertilizing purposes, into the United States during 1901 were valued at \$1,590,761, as compared with \$1,420,918 in 1900.

**PRODUCTION OF ASPHALTUM IN 1901.**

The production of asphaltum and bituminous rock, according to Dr. Joseph Struthers, in "Mineral Resources of the United States, 1901," amounted to 63,134 short tons, valued at \$555,335, as compared with 54,389 short tons, valued at \$415,958 in 1900, and with 75,085 short tons, valued at \$553,904 in 1899. The production in 1901 increased 8,745 tons in quantity, and \$139,377 in value, over the production of 1900, but the production in 1900 and 1901, both in quantity and in value, has been the smallest in the last seven years.

The production of bituminous sandstone decreased from 38,334 short tons, valued at \$119,779, in 1900, to 34,248 tons, valued at \$138,602, in 1901. The production of bituminous limestone increased from 2,434 short tons, valued at \$11,322, in 1900, to 6,970 short tons, valued at \$33,375, in 1901.

The production of hard and refined asphaltum, which includes gilsonite and other pure varieties, increased from 12,367 tons, valued at \$256,793 in 1900, to 19,316 tons, valued at \$333,509 in 1901.

The production of liquid asphaltum, or maltha, all of which was derived from California, increased from 1,254 short tons, valued at \$28,064 in 1900, to 2,600 tons, valued at \$49,850 in 1901. No sales of mastic were reported during 1899, 1900 or 1901, the crude material from which it was previously made being now included in the output of bituminous sandstone and bituminous limestone.

**COAL PRODUCTION OF INDIA.**—The latest returns of Indian coal production show that the industry, though still comparatively small, is steadily developing. In 1901 the output was 6,635,727 tons, as against 6,095,438 tons in the preceding year and only 4,066,294 tons in 1897.

**THE AUSTRO-HUNGARIAN IRON TRADE IN 1901.**—The year 1901 was unfavorable to the Austrian iron industry. There was a great decrease in the home and export trade, consequent on the depression in foreign markets, especially in Germany. The fierce competition between the Austrian and Hungarian ironworks adversely influenced prices and caused a shrinkage of production, especially in the latter half of the year, which led to the discharge of large numbers of workmen.

**AUSTRIA-HUNGARIAN IMPORTS AND EXPORTS OF COAL.**—The following tables show the imports and exports of coal in Austria-Hungary in 1900 and 1901. The total import of coal into Austria-Hungary was:

Year.	Quantity. Tons.	Value. Sterling.
1901	6,466,501	£4,422,280
1900	6,935,795	4,680,097

The export was:

Year.	Quantity. Tons.	Value. Sterling.
1901	9,179,880	£4,559,366
1900	8,982,217	3,969,215

Of the amount imported in 1901, 5,827,332 tons was black coal, and 612,209 tons of coke, out of which the United Kingdom supplied 164,099 tons of black coal and 12,440 tons of coke; only 532 tons came from the United States.

### THE ORE DEPOSITS OF MONTE CRISTO, WASHINGTON.\*

By J. E. SPURR.

In the summer of 1900 the writer made a study of the district of Monte Cristo for the United States Geological Survey, and the operations in and conclusions published in this paper are the result of that work. Not having visited the district since the fall of 1900, it is probable that there are some new developments, but it is not likely there are any which affect the results set forth here. For a fuller account of the district the reader is referred to the Government publication.<sup>1</sup>

The mining camp of Monte Cristo is situated in the heart of the Cascade Range, but on its western slope. It lies nearly due east of the city of Everett and



FIG. 1.—MONTE CRISTO AND WILMAN PEAK.

about 40 miles distant. It can be comfortably reached only by the Everett & Monte Cristo Railroad, which starts at Everett and terminates at Monte Cristo; there is not even a good wagon road by which the camp may be attained. Throughout the whole general region in which Monte Cristo is situated many mining prospects have been found. Coming by rail from Everett one sees prospects and mines along much of the way through the mountains, especially at Silverton. To the south of Monte Cristo there are mining claims nearly all the way to Index (18 miles). One such is the old mining camp of Mineral City, a few miles from Monte Cristo, and farther south is the mining camp of Galena. At Index there are said to be promising mines. Mines have also been exploited on Troublesome Creek, which lies south of Twin Lakes. North of Monte Cristo, on the opposite side of the high mountain ridge which lies north of Glacier Creek, is the Goat Lake mining district, connected by almost continuous mineralization with that at Monte Cristo. The Goat Lake mines are only about a mile northeast of Monte Cristo in an air line, but by the ordinary trail several times as far. In the region surrounding Monte Cristo there has been hardly any actual mining, the region being on the whole in the developmental stage.

The chief mines of the Monte Cristo District are the Pride and Mystery, both operated by a single company. These have extensive workings and a concentrating plant. The Golden Cord mine is probably situated on the same general vein as those just mentioned and is said to have afforded some good ore. The O. & B. Mine is also regarded in the district as a favorable property. There are numerous other prospects in the district of greater or less promise.

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<sup>1</sup>Ore Deposits of Monte Cristo. Twenty-second Annual Report U. S. Geological Survey. Part II.

*Rock Formations.*—The rock series of the Monte Cristo District has as its lowest determined member a series of heavy arkoses, sedimentary beds composed of the debris of granites. These arkoses, which are several thousand feet thick, are capped by a thick series of andesitic flows and tuffs, and these again are covered by thick basalts with a sparing amount of rhyolite. The basalts again are overlain by later andesites, which constitute the youngest of the rocks. Great tonalite dikes form one of the features of the region and were probably intruded between the periods of the early andesites and the basalts. Along the contact of the tonalite dikes the intruded rocks (andesitic tuffs, etc.) have been transformed by contact metamorphism to schistose and siliceous rocks in considerable masses. Roughly

the later andesite lasted during a considerable period of time. The cones of Mount Rainier, Glacier Peak, and other hypersthene andesites of the region are among the products of this period of volcanic activity.

As soon as the Cascade uplift began the rivers, acquiring new velocity in consequence of the heightened gradient, began cutting down their valleys with great rapidity until at the present time the valleys are so deep and so close together that the portions of the old plateau lying between them are left as high mountains—the present Cascade Range.

*The Ores and Their Deposition.*—There are data to show that the deposition of the ores began with the beginning of dissection of the present topography—that is, in the late Pliocene or early Pleistocene, and has continued down to the present day. The district is therefore novel among described ore deposits, in that it presents a case where the ore was deposited almost wholly within the Pleistocene.

The ores have formed chiefly along the joints and fractures, and are often especially localized at the intersection of different fractures. The areas of most profound fracturing are in general the areas of greatest mineralization. As the chief fracturing is in an east-northeast direction, so the chief veins have the same trend. Both unmineralized and mineralized fractures (veins) have a steep dip and sometimes become vertical. A peculiar feature in the mineralization of the district is the formation of large bodies of ore in the form of lenses, or more properly speaking, prisms of flat rhomboidal cross-section. (Figs. 2 and 3.) These lenses are formed by the mineralization of a prism of rock enclosed between intersecting fracture planes to a greater extent than the surrounding portions of rock. The principal ore bodies have originated in this way. Microscopic study has determined that the process of mineralization was chiefly a true replacement of the rock through which the fractures run, the fractures determining the channels of circulation of the mineralizing solutions. The rocks which have thus replaced are usually either tonalite or andesite. A complete and gradual transition was studied from andesite to a sulphide ore with quartz gangue; to a less extent, ores were deposited in open fractures and in dissolved-out irregular cavities (spaces of dissolution). The ores are especially abundant in the tonalite and to a less extent in the andesite; while the arkoses are noticeably barren, except in the vicinity of tonalite dikes. From this and other reasons, it is believed that the ores have been concentrated from a disseminated state in the tonalite, to a less extent from the andesites.

The metals in the ores are chiefly iron, arsenic, lead, copper, zinc, antimony, silver and gold, abund-

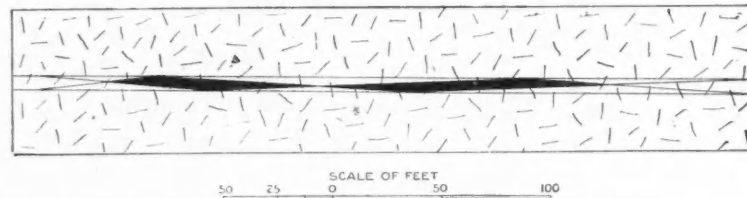


FIG. 2.—HORIZONTAL SKETCH PLAN, SHOWING ORE LENSES ON MAIN VEIN, MYSTERY MINE.

as a metamorphic phase of the andesite tuffs and other rocks is important, for previous to the writer's work the schist of this region had been considered as the oldest rock.

These rock formations are all Tertiary, ranging from the Eocene to the late Pliocene, or early Pleistocene. In late Tertiary times the rocks (with the exception of the later andesite, which was not yet poured out) were folded and subsequently planed down by erosion. Then in late Pliocene or early Pleistocene time occurred the Cascade uplift, by which the planed surface, where the present range is, was uplifted bodily so as to form a plateau. Consequent upon the strains accompanying and resulting from this uplift, extensive fractures, sometimes accompanied by movements and so becoming faults, were developed in the rocks. At about the same time the later andesite was poured out. The eruption of

ant in about the order named. The lead, copper, silver and gold are the metals for which the ore is especially mined. The minerals are chiefly pyrite, pyrrhotite, arsenopyrite, blende, galena, and chalcocite. Realgar is common. Among the rarer minerals are chalcocite, bornite, molybdenite, stibnite, and, as oxidation products of the sulphides, malachite, limonite, hematite, melaconite, and scorodite. The principal sulphides carry in general relatively small amounts of silver and gold. In the Pride and Mystery mines, the average surface ores carried 0.95 ounce gold and 12 ounces silver to the ton; while the average ore at some distance from the surface carries 0.6 ounce gold and 7 ounces silver. The chief gangue minerals are quartz and calcite; epidote and blue soda-amphibole are minerals developed in the wall-rock near the veins, the former chiefly in the andesites and the latter in the tonalites.



In the observed veins of the district it is found that the ores are most abundant near the surface. There is a rough succession from the surface downward, of galena, blende, chalcopryrite, pyrite, and arsenopyrite. Galena, for example, is definitely confined to a zone following the surface, and not generally extending more than 300 feet below it (Fig. 4). As just intimated, the upper zones, characterized

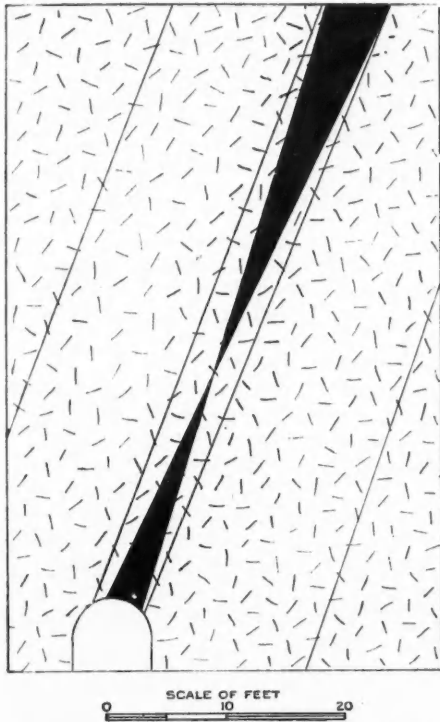


FIG. 3.—ORE BODIES IN MYSTERY MINE.

by galena blende and chalcopryrite, contain more gold and silver than the lower zones, characterized by pyrite and arsenopyrite.

Upon various grounds it has been concluded, then, that the upper sulphide zone, which contains the richest ore, was deposited, largely at least, since the development of approximately the present topography by downward-tending waters. Lead, one of the most conspicuous metals of this zone, is not known to be present in the lowest ores, but is, per-

haps, as the known facts indicate, an original deposit by descending waters. This conclusion involves the derivation of the lead ores from the surrounding rock. The lower sulphide zones afford less evidence as to their origin, but what there is tends in the same direction as that for the upper zones, so that the general suggestion is deduced that all the zones were precipitated, in part, simultaneously, by downward percolating waters, the different belts of minerals being precipitated in order according to their relative solubility. Similar phenomena in other regions, and the known chemistry of such phenomena, support these deductions derived from independent local evidence.

Practical Conclusions.—The geologic study of the Monte Cristo district, approached under the various divisions of petrography, stratigraphy, physiography, chemical geology, dynamic geology, etc., thus finally yields some results of the most vital interest

to the mining men, and illustrates the importance of careful scientific research on practical questions. The deductions are that in the Monte Cristo district the best veins should be looked for in, or within a moderate distance of, the tonalite, and should be especially looked for along the predominant steeply dipping east-northeast striking system of joints. Within the veins the best ores, as regards both quantity and quality, will probably be found near the surface, so that calculations for mining the deeper ores cannot be made on the basis of the surface ores. Both the mineralogic character and the gold and silver content of the ores can, in general, be counted upon as changing in depth, and plans for ore treatment must take this into consideration. These changes in depth will be most regular and certain in regions where there are no very intense fracture zones. Where there are such they may bring about the irregular downward extension of surface conditions to considerable depths.

PRODUCTION OF GYPSUM IN 1901.—The production of gypsum in the United States during 1901, as given by Dr. Joseph Struthers in *Mineral Resources of the United States, 1901*, was 659,659 short tons, valued at \$1,577,493, as compared with 594,462 short tons, valued at \$1,627,203 in 1900, an increase of 65,197 short tons in quantity and a decrease of \$45,710 in value. There has been a remarkable increase in the production of gypsum in the United States during recent years. For the ten years prior to 1899, the annual output averaged 269,712 short tons. During 1900 the production rose to 594,462 short tons, and in 1901 to the maximum output of 659,659 short tons. The rapid development of the gypsum industry has risen mainly from two causes; the increased use of plaster of paris in the manufacture of wall plaster in modern buildings, because of its superiority in hardness and durability to lime plaster and the large quantities consumed in the manufacture of "staff" for the construction of temporary buildings, particularly exposition buildings.

The quantity of crude gypsum sold in 1901 was 72,669 short tons, valued at \$76,773, as compared with 35,479 short tons, valued at \$44,127 in 1900, an increase of approximately 105 per cent over the production of 1900. The value per ton of the product,

GOLD MINING IN THE SOUTHERN APPALACHIANS.

By JOSEPH HYDE PRATT.

The section of country that contains the gold-fields of the Southern Appalachians is an area extending from the vicinity of Baltimore in a southwesterly direction across Maryland, Virginia, North Carolina, South Carolina, Georgia and Alabama. This region includes the area of crystalline rocks of the mountain and Piedmont Plateau districts. The greatest width of this belt is attained in North Carolina, South Carolina and Georgia, where it is from 100 to 150 miles, but it narrows down toward each end in Northern Virginia and Maryland and in Alabama. The crystalline rocks referred to include principally gneisses, various schists and slates, granite, diorite, and limestone. These rocks of the gold belt are decomposed to depths which vary from 50 to 100 feet.

Gold was first produced in the Southern Appalachians about 1793, and gold mining has continued with varying success ever since. The largest returns from gold mining in the South were from 1829 to 1836, and were undoubtedly due to the working of the richer and more accessible placer deposits. When gold was discovered in California in the early fifties, it took away the interest in the Southern gold-fields, and the mining population was attracted to this newer and richer field, so that there was a general decrease from that time in the gold production of the Southern States, and mining practically ceased at the beginning of the Civil War. Since then and prior to 1890 there have been spasmodic revivals of gold mining in the South, but it was not until the last decade of the nineteenth century that systematic mining began to be undertaken.

With the exhaustion of the placer deposits, attention was turned to the veins from which they had been derived. As a rule these veins contain low grade ores, usually in quantity, and in the question of their treatment it is the method rather than the amount of ore that has to be considered. There are numerous mines of unquestioned merit throughout the South which are not at the present time in active operation. These cannot be worked with small capital, but if they are developed on a large scale so that instead of a few tons, 100 to 200 tons of ore per day can be treated, they would make paying

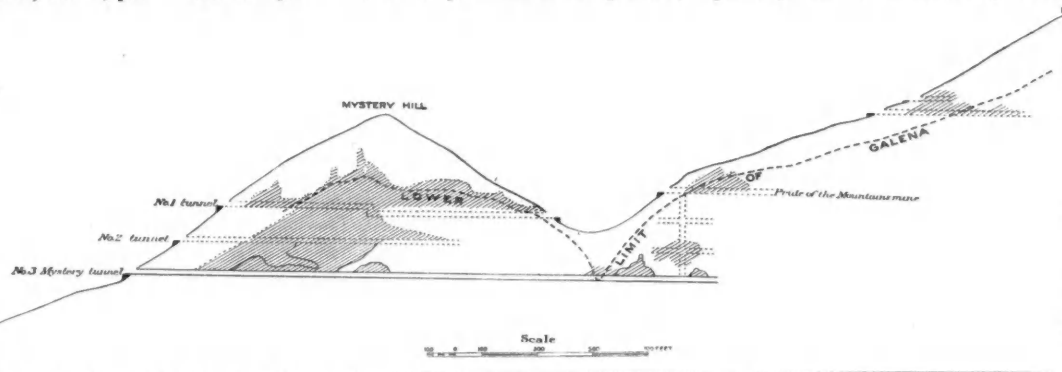


FIG. 4.—VERTICAL LONGITUDINAL SECTION ON MYSTERY-PRIDE VEIN, SHOWING LOWER LIMIT OF GALENA ZONE.

however, decreased from \$1.24 in 1900 to \$1.06 in 1901, the lowest price reported since 1890. Most of the gypsum sold in the crude state is used for land plaster, being ground for this purpose by custom mills.

The quantity of gypsum ground into land plaster during 1901 was 65,698 tons, valued at \$123,153, as compared with 45,682 tons, valued at \$82,806 in 1900, an increased production of 43.5 per cent over the figures for 1900. The value per ton was about the same for the two years, averaging in 1900, \$1.81 and in 1901, \$1.87.

The quantity of gypsum calcined into plaster of paris in 1901 was 421,292 tons, valued at \$1,377,570, as compared with 513,301 tons, valued at \$1,500,270 in 1900. The value per ton decreased from \$3.79 in 1900 to \$3.34 in 1901. The value assigned to calcined plaster is for the quantity of plaster produced after calcination, not for the raw material.

propositions. Many of the ore bodies consist of certain portions or beds in the schists and slates that are impregnated with auriferous pyrite and of imperfectly conformable lenticular veins and stringers of quartz. Where the upper portion of these have been thoroughly altered and decomposed, they were formerly worked for their free gold contents, but as the sulphurets were encountered they were abandoned. These large deposits of low-grade ores, which are capable of being mined in enormous quantity, offer a promising field for a cheap process of recovering the values. While the chlorination process has been worked successfully, as has been, and is still, being demonstrated at the Haile gold mine in Lancaster County, South Carolina, it is also highly probable that the cyanide process can be adapted to these ores, and it is a relatively cheaper process than the chlorination. I also believe that a cyanide plant could be installed at

smaller outlay and would cost less to operate. No thorough test has been made to determine a process for working these ores by the cyanide process, but it is already attracting the attention of capitalists, and in another year or two elaborate experiments will no doubt be made and a suitable cyanide process devised for working these large deposits of low-grade sulphuret ores. The tailings from many of these ores that occur in slates are slimy, but, as has been demonstrated in various mills in Montana, they should not offer any serious difficulty in their treatment.

Another reason why there has not been more advance in the gold production in the Southern States is that the general tendency has been to operate the mines on a too limited scale. It will be found that if a number of these gold deposits were operated under one management, they would make a profitable investment, while unprofitable when worked separately. The establishment of custom smelters at Charlotte, North Carolina, and near Atlanta, Georgia, would be a strong incentive to more active mining in the surrounding districts, if favorable freight rates can be obtained for transporting the ore to these smelters.

The production of gold and silver in the Southern States, with the exception of Georgia, has amounted to about \$30,000,000. During the past ten years the production has been in the neighborhood of \$200,000 per year, the larger proportion of which has been confined to one or two mines. This shows satisfactorily that when these low grade ores are worked on a large scale, they can be treated profitably. These profitable mines are not exceptions, and there are plenty of other propositions, which, if handled in the same way, would also make good investments.

These statements are more applicable to North Carolina, South Carolina, and Georgia than elsewhere in the region, for the greatest extent of the gold belt is in these States and it is here where the ores occur in larger quantities. There are, however, good deposits in Alabama and Virginia, especially the former State, which, if properly developed, will make paying properties.

There are many natural conditions that are favorable to mining operations in the South. The mining fields are all within easy distance of the large business centers of the North; cheap labor is abundant, and skilled labor is also cheaper than corresponding labor in Western mining camps; climatic conditions permit nearly continuous mining throughout the year; the proximity of the mines to railroads and also centers of mining supplies, and to forest for lumber, mine timbers, and cord-wood; abundance of water-power that is available at many of the mining localities which would make practicable the installation of electric power plants.

There has been a considerable advance during 1901 in the development of deposits of the precious metals throughout the South, and, while the actual statistics of production of gold and silver during 1901 show but little if any increase over that of 1900, still the actual work done is of a systematic and permanent character, which will mean a large increase in production during the next few years. A short synopsis of the mining being done in the South is taken up under the head of each State, with the exception of Georgia, which is not considered in this paper.

**Virginia.**—The principal work in Virginia has been confined to some of the placer deposits in Floyd County. There has been no systematic mining, but simply spasmodic sluicing and panning of the gravels, resulting in the production of about \$550 worth of gold. In Grayson County, the John's Creek gold mine is being developed, and it is reported that the ore assays in the neighborhood of \$10 per ton. In Patrick County the Herd Mine is being developed by Wm. Little, of Sumner, North Carolina.

**North Carolina.**—There are approximately 400 localities in North Carolina that have been worked for gold, but at the present time there are not over 15 mines being operated. These are all located in Cabarrus, Mecklenburg, Stanley, Montgomery,

Burke and Rowan counties. A number of them are new properties that have been opened up and developed during 1901, but the greater part of the mining has been confined to old mines and properties, some of which have been quite extensively operated.

The principal mining has been in the vicinity of Gold Hill, Rowan County, about 14 miles southeast of Salisbury. The country rocks are for the most part chloritic and argillaceous schists, which are cut by diabase dikes. The ore bodies consist of bands of this schist impregnated with auriferous pyrite; and of imperfectly conformable lenticular veins and stringers of quartz. In some of these veins the copper sulphide, chalcocopyrite, predominates, and they are worked especially for copper. The principal work being carried on in this district is for gold by the Whitney Reduction Company, which is operating at and near the old McMakin mine. The company has developed its mine by means of three shafts, the deepest one being about 600 feet, and by drifts and cross-cuts between them. They have at the 600-foot level a large body of ore blocked out which has been thoroughly tested by assaying and shows up favorably. A 10-stamp mill and a small but complete chlorination plant used in testing the ores have been erected at the mine. The main mill and reduction plant of the company will be erected at the narrows of the Yadkin River, where an extensive water-power is being developed. This company will not begin to treat ore in quantity until it has perfected its water-power and plant at the narrows of the Yadkin. This may take another year.

The Union Copper Mining Company, which is carrying on extensive mining operations for copper in this Gold Hill district, obtain considerable gold and silver as by-products. The company has a complete concentrating plant and smelter, and reduces its ore to a matte for shipment. The ore deposit is being worked by means of a vertical shaft 520 feet deep connected with a 430-foot inclined shaft and by two other vertical shafts, one 305 and the other 225 feet deep. The ores are concentrated, and the concentrates are roasted and smelted to a 50 per cent matte which is refined at Northern plants. There are a number of other properties being developed and worked in this district.

Among other mines that have been producers of gold during 1901 are: The Parker Mine in Stanley County, the Champion Mine in Mecklenburg County, and the Martha and Mills mines in Burke County.

**South Carolina.**—There is one gold mine in the South that stands out prominently and illustrates the fact that gold mines in the South can be worked at a profit. This is the Haile Mine, situated about 3 miles northeast of Kershaw in Lancaster County, South Carolina. The ore bodies are lenticular in shape and consist of auriferous pyrite, free gold, and, in places, small quartz stringers impregnating the rock, which consists of siliceous hydro-muscovite and argillaceous schists. The conditions are similar to those mentioned as occurring in North Carolina. Under the management of Capt. A. Thies, who took charge of the property in 1888, the ore deposits have been thoroughly developed, and the plant has been increased as the developments warranted, until now it consists of a 60-stamp, back-to-back mill with 20 concentrators and a 3-barrel chlorination plant. This property is the only one that is being worked to any extent in South Carolina, and has been for the past 10 years the chief source of all the gold and silver produced in the State. At Abbeville, the Kendrick's Gold Mining Company is developing a property the ores of which are somewhat similar to those just described. The general characteristics of all the gold properties in South Carolina are similar to those in the southern part of North Carolina, and what is said of one will apply just as well to the other.

**Alabama.**—The principal mining in Alabama is in the Arbacoochee District, Cleburne and Randolph counties. There are three mines in this district which are at the present time being developed and have in the past year produced a small amount of gold. These are the Woodard, about 7 miles southeast of Heflin; the Pinetucky, 14 miles from Heflin;

and another near Goldburg, Randolph County. It is the intention of the companies operating these properties to erect mills and smelters, if the development work warrants it.

**Tennessee.**—There is quite a little work being done in Monroe County, Tennessee, on the placer deposits of Croker Creek, a tributary of the Hiwassee River. Four or five companies are operating in this district and with some success. Little attention has thus far been paid to anything but placer deposits. One company has done some work in tunneling and drifting on quartz veins which carry free gold, but thus far none of this ore has been treated commercially.

#### BAUXITE IN FRANCE.

In a recent British Foreign Office report it is stated that there has been a considerable development in the export of bauxite from France during 1901. A large business is expected to be done this year. It seems probable, in view of a trial shipment of 1,700 tons from Toulon, last December, to Boston, Mass., that spotted bauxite is likely to be attracted to American industrial enterprises. It is estimated that as a result of the visit to Marseilles of American agents and experts in that line some 300,000 tons will cross the Atlantic during the year.

Germany has hitherto been the principal buyer of both red and white bauxite, the former containing a smaller proportion of alumina. The advantage of the French over the American bauxite lies in the latter requiring to be quarried. The richest mines of bauxite are claimed to be in the south of France, between the town of Brignoles (Var) and the Department of the Hérault, the town of Baux, whence the name, having at one time been the center of the industry. There are 31 mines in the Department of the Var alone, the most important of them being at Ampus, Barjols, Cabasse, Carces, Le-Cannet-du-Luc, Le-Muy, Le-Thoronet, Lorgues, Mazaugues, Meounes, Puget-sur-Argens, Rougiers, Tourves and Vins.

The south of France produces three kinds of bauxite—ferruginous, aluminous and the spotted. The demand for the first is small, although it contains 60 per cent of oxide of iron. Were the mines properly developed and the bauxite methodically treated profits would be greater. Aluminous bauxite which can be cut with a knife is much sought after, especially when it contains a high percentage of alumina, little iron and no silica. It is mined in the district of Baux, is said to contain a minimum of 60 per cent alumina and a maximum of 3 per cent silica. It is delivered free on truck at Parabou-les-Baux station at 12s. the ton. Spotted bauxite is pink or violet in color, and is largely mined at Brignoles and its vicinity. The chief deposits are those of Le-Val, Le-Vins, La-Brasque, St.-Christophe. It contains 21.99 parts of sesquioxide of iron, 0.26 of silica, 63.15 of alumina, 2.60 of titanate acid and 12 of water. If the silica is below 3 per cent and the alumina above 60 per cent, the price free on truck at Brignoles Station is 9s. 7½d. per ton. Freight from Brignoles to Marseilles by rail is 3s. 5d. per ton, putting on board is 1s. 6d. per ton, making a total of 14s. 1½d. per French ton, f. o. b. at Marseilles. Price f. o. b. at St.-Raphael is 13s. 8½d.

Of the bauxites of the Var, 43,052 long tons were exported from St.-Raphael in 1901, as compared to 24,292 tons in 1900 and 23,862 tons during 1899. Seventeen hundred tons were exported (for the first time) from Toulon. From Cette 1,672 tons were exported last year, as against 353 tons for 1900 and 962 tons for 1899.

**PRODUCTION OF COAL IN BELGIUM.**—In the first six months of 1902 the production of coal in Belgium amounted to 10,911,840 tons, as compared with 11,096,340 tons for the corresponding period last year. The decrease was made up, however, by the difference in stocks, which were estimated at 716,040 tons on June 30, 1902, as against 1,088,090 tons in 1901.



### ELECTRICAL EQUIPMENT OF THE C. & C. SHAFT AT VIRGINIA CITY, NEV.

By LEON M. HALL, CONSULTING ENGINEER.

When the mining properties on the Comstock Lode were first developed, operations were carried on by means of steam-generated power, wood being used as the fuel. This was very costly on account of the scarcity of wood. The milling was, until quite recently, done at a distance of some 15 miles from the mine, at a point on the Carson River where cheap water-power could be obtained. About two years ago the question of electrical transmission for the purpose of supplying power for deep mining operations on the Comstock Lode was taken up, and since then extensive hydraulic developments have been carried out at Floriston, Cal., on the Truckee River. Power is now transmitted 35 miles to the mines in

circuit is carried on the same poles by oak brackets, with pony insulators. At the sub-station at Virginia City the potential is lowered to 2,300 volts by means of six 450-kilowatt oil-insulated transformers, and at this potential current is distributed to the various mining companies. The distribution circuits are composed of weather-proof wire and are designed for 4 per cent drop under full load. The generating station at Floriston is constructed of brick, with a galvanized iron roof, and the sub-station at Virginia City is entirely covered with corrugated galvanized iron.

The plant has been in continuous operation since October 20, 1900. The Truckee River General Electric Company sells power to the various mining companies at \$7 per horse-power per month, the amount used being based on a maximum peak load of two

Fifty incandescent lamps, together with necessary lightning arresters, fuse blocks, cut-outs and switches.

The apparatus underground consists of the following:

A 15 horse-power type "C" induction motor, operating at 440 volts and driving a fan on the 250-foot level.

Two 10 horse-power motors of the same type, driving fans on the 1,950-foot and 2,150-foot levels.

Three 225 horse-power type "C" motors, operating at 2,200 volts and geared to three duplex double-acting Reidler pumps located on the 2,150-foot level.

Three 10-kilowatt type "O.D." transformers, transforming from 2,200 to 440 volts, located on the 1,750-foot level.

A 3-kilowatt lighting transformer, transforming from 2,200 volts to 110 volts, on the same level.

Three 15-kilowatt type "O.D." transformers, transforming to 440 volts, on the 1,950-foot level.

Two 5-kilowatt "O.D." lighting transformers, transforming from 2,200 volts to 110 volts, on the same level.

Three 10-kilowatt transformers, transforming to 440 volts, on the same level.

A 5-kilowatt lighting transformer, transforming to 110 volts, on the same level.

These are all Westinghouse transformers and supply the motor and lighting circuits within the mine.

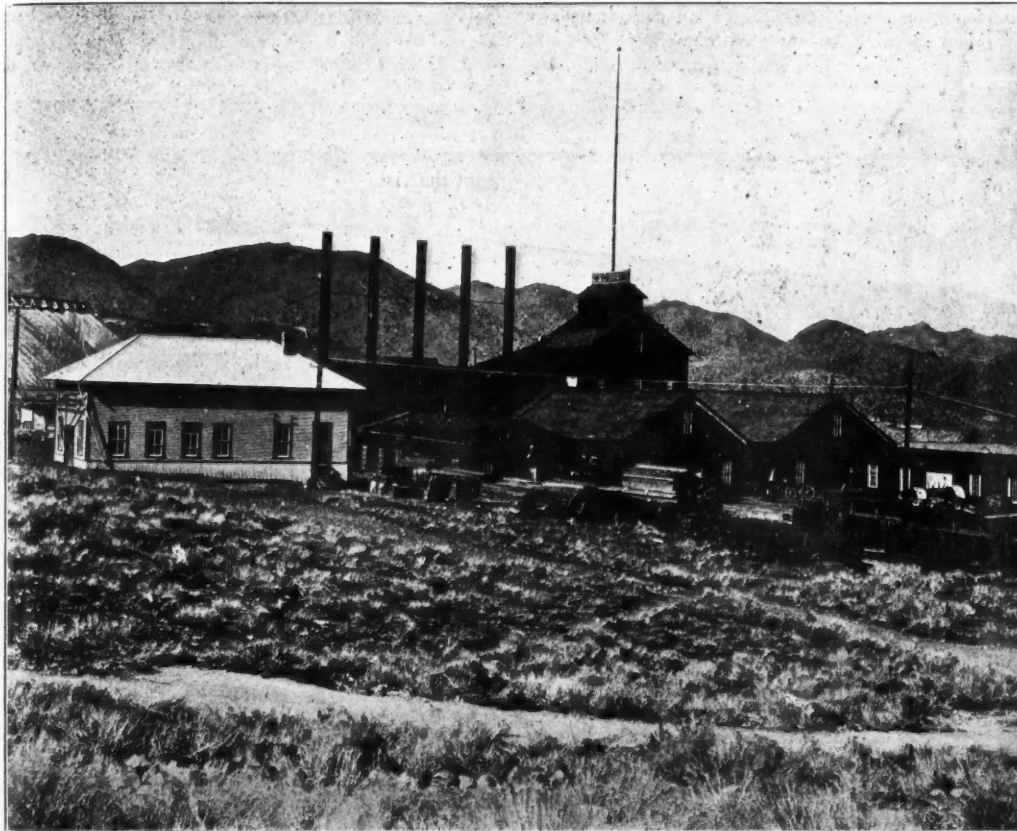
There are 250 16 candle-power incandescent lamps scattered through the workings underground. A No. 6 B. & S. 3-conductor lead-covered cable armored with iron wire extends from the surface to the 2,150-foot level, and a No. 0 3-conductor cable to the pumps on the same level. The weight of the No. 6 cable is 6 tons and of the No. 0 cable 10 tons. The cables were lowered down the shaft by means of the hoisting rope and then securely clamped to the wall plates. At each station a water-tight junction box is used and the lead covering sweated into a tight fitting sleeve located in the side of the box.

The power is brought into the works over two separate circuits, each of which is provided with a single-pole switch at the entrance of the building, and also a Westinghouse integrating watt meter with its transformer. The pump circuit is further equipped with an ammeter, a frequency indicator, a power-factor indicator and a static ground detector. Oil break switches are used on the cable circuits and upon all of the 2,200-volt motors. The smaller motors, both on the surface and underground, are equipped with auto-starters, quick-break switches and slate-base fuse-blocks. Some of these machines are located in warm places and operate under severe conditions.

The entire installation is wired with lead-covered cables or with rubber-covered copper wire mounted on glass insulators or porcelain knobs. The greatest care is used in installing the wiring, with the result that it is safe and gives absolutely no trouble. Candles have been entirely discarded, incandescent circuits having been carried directly to the working faces and into the stopes. The current is taken into the mine at a potential of 2,200 volts through the cables above mentioned, and the potential is lowered in the mine by transformers, which are located as near as possible to the point of consumption.

The compressed air plant, supplying air for drilling, a number of underground hoists and the hydraulic pump, consists of a 16½ by 30-inch Rand & Waring single stage air compressor, driven at 73 revolutions per minute by a 100 horse-power type "C" Westinghouse motor. The motor speed is 580 revolutions per minute, which is reduced by a counter shaft with wooden rim pulleys and rubber belting. No automatic regulator is used at the present time, as the compressor is working to its full capacity and the motor is developing 96 horse-power.

The electric hoist is a decided departure from usual practice in deep mine hoisting plants, and embodies what is commonly known as the balanced continuous or tail-rope system. This was adopted in order to reduce the cost of operation and also the size of the motor to the lowest size compatible with



C. & C. SHAFT, VIRGINIA CITY, NEVADA.

Storey County, and a dozen or more of the properties have been equipped with electrical machinery. Among these is the C. & C. shaft of the Consolidated California and Virginia Mining Company.

The power plant on the Truckee River is about two miles east of Floriston. The river is dammed just below the Floriston Pulp and Paper Mill, and the water is conveyed about 600 feet through a canal and then 8,600 feet through a wooden flume 6 feet 6 inches high and 10 feet wide to a point directly above the generating station. It is then conducted through two wooden stave pipes 160 feet long and 6 feet in diameter to the wheels, upon which there is a head of 84½ feet. There are two pairs of 27-inch horizontal McCormick turbines, direct-connected to Westinghouse 3-phase, 60-cycle generators of the revolving armature type. These generators are separately excited by two 22½ kilowatt direct-current machines. The wheels will each develop 1,400 horse-power at 400 revolutions per minute, with the above head of water. They are regulated by two type "B" Lombard governors. Current is generated at 500 volts, and is raised to 24,000 volts by means of six 300-kilowatt Westinghouse oil-insulated transformers, at which potential it is transmitted 33 miles over a double circuit of No. 4 hard-drawn copper wire to the sub-station at Virginia City. The line is composed of square redwood poles, 30 feet in length, with pine cross arms and locust pins, upon which are mounted 7½-inch Locke insulators. The telephone

minutes duration. This, with other conditions, has made advisable the installation of machinery of the very highest grade and the introduction of some features which are rather unique in character. In the C. & C. shaft, at Virginia City, every precaution has been taken to secure thorough reliability and the highest efficiency. The following brief outline of the machinery in use will give a fair idea of the equipment.

The electrical machinery in operation on the surface consists as follows:

A 200 horse-power type "F," 2,200-volt, variable-speed, 3-phase, Westinghouse induction motor, geared to balance electric hoist, which will be described later.

A 100 horse-power type "C," 2,200-volt, Westinghouse induction motor, belted to a 16½ by 30-inch single stage air compressor.

A 30 horse-power type "C," 440-volt, Westinghouse induction motor, operating circular saws.

A 15 horse-power motor of the same type, driving tools in the machine-shop.

A 10 horse-power type "C" motor, operating a Blake rock-breaker at the ore bin.

Three 15-kilowatt, indoor type, Westinghouse transformers, transforming from 2,200 volts to 440 volts.

One 5-kilowatt Westinghouse lighting transformer, transforming from 2,200 volts to 110 volts.

Two Manhattan arc lamps.

the duty required—viz., to hoist 500 tons daily from the 2,500-foot level by means of double-deck cages carrying 3,600 pounds of rock. The hoist consists essentially of a main driving drum and an idler, around which is wrapped a 1½-inch plow steel wire rope. The rope passes down one compartment, around a movable tail sheave and up the other. One cage is inserted between the ends of the rope and the other fastened to it by means of heavy iron clamps. The main driving drum is geared to a 200 horse-power type "I" variable speed Westinghouse 3-phase induction motor, which operates at a maximum speed of 580 revolutions per minute, moving the cages through the shaft at 1,250 feet per minute. The speed of the motor is readily controlled by means of variable resistances inserted in the secondary winding, but external to the motor itself. The variation of the resistance is accomplished by the use of a special controller resembling an ordinary street car controller; the primary circuit is controlled by means of an oil break switch. The hoist is equipped with heavy post

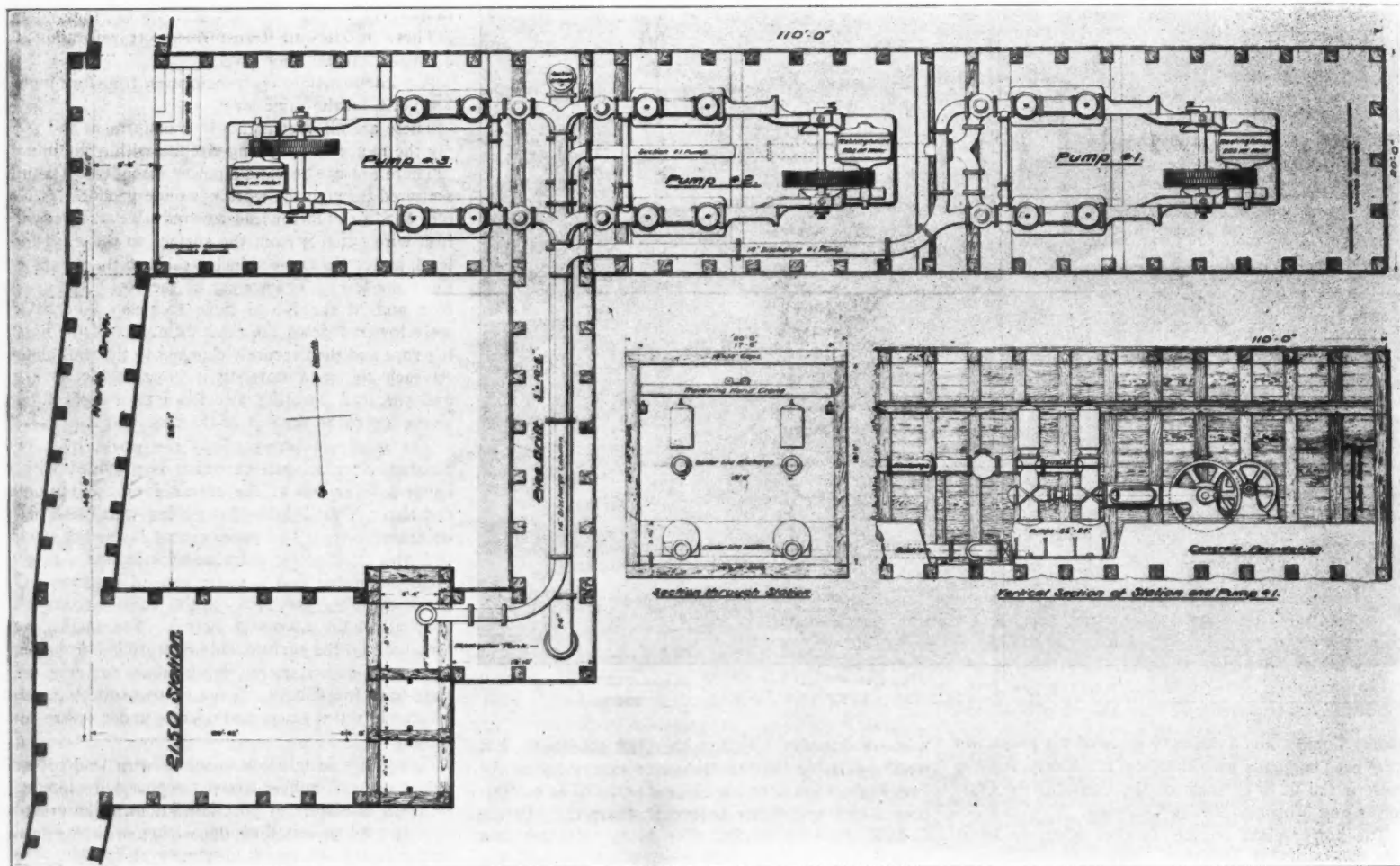
feet long. It is timbered with 14 by 14-inch pine timbers with 3-inch planking. A drift 5 feet by 10 feet 6 inches in section connects it with the shaft, and ventilation is obtained by means of a small electrically driven blower. The motors are all wired with lead-covered cable, and the station is lighted with incandescent lamps. A 10-ton hand crane travels the entire length of the station, so that the labor of handling and installing machinery has been reduced to a minimum.

This plant is undoubtedly one of the best and most complete mining installations in the world, and its operation has been entirely satisfactory both in regard to economy and reliability. Up to the time when electrically transmitted power was adopted the cost of motive power was never less than \$20 per horse-power per month, while under existing conditions it is reduced to \$7. For example, the cost of operating the 100 horse-power air compressor usually averaged about \$1,800 per month, while to-day it is only \$672. The entire plant was installed under the

**THE MANUFACTURE AND USE OF BRIQUETTES IN GERMANY.\***

Among the several branches of German industry which deserve the attention of Americans by reason of their economy, their recovery or utilization of some raw material which exists unused in our country, or because they involve the most intelligent application of scientific knowledge to technical processes, may be reckoned the manufacture of briquettes from brown coal, peat, and the dust and waste of coal mines. Briquettes form the principal domestic fuel of Berlin and other cities and districts in Germany; they are used for locomotive and other steam firing, and are employed for heating in various processes of manufacture. For all these uses they have three tangible advantages: They are clean and convenient to handle; they light easily and quickly, and burn with a clear, intense flame; they make practically no smoke, and are, withal, the cheapest form of fuel for most purposes.

Like most other important German industries, the



PUMPING STATION ON THE 2,150-FOOT LEVEL OF C. & C. SHAFT.

brakes, hydraulically operated, and the machine is handled with remarkable ease. In tests that have been made these hoists show a net efficiency of about 75 per cent, counting all electrical and frictional losses. The pumping plant consists of three duplex double-acting 6 11-16 by 24-inch Reidler pumping engines, located on the 2,150-foot level. These pumps take their water supply from a tank on the east side of the shaft just below the 2,150-foot station. Each pump is separately driven by a 220 horse-power type "C" 2,200-volt induction motor, and has a capacity at 110 revolutions per minute of 1,500 gallons per minute to the height of 450 feet, or to the Sutro Tunnel level. The motors run at a speed of 495 revolutions per minute, the necessary reduction being obtained by the use of cut gearing with stepped teeth. The total capacity is 4,500 gallons per minute, and is intended to take the water from the hydraulic elevator as long as it is used as a sinking pump.

The pumps are located in a station 30 feet north of the shaft. This station is cut from the solid rock, and is 18 feet by 17 feet 8 inches in section and 110

feet long. It is timbered with 14 by 14-inch pine timbers with 3-inch planking. A drift 5 feet by 10 feet 6 inches in section connects it with the shaft, and ventilation is obtained by means of a small electrically driven blower. The motors are all wired with lead-covered cable, and the station is lighted with incandescent lamps. A 10-ton hand crane travels the entire length of the station, so that the labor of handling and installing machinery has been reduced to a minimum.

**DIAMONDS IN BRITISH GUIANA.**—With the introduction of labor-saving machinery and better transportation facilities, it is expected that diamond mining will continue to grow. During the fiscal year ended June 30, 1902, there were produced 132,077 diamonds, chiefly in the Potaro District, where stones of large size are often found. Mines are also located in Conawarook, on the Essequibo River; Cuyuni, Barama, and on the Massaruni. Good diamonds are often recovered in the sluices while washing gold. As yet no deep deposits have been exploited, although there are numerous promising prospects. Twenty-seven companies have declared diamonds during the fiscal year reported, headed by Messrs. Armeny & Fogel, the British Guiana Diamond Company, Limited, the Massaruni Company, Limited, and the Marshall syndicate. The exports for the year were 9,822½ carats.

briquette manufacture is controlled by a syndicate which includes among its members 31 firms and companies, or more than nine-tenths of all the producers in this country, and regulates the output and prices for each year. From the official report of the syndicate for 1901, which has recently appeared, it is learned that the total output during last year was 1,566,385 tons, to which is to be added the product of makers outside the syndicate, consumed at works, small retail sales, etc., making a grand total of 1,643,416 tons.

The average selling price in large quantities was 13.33 marks (\$3.16) per ton, against 12.27 marks (\$2.92) for the year previous, so that, notwithstanding the general relaxation of industrial activity and the diminished pressure upon the coal supply, the ruling price was the highest that had been realized since 1891. Of the 1,566,385 tons sold by the syndicate last year, 749,208 tons were taken by the German railways, 124,380 tons were sold to retailers, 497,136

\*From a report by Frank H. Mason, Consul-General to the State Department.

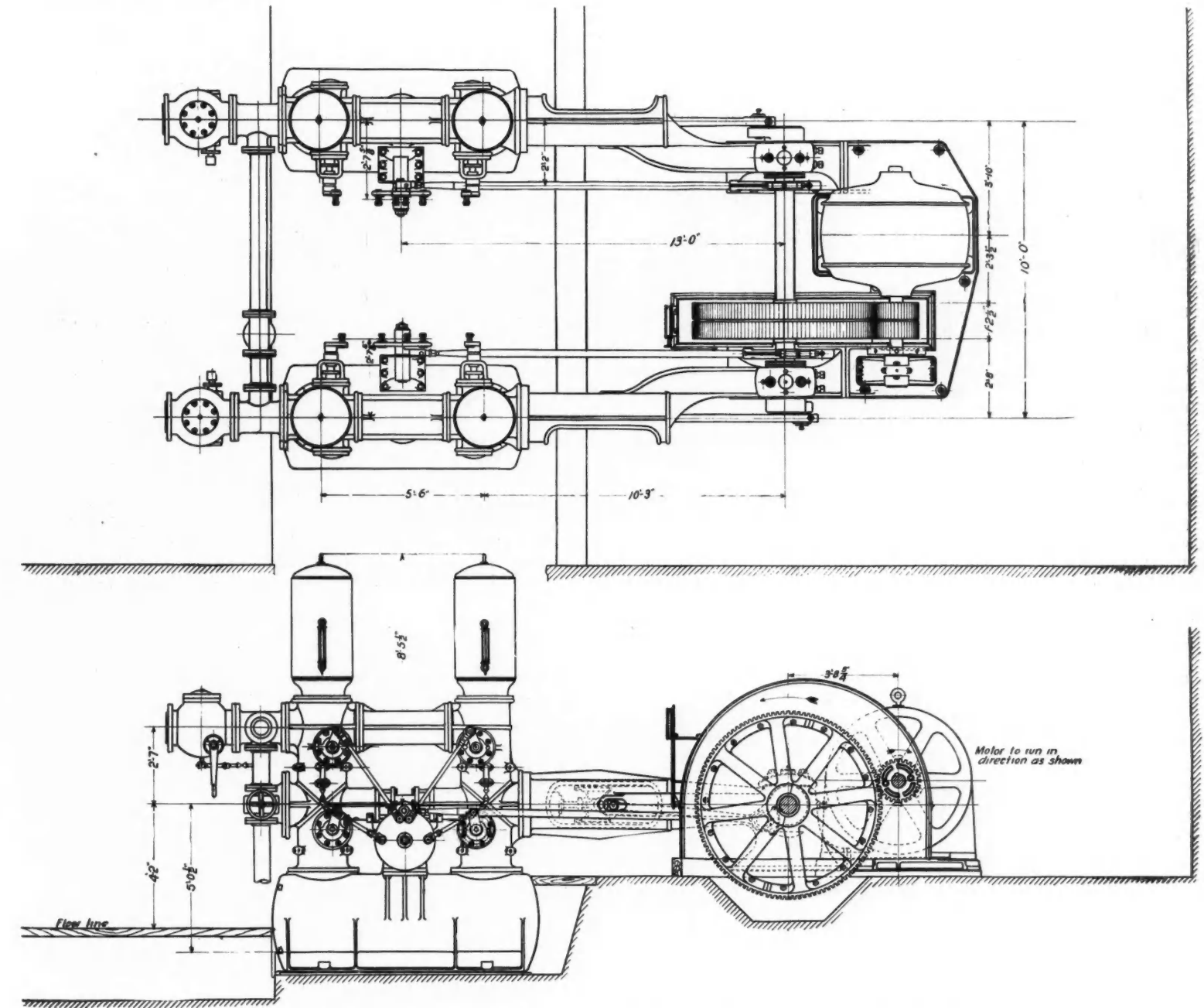


tons were sold to factories and works of various kinds, and 149,089 tons, or 9.8 per cent, were used by German merchant steamers and the navy or exported to the German colonies or neighboring European countries.

The syndicate produces to a large extent briquettes made from coal screenings, which require a matrix or binder of some plastic, inflammable material, and for this purpose 116,956 tons of mineral pitch were used, which cost on an average about \$10.25 per ton, delivered.

The following tabulated statement shows the pro-

duction, the sales of the syndicate, and the mean price per ton for the past eleven years:



C. & C. SHAFT AT VIRGINIA CITY—DUPLIX, DOUBLE-ACTING ELECTRIC-DRIVEN PUMPING ENGINE.

duction, the sales of the syndicate, and the mean price per ton for the past eleven years:

Year.	Production. Tons.	Sales of syndicate. Tons.	Price per ton. Marks.	Price per ton. \$3.02
1891	482,495	202,780	12.67	2.40
1892	533,075	516,508	10.47	2.16
1893	694,025	645,144	9.08	2.10
1894	745,414	719,258	8.82	2.16
1895	796,363	780,185	9.07	2.22
1896	830,985	818,300	9.34	2.38
1897	943,732	934,221	9.99	2.43
1898	1,078,113	1,245,269	10.22	2.34
1899	1,530,816	1,485,130	10.66	2.92
1900	1,563,928	1,519,811	12.27	3.17
1901	1,566,385	1,560,230	13.33	

Berlin, although a busy manufacturing city, ranks as one of the cleanest and best kept in Europe. One of the first things usually noticed by American and English travelers visiting the German capital for the

and quantity over the grate surface as to secure the most perfect combustion of its volatile elements.

Coke making in retort ovens, by which every element is saved and bituminous coal converted into smokeless coke and gas, is another important factor in German fuel economy and abatement of the smoke nuisance. If American municipalities beyond the economic range of anthracite are ever emancipated from their present vassalage to the smoke incubus it will be through the enforced use of one or more of three forms of prepared fuel; viz., coke and fuel gas made in closed ovens from bituminous coal, and briquettes made from lignite, peat and other inferior materials by processes which have been invented, tested and proven to be efficient by the older and more economical countries of Europe.

SULPHUR AND PYRITE IN 1901.\*

By JOSEPH STRUTHERS, PH. D.  
SULPHUR.

The production of sulphur in the United States during 1901 was 7,690 short tons, valued at \$223,430, which was derived from Nevada, Idaho, Utah and Louisiana, in the order of the importance of their output. A comparison with the production during 1900 of 3,525 short tons, valued at \$88,100, shows an increase during 1901 of 4,165 tons, or over 118 per cent, in quantity, and of \$135,330, or over 152 per cent, in value. The production of sulphur in the

United States during 1901 is the largest annual record ever made, and yet the domestic production has always been of insignificant proportions as compared with the total consumption of the country. The quantity of sulphur consumed in the United States from foreign and domestic sources in 1901, including the sulphur content of iron pyrite, which is used in the manufacture of sulphuric acid, amounted to 525,745 short tons.

The use of iron pyrite in the manufacture of sulphuric acid has shown a remarkable increase since 1891. The sulphur content of the iron pyrite used in that year was 93,233 long tons. In 1901 the sulphur content of the imported pyrite amounted to

\*Mineral Resources of the United States, 1901. United States Geological Survey.

181,668 long tons, and that from the domestic production of pyrite was 105,671 long tons, a total of 287,339 long tons, or more than three times the quantity consumed in 1891. This use is increasing steadily. By far the greater part of the sulphur consumed in the United States is used in the manufacture of paper stock by the sulphite process of treating wood pulp.

The imports of sulphur into the United States in 1901 was 175,210 long tons, valued at \$3,287,906, as compared with 167,696 long tons, valued at \$2,941,888, in 1900, and with 140,701 long tons, valued at \$2,523,203, in 1899. The estimated total domestic consumption of sulphur was 469,415 long tons in 1901, as compared with 408,038 long tons in 1900, with 345,904 tons in 1899, and with 211,491 tons in 1891.

The world's production of sulphur in 1900 was 577,420 metric tons, valued at \$10,698,494, as compared with 586,122 metric tons, valued at \$10,844,688 in 1899.

#### PYRITE.

The production of pyrite in 1901 was the largest yearly quantity yet recorded, amounting to 234,825 long tons, valued at \$1,024,449. A comparison with the production during 1900 of 204,615 long tons, valued at \$749,991, shows an increase in quantity of 30,210 long tons, or 14.8 per cent, and in value of \$274,458, or 36.6 per cent. The greater part of the output was derived from Virginia, Colorado, Massachusetts and New York, named in the order of production. Ohio contributed 7,585 long tons of pyrite, obtained as so-called "coal bases" from the coal mined in that State.

In addition to the large increase in the production of pyrite in the United States during 1901, there was a very large increase in the quantity of pyrite imported, the imports for 1901 being 403,706 long tons, valued at \$1,415,149, as compared with 322,484 long tons, valued at \$1,055,121, in 1900, an increase of over 24 per cent in quantity and over 34 per cent in value. The consumption of iron pyrite in the United States in 1901 was 638,531 as compared with 527,099 long tons in 1900, with 44,602 tons in 1899, and with 207,184 tons in 1891.

The quantity of sulphur displaced by pyrite for acid making is estimated at 287,339 long tons in 1901, 237,195 tons in 1900, 200,071 tons in 1899, and at 93,233 long tons in 1891, an increased displacement of over 200 per cent in the 11 years from 1891 to 1901, inclusive.

According to the latest available figures, the world's production of pyrite in 1900 was 1,640,979 long tons, as compared with 1,552,039 tons in 1899, and with 1,082,808 tons in 1892. The corresponding displacement of sulphur was 738,440 long tons in 1900, 648,418 long tons in 1899, and 487,263 long tons in 1892.

**PRODUCTION OF MICA.**—The total amount of plate or sheet mica produced in the United States during 1901, as reported to the Geological Survey, was 360,060 pounds valued at \$98,859, as compared with 456,283 pounds, valued at \$92,758, in 1900. There was a large falling off in the amount of scrap mica produced in 1901, estimated at 2,165 short tons, valued at \$19,719, as compared with 5,497 tons, valued at \$55,502, in 1900. The importation of mica from Canada and India tends to curtail the production in the United States, especially the Indian mica, which can be imported at a cost lower than that for which it can be mined in this country. There was an increase in the production of plate mica in North Carolina, but a large falling off in the production of scrap mica.

The imports of mica in 1901 were valued at \$335,054, as compared with \$319,560 in 1900, and with \$275,984 in 1899.

**BELGIAN PIG IRON PRODUCTION.**—Pig iron production in Belgium in the first six months of 1902 is reported at 509,790, as compared with 377,070 tons in the first half of 1901. The output this year consisted of casting pig, 45,590 tons; pig for refining, 138,220 tons; pig for steel, 325,980 tons.

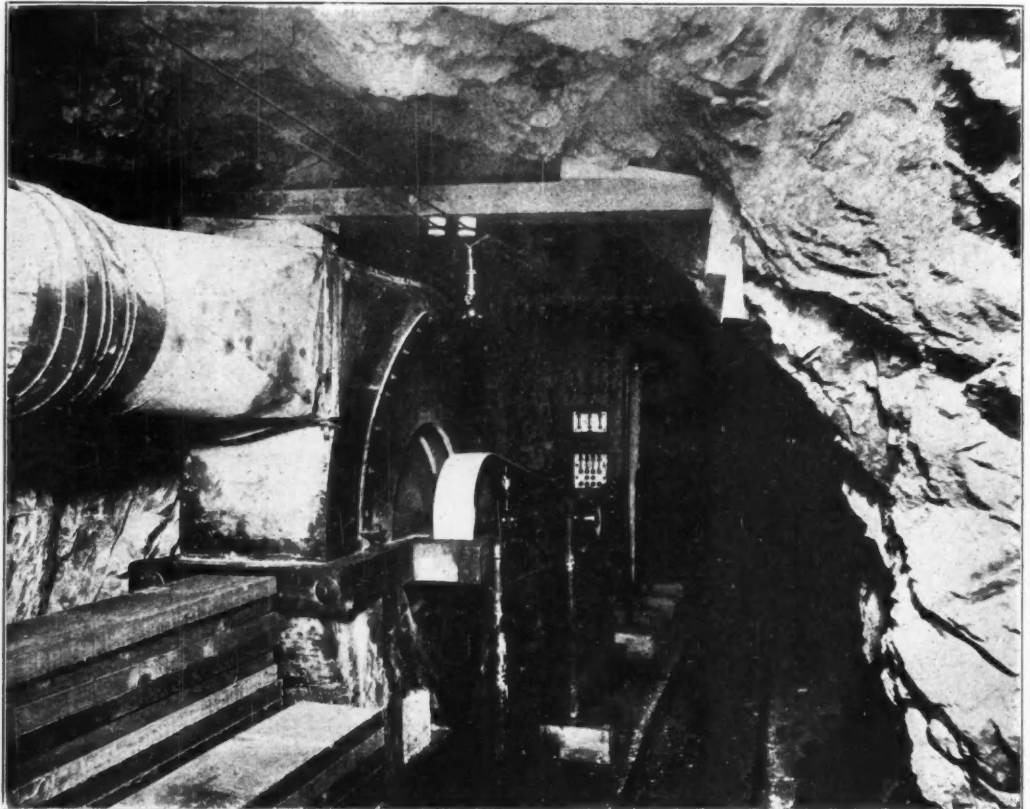
### PROGRESS OF THE UNIVERSITY OF TEXAS MINERAL SURVEY.

By WM. B. PHILLIPS, DIRECTOR.

The field work this season is being conducted in the southwest part of Brewster County and the southeast part of Presidio County. The object is to prepare a special report on the quicksilver district around Terlingua and a more general report on the area above mentioned. The report on the quicksilver district was entrusted to Mr. B. F. Hill, assistant geologist, and the greater part of the manuscript has been sent to the printer. By co-operation with the United States Geological Survey, it has been possible to secure a special topographic map of the Terlingua district covering an area of about 60 square miles on a scale of 1½ miles to the inch and with contour intervals of 25 feet. This map has been prepared by Mr. Arthur Stiles, and it is hoped that it will be ready for distribution some time during October. It will accompany Mr. Hill's report, and will

of 103 degrees 30 minutes west longitude, and for its southern boundary the Rio Grande. This area, therefore, will include the southwestern part of Brewster and the southeastern part of Presidio County, and will cover the Chivatti Mountains, the quicksilver district and a part of the coal fields of Brewster.

Following this map there will be another 30-minute quadrangle to cover the remaining portion of the coal fields and the Chisos Mountains, but this cannot be issued before next summer. All of the map work is being done by the United States Geological Survey under a plan of co-operation with the Texas Survey. The reports on the geology and economic features of the area are being prepared by the Texas Survey. The first bulletin on this region will be issued in October, if possible, and the next one in February, 1903. The field party of the Texas Survey is now in the Chisos Mountains, 40 miles east of Terlingua, the writer and Mr. Hill working together in order to avoid the expense of separate outfits. The Chisos



TYPE C MOTOR, DRIVING BLOWER AT 2,150-FOOT LEVEL, C. & C. SHAFT.

be of the greatest advantage to prospectors, miners, and all persons interested in the development of the quicksilver industry in Texas. It will show every mountain, hill, arroyo, mine camp, water-hole, road, trail, etc., in the district, and is the first map of the region ever prepared.

In addition to this special map there will be a regular Terlingua sheet, one of the series of the United States Geological Survey, to cover an area of about 600 square miles. Last winter an instrumental level line of 250 miles was run by Mr. M. S. Bright, of the United States Geological Survey, beginning at Marfa, Presidio County, and going to Terlingua by way of Alamito and the Fresno Canyon. From Terlingua side lines were run to Cigar Springs, Gano Springs, Grand Canyon of the Rio Grande, Aqua Fria, etc., and the line was brought back to Marfa by way of Butcher Knife, Elephant Mesa, Alpine and Paisano Pass.

Having completed the Terlingua special map, Mr. Stiles is now engaged upon the Terlingua sheet proper, and is triangulating the region, using San Jacinto, Santiago and the high point of the Chisos as three stations. Stone monuments have been erected on these peaks, and the mapping is now in progress. The Terlingua sheet will have for its western boundary the line of 104 degrees west longitude, for its northern boundary the line of 29 degrees 30 minutes north latitude, for its eastern boundary the line

Mountains are most interesting from a geological standpoint, as they are composed almost entirely of eruptive rocks that have come up through cretaceous limestones. The highest peak, Mt. Emory, is about 7,600 feet by barometer, and the entire district is extremely rough and wild. The economic importance of the Chisos range will be discussed in the Report of Progress for 1902.

**MINERAL RESOURCES OF INDO-CHINA.**—The French Academy of Sciences is about to send a scientific mission to French Indo-China for the purposes of examining the nature of the soil and its products. The Geological Section will be of exceptional importance. The names of the savants forming the mission are not published, as certain gentlemen, whose collaboration is somewhat necessary, have not given their final consent. From reports received, coal mining in Anam is making unusual progress. Borings are of frequent occurrence, and it is felt that the mission will lead to great developments.

**PIG IRON IN NEW SOUTH WALES.**—The London *Engineer* says that there are many foundries in New South Wales, but the supply of pig iron is greater than the demand. The price ranges from 72s. to 90s. per ton. On account of the high wages there is a strong tendency at present in the State to fix the price of labor artificially.



**THE MANGANESE DEPOSITS OF SANTIAGO PROVINCE, CUBA.\***

By ARTHUR C. SPENCER.

The deposits of manganese which have thus far been worked in Cuba are all located in the vicinity of the city of Santiago, in the Province of the same name, which is the easternmost on the island. The first ore, shipped in 1887, was a picked lot of 50 tons, and in spite of adverse conditions in regard to facilities for transportation, the output had increased by 1890 to 21,810 tons. From this time up to 1898 the amount of ore annually mined was not so great, but various deposits were denounced, and several mines were opened with varying success. As many as eight mines, which were worked previous to the revolution of 1895-98, have been visited by the writer.

In 1898 the Ponupo Mining Company resumed op-



FIG. 1.—LOCATION OF ORE BODIES IN ANTICLINES.

erations, which had been abandoned because of the demonstrations against the railroad in 1895. This company has been the only producer of manganese from this region since 1898. Other mines were being opened at the time of the writer's visit, in May, 1901, and these will soon be producing ore.

The manganese ores of the Santiago region are mixtures in various proportions of the common oxides of manganese, probably including manganite, pyrrhotite, braunite and wad. The deposits occur in a region lying back of and parallel to the Sierra Maestra, between Guantanamo on the east and Manzanillo on the west, and in general coincident with the drainage basins of the Rios Cauto and Guantanamo. The geological structure between the latitudes of the two cities named is that of a broad synclinal fold, with an east and west axis. From Cabo Cruz on the west to Guantanamo on the east the stratified rocks which compose the northern slopes of the Sierra Maestra dip at angles of from 10° to 20° toward the depressed area of the interior occupied by the Rios Cauto, Guaninicum and Guantanamo, while upon the north side of these drainage basins the strata rise as the mountains which occupy the country between them and the north coast are approached. The rocks exposed along the crest of the Sierra Maestra are coarse, well stratified volcanic breccias, but upon the northern

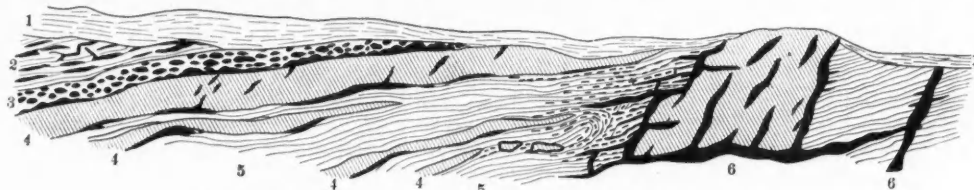


FIG. 2.—GENERALIZED CROSS-SECTION, YSABELLITA MINE.

slope these soon pass beneath strata showing an alternation of marine sediments and fine-grained volcanic tuffs, which are in turn covered by flows of basalt and still other fragmental volcanic deposits. This essentially volcanic series grades into and finally gives place to limestones and other purely marine sediments, as may be well observed along the new military road which crosses the high range of hills north of Santiago Bay, and at Cristo, where the Moroto & Sabanilla Railway crosses the same range in a deep notch or pass. On both sides of the railroad south of this pass there are several old manganese mines in rocks belonging to the upper part of the mixed volcanic and marine series. The manganese mine was also formerly worked near the station of Dos Bocas, several miles west of the deposits located south of Cristo, and apparently in rocks occupying approximately the same stratigraphic position. The beds exposed in these mines are very much disintegrated, and being the first

of the ore-bearing strata to be examined, they were considered to have been derived from volcanic tuffs similar to unweathered beds of pyroclastic material which had been discovered in the vicinity. The decomposed rock is frequently impregnated to a considerable extent by manganese ore. It is variegated in its coloring, being green with red splotches. It exhibits no gritty material, and it appears to have been made up of fragments which were originally angular in form. This view of the volcanic nature of the rock associated with the manganese ores of these localities was afterwards abandoned because of the complete similarity between them and those of other mines to be described, where the nature of the ore-bearing horizons could be definitely fixed. At the Boston mines, located between two and three miles to the east of Cristo, the country rocks are limestones and glauconitic green sands, cemented by lime, and both of these rocks are found replaced by ore.

In the deposits south of the Cristo divide, between the drainage which flows directly to the sea, by way of the Rio San Juan and the basin of the Rio Cauto, which finds its outlet to the west of Cabo Cruz, the strata all dip at varying angles toward the north, excepting in such instances as they are overturned, when the reversed dips are very steep toward the south. Associated with the ore there are large amounts of siliceous rock in the form of dense amorphous jasper, or bayate, as it is locally called. Traced in a broad way, the bayate may be made out to follow the stratification of the bedded rocks, along which it occurs in interrupted masses. But studied locally, the irregularity of the bayate is such that, with the poor exposures of the strata which exist, it would be impossible to say that it did not have the form of cross-cutting veins, as sometimes appear. However, the interbedded character of the silicious rock is established with a good degree of certainty. Across the stratification the thickness of the jasper masses is found to vary from a few inches to 15 or 20 feet, while along the bedding they may have a length reaching in some cases several hundred feet. The ore occurs principally in a very irregular way, filling a space between the jasper and the country rock, but also in the form of veins in the masses of jasper, and disseminated through the decomposed country rock adjacent to the jasper. In the last case the ore frequently has the form of nodules arranged in the bedding planes of the parent rock, which it seems to have replaced in part. The relations of the ore and the jasper are very intimate, and specimens may be found in which veinlets of ore

penetrate the jasper as though there had been molecular replacement of the latter by the former. On the other hand, cases may be observed in which the opposite condition seems to have obtained, so that the ore was replaced by silicious material introduced after the first deposition of the metallic mineral. In general the mode of occurrence is such that both the ore and the associated jasper appear to have been introduced in a secondary way after the deposition of the strata in which they are found, and the original substance of which they now replace. The jasper and the oxides of manganese are of contemporaneous origin, and for their introduction into the strata where they now occur the action of heated water in circulation is suggested. The constitution of the green sand beds was evidently favorable for a chemical reaction between their substance and the materials held in solution by ascending hot waters, which doubtless, originating at a considerable depth, found easy channels of outlet through the more porous of the disturbed and upturned strata occurring in the region.

Other manganese mines, and, in fact, the only ones at present in operation, lie about three miles east of Cristo, and 12 miles to the northeast of the same town. The former comprise the Boston group of claims already mentioned and the Ysabellita near by. The latter is the position of the Ponupo mines. Owing to the limited time at my disposal, it was impossible to sufficiently test the theory, formed in the field, that all of these deposits lie at approximately the same geological horizon. There are, however, some facts which tend to support this idea. Perhaps the most important of these is the occurrence of a band of limestone, composed almost entirely of foraminifera, belonging to the type orbitoides just above the ore horizon, at four distinct and widely separated localities, namely, near the mines east of the railroad south of Cristo; at the Boston Mines, at the Ponupo Mines and at San Nicolas, about eight miles west of San Luis, where manganese ores also occur in green, disintegrated sandstones. Again in almost all of the places where the strata in which the ores occur are exposed, they are exactly similar, being loose, disintegrated sandstones, mostly of a dark-green color. At the Boston Mines the green,

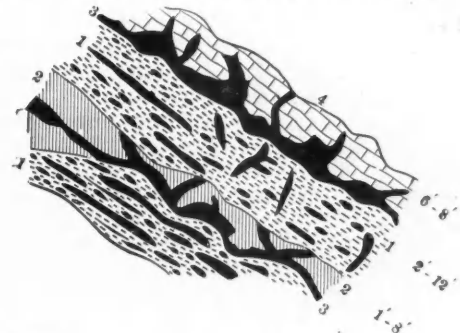


FIG. 3.—SECTION ACROSS ORE BEDS, PONUPO MINE.

decomposed sandstones have been uncovered at a short distance from the ore-body, and here, though resembling in general appearance the sand which occurs with much of the ore, they are found to be made up in large part of the shells of a large variety of foraminifera filled with glauconite and accompanied by grains of the same mineral to which the green color of the sandstone is due. It seemed evident that these rocks and the ore-bearing beds were originally of the same nature, but that the calcareous shells of the foraminifera had been removed from the near neighborhood of the ore deposits by the solutions which deposited the silica and manganese. A similar removal of the calcareous contents may be taken to explain their absence from the other localities, where the only strata observed were those in close proximity to the ore bodies and jasper.

The rocks in the region south of Cristo were found to have been tilted toward the north, as though they were lying upon the south side of a great structural syncline. This, in fact, they do, as more general observations in Santiago Province show. The structure in the immediate vicinity of the Boston and Ponupo mines is quite different. These lie well within the great syncline, where the strata have been thrown into minor folds, and it is observed that the ore deposits in both places occupy the central or axial portion of anticlines or arches in the strata. The Ysabellita Mine is less than a mile from the Boston, and appears to be located upon the same arch, but the structural relation between this fold and the one at the Ponupo Mine is not known. Though the altitude of the strata is different, the relations of the ore, jasper and country rock are exactly the same as at Cristo, and the deposits have been the result of metasomatic replacement of calcareous strata by manganiferous minerals and jasper. In the case of the Boston, Ysabellita and Ponupo mines, and probably also at San Nicolas, it may be argued that the hot waters to which the replacement is attributed ascended through fissures locally developed along the axis of the folds rather than through the strata, as has been suggested for the occurrences in the vicinity of Cristo, where the stratified formations are standing on end. This

\*Published by the permission of Brigadier-General Leonard Wood, U. S. A., Governor-General of the Island of Cuba.

would account for the local character of the deposits along the folds, as well as the presence of undissolved shells and the absence of both jasper and ore in the beds of green sand as they rest on the flanks of the arch at the Boston Mines. The sketch represented in Fig. 1 is a section representing the general mode of occurrence in the anti-cline in which the Boston and Ysabellita mines are located.

In both of these mines the amount of jasper is large, and it occurs in large masses, around which the richest ore is found, with deposits in which the ore is mixed with rock, disseminated locally in the portions of the decomposed green sand or glauconitic rock adjacent to the jasper. Sometimes the ore is found to entirely surround the masses of siliceous rock along its contact with the country rock. An illustration of this is seen in the Boston Mine, where a large block of jasper has been worked about on all sides and a large amount of ore extracted. Another is seen in the workings of the Ysabellita Mine, as shown in Fig. 2, which is a diagrammatic section across this deposit, so far as it has been opened. Next to the large mass of jasper represented to the right of the center of the drawing, a bed of loose, sandy material, containing oxide of manganese in the form of small nodules arranged along the planes of stratification, extends to a distance of not less than 25 feet from the jasper, and the thickness of the ore-bearing bed is not less than 20 feet as exposed.

In this vicinity there are no less than six distinct outcrops of jasper in large masses, within a radius of about 150 feet, but only one has been sufficiently developed to prove the presence of large quantities of ore.

At the Ponupo Mine the conditions are quite similar to those at the two mines just mentioned. The deposit occupies the center of an anticlinal fold, and there are large amounts of jasper, with high-grade ore occurring in contact with it, and ores of lower grade, because mixed with decomposed rock lying adjacent to it. Here the ore extends up to the horizon of the foraminiferous limestone, which it has replaced in part, as was well seen upon the north side of the mine, where the sketch given as Fig. 3 was taken. The ores in these three mines occur about the summits and slopes of knolls which owe their elevation to the durability of the jasper against the processes of erosion. This jasper occurs in very irregular masses, between which the ore is found in equally irregular pockets, either pure, or, as has been stated, mixed with decomposed country rock. Frequently the ores are intimately veined or impregnated with streaks of jasper, when they become valueless, but as a rule the jasper occurs in well defined nodules, which may be easily separated from the rock, which must be mined with the ore.

The mode of occurrence in all of the localities mentioned is such that very large deposits cannot be expected. A yield of 100,000 tons of first-grade ore from any one mine is estimated as all that can be expected in most cases, though if the attempt now being made to concentrate the ores at the Boston Mine is successful the marketable output will be greatly increased.

The Ponupo Mine has been worked on a large scale since the winter of 1898. It has standard gauge tracks laid to the ore chutes. A track has also recently been completed to the Boston Mine, and can readily be connected with the Ysabellita. It is from these mines that the supply of Cuban manganese mineral will be drawn for some time, though with the completion of the railway now under construction westward from Sanitago a few other mines of equal importance may be developed. The amount of ore which may be anticipated from any one of them will not, however, warrant the construction of special tracks of any great length to bring their product to the trunk line.

**IRON AND STEEL IN BELGIUM.**—The output of finished iron in Belgium in the first half of this year was 185,410 tons, as compared with 181,395 tons in the same period last year. The output of finished steel was 358,170 tons, as compared with 240,595 tons.

### GLACIAL GOLD IN WISCONSIN.

By Kirby Thomas.

There have been more or less frequent reports of gold in the glacial gravel of the upper Mississippi region, and the newspapers fill considerable space with stories of stray nuggets and fairy tales about chickens' gullets filled with gold gravel. I had occasion to investigate recently one of the places where glacial gold was supposed to exist in considerable quantities. The locality had long been reported to bear gold, and large stories were extant concerning it. The district in question is at St. Croix Falls in Wisconsin, on the bed of the St. Croix River, and extends for three or four miles above the falls. At this point the river goes through a gorge at right angles to the Keweenaw trap ridges, which are 300 or 400 feet high. The location is just above the famous St. Croix Dalles, and the St. Croix Falls are in a neck, which is the beginning of the St. Croix Dalles. A considerable basin has evidently existed above the St. Croix Falls before the river cut its channel down through the crossing ridge of trap. On the bottom of this basin appears to be a bed of sandy shale, probably of the Potsdam period. The river has cut through this and left the edge to form steep banks on either side of the river. On top of the shale is a mantle of drift from 10 to 25 feet thick at the river bank, and gradually thinning back toward the trap ridges which form the outer rim of the valley. The river now flows on a bed of the original trap. The natural dam and the probable impounding of the waters above it would form the proper conditions for the concentration of any gold or heavy metal in the gravel, and the facts are that on either side of the river along the line of the contact of the gravel with the shale can be found "colors." Some nuggets of gold (one worth \$7) have been found in the bed of the river at the point where the river cuts through the natural dam. When the river is low by reason of the closing of the logging dam above, the residents of this vicinity find it profitable to scratch out the cracks, crevices and pockets of the river bed and extract attractive nuggets and gold dust.

The gold in the river bed is probably the secondary or tertiary concentration from the gravel which now forms either bank. The gold in the gravel has probably been assorted at the outlet of the old lake bed at no very distant date and long after the glacial period. I took pannings of the line of contact at different points for about three miles up, and very seldom failed to get from one to ten colors to the pan. The gold is all flaky, but could be saved by ordinary processes.

The origin of the gold in the gravel is hard to determine, but apparently it has been carried down from the Keweenaw exposures in Douglas County to the north. At the southwest corner of Douglas County the Federal Copper Mining Company has been developing a copper property, and struck a ledge of fine-grained diabase showing native specks of gold in places, and which gives an assay of \$9 to the ton. It is known that the Chippewa Mine, further up on the range, gives a value in the assay of from \$2 to \$11 in gold, and at the Dedham and other properties on the Douglas and St. Croix Ranges more or less gold can be obtained by assay. The gold in most cases is probably not in the native state, as a fire assay fails to give anywhere near the values which it is claimed are obtained by electrolytic assay. As near as I can ascertain, the gold in the Keweenaw traps of Douglas County is in combination with the arsenic, which the assays show exists in the rocks, but some free gold exists, and I have seen samples showing distinct gold colors in the native rock. There has been a great erosion of the Keweenaw rock at both the time of the glacial period and since, and it is not unlikely that if the gold occurred in this formation it has been gathered into the valley of the St. Croix, above the natural dam of the St. Croix Falls, and has been worked over in the currents and concentrated along the bed of the former river or lake.

As to the probability of profitable mining in the

St. Croix gold gravel, it is hard to determine. The colors are almost entirely confined to the contact of the clay shale with the drift, and from 10 to 20 feet of barren drift would have to be removed to get at them.

It was reported that one miner dug a trench for about 300 feet from the river bank, and conducted a ground sluicing operation, obtaining some \$1,200 to \$1,400 of gold in the course of one winter and summer. I have seen the workings, and if the amount of gold did not exceed \$1,200 to \$1,400 it would hardly have paid to have removed the amount of dirt which has been turned over to obtain this value. Probably by sluicing from the transverse streams a considerable amount of the bed rock could be exposed and examined without much expense. A power company is at present building a dam below the gold-bearing gravels, and in a year or so the gravel will be again buried beneath the water. In the meanwhile nobody seems to be able to get up courage to extensively develop the gravel, and the only operating is the occasional desultory work by the natives and the annual scramble to scratch the crannies of the river bed when the water is low.

This story of the gold in the St. Croix River has haunted a good many mining men in the Northwest for a long time, and the fine bottles of dust and nuggets which are hoarded by the residents have led a number of men on to disappointment, but the fact remains that there is gold there, and it is certainly glacial gold.

**COAL RESOURCES OF AUSTRALIA.**—According to reports made by the Government geologists of Victoria and Queensland, there are no less than 62,000 square miles of coal-bearing country in the eastern States of Australia. The probable quantity of coal available (after deducting one-third for loss), in seams ranging from 2 to 27 feet in thickness, is not less than 240,448,053,000 tons. In Victoria there are beds of tertiary coal over 260 feet thick, and extensive seams of oil-bearing shale exist in New South Wales and Tasmania. The coal in New South Wales is estimated at 115,346,880,000 tons; in Queensland, at 83,310,000,000 tons; in Victoria, at 32,388,213,440 tons; in Tasmania, at 8,363,520,000 tons; in West Australia, at 1,045,440,000 tons.

### ABSTRACTS OF OFFICIAL REPORTS.

#### *English Crown Spelter Company, Limited.*

The report of this company for the year 1901 shows that the receipts from sales of spelter were £114,708, while unsold stocks, ore on hand, etc., amounted to £29,398, making a total for the year of £144,106. Expenses for the year at the works in Wales and the mines in Italy, with general expenses, etc., amounted to £142,783, leaving a profit balance of only £1,323 for the year. The directors' report gives the following particulars:

"The accounts show that 12,258 tons of raw calamine and blende were raised from the mines, and that 8,645 tons of discariche ores were sent to the dressing works. These produced 12,313 tons of calcined calamine and blende, net dry weight, at a cost of £3 10s. 1d. per ton of ore delivered at Swansea.

"In addition to the quantity of calamine consumed, 4,101 tons of blende and purchased material were treated at the smelting works. The whole resulted in the production of 6,516 tons of metal. The following is a comparison of the output of calamine ore and blende in raw tons from the mines for the past five years, and the average assay of the ore as received at the works:

1897.	1898.	1899.	1900.	1901.
8,726	8,283	13,380	13,837	12,258
47.85%	49.98%	47.85%	47.04%	46.53%

"The above quantity of 12,258 tons produced 9,739 tons, net dry weight, of calcined ore. The discariche treated at the dressing works during the past year yielded 2,574 tons of calamine and blende, net dry weight, assaying 41.17 per cent zinc.

The smelting works have been conducted to the entire satisfaction of the board during the past year, and have earned a fair profit, which, however, has



been for the most part absorbed by the loss which has been incurred at the mines owing to the heavy fall in the price of spelter. The buildings, furnaces, and general machinery are in excellent order. The average price obtained for the metal invoiced was £17 6s. 1d., as against £20 12s. 11 d. in 1900. This considerable fall in the price practically accounts for the greatly diminished profits earned.

"The Swansea Harbor Trust, having in view the extension of its east dock, which would necessitate its acquiring a strip of this company's land along the southern border of its property, by which its tipping facilities would be interfered with, approached the company on the matter, and a provisional agreement has been entered into with the Trust which provides for the disposal of the slag and other refuse of the works, also for compensation for the land and other rights to be handed over by this company.

"The mines of the Welsh Crown Spelter Company, Limited, have not yet come into profitable operation owing to defects in the machinery which was supplied by the contractors, who, however, have done their best to remedy them, and the works are now completed and have recently been restarted after a long delay. It is believed that they are now working satisfactorily, and are capable of treating the estimated quantity of ore.

"The net results of the combined operations of mining, dressing and smelting show a profit of £1,323 after allowing for depreciation, which, together with the balance of £122 brought forward from the previous year, gives a total amount of £1,445. Out of this profit, the directors recommended that £1,000 be placed to reserve, bringing that fund up to £10,000, leaving the sum of £445 to be carried forward to the next account. The directors regret that these figures do not permit the declaration of a dividend for the year, but the prospects for the coming year are more favorable; the price of spelter has arrived at a satisfactory level, and for the first six months of 1902 has ruled considerably higher than the average price attained for the year under review."

#### *Société des Mines et Forideries de Zinc de la Vieille Montagne.*

This company is well known as one of the largest and most important zinc mining and smelting companies in the world. The report for the year 1901 shows that the net receipts for the year from the sales of ore, spelter and zinc white were 4,105,367 francs; from miscellaneous sources 81,015 francs; making a total net revenue of 4,186,383 francs. The charges entered against these profits were: General administration, 344,046 francs; interest on bonds, 325,681 francs; other interest and miscellaneous, 435,418 francs; a total of 1,105,145 francs. To this should be added 40,572 francs carried over from the preceding year, making a total sum of 3,121,810 francs. From this the sum of 526,247 francs were appropriated for the amortization fund or reserve, and 2,578,905 francs were paid in dividends. This left a balance of 16,658 francs forward to the current year.

The report says that in 1901, the average price of spelter sold was 423.70 francs per metric ton, being 79.50 francs less than in 1900. The price of lead was still lower, having been 315.40 francs per ton in 1901 or 111.05 francs less than in 1900. The company's smelting works produced in 1901 a total of 73,415 metric tons of spelter, while there was also turned out 8,836 tons of zinc white. The larger part of the spelter was sold in the form of sheets, of which 61,891 tons were turned out by the company's rolling mills. Unfortunately, while the price of spelter was lower, that of coal increased, and at the same time, the ores, which the company bought in order to make good its supply, were secured at prices which left a very small margin of profit in smelting. The cost of labor also has not returned to the level which prevailed before the period of prosperity of 1899, and expenses generally have been high. It will be understood that all these circumstances combined to reduce the profits of the year.

At the same time, there were some favorable conditions. Stocks both in Europe and America are not heavy, and demand was large throughout the year. The United States consumed almost its entire production, and the exports from that country to Europe were unimportant. The lower price of the metal was due entirely to the competition which existed among the European companies, for the greater part of the year, in spite of all the endeavors of this company to secure some agreement. The directors of the company believe that there is no reason why a satisfactory return cannot be secured for the metal, and will continue their efforts to establish some agreement among the European manufacturers.

The company's reserve fund now amounts to 10,804,881 francs, which exceeds by 1,804,881 francs the capital stock, which is 9,000,000 francs. A sufficient reserve having thus been provided to pay off the capital stock, it is proposed to return to the system which was pursued before 1888.

#### *Arizona Copper Company, Limited.*

The report of this company, as issued from the office in Edinburg, Scotland, covers the half-year ending March 31, 1902. The total profits from the operation of the mines at Clifton and the Arizona & New Mexico Railroad were £118,066. Dividends on preferred stock were £12,266, leaving a balance of £105,800.

The directors' report says: "The balance brought forward from September 30, 1901, was £14,410, which added to the above gives a total surplus of £120,210. From this amount will be deducted, at the close of the financial year, a sum to be set aside for redemption of debt and for contingencies. The directors have resolved to pay on July 30, 1902, interim dividends for the year of 4s. per share, free of tax, on 316,530 preferred ordinary shares and 63,444 deferred ordinary shares. These dividends will absorb £75,995, and leave a balance of £44,215, subject to the deduction referred to above. The capital outlay during the half-year was £94,898, chiefly for railroad construction. The construction of the Lordsburg & Hachita Railroad has progressed satisfactorily, and it is expected that the line will be completed at an early date. The widening of the gauge of the Coronado Railway from Longfellow to Metcalf, and the additions to the bessemer plant, referred to in the last report, are being proceeded with as expeditiously as possible.

"The amount in the hands of the trustees for the debenture stockholders, from the sale last year of certain of the company's mines, was recently reduced, by redemption of debenture stock, to about £129,000, the debenture stock outstanding being also reduced to about £187,000, including the premium payable on redemption. With a view to making the sum in the trustees' hands available to the company towards the capital expenditure, completed and in progress, the directors have offered to give 5 per cent terminable debentures of the company in exchange for debenture stock. The response to the directors' proposals has been such that the success of the scheme is assured, and it is anticipated that the whole of the debenture stock will soon be either converted or paid off, and the trust brought to an end.

"The production during the half-year was equivalent to 7,506 tons (2,000 lbs. each) of pig copper. This is largely in excess of the quantity which Mr. Colquhoun promised would be made when the new plant was in operation, and had the market price of copper been maintained, the results of the working for the half-year would have been still more satisfactory."

The general superintendent's report says: "In the smelting department 56,101 tons of copper ore and concentrates, and 1,544,685 pounds of copper derived from leacher, were smelted, resulting in a gross yield of 14,819,495 pounds (not including 147,892 pounds of copper produced as bluestone), which was equal to a monthly average of 1,235 tons. Of the total, 6,637 tons were obtained from the smelting of copper ores and concentrates, representing an average

yield of 11.8 per cent.<sup>1</sup> 170,774 tons of concentrating ores were treated, and, in their concentration, yielded 26,114 tons of concentrates. Of the 170,774 tons of ore treated, 55,044, or 32.2 per cent., were obtained from Metcalf and Coronado, and 115,730 tons, or 67.8 per cent, from the Humboldt Tunnel workings and from Yavapai. Nos. 1, 3, and 4 concentrators treated 86,627 tons, and No. 5, 42,735 tons of sulphide ores, while No. 2 concentrator disposed of 41,412 tons of oxide ores, which was obtained from Metcalf and mines tributary to that field. On an average 6.54 tons of raw ore produced 1 ton of concentrates, as against 6.04 for the last six months.

"The operation of the acid plant resulted in a yield of 2,239.53 tons of sulphuric acid (H<sub>2</sub>SO<sub>4</sub>). During the previous half-year the output of acid was 1,463.21 tons. No. 4 lead chamber was rebuilt and put to work in the early portion of the half-year. The entire plant may now be regarded as new. The leaching plant treated 35,035 tons of tailings, and produced 1,597,165 pounds of copper; in addition it produced 295.78 tons of bluestone, which contained 73.95 tons of copper. The yield per cent (including copper contained in bluestone) was 2.49, as against 3.37 for the last term, when 19,100.2 tons of tailings were treated. As compared with the previous six months, the consumption of tailings shows an increase of 15,935 tons, and the production of copper was increased by 227.4125 tons, reckoning 25 per cent of bluestone production as copper.

"Including fluxes, 215,556 tons of ore were treated, the yield being equal to 3.49 per cent. In the previous term the tonnage amounted to 123,082, and the yield to 3.42 per cent. In all, 199,954 tons of copper ores were treated, of which 170,774 tons, or 85.4 per cent, were concentrating ores. The average yield of all copper ores treated was 3.72 per cent. Including bluestone, the yield was 3.76 per cent. First class ores yielded 2,476 tons of copper, while the concentrating ores—including the leacher output—contributed 5,033.93 tons (including copper in bluestone). The yield from concentrating ores was 2.95 per cent, as against 2.86 per cent last half-year.

"The new plant has been in operation long enough to enable us to discover its merits and its defects. Its capacity is much beyond what we had any reason to expect. In all, it has six furnaces; but only two of these are necessary to successfully treat all the ores and mill products our mines and mills are producing. As was to be expected after such a phenomenally rapid construction, much remained to be done in the way of improvement of yards, bins, approaches, etc. The expense of a great deal of this work has been charged as ordinary expenses, and the expenses are therefore higher than they will be hereafter. Further expense, however, is necessary in order to give our men that protection from heat and dust which is necessary to good work. Notwithstanding these extraordinary expenses, the plant shows a saving of over £40,000 per annum as compared with the old plant. The smoke nuisance, although abated, is not yet quite eradicated. Arrangements have been made for the erection of an additional flue, which, it is hoped, will make the conditions as perfect as can be expected under the circumstances.

"During the half-year an arrangement has been erected for the more perfect handling of the slag and leacher tailings. The slag is granulated and carried by water to a sand-wheel which elevates it into a bin. From this and from another bin the slag and tailings are hoisted by a skip-car and dumped into bins. These bins are tapped by side-dumping cars, which convey the refuse material to the Arizona & New Mexico Railway bridges, where it is dumped and used as fillings. Bridge No. 12, the largest bridge on the railway, over 500 feet in length and fully 60 feet in height at its center, is being filled up in this way. At the present rate of filling, this bridge will be converted into solid road-bed in about three

<sup>1</sup>The production applicable to the half-year, as finally adjusted, including the copper produced as bluestone, was equivalent to 7,506 tons (2,000 lbs. each) of pig copper in the mill.

months. It is proposed to fill up all trestles in this way. At the present moment steel sheds are being erected in the bullion cleaning yard and behind the feed floor. Without these improvements it would be impossible to maintain in hot weather the present high efficiency of the workmen. For the better treatment of flue-dust and fines a large grinding pan has been ordered. This will furnish a valuable aid in the treatment of such materials.

"During the half-year, 7,510 tons of copper were produced, an increase of 3,296 tons as compared with the previous half-year. The average yield of all the ores was 3.72 per cent. The new smelting plant has succeeded even beyond our expectation; the new concentrator at Longfellow is a notable success; the increase in output has been greater than was predicted, and the reduction in costs has been as great as could be expected, considering the extraordinary conditions into which we have just entered. The full effect of these improvements will not be felt until next September, when we will receive the benefit of reduced railroad rates.

"At the mines of the Longfellow group, the sudden demand for a large increase in ore output was ably and successfully met by Mr. Nicholas, whose dispositions were all that could be desired under very trying circumstances. The necessity for closing up old stopes and of opening out new stopes in various parts of the mines became soon apparent, and the extra cost of this work added to the burden. The new system of attacking the ore-bodies involved much dead-work in the way of drifts, air-connections and waste-rock connections, few of which are even referred to in this report. In addition, fully 1,000 lineal feet of tunnel were driven, resulting in the extension of the Humboldt Tunnel to Carasco Gulch and into the Clay Mountain. This tunnel is now being extended into the Clay Mountain. It forms a convenient means of prospecting the Clay and Carasco groups, and will be used for that purpose. The developments on the Humboldt Tunnel level and on the lowest level of the property clearly proved the continuity of the ore-bodies. The cross-cut which parallels the Rex Monte Tunnel developed an unexpected width of ore-body. As usual, all expenses were charged against the ore.

"In the Metcalf field the conditions were not favorable to good results, and the drop in the price of copper which affected all of the half-year made matters worse. An unusual amount of development and improvement work was done, and all of this was charged to revenue. The closing down of the Coronado, which, but for the necessity of carrying materials and machinery for the new shaft, would have taken place last December, enables us to draw in our lines and concentrate work on the Metcalf field, from which improved results may now be looked for. The closing down of the Coronado has also enabled us to place a number of men on lease work, which we will encourage as much as possible. Mr. McLean has handled this extremely difficult field with conspicuous ability. On the whole, the mines are in a thoroughly satisfactory condition, well able to deal with the present or any condition that is likely to arise.

"The improvements on the Coronado Railway have resulted in greatly increased capacity and reduced cost. Agreeably to the arrangements with the Shannon Copper Company, we are now driving tunnels and making ready to widen the Coronado Railway between Longfellow and Metcalf. We hope to have this work completed by next October."

#### BOOKS RECEIVED.

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

*The Foundations of Geometry.* By David Hilbert, Ph.D., University of Göttingen. Authorized translation by E. J. Townsend, Ph.D., University of Illinois. Chicago; The Open Court Publishing Company. Pages, 132; illustrated. Price, \$1.

*Western Australia, Preliminary Report of the Department of Mines for 1901.* H. S. King, Under-Secretary for Mines. Perth, W. A.; Government Printer. Pages, 44.

*Twelfth Census of the United States, Volume II, Population. Part II.* Prepared under the supervision of William C. Hunt, Chief Statistician for Population. Washington; United States Census Office. Pages, 754. Illustrated with maps and diagrams.

*Mining Institution of Scotland. Translations, Volume XXIV. International Engineering Congress, Glasgow, 1901. Proceedings of Section VI.—Mining and Metallurgy.* Edited by M. Walton Brown, Secretary, Newcastle-upon-Tyne. Published by the Institution. Pages, 306; illustrated.

*United States Geological Survey; Mineral Resources of the United States, 1901. Manufacture of Coke.* By Edward W. Parker. Pages, 78. *Occurrence of Strontium Ores.* By Joseph Hyde Pratt. Pages, 8. *Production of Cement.* Pages, 17. *The Stone Industry.* Pages, 67. Bulletins. Washington; Government Printing Office.

#### BOOKS REVIEWED.

*United States Geological Survey. The Gold Belt of the Blue Mountains of Oregon.* By Waldemar Lindgren. Extract from 22nd Annual Report of the Survey. Washington; Government Printing Office. Pages 226; illustrated.

This report records the results of a reconnaissance in the gold-bearing area of Northeastern Oregon and is accompanied by a topographical and geological map on the scale of six miles to the inch. Much attention has recently been attracted to the district surrounding Baker City and Sumpter, formerly only known as a placer mining country, it has forged ahead rapidly during the last few years by the discovery of a number of important producing veins like the North Pole, Columbia, Red Boy and Bonanza, and its annual production ranging from \$1,100,000 to \$1,800,000 bids fair to be materially increased.

The Blue Mountains are considered as a salient from the great mass of central Idaho and are nearly entirely surrounded by floods of Neocene lavas. The geology is described first in its general features, and then more in detail when the separate mining districts are taken up. The main core of the mountain consists of probably Carboniferous argillites with some limestone lenses, broken by great irruptions of granodiorite and diorite, while the Eagle Creek Mountains in which the Cornucopia Camp is located consists largely of Triassic sediments and lavas, in part altered by regional metamorphism and also cut by granitic intrusions. On the whole, this region thus belongs to the Pacific province and shows similarity in some respects to the Sierra Nevada.

The description of general geology is followed by a review of the mineral deposits. The gold and gold-silver veins are naturally treated in more detail, though some pages are devoted to the copper deposits, most of which are as yet in the stage of prospects. The gold veins form strong vein systems cutting argillite or intrusive rocks, never in the Neocene lavas. Their general direction is easterly or northeasterly, similar to the majority of the fissure veins in central Idaho and southern Montana. Most of them are typical gold quartz veins; in metasomatic alteration and in the mineral associations they resemble the gold quartz veins of California and Idaho, and are believed to belong to the same period of formation, that is, to the early Cretaceous. The native gold, which sometimes occurs very sparingly, is accompanied by rich sulphures, tellurides, and sometimes roscelite and scheelite. Several subtypes are recognized and described. The ore shoots are described in some detail and interesting relations shown of their occurrence in the wide composite veins of the Cracker Creek district. As a rule, these shoots occupy only a small part of the width of the vein and this may possibly be due to a kind of secondary concentration along later breaks in the

vein. This is, however, not conclusively proved. At any rate, this enrichment is not dependent upon surface influences by oxidizing waters. There is a zone of secondary enrichment due to this action, but as a rule it is not deep and the difference in tenor between the altered and unaltered parts of the vein is often surprisingly slight. This is due to high water level and the impervious character of the ore.

The influence of the country rock is, as in the California veins, very slight. The veins are massed near the contacts of sedimentary and intrusive rocks; they may outcrop in one or in the other, but their occurrence certainly seems to be throughout connected with the intrusion of diorites, granodiorites and granites.

The copper deposits differ greatly from the gold veins. They occur as contact deposits between limestone and diorite, as irregular replacement veins carrying tourmaline gangue in diabase, and finally and most commonly as replacement deposits along joint systems in Triassic lavas, here containing gangue of epidote, amphibole and chlorite.

Some space is also devoted to the placer mines. The gradual increase in fineness of the gold when removed from its primary deposit is brought out. Very few of the placers are older than the Neocene lavas. Most of them are late Neocene or Pleistocene and accumulated along the borders of the many lakes created by the lava flows, or along the present valleys; in the latter case they now appear as benches above the water course.

Of interest is the description of the Nelson Placer Mine, by the operations of which a great fault plane at the eastern foot of the Elkhorn Range is exposed.

Of the 220 pages of the report, 130 are devoted to the detailed descriptions of the mining districts extending from Canyon City on the west to the Seven Devils on the east.

*The Mechanics of Engineering. Volume II. Stresses in Framed Structures.* By Prof. A. Jay DuBois. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 612; with plates and diagrams. Price, \$10.

This work, which originally appeared as a separate book, and as such has passed through 12 editions, is now issued as Volume II of the author's complete work on the Mechanics of Engineering. Volume I, on Kinematics, Kinetics and Statics, was published last year, and formed, as does the present one, part of the Yale University Bi-centennial Series of Publication. Under the general title given, it treats of stresses in framed structures; of the strength of material and the theory of flexure; of the determination of dimensions and designing of details; of specifications, complete designs and working drawings.

The present volume is complete in itself. The entire work has been carefully revised, although but few changes from the last edition have been found necessary. Special attention is given to a new treatment of the continuous girder. By the application of the principle of least work the "theorem of three moments" has been deduced not only for the solid beam of uniform section as heretofore, but also for the first time, for the framed girder of varying depth, with or without unbraced pier spans and for uniform and concentrated loading. The resulting formulae are for the first time really general, and the calculation of the framed continuous girder is now possible without first incorrectly assuming it to be solid beam of uniform section and then applying the results of such assumptions to the framed girder itself.

The same remarks apply to the swing bridge, which is but a special case of the continuous girder, and also to the braced arch. In the latter case the general formulae apply directly to the solid arch, and the author has therefore given a chapter to the stone arch also, which will be of value to the engineer. It outlines a simple method of computation by which a stone arch may be safely and intelligently designed, the position and magnitude of the thrust at crown accurately found, and the curve of pressures located, for any shape or surcharge. The application of the



principle of least work to the suspension system furnishes a solution much more nearly in accord with actual conditions than the method heretofore in use. According to this latter method the cable is assumed to carry all the load, dead and live, and the truss is considered as resisting deformation only. As a matter of fact, the truss must carry its share of the live load, and by our method we are enabled to find what this share is.

#### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the MANAGING EDITOR.

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

#### A Correction.

SIR:—Will you kindly note the following correction: In the article on the "Determination of Arsenic and Antimony," in your issue of August 2, page 148, lines 29 and 35, the boiling point of the solution of zinc chloride should read 108 degrees, and not 180 degrees, as given in the article.

L. B. S. and R. H. H.

#### Phenomenal Furnace Results.

SIR: Allow me to add some explanatory information to supplement the bare figures as to tonnage of the Boundary smelters given by Mr. E. Jacobs in the *ENGINEERING AND MINING JOURNAL* of July 5, following which Mr. William A. Heywood, in your issue of July 26, gave some figures as to tonnage and other information from the plant of the Tennessee Copper Company.

When one talks about "phenomenal furnace results" he should include more than the tonnage pure and simple, as this largely depends on the size of the furnace and the proportions of silica and iron in the slags made, for by increasing the furnace in length and putting as many slag spouts on the side as may be required, one can put up a single furnace that will smelt say 2,000 tons of copper ores every 24 hours. Such a furnace I would make four times 180 inches long and 48 inches wide, and would have five slag spouts on the long front side.

In order to show the merits of one smelting plant over another one has to give more figures than those of bare tonnage; among others, cleanness of slags made and number of men employed per ton of charge smelted. In comparing work done as to tonnage of furnaces of different sizes to determine whether one furnace has done more work than another, one figures out the daily tonnage per square foot furnace area at the tuyere zone, as there is where the smelting proper is done. The Tennessee Company's furnaces are 56 by 180 inches at tuyeres, having thus a square area of 70 square feet. The British Columbia Copper Company's furnaces are 42 by 150 inches at tuyeres, and have thus a square area of 43.7 square feet. The tonnage given for the British Columbia Copper Company's furnace at Greenwood does not include slag, matte, or flue dust re-smelted, but only ore. I would ask Mr. Heywood whether in his charges he includes, besides the daily average of 33 tons of easily-melted converter slags, matte and flue dust re-smelted.

Now take Mr. Heywood's daily average tonnage for ten months, which he gives at 495 tons of charge, and divide this by the number of square feet of his furnace as tuyeres, which is 70, and you get a tonnage of 7 tons per square foot furnace area in 24 hours. Take the daily average which Mr. Jacobs gives as 380.5 tons of ore with a furnace area of 43.7 square feet, and you get a tonnage of 8.7 tons per square foot furnace area, or 24.3 per cent more put through the square foot furnace area of the Greenwood furnace than that of the Tennessee Co.'s furnace.

Now take the highest tonnage month of the Tennessee furnace, February, with 561 tons of charge

daily; this gives 8.0 tons per square foot furnace area for 24 hours. The highest tonnage months given by Mr. Jacobs for the Greenwood furnace is 428.6 tons for January, which gives 9.8 tons of ore per square foot furnace area, or 22.5 per cent more capacity per square foot furnace area than that of the Tennessee furnace.

Again, take the highest run for a single day of the Tennessee furnace, which is 657 tons of charge, and which gives 9.4 tons per square foot furnace area in 24 hours; then take the highest single day for the Greenwood furnace, which is 460 tons of ore, and which gives 10.5 tons per square foot furnace area for 24 hours, and here you have 11.7 per cent more in the Greenwood furnace results than in that of the Tennessee furnace.

Non-professional newspaper men always talk about the self-fluxing ores of the Boundary country, but these ores are only self-fluxing if you make them so by mixing the different varieties, and I will venture to say that if we had as much iron in our ores as the Tennessee Copper Company has in its, I could show up a still larger tonnage. With plenty of iron in the ores there is no trouble to get tonnage. Our daily slags have averaged for the last six months 39.8 per cent silica, 23.6 per cent iron, 19.6 per cent lime, and 0.321 per cent copper. The daily mattes for the same period have averaged 50.1 per cent copper. The slags have not been made for copper by a colometric slop assay, but by careful determinations that will check to 0.01 per cent in copper. The last month's slag have averaged 43 per cent SiO<sub>2</sub>, 20.7 per cent Fe, and 19.1 per cent CaO, which is a much harder slag to run than a high iron slag, which runs itself. Some years ago it was considered good work in copper smelting to get only 0.1 per cent of copper in the slag for each 10 per cent of copper in the matte; thus, if 20 per cent copper matte were made to have 0.2 per cent copper in the slag, 30 per cent matte, 0.3 per cent copper, 40 per cent matte 0.4 per cent copper, 50 per cent matte 0.5 per cent copper in the slag, and so on. As already mentioned, the average daily grade of the matte produced at the Greenwood smelter during the last six months has been 50.1 per cent copper, and the corresponding slags 0.321, which gives 0.064 per cent copper in the slag for every 10 per cent copper in the matte. I would, in the interests of the profession, ask Mr. Heywood what the average grade of his matte has been during the last several months, and what the corresponding average of his slags has been in copper, silica, iron and lime.

For several months the daily tonnage of ore put through one furnace here has been 422.5 tons, and the total number of men employed, including besides those at blast furnace work proper, sample mill crew, engineers, firemen, blacksmith, mason, carpenters and foremen, has been 47, which gives a daily average of 9 tons of ore handled to every man employed. It would be very interesting if Mr. Heywood would give the average number of tons of charge handled per every man employed at his plant. As for the blast employed, I use for each furnace a No. 7½ Connersville blower, which give 80 cubic feet of air for each revolution, and averages 150 revolutions per minute, showing an average blast furnace pressure at the furnace of about 1.8 inch mercury or about 14.15 ounces. The 7½ Connersville blower requires 45 horse-power to run at this blast pressure, and cost \$1,600.00. At an average of 422 tons smelted per day, each ton of ore will thus require about 0.1 of one horse-power for blast. The total amount of flue dust produced is 1 per cent of the ore smelted. Now it is my opinion that it is all right with a blowing engine for iron blast furnaces, or perhaps also lead blast furnaces, when you want 3 pounds pressure or more for a high charge, but that is a waste of first cost in the price of the blowing machine, takes a higher cost in running, makes more flue dust, and it is unnecessary to have blowing machines for a copper furnace, especially when you make an iron slag relatively low in silica that will run fast anyhow. With others in the profession I

would be indebted to Mr. Heywood if he would state the first cost and what horse power it takes to run the Tennessee Company's blowing engines, giving 20-40 ounces of blast, and how much flue dust he produces in percentage of the charge smelted.

As to charging the furnaces by mechanical feeders in preference to feeding by hand—I have my own opinion on this question, gotten by actual experience in several places. If you have lots of iron in your charge, the stuff will smelt as a rule any way you dump it in, but if your ore varies considerably and is hard to smelt you generally get into trouble with mechanical feeders. Having good hand feeders who know their business, you can always make cleaner slags, put more through your furnaces, and keep them in better shape. I know of one case of hand feeding and mechanical feeding on the same kind of ores where the hand feeding saves in cleaner slags alone an average of 30 cents per ton of ore, which putting through 350 tons per day amounts to \$105.00 per furnace per day. Besides, when the ore comes up in silica so that you have to run 46 to 48 per cent of it on your furnace for some time, the mechanical feeder will cause the furnace to freeze up, whereas with judicious hand feeding you can keep it going until you get less siliceous ore, and so can get the furnace in good shape again.

With the above suggested further information as to cleanness of slags, tonnage handled per man, and power required per ton smelted, besides amount of flue dust produced, in addition to the daily tonnage per square foot furnace area, one can better compare the work done at the different smelting plants and decide which is the more or less phenomenal.

PAUL JOHNSON, E. M.

Designer and manager of the British Columbia Company's smelter.

Greenwood, British Columbia, August 4, 1902.

#### British Columbia Mineral Statistics.

SIR: It will be remembered that in January of the current year Mr. Wm. F. Robertson, Provincial Mineralogist, submitted to the Hon. the Minister of Mines, an approximate estimate of the amount and value of the mineral production of British Columbia for the year 1901, which estimate was published immediately afterwards. This innovation—which it was so far as this province is concerned, for this was the first time an estimate had been prepared and published within two or three weeks of the close of the year covered—was a most serviceable one, and one that met with nearly universal approval, the technical mining journals and the newspapers generally having been almost unanimous in their appreciative comment. It remained, though, for a "special correspondent" in British Columbia of the *Mining World and Engineering Record*, of London, England, to alone offer carping, and, as it eventuated, ill-informed and unwarranted criticism of the estimate prepared with such care and commendable promptitude by the Provincial Mineralogist. The published criticism of this special correspondent came under my notice some time ago, and it was my desire to at once ask your permission to direct attention through the medium of the columns of the *ENGINEERING AND MINING JOURNAL* to the glaring inaccuracies in the statements and the general unreliability of the conclusions of this critic; but as the revised statistics of the mineral production (for which I deemed it best to wait, so as to have the corrected figures to quote from) were not earlier available to me, I have been compelled to wait until now to carry out my purpose.

Space limitations prevent my going into all the mistakes and misstatements of the correspondence under notice, so I shall confine myself to the more prominent of them, taking these in the order in which they were published. First, the correspondent wrote "it may be justly inferred that this preliminary report, showing as it does an increase of about 57 per cent in tonnage and 26 per cent in gross value, will be considerably reduced when the actual re-

turns have been submitted." To this I reply (1) no "report" was submitted, but, quoting from the published document itself, only "an approximate estimate." (2) The *estimated* tonnage of ore mined from the lode mines in 1901 was 871,832 tons, or about 57 per cent increase over that of 1900; the actual tonnage was 920,416 tons, or an increase of about 66 per cent. The tonnage therefore was not "considerably reduced." (3) The official estimate of gross value of the mineral output was \$20,713,501; the estimate of the correspondent was \$19,321,308.73; the revised figures placed the actual value at \$20,086,780. The correspondent made the official estimate appear to be \$1,398,192.27 too high—it was only \$626,721 too high. The actual increase in total value was 22.9 per cent; the approximate estimate was 26.7 per cent; the percentage of error was 3.8 per cent, and this error occurred chiefly in overestimating the copper values in the ores of the Boundary District, where towards the close of the year mining and smelting costs had been so materially reduced as to have admitted of a much increased tonnage, including large quantities of ore of lower grade than it had been considered possible to mine and treat at a profit. Consequently the average values that had applied earlier proved too high under the exceptional conditions that prevailed later, and, by the way, still continue. Next, the correspondent questioned the individual values of the several minerals adopted by the Provincial Mineralogist as the basis of his calculations. Said the critic "These figures are nominal" and then he gave what he termed "specific values," all of which were lower than those used by the official. These incorrect lower figures enabled the correspondent to prove to his own satisfaction that the official total was, as above mentioned, \$1,398,192.27 too high. Now for a comparison. The lode gold was given in ounces of "fine gold," which the official took at its value of \$20.67 per ounce troy; the correspondent valued all the gold at \$19.63 per ounce. As to other values, the *ENGINEERING AND MINING JOURNAL* of January 4th last gave the following average prices for 1901: Silver, 58.95 cents per ounce; lead, 4.334 cents per pound, and copper, 16.115 cents per pound. The official used in his valuations, silver, 56 cents; lead, 3.9 cents, and copper 16.11 cents, purposely allowing the consequent margin. The correspondent's "specific values" were: Silver, 52.8; lead, 2.7; and copper, 15.3. Since the values adopted by the Provincial Mineralogist were the same as those used by the Dominion Government and the United States Government statisticians there does not appear to be any need to further defend them. The correspondent was, seemingly, a law unto himself in this connection, improvising values to suit the occasion.

Summing up the foregoing, the position appears to be that the Provincial Mineralogist within 15 days of the close of the year approximately estimated the gross value of the mineral production of a large province, parts of which are difficult of access and without means of prompt communication, at \$20,713,501 and the revised statistics show it to have been \$20,086,780, with the chief cause of the greater part of the error in the estimate plainly attributable to new and quite unexpected conditions having towards the close of the period under review arisen in one district. The official is widely known among disinterested observers to be a competent, conscientious and conservative man, and no juggling of figures in ill-advised attempts to discredit him can in the long run do other than recoil on the head of any such self-constituted critic as the one here noticed.

Besides the miscalculations mentioned above, there were others not having direct reference to the Provincial Mineralogist's alleged over-valuation, and the more glaring of these latter will be briefly pointed out to further demonstrate the unreliability of the "special correspondent's" figures. In an endeavor to show the average value of what he described as the "gold-copper ores" of the Province he made certain deductions from the gross value of the mineral production, first of "the value of non-metalliferous material" and next of "silver-lead ores." It so hap-

pened that he included the value of the coal and coke of East Kootenay in both of these, thereby deducting about \$1,000,000 twice instead of once. Further, he lost sight of \$892,500, value of placer gold not properly taken into account in his medley of figures.

THE *ENGINEERING AND MINING JOURNAL* has many readers in Great Britain, and it is to the attention of these particularly the foregoing is commended, with the respectful suggestion that the estimates of a responsible official are far more likely to be reliable than those of an irresponsible correspondent.

E. JACOBS.

GREENWOOD, B. C., Aug. 10, 1902.

#### QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.)

**Cuban Iron Ore Imports.**—Have you any statistics showing the imports of Cuban iron ore into the United States, and can you inform me who are the largest consumers? I understand shipments to this country are steadily increasing and that Americans are the most active operators on the island.—S. M. R.

**Answer.**—According to the Bureau of Statistics the imports of iron ore from Cuba in the fiscal year ended June 30, 1902, amounted to 630,602 tons, which is 174,181 tons, or about 38 per cent more than was reported in the previous year. These imports are equal to over one-half the quantity received from all countries. Probably the largest consumer of Cuban ore is the Pennsylvania Steel Company, of Steelton, Pa., and Sparrows Point, Md. This company is also one of the most important operators in the Cuban iron mines.

**Laws Affecting Assessment Work on Placer Mining Claims.**—Sec. 2,556, of Mining Laws of Wyoming, allows assessment work to be done on any one of a number of contiguous placer mining claims owned by the same persons, etc., and to count for the benefit of all such claims. Is this in conflict with the United States mining law requiring assessment work on each placer mining claim of 160 acres or less, and would it be safe to follow the Wyoming law in this respect in doing assessment work on oil claims in that State located under the United States mining laws relating to placer claims?—P. L. G.

**Answer.**—We should say that you would be safe in following the Wyoming law in this respect. The statutes of the United States permit the total annual expenditure for all work done on contiguous mining claims and owned by the same parties to be done on any one of the claims provided that such total expenditure shall amount in the aggregate to \$100 for each claim or location not exceeding 160 acres. That is to say, if there were 10 claims all contiguous, \$1,000 worth of assessment work per year done on any one claim for the benefit of all, would satisfy the United States law.

The provision of the Wyoming law of 1888, so far as it reduces the annual work for a placer claim of less than 160 acres, is, we believe, contrary to the United States statutes. (See Ruling Supreme Court, Colorado, cited on page 780 of *Lindley on Mines*). If a placer mine claim contains less than 160 acres, it is nevertheless necessary to perform \$100 worth of assessment work. The Supreme Court of the United States (*Jackson vs. Roby*, 109 U. S. 440) held that "it often happens that for the development of a mine upon which several claims have been located expenditures are required exceeding the value of a single claim, and yet without such expenditures the claim could not be successfully worked. In such cases it has always been the practice for the owners of

the different locations to combine and work them as one general claim; and expenditures which may be necessary for the development of all the claims may then be made on one of them. . . In other words, the law permits a general system to be adopted for adjoining claims held in common, and in such case the expenditures required may be made or the labor be performed upon any one of them." In order to receive the benefit of the law in this respect, the conditions mentioned above are essential.

#### PATENTS RELATING TO MINING AND METALLURGY

##### UNITED STATES.

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

Week Ending August 5, 1902.

- 706,031. FURNACE FOR ANNEALING WIRE.—Fred H. Daniels, Worcester, Mass. A chamber through which the wire is drawn, said chamber having a floor adapted to support the wire, said floor being constructed of tiles having longitudinal corrugations formed therein to constitute channels or gutters to separate and guide the plies of the wire.
- 706,035. CONTINUOUS BRICK KILN AND DRIER.—James F. Du Bois, Bellaire, Ohio. A system for drying and burning brick, comprising a drying-tunnel and a kiln-tunnel with tracks arranged therein, a vertically-movable door arranged at the exit of the drying-tunnel and a like door arranged at the inlet to the kiln-tunnel, and means whereby said doors are simultaneously elevated.
- 706,076. FLEXIBLE CONDUIT OR TUBE.—George A. Lutz, Brooklyn, N. Y., assignor of one-half to Thomas E. Quinn, New York, N. Y. A tube comprising a spirally-wound strip having grooves or depressions on opposite sides of the central or median line, the groove or depression of one convolution on one side of the strip lapping and interlocking with the groove or depression on the opposite side of the strip of the next convolution.
- 706,089. METHOD OF MANUFACTURING BASIC BESSEMER STEEL.—Samuel McDonald, Youngstown, Ohio. In the manufacture of basic bessemer steel, a method, which consists in pouring successive converter charges into a common receptacle from which the metal is taken to be cast, testing each charge in turn, and varying the duration of each succeeding blow according to the result of the preceding test.
- 706,099. ELECTRIC FURNACE.—Arthur Parker, Chorley, England. In an electric furnace the combination with a crucible and positive-carbon electrode placed diametrically across the crucible, of a rotatable supporting-platform, the recessed base, a supporting-plate in two parts with recess into which the platform-base fits, worm-wheel around its periphery, worm gearing with wheel chutes to deliver the material direct into the arc, and mechanism for raising the carbon electrode as the crucible fills.
- 706,102. CENTRIFUGAL GRINDING-MILL.—John H. Pendleton, Jamesburg, N. J., assignor to the Pendleton-Topscoff Company, New York, N. Y., a corporation of New Jersey. The combination of a mortar and grinding-balls therein, a shaft which carries said mortar, two shafts aligned with each other and between the adjacent ends of which the first-named shaft is obliquely arranged and carried as part of a flexible crank connection and means for rotating said shafts at different velocities, substantially as described.
- 706,128. ELECTRIC FURNACE.—Edward R. Taylor, Penn Yan, N. Y. An electric furnace having, in combination a working chamber, means for continuously supplying the same with material for a given reaction or reduction, conduits constructed of conductive material and arranged to discharge into the working chamber by gravity, means for feeding into and through said conduits fragmentary conductive material adapted to constitute self-renewing electrodes in the working furnace, and means for connecting said conduits with a suitable generator of electricity.
- 706,163. ORE-SEPARATING APPARATUS.—Ben C. Cook, Deadwood, S. D. An apparatus comprising a box or receptacle with longitudinal partition-wall therein with the lower portion of each compartment thus formed hopper-shaped with the adjacent inclined walls diverging from and joined to the partition, bottoms hinged to the longitudinal edges of said hopper-shaped portions, a valved outlet from one compartment to the other at the top, and a feed-pipe disposed longitudinally of said box and supported thereon at one end to deliver the incoming material in a direction reverse to the outflow of said material from said box and a flexible connection with the said pipe beyond its point of support whereby the said pipe may be swung laterally while supported on the end of the box, said box having an overflow-discharge passage at the end over which



the material is fed, the feed and overflow being opposite in direction.

706,173. FLUID-PRESSURE APPARATUS FOR WELL-DRILLING TOOLS.—George B. Gallagher and Charles J. Macomber, St. Mary's, Ohio. A device comprising a fluid containing cylinder, a piston mounted therein and operating to support the same by fluid contained between the piston and one end of the cylinder, valves for positively controlling passage of fluid from the upper to the under side of the piston to allow the cylinder to descend, a by-pass connecting the ends of the cylinder and a force-pump for withdrawing fluid from the under side of the piston and forcing it against the upper side thereof to raise the cylinder.

706,195. DREDGE.—Gordon McKay, Newport, R. I. A scow, a dredging device at one end thereof, two oppositely-disposed grizzlies located to receive the material from the dredging device and to discharge the tailings over either side of the scow.

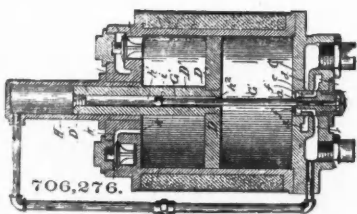
706,197. STONE-HANDLING APPARATUS.—Charles N. Owen, Mechanicsburg, Pa. Apparatus comprising a carrying-truck, a portable bin mounted thereon, means for raising and lowering the bin and a stone-elevator adapted to deliver to the bin.

706,221. CLAM FOR DREDGES.—Ephraim Chaquette, New Rochelle, N. Y. A clam for dredges which consists of an electric motor mounted upon a suitable frame, a shell inclosing said motor and composed of two hinged portions pivoted to said frame, one of said portions having an outside segmental rack and the other an inside segmental rack, a pinion driven by said motor and engaging both said racks and suitable circuit-closers mounted upon said clam whereby a direct or reverse current may be automatically transmitted to said motor to open or close said clam when required.

706,222. APPARATUS FOR UNLOADING COAL.—Charles D. Day, Baltimore, Md. An apparatus comprising a reservoir, a runway mounted thereabove, an endless, grouped bucket conveyer passing from the bottom of the reservoir along the runway, means for simultaneously discharging the buckets of several groups of buckets at a predetermined but changeable group of points along the runway, and a number of movable carriages carrying chutes placeable at this group of points to receive and transfer the discharge from the buckets.

706,238. GAS-RETORT.—Charles W. Isbell, New York, N. Y. An upright gas-retort having a single wall in the inner surface of which are upwardly-running channels and on the outer surface of which are upwardly-running ribs.

706,276. COMPRESSOR.—John Stumpf, Berlin, Germany. In a steam-actuated aeriform-fluid compressor, the combination of a single cylinder forming both the steam-chamber and the compression-chamber, a piston working in the cylinder exposed on one side to the steam and performing on its other side the work of compression, a steam inlet and outlet slide-valve, means for positively moving the



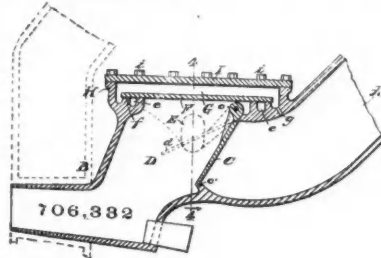
valve consisting of a stem connected at one end to the valve and provided at its other end with a shoulder, said stem being movable in a chamber in the piston, a shoulder at the lower end of the chamber adapted in the upward movement of the piston to engage the shoulder on the stem to close the valve, a shoulder at the upper end of the chamber adapted in the downward movement of the piston to engage the end of the stem to open the valve, and piston-returning means opposing the force of the piston-moving means.

706,302. MEANS FOR EXTRACTING PRECIOUS METALS FROM ORES.—Levi B. Darling, Providence, R. I. In a gold-extracting plant provided with a substantially flat treating-floor of non-absorbent material, a series of longitudinally-extending channels formed therein, a transverse groove or end launder in direct communication with said channels, fixed screens or strainers covering the top of said channels and launder, side launders or ducts, and valved connections interposed between and uniting the said end and side launders.

706,303. PROCESS OF EXTRACTING PRECIOUS METALS FROM ORES.—Levi B. Darling, Providence, R. I. A process which consists in spreading a comparatively thin layer of the ore over a substantially flat and large working surface provided with drainage ducts or channels; then covering said material with suitable metal-dissolving or cyanide solution; then passing a heavy roll back and forth over the charge of material, agitating or stirring the charge and forcing some of the solution into the drainage-ducts; then discharging said solution into the sump, and finally precipitating the precious metal from the solution.

706,312. DEVICE FOR SECURING OR RELEASING TRAP-FLOORS FOR ORE-CARS.—John J. Galway, Duluth, Minn. The combination with a car provided with trap-doors, of a rod designed to support the same in a closed position, means for locking said rod, devices for releasing said rod's locking means, mechanism for rotating the rod after it is released, and devices connected with said rotating mechanism, adapted, upon reciprocation, to impart such rotation.

706,332. FURNACE-TUYERE.—Edwin H. Messiter, San Luis Potosi, Mexico. In a furnace blast apparatus an air-introducing mechanism having a furnace outlet-duct, a blast

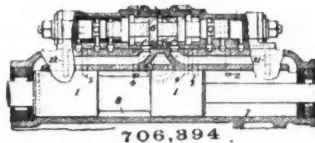


inlet-duct, an escape-duct communicating with the atmosphere, a passage-way connecting the blast inlet-duct and the furnace outlet-duct and closing devices simultaneously closing said passageway and the escape outlet-duct.

706,334. APPARATUS FOR LEACHING ORES.—George Moore, Salt Lake City, Utah. An apparatus for leaching comprising a shell or body in the form of a truncated cone, a head at each end of said body having a central opening, one of said openings to receive material to be operated upon and the other to receive a fluid solvent, means for rotating the body about its central horizontal axial line, and means for causing the material and fluid solvent to pass through the body simultaneously in opposite directions.

706,365. TREATMENT OF GOLD AND SILVER ORES.—Sidney Trivick, Clapham Common, England. A process for evolving nascent chlorine and effecting the chlorination of metals in order that they may be extracted from a metalliferous mass by rendering their solvent consisting in adding to the mass a mixture in definite proportions of two dilute solutions, one being a solution of calcium hypochlorite free from calcium hydrate, and the other a solution of ferric chloride, the proportions being such as to result in the formation of ferric hypochlorite leaving some excess of ferric chloride, which will evolve nascent chlorine.

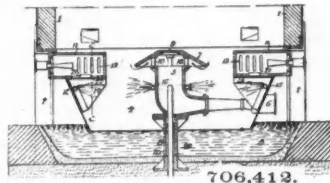
706,394. PERCUSSIVE ROCK DRILL.—Zacharias W. Daw, London, England. The combination with a motor-cylinder of a main valve for regulating the supply and exhaust to and from such cylinder and working in a



valve-cylinder, a motor-piston in said motor-cylinder controlling by its movements the ports which govern the operation of the main valve, and a shut-off valve also controlled by said motor-piston for cutting off or practically cutting off the supply to the motor-cylinder, so as to allow the motive fluid to act expansively therein.

706,396. DREDGE AND WELL-BORER.—Charles Ehrenfeld, Pasadena, Cal. A dredge comprising a hollow cylindrical body provided with a bottom having an opening; a yoke extending over the top of the cylinder and provided with upwardly-projecting lugs; a shaft slidingly journaled in the yoke and in the bottom of the cylinder and provided at its lower end above the bottom of the cylinder with a blade to form a gate to close the opening.

706,408. APPARATUS FOR COATING METAL PLATES.—Geo. B. Hammond and Thomas Dennis, Neath, England; said Dennis assignor to said Hammond. In a machine for coating plates, the combination with a bath-pot and means for conveying plates to and from same, of means movable longitudinally of said bath-pot for pushing the plates therethrough, and means engaging said pushing means for alternately moving the same forward and back again to its initial position.

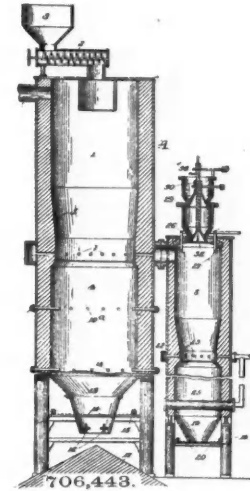


706,412. GAS PRODUCER.—James A. Herrick, Philadelphia, Pa. The combination in a gas-producer, of a central blast-pipe for supplying air to the mass of fuel in the producer, with inwardly projecting tuyere boxes independent of said central blast-pipe and having openings, inwardly

beyond the wall or casing of the producer, for supplying air to the fuel between said wall or casing, and the central blast-pipe.

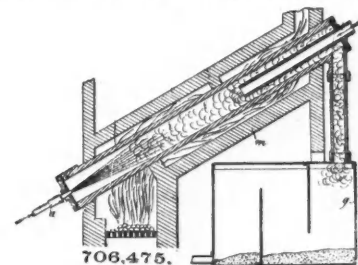
706,436. APPARATUS FOR THE ELECTROLYTICAL TREATMENT OF ORES OR SLIMES.—Frank T. Mumford, Kalgoolie, Western Australia, Australia. An apparatus for the extraction of metals from their ores and slimes, comprising a metallic drum, a copper lining therein, means to maintain said lining continually amalgamated, a trailing electrical contact for the drum, a plurality of conductive bars passing longitudinally through the drum and insulated therefrom, and means to rotate said drum.

706,443. PROCESS OF MAKING COKE.—Paul Naef, New Brighton, N. Y. In a process for producing coke, passing a mass of finely-divided carbonaceous material through a furnace or shaft and simultaneously forcing heated fluid



and steam into said mass a considerable distance from both ends of said furnace or shaft, whereby successive portions of the mass will be coked, the coke desulphurized and the by-products absorbed by the heated fluid as it ascends through the mass and permitted to pass from the upper end of the furnace or shaft.

706,475. METHOD OF PRODUCING METALS IN A FINELY DIVIDED STATE.—Eduard Pohl, Weisswasser, Germany. A process for producing metals in a finely-



divided state, consisting in smelting the material, spraying the smelted material into a retort heated to a suitable temperature, evaporating the spray, and then condensing the obtained vapors.

GREAT BRITAIN.

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

Week Ending July 10, 1902.

12,228 of 1901. MINERS' LAMPS.—C. Darrah and J. G. Patterson, Manchester. Improvements in the inventors' devices for electrically igniting and locking miners' safety lamps.

13,662 of 1901. ELECTROLYSIS OF SALT.—J. Raschen and United Alkali Company, Liverpool. In cells for electrolyzing fused salts, method for keeping the liquid cathode at the bottom at a constant level.

19,036 of 1901. ALKALI PRODUCTION.—H. A. Frasch, Hamilton, Ontario, Canada. Producing alkali by the reaction of hydroxide of a metal (especially nickel) on salt in the presence of ammonia.

21,424 of 1901. SEPARATING METALS FROM RESIDUES.—H. Brandenburg, Kempen-on-Rhine, Germany. The use of sodium bisulphate to fuse drosses and residues of copper, tin, etc., to separate and recover the metals.

3,837 of 1902. GATE FOR ORE BINS.—F. C. Roberts, Philadelphia, U. S. A. Improved gate-lifting device for discharging ore bins into cars.

9,812 of 1902. ELECTROLYSIS OF SALT.—H. Seibert and G. Tempel, Radebeul, Germany. A plant for electrolyzing salt, producing chlorine water and soda.

10,953 of 1902. TREATING ZINC ORES.—O. Nágel, Carbon, Pa., U. S. A. Reducing zinc oxide ores by an atmosphere of heated water gas, and cooling the zinc vapors in cold water gas.

## PERSONAL.

Mr. S. Rankin has resigned as superintendent of the Neck City Mining Company, of Neck City, Mo.

Prof. N. R. Leonard, president of the Montana School of Mines, has returned to Butte from the East.

Mr. H. C. Crouch has been elected assistant professor of mechanical engineering at the University of Colorado.

Mr. J. J. Thomas, assayer, of Los Angeles, Cal., has been examining a mining property in Northern California.

Mr. C. J. Caughey, vice-president of the Majestic Copper Company, has returned to New York City from Utah.

Mr. T. R. Morgan, of the Wellman-Seaver-Morgan Engineering Company, of Cleveland, O., has returned from Europe.

Mr. John D. Nicholson, president and treasurer of the Pittsburg Coal Company, has returned from his trip to Europe.

Mr. Richard Devens, of the London offices of the Brown Hoisting Machinery Company, is now in Cleveland, O.

Mr. John R. Stanton, president of the Phoenix Mine, in the Lake Superior copper district, recently visited the property.

Mr. Quincy A. Shaw, auditor of the Calumet & Hecla Mining Company, was recently at the mine, Calumet, Mich., for a few days.

Mr. J. H. Oppenheim, of the American Metal Company, of New York City, has been inspecting mines in the Michigan copper country.

Mr. Leo Von Rosenberg, of New York City, has left Denver, Colo., for San Francisco, Cal., to examine mining property in that State.

Mr. E. B. Sawyer has resigned his position with the Horseshoe Mining Company, Pluma, S. D., and is at present at Lincoln, Neb.

Mr. Walter G. Filer, of the Western Exploration Company, who has been in the Philippines for 2 months, has returned to Salt Lake, Utah.

Mr. J. P. Sawyer, of Providence, R. I., who is interested in the Sheba Company's Humboldt County, Nev., mines, has visited the property.

Mr. Harold Howes is to act as superintendent of the arsenic plant of the Mineral Creek Mining and Smelting Company, of Tacoma, Wash.

Mr. Edmund D. Brigham, general freight and traffic manager of the Chicago & Northwestern Railroad, recently returned to Chicago from Nogales, Ariz.

Mr. Richard Eames, Jr., of Salisbury, N. C., who has been examining mines near Guadalajara, Jalisco, Mex., will return to New York City by August 30.

Mr. J. H. Collier has resigned as superintendent of the Tesla coal mines, Tesla, Cal., and has charge of a cyanide plant at the Golden Eagle Mine, Hayden Hill, Cal.

Mr. Erich Langguth, a German metallurgical expert, has been in Leadville, Colo., for the purpose of making an investigation of the complex zinc-lead ores of that district.

Mr. E. Swyer, a mining expert from London, Eng., has been in Butte, Mont., for the reported purpose of examining and reporting upon some Butte mines in the interest of English capital.

Messrs. E. W. Pratt, Charles Merriman, H. B. Goodenough, C. A. Hart and George W. Wilson, of Hartford, Conn., recently visited the Majestic Company's mines in Beaver County, Utah.

Mr. E. E. Quentin, of Denver, Colo., has organized the Quentin Investment Company, of which he is president. The company has acquired all the interests of the Ramsey C. Bogy Investment Company.

Mr. S. A. Provt, formerly superintendent of the Copper Queen Smelter at Bisbee, Ariz., has been appointed superintendent of the Indiana-Sonora Company's property at Cananea, Mex., recently purchased by Phelps-Dodge & Company.

Mr. M. A. Hays has severed his connection with the Southern Railway as agent for the East of the Land and Industrial Department, to become secretary of the Chamber of Commerce of Sault Ste. Marie, Mich.

Mr. C. O. Baker, Jr., of Baker & Co., Newark, N. J., platinum refiners, has been appointed a member of the board of directors of the National State Bank of Newark, one of the strongest financial institutions of New Jersey.

Mr. E. E. Chase, mining engineer of Denver, Colo., returned recently from a professional trip to Wyoming, and left again for Mexico. Until September 1 his address will be care of El Refugio Mining and Milling Company, Ocampo, Chihuahua, Mex.

Mr. J. K. Robinson, of Iquique, Chile, who represents the interests of the Westinghouse Electric and Manufacturing Company on the west coast of South

America, has sailed for home after a visit of several weeks' duration in the United States.

Mr. Frank Richardson, who has the management of the Santa Rose Mill, of the Bufo Mining, Milling and Smelting Company, of Sonora, Mex., accompanied by Mr. E. H. George, left Los Angeles, Cal., recently for the company's mines to start the mill, as the rainy season is drawing to a close.

Mr. E. G. Rust, general superintendent of the Colorado Fuel and Iron Company's works at Pueblo, and Mr. A. H. Helander, chief engineer, have resigned in order to open an engineering office in Philadelphia, Pa. Messrs. Rust and Helander have for several years been prominently connected with the extensive improvements which have been made at the steel works at Pueblo, in connection with which Mr. Rust was for several years chief engineer.

The Governor of South Dakota has appointed these delegates to the International Mining Congress at Butte: J. E. Todd, E. W. Martin, K. G. Phillips, W. H. Bonham, Harris Franklin, George V. Ayres, J. W. Fowler, I. A. Webb, James Munn, W. S. Elder, Otto Grantz, F. W. Bower, Deadwood; Thomas Gregory, T. J. Grier, I. R. Crow, T. D. Edwards, R. H. Driscoll, Lead; E. H. Warren, Spearfish; Titus E. Corkhill, Central; J. M. Lawson, Aberdeen; C. E. Mason, J. W. Pilcher, Custer; Dr. Slagle, J. B. Gosage, Rapid; H. E. Perkins, Max Blatt, Sturgis; J. S. Moodie, A. H. Marble, Belle Fourche; George J. Jenkins, Sisseton.

Governor Robret M. LaFollette, of Wisconsin, has appointed these delegates to the International Mining Congress: William H. Harris, Galena, Ill.; James McGee, Carl E. Hilbert, Milwaukee; Phillip Allen, Jr., Chas. McIlhon, Mineral Point; Geo. D. Orput, Arthur Kopp, Platteville; Thos. H. Gill, Milwaukee; Philip Fox, Madison; Herman Grotophrath, Baraboo; Richard Bell, Platteville; Fenwick Coulthard, New Diggins; John M. Vorchota, La Crosse; F. C. Bissell, Fond du Lac; Thos. Barton, Ashland; Richard Kennedy, Highland; Jefferson Crawford, Hazel Green; Henry Ragge, Benton; J. W. McLaughlin, Benton; Thomas Williams, Hazel Green; R. B. Luckey, Cuba City; James W. Murphy, J. J. Williams, Platteville; Calvert Spencey, Mineral Point; T. B. Ennor, Potosi; Thomas J. Law, Shullsburg; George W. Watson, New Diggins; M. J. Regan, Madison; Frank J. Kipp, M. D. Kelly, Milwaukee; Martin Pattison, Kirby Thomas, J. B. Arnold, Walter Fowler, West Superior; Matthew Richards, Platteville.

Governor Timothy Hunt, of Idaho, has named the following additional delegates to the International Mining Congress at Butte: Timothy Regan, R. S. Sheridan, D. W. Ross, H. L. Morris, Boise; C. H. Jackson, Orchard; J. D. Fleener, Boise; E. E. Kelly, Col. J. G. Brown, Blackfoot; E. P. Coltan, Idaho Falls; T. F. Terrell, Pocatello; J. A. Lippincott, Idaho City; John Kincaid, J. H. Hutchinson, Boise; Lawrence Green, Clayton; Louis Sweetser, Yale; H. M. Mansfield, Nampa; E. F. Phelan, Mountain Home; Gen. W. H. Pettit, Atlanta; J. J. Bennett, E. McBroom, Louis Smith, Grangerville; J. A. Czizek, Warrens; P. Clagstone, Granite; A. J. Macnab, Salmon City; F. W. Vogler, Salmon City; A. G. Kerns, W. B. Heyburn, Mrs. M. A. Hutton, Richard Wilson, Wallace; W. H. Fraser, Thomas L. Greenough, Mullen; John Kelly, Burke; John Connors, Silver City; Avery C. Moore, Whitebird; R. E. Lockwood, Weiser; Col. W. R. Everett, Col. Wm. C. Hunter, F. T. Day, Chicago, Ill.; A. E. Riter, Hope; H. M. Lancaster, Rathdrum; George W. McAllister, Idaho City; J. A. Brown, Rathdrum; Reginald Coryell, Custer City; Col. J. L. Weaver, Boise; J. T. Scott, Coeur d'Alene; Martin King, Glens Ferry; Geo. H. Williams, Hailley; Charles E. Mullen, Horseshoe Bend; A. B. Redfore, Spencer; O. N. Parsons, W. N. McCarty, Wm. Lane, Tim Farrell, Pocatello; D. F. Boyd, Mackey; George T. Burroughs, Minidoka; Frank Allan, Jr., Dr. J. A. McNevin, Gibbonsville; Mrs. W. W. Woods, Wallace; F. C. Wright, Salmon City; M. M. Sweet, Challis; Capt. E. E. Rodgers, Moscow; A. H. Mikesell, Pocatello; I. B. Giles, Yellow Jacket; Fred Wood, Pierce City; Frank Haynes, Shoup.

## OBITUARY.

John J. Williams, who for a number of years held the position of mine inspector for the Lehigh Valley Coal Company, died at his home in Reading, Pa., on August 11, aged 69 years.

William Coyne, a Montana pioneer, died at Helena on August 10. He was born in Glasgow, Scotland, in 1839, coming to this country when quite a young man. In 1863 he went to Virginia City, Mont., and since then has been engaged in mining in the West. He owned mining properties in St. Louis Gulch, near Helena.

Charles W. Wharton, one of Philadelphia's wealthiest citizens, died August 16 at his summer residence, at Jamestown, R. I., of cancer, aged 77 years. He leaves one son, J. Lovering Wharton, a prominent business man of Philadelphia. Mr. Wharton was a brother of Joseph Wharton, and with him was a

large owner in the Bethlehem Steel Works before it was absorbed by the present steel combination.

Col. A. C. Ferris who died at Haynes Falls, N. Y., August 1, in the 84th year of his age, was one of the pioneers of the petroleum industry. He was born at Mamaroneck, N. Y. He went to California in 1849 but returned the following year. In 1857 he began to experiment with the crude oil obtained from the salt wells near Pittsburg. At this time there were refineries of oil distilled from albertite coal from Nova Scotia, at Boston, Portland, and Freeport, and others in Pennsylvania, Ohio, West Virginia and Kentucky from cannel coal from Kentucky.

In connection with his experiments with the crude oil Col. Ferris set about to devise and construct a lamp in which the oil could be burned without smoke or odor, and in 1859 he manufactured lamps and burners which were shipped to various markets. Mr. Ferris finally succeeded in producing an oil showing 200 degrees fire test and was really the introducer of petroleum into the markets of the country as an illuminant, his sales from 1857 to 1860 having reached a total of 3,000 bbls. per annum.

## SOCIETIES AND TECHNICAL SCHOOLS.

INTERNATIONAL MINING CONGRESS.—Secretary Mahon has announced the following committees to serve during the 5 days' session which begins in Butte, Mont., September 1: Entertainment Committee—A. F. Bray, Lee Mantle, W. A. Clark, Jr., John S. Harris, H. A. Galway, Exhibit Committee—W. A. Clark, H. L. Frank, J. R. Wharton. Excursion Committee—J. R. Wharton, J. E. Dawson, W. H. Merriman, H. O. Wilson, H. F. Reuger. Badges Committee—O. Hight, J. A. McKee, Harry S. Tuttle, E. N. Wood, William Horgan. Hotel Committee—J. J. Hammill, J. W. Passmore, Dan Tewey, Hugh I. Wilson, W. D. Thornton, R. A. Taylor. Music Committee—C. W. Clark, W. C. Dierks, W. Orton. Reception Committee—Senator W. A. Clark, Senator Paris Gibson, Caldwell Edwards, Governor J. K. Toole, ex-Senator H. R. Carter, ex-Senator Lee Mantle, Robert B. Smith, S. T. Hauser, J. E. Rickards, B. F. White, B. Platt Carpenter, P. H. Leslie, Mayor W. H. Davey, William Scallon, F. A. Heinze, John Gillie, George H. Robinson, C. W. Goodale, D. B. Gillis, A. H. Wethey, C. H. Repath, W. W. Wishon, James B. Gallagher, John S. Harris, Eugene Carroll, D. J. Hennessy, William Horgan, E. H. Reisch, Charles F. Booth, H. M. Patterson, J. M. Doull, W. W. McDowell, A. J. Davis, Alexander Johnston, T. M. Hodgins, J. D. Ryan, C. R. Leonard, J. A. Murray, Charles W. Clark, W. A. Clark, Jr., Henry Mueller, J. T. O'Brien, W. D. Clark, P. J. Brophy, Joseph Broughton, R. N. Davidson, A. K. Ervin, J. W. Fairfield, H. L. Frank, John F. Forbis, John W. Cotter, J. G. Hammer, W. B. Hamilton, Henry Jones, S. V. Kemper, John N. Kirk, Pat Mullins, E. A. Morley, J. W. Passmore, Fred J. Rowlands, R. B. Turner, W. O. Speer, Charles J. Schatzlein, J. R. Thompson, H. W. Turner, E. P. Triol, J. H. Vivian, J. R. Wharton, W. H. Reber, Charles H. Lane, T. J. Bennetts, James H. Lynch, George W. Irvin, Tom Kilgallon, C. F. Lloyd, Sellers Largey, O. W. McConnell, Thomas Lavelle, J. R. Reed, E. H. Sherman, D. Dore, W. McC. White, M. L. Heiman, Thomas Noyes, D. J. Girard, R. L. Clinton, George E. Moulthrop, E. B. Weirick, R. G. Young, S. H. Greenwood, James T. Finlen, H. I. Wilson, Dan Tewey, R. A. Taylor, W. D. Thornton, J. H. Leyson, A. F. Bray, T. A. Grigg, T. J. Murray, D. B. Campbell, J. S. Hammond, McDonald, McNevin, Sievers, Monahan, R. H. Paxon, J. D. Slemmons, John Caplice, D. J. Charles, J. H. McQueeney.

## INDUSTRIAL.

The Risdon Iron Works, of San Francisco, Cal., is reported to have taken some large Mexican contracts.

Crane Company, of Chicago, Ill., has opened a branch office in Salt Lake, Utah, in charge of William Bowman.

The Pelton Water Wheel Company is about to ship a number of water wheels and considerable piping, etc., to Spain.

The Buffalo Forge Company, of Buffalo, N. Y., has secured a large order for machinery to be shipped to Barrow-on-Furness and London, Eng.

G. W. Topliff, manager of the Rand Drill Company's Salt Lake branch, has sold a compound belt-driven air compressor to the Tetro Mining Company.

The Ingersoll-Sergeant Drill Company, through its Salt Lake City office, has supplied the Steamboat Mine, Park City, with a 14½ by 18-in. air compressor to be operated by water power.

The Intermountain Pipe Company, of Salt Lake, Utah, at its works at 619 South Fifth West street, is turning out wood pipe made of kiln dried Douglas fir, wire bound. The pipe is made in all sizes.

H. E. Haynes & Company, boiler makers of Salt Lake, have filled an order for 10 small boilers for the Consolidated Mercur Company, to be used in connection with the roasters in the Golden Gate Mill.



The deal for a consolidation of the American Car and Foundry Company, of St. Louis and New York with the Pressed Steel Car Company of Pittsburg, has been dropped. The reason given is the refusal of the new Standard Steel Car Company to go into the deal.

The Link-Belt Engineering Company, of Philadelphia, Pa., has an order from the Norfolk & Western Railroad Company for 3 coaling stations, one at Roanoke, Va.; one at Crewe, Va., and the other at Bluefields, W. Va. These plants will be of 600-ton capacity each, and will also be equipped to handle sand and ashes.

The Holly steam loop system is being introduced in a large number of steam plants. A few representative installations are: Chicago Edison Company, Chicago, Ill.; American Smelting and Refining Company, Leadville, Colo.; Denver Tramways and Power Company, Denver, Colo.; Atchison, Topeka & Santa Fe Railway, Topeka, Kans.

The Tennessee Coal, Iron and Railroad Company will expend something like \$250,000 in improvements about its furnaces at Ensley, Ala. It is intended to put up new hoisting inclines, and bins for raw material thereby reducing labor cost. It is expected that inside of a couple of years the saving will pay for the new improvements.

The Societe Anonyme Westinghouse has found it necessary on account of the great number of orders to make extensive additions to its plant, which has been in operation for only 5 years. This plant is located at Havre, France, and supplies the territory included in Holland, Belgium, Italy, Switzerland, Spain, France and their colonies and protectorates.

Plans are being prepared by Edgar S. Low & Co., of Pittsburg, for the building of a large car works in Everson, Pa. The new works will be operated mainly to supply car equipment for contracting concerns and railroad building, but it is said that the company will also be prepared to supply standard railroad cars of the wooden type to railroads which will keep up that form of equipment.

The Commonwealth Steel Company, of St. Louis, Mo., is rushing work on its new plant at Granite City, Ill., for the manufacture of steel castings. It is expected that the plant will be in operation by September 1. In the open-hearth plant the furnaces will be of a special design, adapted to oil or gas. They will be of the basic type. The annealing furnaces will be equipped with double combustion oil burners.

The Hendrie & Bolthoff Manufacturing and Supply Company, of Denver, Colo., has shipped a 12 by 16 double drum Vulcan hoist, with steam operated clutch and post brakes, to Lead, S. D., for the Oro Hondo Mine, of which George M. Nix is manager. The order includes 2 100-h.p. horizontal boilers and a Norwalk air compressor. The company has also sold a steam hoist and compressor to F. H. Gira for the Cuyahoga Gold Mining Company at Custer, S. D.

The Otis Elevator Company, of New York City, reports that within the past week it has closed contracts for no less than 40 hydraulic passenger elevators to be installed in New York City in large office buildings. Last week's orders included 51 electric elevators for New York City alone. Several of these are of the full automatic or push button type where no attendant is required. The company says that engineers and building contractors lean toward the modern Otis vertical cylinder hydraulic elevator for large office buildings and hotels.

The Denver Engineering Works Company, of Denver, Colo., has these electric hoists under construction. Three 2-h.p. hoists, 2 5-h.p. hoists, 2 hoists of 10,000 lbs. capacity, 2 150-h.p. hoists for the Penoles Mine, in Old Mexico; a 135-h.p. hoist for the Utah Fuel Company; a 50-h.p. hoist for the Kendall Gold Mining Company, Kendall, Mont.; a special 50-h.p. hoist for the Montana Coal and Coke Company, Horr, Mont.; a 50-h.p. hoist for the Northern Pacific Railroad Company, and a 100-h.p. endless cable, electrically driven, winding engine for the Anaconda Copper Mining Company.

The American School of Correspondence, of Boston, Mass., has recently made an arrangement whereby the students are admitted to the classes of one of the resident technical schools without further examination, and their work counts toward a degree of B. S. This shows in a most striking manner the advance in the standard of correspondence work in the past few years. The trustees of the American School of Correspondence have been offering a limited number of free scholarships to deserving young men for the purpose of securing a few representative students in large shops. The school now announces that after September 30 no more free scholarships will be awarded. The school offers courses in mechanical, steam, textile and sanitary engineering (including heating, ventilation and plumbing) and mechanical drawing.

The exhibition of ship riveting which the Chicago Pneumatic Tool Company is giving at Glasgow, Scotland, is proving highly successful. The work is in charge of E. Guennell, for many years superin-

tendent of the Chicago Shipbuilding Company, at South Chicago, Ill., and he reports great interest among the shipbuilders on the Clyde. To assist him in his work, the Chicago Pneumatic Tool Company has sent 2 expert riveters from the Chicago Ship Yards to Glasgow. The Chicago Pneumatic Tool Company recently sent F. D. Johnson, manager of the New York office, to push business in Europe, and has also sent George H. Hayes to take charge of the mechanical work in the London works. W. H. Armstrong from the headquarters of the Chicago Pneumatic Tool Company, at Chicago, will have charge of the New York City office.

Among the recent sales reported by the Salt Lake office of Fairbanks, Morse & Co., C. P. Mason manager, are: 3 mining cages, 6 mining cars, 1 ore skip, 4 gasoline hoisting engines, ranging from 12 to 44 h.p.; wire rope and mining supplies for Tonopah District, Nevada; 1,200 ft. of wire rope, 2,000 ft. of air pipe, 3 horse whips, 5 ore cars, car-load 16-lb. rails and assortment of mining supplies for iron mines at Cedar City, Utah; 16 gasoline engines, with centrifugal pumps, for irrigation service in Idaho and Utah; 54-h.p. gasoline engine for mill, for Messrs. John Dern and E. H. Airis; 4 Fairbanks-Morse duplex steam pumps for Utah and Idaho points; 22 scales for railroads, smelters, mines, merchants and consumers; 1 set 18-in. Sturtevant high-speed rolls, 2 Sturtevant toggle screen separators, for Mayday Mill, Eureka, Utah; 1 large water heater and purifier for Idaho.

The Denver office of the Allis-Chalmers Company has received an order for all the machinery necessary to increase the bromide plant of the Telluride Reduction Company, at Colorado City, Colo., from 100 tons of ore to 300 tons per day. The increase consists in part of 2 100-ton Wethey mechanical roasting and cooling furnaces, 2 100-ton revolving dryers, 4 large sets of rolls, the necessary Montejus tanks, elevators, screens, etc., aggregating some 300 tons of machinery. The Denver office also reports the sale of a very fine first motion hoisting engine to the Theresa Gold Mining Company, Cripple Creek District, Colo.

The Denver Tramway Power Company has just let a contract for doubling the capacity of its present power plant in Denver to the Allis-Chalmers Company. The 2 new engines will be the largest electric generating engines ever sent west of the Mississippi River, and will be directly connected to a 1,600-kw. generator. The 2 engines are to develop about 5,000 h. p. at best economy.

Among the large number of orders received by the Colorado Iron Works, of Denver, Colo., during the past few days were the following: 12 slag trucks for the Cananea Consolidated Copper Company, of Cananea, Mex.; a steam hoist with 2 double deck cages and 8 cars for the New York & Nevada Copper Company, of Ely, Nev.; complete smelting plant for mule back transportation, with 36 by 65 in. silver-lead furnace, for Vincente G. Ortiz, Mexico; rubber top Bartlett table for the Mount Washington Copper Company, Baltimore, Md.; a carload of cast iron waterjackets for the Compania Metalurgica Mexicana, San Luis Potosi, Mex., and a carload of the same for the American Smelting and Refining Company, East Helena, Mont.; 1 set 8 in. by 54 in. high-speed rolls for the Horseshoe Mining Company, of Deadwood, S. Dak.; machinery, including buildings and installation of plant for a 38 in. by 120 in. hot blast copper matting furnace with U pipe stove and 38 in. by 144 in. silver-lead furnace, sampling plant, power plant, etc., for the Majestic Mining Company, of Milford, Utah; a 42 in. by 126 in. silver-lead furnace for the Compagnie des Metaux et Produits Chimiques d'Overpelt, Belgium.

#### TRADE CATALOGUES.

The Chicago & Northwestern Railroad has issued a circular calling attention to the low rates offered to Butte, Mont., during the session of the International Mining Congress. The rate is one fare, plus \$2 for round trip, with choice of routes via Omaha or St. Paul. Side trips at low rates can be made to Helena, Yellowstone Park, Salt Lake or points in Colorado or on the Pacific coast.

A new catalogue of electrical supplies has been issued by the H. W. Johns-Manville Company, of New York City. It is much more comprehensive than the company's previous electrical catalogue, containing 108 pages as against 60 in the old. The new catalogue includes a full line of overhead line materials, heaters, rail bonds, 500-volt fuses, "Vulcabeston" and special molded insulating pieces, together with many new articles, such as double trolley suspensions. The catalogue also shows an improvement in other respects. It has a very complete table of contents in the front and a comprehensive alphabetical index in the back, greatly facilitating reference. A simple cover design with a rich effect of greens is noteworthy. The company controls the sales of molded mica, "Noark" enclosed indicating fuses, electrotherms, etc., made by the Johns-Pratt Company, of Hartford, Conn.

A finely illustrated catalogue of 32 pages, describ-

ing the company's electric hoists, is issued by the Denver Engineering Works Company, of Denver, Colo. The company states that these hoists, properly constructed and installed, possess all the advantages of steam or air hoists, with better control of speed, less liability to derangement and less opportunity for loss of power by condensation, leakage, etc. The hoists include winze hoists of 1 to 3 h.p., prospecting hoists of 5 to 7½ h.p., flat friction hoists of 5 to 7½ h.p., direct-current hoists of 15 to 20 h.p., Cripple Creek patent hoists of 10 to 50 h.p., and standard deep mine hoists with single or double drums up to 200 h.p. One of the many good features of the pamphlet is a general drawing of each hoist, accompanied by a table giving all the dimensions for the location of hoists in the plans of the constructing engineer. A partial list of users shows that prominent mining concerns have given repeated orders for these hoists, the concerns being located in Mexico and British Columbia as well as in this country. The Cripple Creek District in Colorado is a large user of electric hoists, and has given many orders to the Denver Engineering Works Company.

"Giant" air compressors and "Giant" rock drills are described in a neatly illustrated 68-page pamphlet published by the Compressed Air Machinery Company of San Francisco, Cal. The company states that its "Giant" compressors are well designed, strongly built machines, with valves of the poppet type, though the company also builds compressors with mechanically operated valves. If great economy is required for permanent steam-driven plants, compressors either single or double stage driven by Corliss engines are recommended. For prospecting work where first cost of machinery must be considered, the company's Class C compressors are recommended, while for heavy work the company makes a straight-line steam-driven compressor. The company also makes power or belt-driven compressors, particularly compressors to be driven by a water wheel fitted directly on the shaft. All the company's compressors are regularly fitted with the Reardon patent inlet valve that admits a full volume of free air, owing to the large free passages, and wears evenly. "Giant" rock drills have a plain flat slide valve operated by a tapper, or in the short stroke drill a balanced plug valve. The cylinder is made of semi-steel, and the head of the best cast steel. No rubber buffers are used, but a heavy steel spring in the back head cushions the blow in the event of the piston striking the front or back head.

#### GENERAL MINING NEWS.

##### ARIZONA.

###### COCHISE COUNTY.

*Tombstone Consolidated Mines Company.*—The big smokestacks are in place. Much heavy machinery is being installed in the large hoist house. The steel gallow's frame was made by the American Bridge Company, of New York City, and has been installed. The gallow's frame is 65 ft. in height, capable of admitting 3-decker cages for the 4-compartment shaft, which is 8 by 25 ft. in the clear. The work of installing a system of pumps will soon begin.

(From Our Special Correspondent.)

*Calumet & Arizona Copper Company.*—This company has let to the Allis-Chalmers Company a contract for a second 250-ton copper smelter, to be ready in February. This will give the company 500 tons capacity daily, and the mine is rapidly getting in shape to supply the rock. The average percentage of copper in rock to be treated is said to be better than 8 per cent. No. 1 stack is to be in blast in October.

###### MOHAVE COUNTY.

(From Our Special Correspondent.)

*Connor-Minnesota.*—This mine, at Chloride, belonging to the Philadelphia & Arizona Mining Company, is in a 4-ft. body of lead and silver ore on the 400-ft. level. The concentrates give assay returns of 100 oz. silver per ton and good values in lead.

*Cyclopic.*—This mine, in Gold Basin, is installing a rock crusher and cyanide plant. A. B. Robbins is owner and superintendent.

*German-American.*—This company, at Gold Roads, is surveying 14 gold claims for patents.

*Keystone.*—This mine, at Mineral Park, belonging to James Uncapher, under bond and lease to a Los Angeles, Cal., company, is in shipping ore.

*Lucky Boy.*—This mine, on Cerbat Mountain, belonging to T. B. Scott and associates, of Chicago, Ill., is reported in good shipping ore at the 350-ft. level. The working force of 12 men is to be increased to 20.

*Portales del Oro.*—This new company, at Union Pass, is opening a number of gold claims and installing machinery.

*Quartette.*—This mine, in the Colorado River District, is preparing for a winter's work. J. M. Grady is superintendent.

*Schuytkill.*—News has been received from Pitts-

burg, Pa., that W. D. O'Neil will soon arrive at Chloride to resume work at this mine.

**Vulcan Smelter.**—This new 50-ton plant, at Chloride, is in operation. A stack for lead ores will be erected.

#### YAVAPAI COUNTY.

**Senate Gold Mining Company.**—This company, of Congress, has ordered a 50-h.p. Fairbanks & Morse gasoline engine, together with 3 Sullivan drills, and has purchased a steam pump.

**United Verde.**—According to all reports the fire in this mine, at Jerome, is likely to prove very serious. The mine and smelter are closed, and only a few men are employed. The fire started in a big stope on the 4th level, and has spread to the 5th. The burning stopes are beneath the slag dump and the made ground on which the smelter is built, and as the fire spreads the workings are liable to cave, causing much damage to the surface plant. The company is reported to be considering an attempt to smother the fire by carbonic acid gas forced into the burning stopes. The mine may be closed some months.

#### CALIFORNIA.

##### AMADOR COUNTY.

(From Our Special Correspondent.)

Coal from the Fitzsimmons ranch, near Jackson, is used locally, and is said to be superior to that found near Ione. Distance from railroad prevents more than local use.

**Amador Phoenix.**—At this mine, near Jackson, James E. Dye superintendent, operations will continue as planned. An extension of the bond for 6 months has been obtained.

**Argonaut.**—At this mine, at Jackson, J. B. Francis superintendent, some work is being done to the shaft to prevent damage by water. Prospecting has stopped, and the water has risen to the 1,400. The company is waiting the decision of the United States Supreme Court in the litigation with the Kennedy Mining Company adjoining.

**Oncida.**—At this mine, near Jackson, J. H. Mooser, 320 Sansome street, San Francisco, secretary, 40 stamps are running, and the ore is reported improving.

**Sargent.**—The contractors have begun sinking 300 ft. on the incline shaft.

##### CALAVERAS COUNTY.

(From Our Special Correspondent.)

**Altaville.**—In this mine, at Angels, a compressor is being put in.

**Beatrice.**—At this mine, near Murphys, R. Ober superintendent, work continues day and night.

**Crystal.**—A hoist and new boilers are being put on this Angels mine. W. W. Moorehead is superintendent.

**Lancette.**—Very rich gravel is being washed in this hydraulic mine, near Mokelumne Hill. Many nuggets are found. Percy L. Schuman is superintendent.

**Rose Rock.**—From this mine, between Murphys and Sheep Ranch, Joseph Heinsdorff, owner, a crushing of 50 tons resulted satisfactorily.

##### MARIPOSA COUNTY.

(From Our Special Correspondent.)

**Hite Cove.**—This mine, at Hites, has been turned over to Hal J. Sisty and C. Arkell as representatives of the San Francisco and London purchasers.

**McAlpin.**—At this mine, near Coulterville, Mr. Rigg superintendent, work on the new gallows frame has commenced.

##### NEVADA COUNTY.

(From Our Special Correspondent.)

**Allison Ranch.**—At this mine, near Grass Valley, the machinery is run by compressed air. Work on the new mill is continued.

**Empire Mines Company.**—George W. Starr is superintendent at Grass Valley; W. B. Bourn, of San Francisco, president, and J. Walter Ward secretary. The new Norwalk compressor, just installed, has a capacity of 40 air drills. Considerable development is to be done. The 2,800-ft. shaft is to be extended to 3,500 ft. The company is working 140 men.

**Grass Valley Exploration Company.**—The W. Y. O. D. Mine, Mark B. Kerr superintendent, has been temporarily closed. The company is to appeal from the decision recently given in favor of the Pennsylvania Mine adjoining, and will work another mine.

**Pennsylvania.**—This mine is to start again. It formerly employed 70 men, and is expected to have as large a force. It is free of water.

**Sierra Queen.**—The result of the clean-up at this mine, W. H. Martin superintendent, was satisfactory. The shaft is down 300 ft.

##### SAN DIEGO COUNTY.

**California King Gold Mines Company.**—The company states that the attachment obtained against it by Hewlett Bush on an assigned claim of the Colo-

rado Iron Works Company, has been vacated by an order of the court. The mining company has filed a bond covering the claim until the amount in dispute is finally adjusted.

(From Our Special Correspondent.)

**California Gold King.**—On the property at Pichacho work on the 1,000-ton cyanide plant is progressing.

**Noble.**—These mines, at Pine Valley, 13 miles from San Diego, have been sold by Thomas and John Noble to English people represented by J. H. Thring and J. A. Wanchope. Six claims are embraced in the sale. There is a 5-stamp mill and more stamps are to be added.

**Tourmaline Deposits.**—Another deal is pending for 1,000 acres of land at Mesa Grande containing tourmaline deposits. C. O. McCarroll originally owned nearly all this tourmaline land, and he has sold to several parties.

##### SAN JOAQUIN COUNTY.

(From Our Special Correspondent.)

**Clements Dredger.**—The gold dredge being constructed near Clements for work in the Mokelumne River is nearly completed. Extensive borings have been made along an old channel, and the company expects a good yield.

##### SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

**Grizzly Mining Company.**—This company is putting up a 2-stamp mill on Alder Creek, near Cambria.

**Trafton.**—M. Trafton states that money has been secured for a 10-ton furnace on his quicksilver mine at Josephine. Considerable work is being done on cinabar claims in that vicinity.

##### SHASTA COUNTY.

(From Our Special Correspondent.)

**Afterthought.**—This copper and gold property, near old Furnaceville, about 30 miles from Redding, has been under bond for some time to the Tarbet Mining Syndicate of Salt Lake, Utah. The money is reported paid, and the mine will be worked. The price is supposed to have been about \$100,000.

**Hawkinsville Dredger.**—The dredger at Hawkinsville has been fitted with electric lights from the Yreka electric light plant. This company, as well as others, finds trouble in getting wood choppers, and fears a short fuel supply.

**Little Wazie.**—This mine, on the Shasta Divide, 4 miles from Whiskytown, has been bonded from Ernest Dozier and D. B. Hunt by B. M. Newcomb, of Oat Hill. J. P. Munger, of Redding, represents Mr. Newcomb, and will run a tunnel to prove the ledge, which shows rich ore on the surface.

**Loag Ledge.**—A ledge which produced largely in 1857, and was then lost, is reported to have been found near Centerville, about 15 miles from Redding, by Nelson Waite, L. A. Stockley and W. J. Clark. It was worked by James Loag and a Mr. Smith, but a fault cut them off, and after some prospecting they quit. A 200-ft. shaft is to be sunk.

**Yreka Mill and Mining Company.**—This company owns several quartz claims near Rollin, of which L. D. Ball is superintendent. It has stopped work on the Mounted Laurel and Golden Eagle claims, and will operate the Ohio, Flora Blanche and Aida.

##### SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Blue Gravel.**—This property, near Yreka, idle some time, is to be worked by a new company, with John Garvey as superintendent. The principal stockholders are Yreka men.

**Golden.**—A steam hoist will be put on this quartz ledge near Fort Jones, owned by A. C. Brokaw & Co., and work started on the 200-ft. shaft.

**Quartz Hill.**—M. M. Hough has sold to Raphael Phillips several claims and ditches at Scott River for \$100,000. The property consists of the Quartz Hill, Ryan and California mines, including the ditch from Mill Creek to Hooper Hill, the ditch to Poorman's Bar, and the Ryan, Tom Smith and Ed. Reynolds claims, the new ditch and the Hicks ditch, together with all hydraulic pipe, giants and other apparatus. The mines have given good returns, but will be worked more extensively.

**Salmon River Company.**—The elevator at the Myers claim, near Sawyers Bar, handles the gravel easily. For the Jordan, another of the company's claims on South Fork of Salmon River, a large ditch is to be dug to increase the water supply.

**Yellow Jacket.**—This quartz mine, near Fort Jones, owned by O. Goodfellow and T. J. Henderson, has been bonded by the Sheba Mining Company, of San Francisco, and a 3-stamp prospecting mill has been bought.

##### SONOMA COUNTY.

(From Our Special Correspondent.)

**Culver-Baer Mining Company.**—This quicksilver company has paid a small dividend, and is making satisfactory progress on its 20-ton furnace.

**McMillen Silver Mining Company.**—This company, at Santa Rosa, has elected the following directors: W. P. Holmes, C. A. Hoffer, J. P. Overton, A. G. Burnett, Jacob Wheeler, J. T. Campbell and T. B. Hood. Mr. Holmes is president and Mr. Hoffer secretary.

##### TULARE COUNTY.

(From Our Special Correspondent.)

**Duke Whitt.**—This mine, near Crosi, has been bonded by John McKiernan, and a mill is to be erected.

##### TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Duleck.**—W. J. Graham is to set men at work on this mine, near Groveland. The proposed large tunnel will tap the veins at 950 ft. depth.

**Hidden Treasure Blue Gravel.**—This old property, on Table Mountain, at Mormon Creek, is being worked by Charles L. Lang and the Duchow Brothers. A number of upraises have been run, and the eastern rim of the channel found.

**Pratt.**—At this old mine being reopened near Groveland 10 men are at work under Arthur James.

**Star Mining Company.**—This company, at Columbia, F. W. Williams superintendent, is preparing to rebuild the flume from Rose Creek to the mine.

**Sullivan.**—A contract has been let to sink a 100-ft. shaft on this mine, at Soulsbyville. Hoisting works are being erected, and an air compressor put in.

**Surprise and Dollie Dimple.**—These mines, on Yankee Hill, have been sold to Charles Lewis, of Connecticut. George Mapes retains a 1-3 interest, and will be superintendent. The old Clio 10-stamp mill has been hauled to the property.

**Yankee Hill Mining Company.**—The John Royal Mine, near Columbia, has its incline shaft down 70 ft., exposing a vein of free milling ore.

##### TRINITY COUNTY.

(From Our Special Correspondent.)

**Bullychoop.**—This company has put in a Huntington mill. There is a stamp mill already at the mine.

**Schroeder.**—This mine, at Deadwood, managed by Reiner & Wallace, is to be developed. A number of men are at work.

##### YUBA COUNTY.

(From Our Special Correspondent.)

**Pennsylvania.**—This mine, one of the Victor gold mines, under bond to a company of which Lindsay Scrutton is manager, has shut down. The property is at Brown's Valley. Over \$30,000 have been spent in exploration without success. Much water is encountered in the group.

##### COLORADO.

##### DOLORES COUNTY.

**Emma Gold Mining Company.**—This company, at Dunton, has a 125-ton mill, and is using a ball mill, 18 concentrators, a 100-h.p. marine boiler and 75-h.p. duplex engine. There are about 6,000 ft. of development, including 4 tunnels. Richard Keller is manager, and 84 men are employed.

**Mt. Gorham Mining Company.**—This company has a 10-stamp mill busy, employing 25 men.

##### FREMONT COUNTY.

**United States Reduction and Refining Company.**—This company has let a contract to a Florence foundry for the manufacture of 18 roasting furnaces for installation in its zinc and lead smelter in Canon City. The improvements will cost \$100,000, and the capacity of the plant will be doubled. The smelters will be ready for work October 1.

##### GUNNISON COUNTY.

**Citizen.**—This mine, adjoining the Maid of Athens, is operated by the Wallace Mining Company, which is controlled principally by J. C. Osgood, of the Colorado Fuel and Iron Company. Two shafts have been sunk and various levels run. The shipping ore runs about \$60 per ton, principally in silver.

**Good Hope.**—This mine, in the Vulcan District, is reported shipping very rich gold ore from the 5th level.

**Maid of Athens.**—This mine, in the Mineral Farm Basin, has produced over \$150,000. Stopping is in progress, and new development is under way. The vein showing in the tunnel 150 ft. from the surface varies from 2 to 6 ft., carrying 70 oz. in silver and some gold.

**Pitkin Gold Belt Mining and Reduction Company.**—This company is doing extensive work on the Whig property in the Gold Brick District. The officers are: W. F. Stewart, president; Walter C. Jones, vice-president; J. M. Lowe, secretary; Ed. McCarthy, treasurer; J. T. Quigley, manager, all of Galveston, Tex. Good machinery has been installed. Machine



drills are used. The new shaft will be sunk to 1,000 ft. or more.

## LAKE COUNTY—LEADVILLE.

**Bangkok-Cora Bell Mining Company.**—At the annual meeting at the office, in Denver, on August 7, the following directors were elected: James H. Crandell, Louis H. Jackson, Louis Wagner, Alexander C. Foster, S. C. Madden, C. F. Allen and N. O. Tanquary, all of Denver. The property of this company has recently been leased for 10 years to the Fryer Hill Mines Company, which is now unwatering the Bangkok and adjacent properties preparatory to mining ore known to exist. The Bangkok has been closed down since the strike in June, 1896. Prior to that time the company was a good dividend payer. The company is out of debt, and has a small balance in its treasury. The company has paid in the past over \$100,000 in dividends. The new officers are: Louis H. Jackson, president; Louis Wagner, vice-president; James H. Crandell, secretary and treasurer.

(From Our Special Correspondent.)

The iron market is very dull, and a decrease in shipments is noted. The total tonnage is about 2,200 tons daily of all classes of ore.

**A. Y. & Minnie Mill.** This new concentrating mill is now treating 100 tons per day. Heretofore the lessees have shipped crude material and a lead concentrate. The zinc went into the tailings. The new mill saves the zinc. The A. Y. & Minnie shaft is to be sunk to the lower contact. The property has been a producer for 21 years, and has never been developed below the 450-ft. level.

**Antelope Mining Company.**—Local people head this company, operating a large portion of the old Black Prince property, on Breece Hill. Development is on a small vein, which shows occasional high values.

**Best Friend.**—The new lease, headed by Patrick Boland, is following a small vein which runs 3 and 4 oz. gold and several hundred ounces silver.

**Carbonate Hill Mining Company.**—The famous P. O. S. shoot, supposed to be in this ground, could not be located, and work has ceased.

**Homer Placer.**—H. I. Higgins has returned from the East, and resumed operations in this virgin territory. The new shaft is 300 ft. deep. No work whatever has been done before in that locality, and the enterprise is considered most important.

**Leasing City Territory.**—The Morocco and Home Extension mining companies have applied to the city for leases on the territory lying under the streets and alleys of a large acreage in the downtown section.

**Little Louise Mining Company.**—C. E. Lindeman is at the head of this combination which is sinking a new shaft on the Little Louise group in Birdseye. He is purchasing new machinery, and the shaft goes down 500 ft.

**New Valentine Mining Company.**—President McCarty is putting in heavy machinery for pumping by September 1. The levels already opened will be explored. W. Shadbolt will be manager and superintendent.

**Ollie Reed.**—This property adjoins the new Monarch group. Exploration for over a year is beginning to show results.

**Peerless Maud Combination.**—Manager Hugh Dyatt is pushing work and acquiring, by purchase and lease, a large territory. In the Peerless shaft a new find of lead ore is widening, and runs \$40 to \$50 to the ton. A new shaft on the Peerless Maud, and at 135 ft., is breaking into mineralized ground. Arrangements have been made to ship and handle with a mill the low-grade ore bodies in sight.

**Printer Boy Gold Mining Company.**—Operations have been suspended temporarily awaiting a settlement by the New York owners and the raising of further funds.

**Rubie Leasing Company.**—This concern has passed into new hands, headed by William Bowden. An immense lead sulphide shoot in the Rubie will be developed. The new owners will connect with the Yak tunnel by running 400 ft.

## PUEBLO COUNTY.

**Philadelphia Smelter.**—This plant of the American Smelting and Refining Company, at Pueblo, has been closed. The reason given is that the new smelter at Murray will take care of the Utah output.

## SAN JUAN COUNTY.

**Wage Scale for Miners and Mill Men About Silverton.**—A threatened strike of miners and mill men has been averted by the signing of a wage scale at Silverton on August 14. The scale, as finally approved, for a term of 3 years, beginning September 1, is a compromise between the demands of the owners and the miners, and is as follows: Mines underground, all 8 hours; miners, \$3; machine men, \$4; machine men helpers, \$3.50; mule drivers, \$3; nippers, \$3; timber men, \$3.75; timbermen helpers, where employed all the time, \$3.25; hoisting engineers, \$4; station tenders, \$3; blasters, \$3.50; trammers and shovelers, \$3. Mine employees outside the above are to be paid as follows:

Engineers, 12 hours, \$4; firemen, 12 hours, \$3.50; blacksmiths, 9 hours, \$4; tool sharpeners, 9 hours, \$3.75; blacksmith helpers, 9 hours, \$3.25; laborers, 9 hours, \$3. Mill men—Battery, Huntington, Chilean, 12 hours, \$4; crusher men, 12 hours, \$3.75; jig men, 12 hours, \$3.75; table men, 12 hours, \$3.75; vanner men, 12 hours, \$4; tailings plant, 12 hours, \$3.25; firemen, 12 hours, \$3.50; mill helpers, 12 hours, \$3.25; crusher men, 10 hours, \$3.20; mill helpers, 10 hours, \$3; blacksmiths, 10 hours, \$4; blacksmith helpers, 10 hours, \$3.25; roustabouts, 10 hours, \$3; tramway men, grip men and bucket men, 10 hours, \$3.25; brakemen, 10 hours, \$3.50; oilers and line men, 10 hours, \$4.

Contract provisions.—For all classes of labor sinking shafts, 25c. per day shall be added; for all classes of labor sinking wet shafts another 25c. per day additional.

Short shift on Saturday to all 10-hour men, short shift to be 9 hours.

Nine hours shall be considered night shift for all 10-hour men.

All men to go to and from work on their own time. The rate of wages for all labor not enumerated hereon shall be agreed upon by employers and employees, provided that the minimum wage shall not be less than \$3 a day.

All contracts shall be in writing. At the expiration of 7 days after beginning work, contractors shall have the option of relinquishing their contracts without penalty, and such provision shall be made in the contract. If at the expiration of 7 days contractors desire to finish their contracts, both parties to the agreement shall use their best endeavors to have the contract completed.

The scale is signed by the Colorado Mining and Milling Company, the Contention Mining Company, the North Star, the Eureka Exploration Company, the Gold King Consolidated Mines Company, the Grand Mogul Mines Company, the Iowa Gold Mining and Milling Company, the Kendrick & Gelder Smelting Company, the Ledge Mining and Milling Company, the Natalie Mining and Milling Company, the Notaway Gold and Copper Mining Company, the Occidental Mining Company, the Quartz Mining and Milling Company, the Royal Mining and Investment Company, the Silver Lake Mines, the Silverton Mining Company, the Sioux Mining Company, the Sunnyside Mines and the Tom Moore Mining Company. On behalf of the mine owners the above agreement was signed by W. Z. Kinney, Joe B. Warner, W. R. Pyke, Joe T. Terry, R. W. Watson.

(From Our Special Correspondent.)

**Carbonate King.**—Four car-loads of ore were recently shipped to the local smelter as a trial, and others will follow if results are satisfactory. The mine is under lease to John T. Bassler.

**Grand Mogul.**—The tunnel has cut the vein at 1,700 ft. in exposing an ore body 24 ft. wide, running from \$5 to \$60 gold per ton. The projected mill is now a certainty.

**New York-Brooklyn.**—These mines are soon to be equipped with a mill. Preliminary work has begun. Since the recent strike the mines have been regular producers.

**Picket.**—Ouray parties have secured a lease from Ben Duval, the owner, and are mining shipping ore.

**Robert Bonner.**—A 15-stamp mill is being erected by Loune & Johnson for treating ore from this claim, near Silverton.

**Royal Mining and Milling Company.**—This company has shipped its first ore to the local smelter as a test. Several hundred tons await the completion of the tram. A rich strike was recently reported of high-grade gray copper and ruby silver.

**Tribby Gold Mining and Milling Company.**—This company has recently acquired title to several claims adjoining its former workings, and has now a compact group of 12 claims and a tunnel site. A contract for driving 100 ft. will be let shortly.

## SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

**Blue Lake Mining Company.**—This company, in Bridal Veil Basin, has completed the short cross-cut tunnel, and is pushing work on the vein with satisfactory results. W. W. Cramer is superintendent.

**Calumet-Telluride Gold Mining Company.**—This company, incorporated by H. M. Hogg, Telluride; John Akman and Isaac Tengam, Calumet, Mich., is capitalized for \$200,000. It will operate the H. M. H. group, at the head of Bear Creek, in Bear Creek Basin, 4 miles southeast of Telluride. The claims are near the Nellie Mine, and show considerable development work. The ore is carbonate and a concentration proposition. The veins are from 3 to 5 ft. wide. A tramway 400 ft. long will be built from the mine to the Glencoe, a 10-stamp concentration plant, next spring, when work will start. John Akman will be manager.

**Double Eagle Mining Company.**—The new boarding house, in Bridal Vein Basin, is completed, and the force will be increased soon. Work on the tunnel is

progressing satisfactorily. J. B. Litchfield is manager.

**Keystone Hydraulic Mining Company.**—At the annual meeting at Telluride the old board of directors was re-elected, with the exception of E. L. Davis, who declined on the ground that he contemplates making an extensive journey to Japan and other foreign points. Mr. Davis has been president of the company for a number of years. The following are the officers elected: A. L. Garford, of Cleveland, president; Wilbur Thomas, of Denver, vice-president, and C. M. Coleman, secretary and treasurer; executive committee, Wilbur Thomas, W. A. Nicodemus and C. M. Coleman. A. Schoppe, of Denver, was elected a director to take the place left vacant by Mr. Davis. Work at the mine is progressing faster than for some time.

**Little Eva.**—A test run on this ore, at the Suffolk Mill, at Ophir, gave returns better than 3 oz. gold to the ton. The mine is worked under lease. The force will be increased, and part of the Suffolk Mill used steadily. Brewster & Hathaway, Ophir, are the lessees.

**Nellie.**—A small force is employed at this mine, near Telluride, taking out ore for a test run, and the tramway is being repaired. Cooper Anderson is manager.

**Savage Basin Road.**—Work is being pushed and rapid progress made. Above Pandora, 2 miles east of Telluride, the road will be blasted out of the cliffs. Holes are being drilled, and 60 kegs of black powder will be set off at one blast.

**Silver Bell.**—The mill is closed while foundations for the new batteries are being built, but will start soon. Machine drills are busy on the Ida and Butler veins. W. S. Buckley is manager.

**Tomboy Gold Mines Company.**—The new mill, at the mouth of the Cincinnati tunnel, to handle Cincinnati and Argentine ores, is nearly completed, and the machinery is being installed rapidly. John Herron is manager.

## SUMMIT COUNTY.

**Cashier.**—This mine, at Breckenridge, has a new 85 h. p. boiler in place. Col. Thomas L. Wood, of Denver, is manager.

**Chamberlain-Dillingham Sampler.**—This sampler, at Breckenridge, is running on iron ore from Montezuma and local mines. The ore from the Pride Company and the Rose, at Montezuma, the Mountain Pride, the Cross, the Brier Rose, and others at Breckenridge, is coming in now at the rate of over 3 car-loads a day.

**Swandyeke District.**—The Three Kings Company, composed of Denver men, is putting in a complete cyanide mill, and the old Griffith Mill is being remodeled to cyanide the ores from the Tyler and Carrie mines. Charles Appeaman has struck gold ore in his Wise Mountain claim.

## TELLER COUNTY—CRIPPLE CREEK.

**Fair Chance Mining Company.**—This company, of which H. McK. Twombly, of New York City, is president, is to start a 3-compartment shaft on its property, which consists of the Rob Roy, Helen McGregor and Phoenix lodes.

**Portland Gold Mining Company.**—Judge Hallett, in the United States Circuit Court, has entered an order in the suit of this company against the Monument Gold Mining Company and John Gray and P. Kurtz, in which the injunction against the latter company asked by the Portland company is denied, but the defendants are required to set aside 35 per cent of their mill or smelter returns and deposit them in the First National Bank of Colorado Springs pending the issue of the dispute. The defendants are also required to file their answer in the suit within 30 days. The suit was brought to prevent the defendant company from working their mines on a vein which, the Portland company alleges, is an extension of a vein on the Tidal Wave claim, within the Portland group.

(From Our Special Correspondent.)

**Mining Under Cripple Creek Streets.**—Dan Hanley and associates have obtained a franchise to work under streets and alleys, and will at once start prospecting. Some time ago Mr. Hanley opened up a promising vein on some lots in the rear of his place of business. The Home Mining Company, composed of the California people, under the direction of Judge Beall, once did considerable work under the streets and alleys, but failed to find anything of any value. Mr. Hanley has started work in a different place, and the outcome is watched with interest.

**American Eagles.**—It is reported that some rich ore is being shipped from the lower levels, and a number of rumors have been circulated about rich ore. The property is owned by W. S. Stratton, and is situated on Bull Hill.

**Golden Cycle Mining Company.**—It is understood that Col. Lillibridge, of Colorado Springs, has an option on enough of the stock to insure his control should the option be taken up. The property is near the town of Goldfield, and although somewhat of a

low-grade proposition, has made a splendid record during the past year, is paying dividends, and has considerable treasury reserve. John T. Miliken, of St. Louis, Mo., is one of the largest stockholders, and F. J. Campbell, of Denver, is general manager.

**Golden Wedge.**—This property is shipping a fair amount of ore. The property belongs to the Mary Jane Company, and is worked under lease.

**Portland Gold Mining Company.**—It is reported on good authority that sinking is to begin again in the 3 shafts. The main shaft, known as the Burns, is down something over 1,000 ft. Recently the company completed a 300-ton mill at Colorado City, which is reported working very advantageously. J. F. Burns, of Colorado Springs, is general manager, and C. J. Garvin is superintendent.

**Sheriff.**—This property, on Raven Hill, near Windy Point, is being worked under lease by George Wrockloff. It belongs to Len Jackson and associates, of Colorado Springs. Considerable work has been done, but no ore in large quantities has been taken out. Mr. Wrockloff made considerable money leasing on the Burns property of the Acacia Company.

## IDAHO.

### BOISE COUNTY.

(From Our Special Correspondent.)

**Lucky Boy.**—This mine, purchased by a Salt Lake company 2 years ago, has been developed by shaft 250 ft. A cross-cut has opened a vein larger than in the upper workings. The 10-stamp mill is running on \$15 to \$20 ore.

**Ram's Horn.**—This mine, near the Lucky Boy, has opened a body of gold ore.

**Washington.**—This mine, near the Lucky Boy, at one time quite a producer, is being opened below the old 300 ft. level.

### CUSTER COUNTY.

(From Our Special Correspondent.)

**Blue Bird.**—George Smith, of Salmon, who owns this mine at Clayton, has opened 3 ft. of galena in the winze of the upper tunnel, which is said to sample 50 per cent lead and 30 oz. in silver.

**Clayton Mining and Smelting Company.**—The silver-lead smelter of this company, at Clayton, has been operated each season during the summer for 20 years. L. Green, who has been superintendent for some years, has resigned, and will move to Salt Lake. Messrs. Barton & Nash, of Omaha, owners of the plant, have given orders to close the works for an indefinite period, probably until a railroad is built. One furnace is in use. The bullion is sent across the range to Ketchum, a distance of something like 80 miles. It has always gone to Omaha for parting.

### IDAHO COUNTY.

**Lincoln Mining Company.**—John T. Hodson, general manager of this company, of Boise, has placed an order with the Salt Lake Hardware Company for machinery for a 100-ton concentrating mill and 1½ miles of 4-in. pipe. The equipment of the mill will embrace a No. 2 gyratory crusher, 14 by 27-in. rolls, a 6-ft. Chilean mill and 8 concentrating tables, the motive power to be 2 30-h.p. gasoline engines and 1 8-h.p.

**Mayflower Mining Company.**—This company is developing a group of 5 claims 60 miles from Tampa and 40 miles from Mackay. The company is capitalized for \$600,000, in \$1 shares. The development consists of a tunnel 350 ft. long, which has cut 2 veins—one gold-bearing and the other silver-bearing. The company is putting up a 5-stamp mill. About \$5,000 has been taken from the property. The company intends to have most of its ore treated at the Mackay Smelter. The officers are: President, W. D. Garlock, of Boise; vice-president, E. L. Tracy, of Ogden; secretary, B. Mason, of Nampa; treasurer, H. E. Neal, of Boise.

### LEMHI COUNTY.

(From Our Special Correspondent.)

**American Development and Mining Company.**—Fifteen stamps are dropping at the Gibbonsville Mill; the other 15 stamps are hung up for want of ore. The property is under the management of H. C. Bacon, who is acting for the receiver. The ore milled is a heavy iron sulphide, 50 per cent of the value is caught on the plates. Frue vanners are used to save the concentrates, which are treated by cyanide. Some years ago the company erected a chlorination plant, using a Pearce turret roaster. The tailings from this mill were saved. The present management is now running these tailings through the stamp batteries with satisfactory results.

**Rambler Group.**—This property, on Wimpey Creek, 8 miles from Baker, was recently sold by the discoverer, H. L. Albertson, of Baker, to Rosenbery and Vogler, of Salmon. The new owners will develop the group, and may erect a stamp mill. A good body of milling ore is exposed.

**Wellington.**—This property, on Sandy Creek, owned by Quarles and Boxwell, of Salmon, and one of

the first gold properties in the county on which a stamp mill was built, has recently been bonded to parties who contemplate reopening the mine and overhauling the mill. The property has a good record, the ore plating about \$10 a ton.

### SHOSHONE COUNTY.

**Monarch Mining Company.**—This company, of Murray, Idaho, C. L. Derby manager, recently placed an order with J. H. Sanborn, Pacific Coast representative of the J. George Leyner Drill Company, for a 6-drill Leyner compressor and drills.

**O. K. Consolidated Mining and Milling Company.**—This company is reported to have struck a body of lead ore 14 ft. wide in Government Gulch, at the foot of a 200-ft. shaft. B. F. O'Neil is president of the company, and N. Wittner secretary. The directors are: B. F. O'Neil, J. W. Flink, N. Wittner, O. H. Linn, J. W. McNall, all of Wallace; Albert Burch, of Kellogg, and O. C. Traux, of Tekoa.

## ILLINOIS.

### SANGAMON COUNTY.

(From Our Special Correspondent.)

**Illinois Coal and Coke Company.**—Some of the reports about this company are premature. Newton Jackson, of Philadelphia, Pa., holds options on a number of plants that have been mentioned, but not on all of them. It is possible that the combination may be effected in the next 30 or 60 days. The operators in the Springfield District are not sure yet that Mr. Jackson commands sufficient capital to swing the deal. A few weeks will tell the tale, as most of the options he holds expires August 31 without any provision for a further extension.

**Jones & Adams Company.**—This company, of Chicago, Ill., has contracted with the Goodman Manufacturing Company, of Chicago, for a 75-kw. generator, 15 by 16 in. McEwen engine, and an 8-ton electric locomotive, for the mine at Springfield. This will double the present electric equipment, and the company expects to increase its output from 1,050 tons to 1,400 tons per day, making this the largest mine in the Springfield District.

## INDIANA.

### MARION COUNTY.

(From Our Special Correspondent.)

**Columbia Clay Product Company.**—This company, of Indianapolis, has been incorporated with a capital of \$100,000. The directors are J. S. Cruse, W. A. Rhodes, G. W. Gilbert and Frank Kissing. The company will mine clay and build a large manufacturing plant.

## LOUISIANA.

### CALCASIEU PARISH.

(From Our Special Correspondent.)

**Welch Oil and Development Company.**—The well of this, a local company, had a blow-out of mud, gas and oil at 1,450 ft. The gas pressure is very strong, and threatens to ruin the well as it ruined 2 others put down by the company. Experts say the field is a good one, and a gusher is expected if the well can be got under control.

### ST. MARTIN'S PARISH.

(From Our Special Correspondent.)

**Anse-le-Butte District.**—The Martin-Heywood Company well is down 400 ft., the last 200 ft. being a bed of salt. The company has ordered outfits for 2 more wells.

## MICHIGAN.

### COPPER—HOUGHTON COUNTY.

**Calumet & Hecla.**—At the annual meeting the following directors were re-elected: Alexander Agassiz, Newport, R. I.; Francis L. Higginson, Boston, Mass.; Francis W. Hunnewell, Wellesley, Mass.; Quincy A. Shaw, Jr., Boston, Mass., and James N. Wright, Detroit.

(From Our Special Correspondent.)

**Atlantic.**—This company is stamping 1,500 tons of rock daily, which is mainly from A, B and D shafts. A shaft is down 900 ft., B shaft, 2,500 ft., and D shaft, 2,950 ft.

**Baltic.**—The 3d head at this company's stamp mill is in commission, and the mill is treating 1,500 tons of rock daily, with 43 power drills busy underground. The force of miners has been increased. Twenty new drilling machines have been received, and will be placed underground within a few weeks.

**Calumet & Hecla.**—This company is shipping 650 tons of rock per day from the Red Jacket shaft, where 2 compartments are used solely for hoisting of rock. Preparations are being made for important changes in hoisting and in handling the rock after it reaches the shaft house. Skips will be used in place of cages.

**Champion.**—This mine is stamping 225 tons of rock per day at the Atlantic Mill. Within 3 weeks the 4th head at the Baltic Mill will be installed, and will treat rock from this mine, doubling the output. The shafts have reached the following depths: B, 650 ft.;

D, 775 ft.; C, 640 ft., and E, 890 ft. A new machine shop, 144 by 44 ft., ground dimensions, sandstone walls with steel truss roof, will be erected, and will be equipped with a 10-ton steel traveling crane and full outfit of tools.

**Franklin.**—This company has discharged a number of men at the Franklin Junior branch, and taken out 6 power drills.

**Isle Royale.**—Good progress is being made with the diamond drill work. The outfit is from the Sullivan Machinery Company, of Chicago, Ill. Sixteen air drills are busy in No. 1 shaft, the only one operated at present.

**Osceola Consolidated.**—This company has discharged 125 men at the North Kearsarge branch and 50 men at the South Kearsarge Mine. A number of drilling machines have been removed, and operations are confined mainly to the opening of new ground. Surface work continues. Only 3 heads are in commission at the stamp mill, treating 1,600 tons of rock daily. The Tamarack Junior branch, operated during the day shift only, is shipping 250 tons of rock per day, and No. 6 shaft, of the Osceola branch, supplies 650 tons. The remainder comes from the Kearsarge mines.

**Quincy.**—This company is fitting No. 2 stamp at the mill with the Parnall-Krause mortar and screen for the coarse system of stamping. No. 1 head, which was fitted recently with the apparatus, is stamping 525 tons of rock daily. Fred G. Schubert has been appointed draughtsman to succeed R. M. Morrison, resigned.

**Winona.**—This company has encountered a 800-ton mass of copper in the drift south from No. 2 shaft at the 6th level.

**Wolverine.**—The new stamp mill at Traverse Bay is in commission. Rock shipments are being increased gradually, and the mill will be running full capacity within a few days. The mill is 180 by 206 ft. on stone foundations with steel framework from the Wisconsin Bridge and Iron Works, of Milwaukee, Wis. The 2 stamps are from the Nordberg Manufacturing Company, of Milwaukee, and the 72 jigs from the Portage Lake Foundry and Machinery Company, of Hancock. The boiler house, 42 by 58 ft., is 16 ft. south of the mill, with stone foundation and walls and a steel truss roof. It is equipped with a battery of Sterling water tube boilers capable of furnishing 600 h. p.

### COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

**Ahmeck.**—Engineers have surveyed the property. Exploration work, consisting of test pitting and trenching, will start in search of the Kearsarge amygdaloid lode, which has been opened immediately south and north at the North Kearsarge and the Mohawk mines.

**Allouez.**—This company has closed the stamp mill, one head of which has been used by the Wolverine Mine for 5 years. The mill has been partially dismantled, and will not be used for some time. The old workings on the Allouez conglomerate lode are kept dry, pending a decision by the Eastern officials.

**Mohawk.**—The rails on the Mohawk & Traverse Bay Railroad, connecting the mine and stamp mill, have been spread to standard gauge. An accident to the hoisting engine at No. 2 shaft has stopped hoisting for 2 weeks until repairs are completed. The complete equipment for one stamp has arrived at the mill.

**Phoenix.**—Cornelius Bedell, formerly superintendent of the Quincy Mill at Mason, has been appointed mill superintendent, and will have charge of the head on the Eagle River. The foundations are about ready and the timbers for the walls are on the ground.

### COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

**Adventure.**—Opening work underground is being pushed. The stamp mill will not go into commission before September. The electric tram in the Butler tunnel, ½ mile long, is in commission.

**Michigan.**—Seventeen tons of copper have been cut off the large mass encountered recently in the branch vein.

**Victoria.**—Work on the new shaft is well advanced by sinking and raising from 3 levels west from No. 2 shaft. The shaft will be about 2,000 ft. from No. 2 shaft.

### IRON—MENOMINEE RANGE.

**Aragon.**—The Oliver Mining Company has completed the No. 5 shaft, sunk 1,080 ft., as the main shaft. Work began 16 months ago, and has been extremely rapid. The shaft is in the Hanbury slate, is 10 by 14 ft., and has 4 compartments, the timber compartment being so arranged that timbers can be lowered in the car on which they are run to the collar of the shaft. A crank and flywheel pump of 2,000 gal. capacity will be installed. A cross-cut of 1,200 ft. will be run to the present workings, and in this will be a double track railway for pneumatic locomotives.



**Oliver Iron Mining Company.**—This company is to sink a steel shaft at the Chapin Mine in the limestone hanging wall to be 10 by 23 ft. inside timbers, and have 4 compartments—2 skipways, a cageway and a pump compartment. The shipways will be 5 by 8 ft. At 965 ft. connection will be made with the Hamilton shaft. The large Allis Cornish pump that once stood in D shaft will be installed in this shaft. Its normal capacity is more than 3,000 gal. a minute, against a head of 1,500 ft. The shaft will have steel frames, plank lined, but with the planking broken by steel plate to prevent fire from spreading.

**Wisconsin, Michigan & Northern Railway.**—It is claimed that this company will spend over \$2,000,000 this year and next for improving its plans for hauling iron ore from the mines to the Chicago and Eastern furnaces. This fall the road will have tracks into Norway and Quinnesec, and next spring an extension will be built to Iron Mountain. Side tracks will be laid to all the mines in the vicinity of Norway, Vulcan and Quinnesec this fall. The plan is to load ore into the cars at the mines, send them over the Wisconsin, Michigan & Northern to Peshtigo and then by car barges to South Chicago. From South Chicago the ore will go east to Pennsylvania and Ohio points. The company will build a fleet of car barges.

MINNESOTA.

(From Our Special Correspondent.)

The steamship *James Hoyt* has taken her first cargo at Duluth, loading 5,439 gross tons of ore in 2 hours. This is a wonderful record, but hardly a fair one, as everything was prepared for a quick job. The ship is designed for rapid loading and unloading, and it is expected that 95 per cent of her cargo can be taken out by the Hulett machine without other human labor than that required at the unloader.

The following statement of labor costs and results at typical Mesabi Range mines of the United States Steel Corporation, underground, steam shovel and milling, has been made up for the period of 1901 to October 1.

	Tons per man per day.		Average daily wage.		Product during period.
	Mine labor.	Total labor.	Mine labor.	Total labor.	
Underground Mines:					
Adams	5.32	4.09	\$2.23	\$2.20	660,000
Spruce	4.80	4.02	2.26	2.27	225,000
Hull	6.01	4.71	2.36	2.27	480,000
Rust	6.05	4.98	2.13	2.09	
Burt	8.16	5.23	2.17	2.20	
Pillsbury	6.48	5.00	2.33	2.35	100,000
Genoa	6.03	4.81	2.19	2.21	266,000
Average	6.12	4.69	\$2.24	\$2.21	246,570
Open pit mines:					
Mountain	40.28	32.37	\$2.07	\$2.12	Steam shovel.
Auburn	26.09	20.13	2.17	2.15	Milling pit.
Fayal	25.65	21.24	2.08	2.18	Shovel & milling.
Duluth	16.00	12.39	2.04	2.04	Milling pit.
Average	27.01	21.53	\$2.09	\$2.12	

The Mountain Iron was the only one of these properties that secured the whole of its product during the shipping season, and it mined from May to October, the period included in the comparison for open-pit mines, 950,000 tons.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

**Crofton.**—This new Sellwood mine was entered in May and a shaft sunk into the ore. It is shipping its first cargoes this week. It will be a large shipper another year, and may get out this season 40,000 tons. It is in Section 13, T. 58, R. 20.

**Minnesota Iron Company.**—This company, which is the operator of the old Minnesota Iron Company's mines, as well as those of the Lake Superior Consolidated Iron Mines, is now working at the following properties: Hibbing, Hull, Rust, Burt, Day, Sellers, Pillsbury, Glen, Clark and Chisholm, and is opening a tenth for early shipment. It is employing about 2,500 miners at these properties, and will make a season output of 1,900,000 to 2,000,000 tons. The company has built a large laboratory. The chief new work is a very large stripping contract under way by Winston Brothers & Dear, on the Burt. The present contract will clear a space 2,500 ft. long and 250 ft. wide to the ore, at an average depth of about 33 ft. It is expected that when this contract is completed a second will be undertaken, and that ultimately the entire northern part of the ore body will be stripped, making one of the largest open pits on the range. The Burt is now shipping from shaft. At the Chisholm a second shaft will be sunk. The Glen, a new mine, opened last winter will produce 50,000 tons this year. A contract for 24 dwellings will be let soon for this location. The Hull may be stripped another year. The surface is not deep and the ore body is very large. The new property is in Section 23, T. 58, R. 20, and has been in this company's possession some time.

**Pearce.**—This mine is being opened by Jos. Sellwood. It adjoins the Chisholm and Clark, and carries a royalty of 32c. as well as a cash bonus. Its ore is guaranteed at 63 per cent iron and .035 phosphorus. A shaft has been sunk since May 150 ft., much of the way in hard rock, and the mine is now producing 600

to 700 tons daily. It is expected to mine 60,000 tons this season. It belongs in fee to lumbermen of Winona and Chicago.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

**Joplin Ore Market.**—Last week there was another clean sweep of ores. Prices advanced \$1 a ton all around, the highest grades bringing \$39 per ton at the curb market Wednesday night. The sales were mostly on straight bids and assay prices were little considered, but the sales would make the assay price for the week at about \$36 for standard 60 per cent ore. There was no change in the price of lead, which sold for \$49 per ton, delivered.

During the corresponding week of last year the zinc shipment was 775,940 lbs. less, the lead shipment 242,100 lbs. greater and the value \$57,102 less. For the corresponding 33 weeks last year the sales of zinc were less by 13,453,710 lbs., the sales of lead greater by 2,680,140 lbs. and the value less by \$964,621. Following are the sales from the various producing camps of the Joplin District for the week ending August 16:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,771,500	365,130	\$57,843
Galena-Empire	1,066,700	237,360	21,816
Cartersville	1,908,030	283,940	36,953
Aurora	818,350	13,130	14,594
Duenweg	926,650	16,260	17,074
Zincite	513,440	11,700	9,529
Oronogo	455,910	49,710	8,852
Prosperity	226,450	23,670	4,537
Carl Junction	511,170	.....	9,457
Granby	310,000	46,000	4,100
Springfield	266,000	.....	4,788
Sarcoite	160,180	.....	2,883
Cave Springs	109,290	65,470	3,353
Central City	119,600	16,230	2,072
Reeds	113,560	.....	2,044
Spurgeon	101,140	20,120	1,403
Flemington	73,000	.....	1,241
Neck-Alba	161,370	.....	2,905
Stotts City	66,000	.....	1,122
Sherwood	48,840	.....	830
Wentworth	42,130	.....	676
Total	10,769,370	1,098,720	\$208,132
Total, 33 weeks	344,048,120	40,765,140	\$5,973,535

Zinc value, week, \$181,487; lead, \$226,645; zinc value, 33 weeks, \$5,073,775; lead, \$589,760.

**Paragon Mining Company.**—With a capital of \$80,000, this company, incorporated by Carthage, Mo., and Chicago, Ill., men, recently purchased the Nellie M. Mine, on the Schifferdecker land, west of Joplin.

MONTANA.

BEAVERHEAD COUNTY.

**Montana Copper and Gold Mining Company.**—This company's property is located in the Stone Creek District. A. P. Ballow, secretary, says the suspension of work is only temporary; that work will be resumed in a short time and heavier machinery used. The vein has been cross-cut at a depth of 265 ft.

FLATHEAD COUNTY.

**Kalispell & Dayton Mining Company.**—This company is taking some gold ore from its claims on Dayton Creek. The principal claim, the Jumbo, has a shaft 80 ft. deep. The vein is about 4 ft. wide. The ore is chalcopyrite, carrying free gold.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Liverpool.**—This property, the pioneer silver producer of Lump Gulch, near Clancy, was the first property in the district to be equipped with steam machinery. The main shaft, 400 ft. deep, has been practically idle since 1896. Now a new company has taken hold under the management of Ed. Ely. New machinery has been purchased throughout, including an air compressor, a 9 by 14 hoist, station pump, boiler, etc. The shaft will be pumped out and sunk an additional 400 ft. The property has produced \$500,000 in silver, the ore being a complex blende, some of which went several hundred ounces in silver per ton. John Dickson, of Clancy, is master mechanic.

LEWIS & CLAUKE COUNTY.

**Montana Mining Company.**—The July report states that at the Drumlummon 2,300 tons of ore were crushed in the 40-stamp mill, and 13,605 tons of tailings from the dams were treated. The estimated yield of the ore was \$10,500 and of the tailings \$26,100. The cost of treating the tailings was \$13,900, and the total estimated profit is \$11,100.

(From Our Special Correspondent.)

**Big Indian Mining Company.**—The capital of this company is \$1,500,000. Tacoma, Wash., is the principal place of business. Allan C. Mason, Wm. J. Mead and F. M. Harshberger, all of Tacoma, are the incorporators. The 60-stamp mill will be finished shortly. Colin McIntosh, of Helena, is agent and local manager.

MISSOULA COUNTY.

M. F. Maher and others have located 400 acres of placer gold on Nine-Mile Creek, about 8 miles from St. Regis, near Missoula. A portion of the ground was worked 15 years ago. The locators intend to work the property next spring.

POWELL COUNTY.

**Washoe Smelter.**—The strike of the engineers and many of the switchmen is on, though many returned to work at the same scale of wages as formerly. The company has suffered little inconvenience from the walk-out, and has been able to keep sufficient engines running to keep all departments of the smelter in operation.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

**Cora.**—Since the court injunction closed down the Minnie Healey Mine, the Montana Ore Purchasing Company has largely increased the force of miners in both the west and east shafts of this mine.

**Sinbad.**—Cross-cutting still continues on the 700-ft. level. The north cross-cut is in about 150 ft., and the south about 110 ft. The property is situated on the flat east of Meaderville.

**Speculator.**—This property is closed down, throwing 300 miners out of work.

NEVADA.

LINCOLN COUNTY.

(From Our Special Correspondent.)

**Bamberger-De Lamar Gold Mines Company.**—This company, incorporated under the laws of Wyoming, has a capital stock of \$5,000,000, divided into \$10 shares, non-assessable. The officers are: Simon Bamberger, president and general manager; Marcus Stine, vice-president; L. S. Frankenheimer, treasurer; H. P. Thurston, secretary. The directors are: Simon Bamberger, Salt Lake, Utah; Martin A. Marks, Cleveland, O., and L. S. Frankenheimer, J. E. Heimerdinger, Philip Lehman, William Nash, Marcus Stine and Henry B. Thurston, all of New York City. The Central Realty Bond and Trust Company, of New York City, is transfer agent and the North American Trust Company, registrar. The company has taken over these properties at De Lamar; De Lamar's Nevada Gold Mining Company, Magnolia Gold Mining and Milling Company, Boston De Lamar Gold Mining and Milling Company, Mono Gold Mining and Milling Company, April Fool Gold Mining and Milling Company, Rose Group of gold claims, Pleides Group of gold claims.

James W. Neill, mining engineer, of Salt Lake, who examined the properties, after stating that the De Lamar's Nevada Gold Mining Company has alone produced over \$13,000,000 in gold bullion during the last 7 years, estimates the quantity of ore actually in reserve, without taking into consideration any ores below the 9th level, at 314,000 tons of an average assay value of \$9.97 per ton, \$3,130,580. Mr. Neill further states that the future prospects indicate that the mine will produce as largely as ever heretofore, and that after the mills are in running order the monthly net profits from 300 tons of ore and 500 tons of tailings per day should be not less than \$50,000 per month. Mr. Neill states in his report as to the Magnolia property, that many specimens carrying free gold in quite large pieces are found, and from the upper workings ore of this character to the amount of over \$100,000 has been sent to the Salt Lake smelters. He also says that, for a prospect, it has a most excellent showing. The experts report that the April Fool property has actually in reserve ores that will produce \$250,000 in gold bullion.

These properties embrace about 1,600 acres of ground and cover the vein for 3 miles.

The prospectus states that a contract has been closed with the General Electric Company for the erection of a power plant at a point on the Oregon Short Line Railway, and the transmission line, about 15 miles in length, to the mines and mills is being constructed. Additional machinery has also been contracted for, and the De Lamar Mill is being overhauled with a view of increasing the capacity from 200 to 500 tons per day. The April Fool Mill has been overhauled. Both mills are working over tailings with considerable profit.

The New York City offices of the company are in the Broad Exchange Building.

OREGON.

BAKER COUNTY.

(From Our Special Correspondent.)

**California Consolidated.**—The long tunnel has cut the main vein at 1,068 ft., and opened good ore.

**North Pole Mining Company.**—This company has purchased an extension on its ledge and now controls 8,000 ft. on the lode.

**Oregon Smelting and Reduction Works.**—The following officers and directors have been elected: President, W. E. Lindsay, of New York City; first vice-president, W. S. Eberman; second vice-president, N. C. Richards; secretary, D. L. Killen; treasurer, J. H. Robbins; general manager, Dr. Ed. W. Mueller; all of Sumpter, Ore. The board of directors is composed of the above, and E. J. Lindsay, of Milwaukee, Wis.; Walter A. Wood, of Hoosick, N. Y. and E. F. Warner, of Sumpter, Ore. The bids for the machinery are all in, and the general manager is now in Denver, Colo.,

to secure equipment. The plant will have a daily capacity of 160 tons and sampling works. The brick are now being burned and the site is being cleared. The plant may be in operation by the close of the year.

## GRANT COUNTY.

(From Our Special Correspondent.)

**Dixie Meadows Gold Mining Company.**—A body of gold ore at 125 ft. on the north drift from the main tunnel assays well. The vein is 12 ft. wide, and the general average is said to be \$40.

**Red Boy Consolidated Gold Mines Company.**—This mine may install a large electric power plant, taking water from Olive Lake. The lake will give a head of 770 ft., enough to develop 2,000 h.p. The plant will cost about \$150,000. It will permit economies, and add another source of revenue by placing power on the market. A very rich strike has been made in the north drift of the Monarch vein. It is called the richest ore ever found in the property.

## PENNSYLVANIA.

## BITUMINOUS COAL.

**Buffalo & Susquehanna Coal and Coke Company.** This company recently purchased the Berwind shaft of the Berwind-White Company, near Du Bois. The transaction involves 32,500 acres of coal land taken up by the Berwind-White Company 10 years ago.

**Valley Coal and Stone Company.**—This company has bought lands in Stony Creek and Richland townships extending from Constable Hollow, on the north, to the Ingleside mines of the Lorain Steel Company, on the south. The company owns about 1,000 acres of coal and has about 182 acres under lease. The amount invested is not far from \$100,000. The officers are: T. Edwin Murphy, president; George M. Wertz, vice-president; George W. Reese, secretary and general manager; S. Hamor Cauffiel, treasurer. The directors are, in addition to the officers: Robert S. Murphy, Joseph Cauffiel, John L. Tross, Daniel Cauffiel, W. J. Watkins, all of Johnstown, and Rodney Ludlow, of Philadelphia.

## SOUTH DAKOTA.

## CUSTER COUNTY.

(From Our Special Correspondent.)

**North Star Company.**—The 10-stamp mill is making its initial run on ore from the mine. If results are satisfactory, the company will put in a cyanide annex.

**Old Bill.**—J. B. Safford and associates are in Custer, starting work. A steam plant has been installed and the shaft is being sunk.

## LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Dakota Mining Company.**—Ore is being mined, shipped 10 miles and cyanided at the 100-ton plant in Deadwood for a reported cost of \$2.83 per ton, of which 75c. a ton is paid for freight. The company is preparing to enlarge its plant, and expects to treat 200 tons.

**Golden Crest Mining Company.**—Ground has been broken at the head of Two-Bit Gulch for a new 100-ton cyanide plant. Edward Henderson, of Detroit, Mich., secretary, is at Deadwood superintending work.

**Penobscot Mining Company.**—Six car-loads of machinery have arrived for the 40-stamp cyanide plant at Garden City. The company is working 125 men, and intends to have the mill completed by November 1.

**Shamrock.**—Thomas Christianson and associates are making regular shipments of silver-lead ore to Omaha that is reported to run from 20 to 30 oz. silver and 40 per cent lead.

**Swift Gold Mining Company.**—This company owns a group of claims at Garden City, near the Penobscot. It is capitalized at \$350,000.

**Sunday.**—R. H. Akhurst and R. F. Atwood, of St. Joseph, Mo., contemplate the erection of a cyanide plant. Upward of 20 cars of ore have been shipped to different custom cyanide plants within the last 2 months.

## TEXAS.

## JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Beaumont Oil Wells.**—The oil situation is unchanged as regards scarcity of crude available for shipment, although 50 wells are now averaging 700 bbls. per day each. New contracts are not wanted, and consumers are clamoring for oil to be delivered under contracts made months ago which oil companies cannot or will not carry out. The Texas Company is suing to enforce contracts for delivery of low-priced oil, and many other actions will be entered. The outlook for fuel oil burners who depend on Beaumont oil is not bright, for it is becoming apparent that the most of the product is to be absorbed and held by or for the owners of refining plants now

under construction. Crude may touch 50c. inside of 30 days.

Among new corporations are: The Purity Refining and Fuel Oil Company, capital \$600,000, Beaumont; the Pecos Oil Company, capital \$400,000, Pecos; the Twenty Oil Well Company, capital \$100,000, Beaumont.

## UTAH.

(From Our Special Correspondent.)

**Ore and Bullion Settlements.**—For the week ending August 16 the Salt Lake banks report the following on settlements: Gold, silver, lead and copper ores, \$200,300; base bullion, \$107,000; gold bars, \$103,900.

## BEAVER COUNTY.

(From Our Special Correspondent.)

**Frisco Shipments.**—During the week ending August 16 the Horn Silver shipped 2 cars of ore.

## IRON COUNTY.

**Iron Ore Lands.**—Wallace Kimberley, who is making an investigation of the iron deposits recently optioned by P. L. Kimberley and associates for a reported price of \$2,225,000, has 17 outfits at work making cross-cuts, running tunnels and sinking test pits.

## JUAB COUNTY.

**Centennial-Eureka.**—This mine resumed work August 15, after being idle a year, except for retimbering the 1,600-ft. shaft. The force now numbers 45, and will work on 2 shifts, cleaning out the mine and getting everything in shape for mining that is to begin by September 1. It is expected that 300 men will then find employment, and the aerial tram will be run to its full capacity of about 200 tons in 10 hours. There will be little sorting done, as the company owns its own smelter, and this will permit the free use of machine drills in breaking down ore. The management proposes to try the contract system, paying the miners by the ton.

(From Our Special Correspondent.)

**Tintic Shipments.**—For the week ending August 16 shipments were: Mammoth, 14 cars; Eagle & Blue Bell, 3 cars; Bullion Beck, 12 cars; Eureka Hill, 10 cars; South Swansea, 5 cars; Gemini, 5 cars; Grand Central, 10 cars; Carisa, 6 cars; Yankee Consolidated, 6 cars; Uncle Sam, 5 cars; Star Consolidated, 5 cars.

## SALT LAKE COUNTY.

**Black Jack.**—Work has ceased at this mine, at Mammoth. More than \$100,000 has been expended without striking the vein.

**United States.**—At the mine the forces employed are gradually increasing. On the payrolls of the Old Jordan and Old Telegraph are 27 and 18 men, respectively. This is exclusive of the tramway construction gangs.

(From Our Special Correspondent.)

**Bingham Shipments.**—The following were shipped during the week ending August 16: Ben Butler, 4 cars; Utah Consolidated, 2 cars; Columbus, 1 car; Gold & Silver, 1 car; Storey, 6 cars; Petro, 1 car; New England, 1 car; Moscow, 1 car. From Alta the Albion shipped 1 car ore.

## SUMMIT COUNTY.

(From Our Special Correspondent.)

**Park City Shipments.**—Shipments during the week ending August 16 were: Daly West, 3,209,130 lbs. ore; Ontario, 1,234,810 lbs.; Silver King, 1,688,400 lbs.

## TOOELE COUNTY.

**Ophir Hill Mining Company.**—This company, of Ophir, has given the Salt Lake Branch of the General Electric Company a 400-h.p. generator, the motive power for which will be a Pelton water wheel, which is to be installed 1¼ miles from the mine and mill. The generator will furnish power for the operation of 2 150-h.p. motors. One of these will furnish power for the mill, while the other will be used in running an Ingersoll-Sergeant compressor. The pressure will be 2,300 volts.

## UTAH COUNTY.

**Salt Lake City Onyx and Mining Company.**—This company has acquired the Eagle group of copper claims located on the divide between Deer Creek and Dry Creek, and will begin development.

## WASHINGTON.

## FERRY COUNTY.

(From Our Special Correspondent.)

**Gold Ledge.**—The tunnel is in 1,155 ft.

**Hattie E.**—This prospect, in Nespelim District, is reported bonded to Eastern parties for \$25,000.

**Hit or Miss.**—Work suspended 2½ years ago will be immediately resumed. At 90 ft. \$5 ore was found, and 20 ft. deeper the values increased to \$7 per ton. It is hoped to find ore good enough to ship by sinking to 150 ft. level.

**Mountain Lion.**—A deal for the control of the

shares of this company is reported, involving about \$250,000 for the purchase of the shares owned by Jonathan Bourne, of Portland, Ore., president of the company. A. E. Palmer, of Spokane, Wash., is said to have about \$500,000 invested in the mine, and is engineering the deal for himself and friends. J. B. McLaren and H. P. De Pencier, of Vancouver, B. C., were at Republic August 10. Mr. McLaren is supposed to be interested in the present deal.

**Princess Maud.**—The mine has been unwatered, and Manager Van B. De Lashmut is in camp to look after resuming operations. The company intends to begin on the 600-ft. level and stope to the surface.

## PIERCE COUNTY.

**Tacoma Smelting and Refining Company.**—At a recent meeting of the board of trustees the Tacoma Smelter, including grounds, equipment, dockage, etc., was deeded to the Tacoma Smelting Company in accordance with the recent sale, at which the property was disposed of to the Tacoma Smelter Company as the highest bidder, for \$255,000.

## WYOMING.

## CARBON COUNTY.

**North American Copper Company.**—John S. Carey, president of this company, Willis G. Emerson, president of the Southern Wyoming Tramway Company, and their attorney, E. F. Richardson, of Denver, Colo., have completed arrangements for the transfer of the Ferris-Haggarty copper mine to this company. The first payment of \$250,000 on the purchase price of \$1,000,000 will be made September 1. J. C. Davis, one of the directors of the Ferris-Haggarty company, has been appointed trustee. The second payment of \$250,000 is to be made within 6 months, but the purchasers are not to take any ore from the mine until this payment is made. The third and fourth payments are to be made at intervals of 90 days from the date of the second payment.

The last towers of the Grand Encampment-Battle Lake aerial tramway have been erected, and by September 1 the cables will be strung clear through from the smelter at Encampment to the Ferris-Haggarty Mine. Work is progressing on the electric power plant at Encampment, which is intended to generate sufficient power from the waters of the north fork of the river to supply the tramway, smelter and Ferris-Haggarty Mine.

## JOHNSON COUNTY.

**Lost Cabin.**—Two prospectors are reported to have found what is believed to be this more or less mythical gold mine on the south branch of Otto Creek, 60 miles southwest of Buffalo. There is said to be a rush of prospectors to the district.

## FOREIGN MINING NEWS.

## AFRICA.

## RHODESIA.

According to the report of the Chamber of Mines, the gold output in June was 15,841¼ oz., valued at £56,206. Of this output 12,923 oz. came from mill ore and 2,827 oz. from tailings. The average yield of the mill ore was 11.5 dwt. per ton and of the tailings 4.1 dwt. per ton. The Selukwe Mine, the largest producer, treated 5,300 tons, with 40 stamps, running 28.3 days. The total yield of the mill was £11,408, and of the cyanide plant £5,247.

## TRANSVAAL.

The following reports for July are noted: Durban Roodeport Deep, 40 stamps for 30 days; tons crushed, 5,153, yielding 702 fine oz. gold; tailings treated 3,800 tons, yielding 488 oz.; slimes treated, 1,078 tons, yielding 55 oz. Total yield, 1,247 oz.; estimated loss, £650. Geldenhuis Deep, 115 stamps, for 30½ days 15,500 tons crushed, yielding 4,046 fine oz.; 11,893 tons tailings, yielded 2,596 oz.; 3,830 tons slime yielded 372 oz. Total yield, 7,015 oz.; profit, £13,900. Jumpers Deep, 60 stamps for 30½ days; ore crushed, 9,590 tons, yielding 2,371 oz.; tailings, 6,515 tons, yielding 1,536 oz.; slimes, 2,836 tons, yielding 225 oz. Total yield, 4,133 oz.; profit, £3,600. Langlaagte Deep, 70 stamps 23½ days; ore crushed, 8,010 tons, yielding 2,508 oz.; tailings treated, 5,530 tons, yielding 1,189 oz.; slimes treated, 1,770 tons, yielding 97 oz. Total yield, 3,795 oz.; estimated profit, £2,100. Nourse Deep, 65 stamps 30¼ days; ore crushed, 9,549 tons, yielding 1,421 oz.; tailings treated, 7,335 tons, yielding 1,022 oz.; slimes treated, 2,523 tons, yielding 148 oz. Total yield, 2,592 oz.; profit, £900. Rose Deep, 75 stamps, 27 5-6 days; ore crushed, 10,800 tons, yielding 2,552 oz.; tailings treated, 8,400 tons, yielding 1,713 oz.; slimes treated, 2,114 tons, yielding 118 oz. Total yield, 4,384 oz.; profit, £7,400.

**Bonanza Limited.**—The report for July shows: Ore crushed, 7,849 tons, yielding 4,574 oz.; treated at cyanide and slime works, 7,849 tons, yielding 2,626 oz.; profit, £20,050.

**Geldenhuis Estate.**—The report for July gives stamps working, 45; ore crushed, 5,225 tons; yield of mill, 1,621 oz.; tailings, 839 oz.; slimes, 309 oz.;



total yield, 2,769 fine oz.; profit, £3,433. The reduction in number of days worked and in number of stamps from June was due to native labor difficulties and a short supply of coal.

## CANADA.

## BRITISH COLUMBIA—BOUNDARY DISTRICT.

*Jewel.*—This mine, at Long Lake, which has been for some months shipping gold quartz ore to the Granby smelter, has shut down, the contract to supply 2,000 tons of ore having been completed. Nothing definite is known as to when work will be resumed. The management is in London, Eng.

## ONTARIO—LAKE OF THE WOODS DISTRICT.

(From Our Special Correspondent.)

Development work at the mines and on several new properties is showing splendid results.

*American-Canadian Gold Mining Company.*—This company is a combination of English and American capital to work the Alice A. Mine. The company has secured a lease of the property for 99 years, and will increase the capital stock from \$1,200,000 to \$2,000,000. The mine is to be operated at least 300 days a year, according to the company's agreement, with a guaranteed output of 100 tons of ore per day.

*Big Master.*—The trial run of the new 10-stamp mill is most satisfactory. Gold bricks will be produced forthwith.

## YUKON TERRITORY.

*Klondike Gold Production.*—According to Mr. Senkler, Assistant Canadian Gold Commissioner, there has been a large falling off in the gold output from the Klondike. Mr. Senkler states that, while last year's output of gold amounted to more than \$21,000,000, the production of the coming year, according to the estimate of the Government officials, will not exceed \$14,000,000, a falling off of nearly one-half. The reason for this very large decline is that the old creeks or finds are being worked out and that no new discoveries have been made for more than a year. The hope of the Klondike now lies in the discovery of gold-bearing quartz of sufficient richness to pay the working. So far no such quartz has been discovered.

## MEXICO.

## COAHUILA.

(From an Occasional Correspondent.)

*Jimulco Mining Company.*—A year ago this company purchased the Jimulco copper mines, which had been worked in a desultory manner with a small force of men, and at once began vigorous developments, with very satisfactory results. The company states that during the year 100 cars, say, 2,600 tons of ore, have been shipped from development, averaging 20 per cent copper, 200 grams silver per ton, with appreciable values in gold. The company will immediately begin shipping 40 tons daily to the big smelter at Aguascalientes. The mine is equipped with a gasoline hoist, and has rails and cars in all the tunnels and levels. The location is 5 miles from the Mexican Central Railroad over good road. Eighty per cent of the property is owned by Otto Wahrmond and Otto Koehler, of San Antonio, Tex., and S. D. Bridge, of Monterey, Mex. Altogether about 8,000 ft. of work has been done, and the mine gives promise of making a big producer. Three hundred men are employed. A tram railroad with Shay engines from mines to railroad is under consideration.

## NEW ZEALAND.

(From Our Special Correspondent.)

*Gold and Silver Exports.*—During May the export of gold from the colony was 48,157 crude oz., valued at £186,982 (\$934,910), and of silver 95,110 oz., valued at £10,292 (\$51,460). The total export of gold for the first 5 months of this year was 189,936 crude oz., value £728,422 (\$3,642,110), an increase of £53,567 (\$267,835) on last year's figures.

*Gold Dredging.*—During June dredging has gone on steadily. Though few large returns have been reported, the average yield is very satisfactory. During the week ending June 23 the returns from 64 Otago dredges totaled 2,294 oz., giving an average of nearly 36 oz. per dredge.

## MINING STOCKS.

(Complete quotations will be found on pages 266 and 267.)

New York. Aug. 21.

The professional element is in control of the market; hence trading is limited and prices are fluctuating only fractionally. The copper group is expectant, as the metal market is still unsettled. Amalgamated made small sales at \$65@86½, and Anaconda at 104 per cent (\$26). Curb coppers were sympathetically quiet. Greene Consolidated sold at \$27¼@27½; White Knob, of Idaho, \$22¼@21½; United, of Montana, \$34; Tennessee, \$16½@18¼; British Columbia, \$6½@8¼; Montreal & Boston, \$2¼@3, and Union, of North Carolina, \$8½. A newcomer on

curb was Santa Fe Gold and Copper, of New Mexico, which changed hands at \$1¼@1½.

Cripple Creek, Colo., gold stocks were quiet. Portland brought \$1.80, and Isabella, 32c.

The Comstocks were handled chiefly by room traders. Consolidated California & Virginia was quoted at \$1.30 and Ophir, at \$1.20.

A new flotation was made in this market, called the Bamberger-De Lamar Gold Mines Company, a consolidation of various properties situated at De Lamar, Lincoln County, Nev. The company is capitalized at \$5,000,000, divided into 500,000 shares, of which 150,000 shares are offered for public subscription at par, \$10. The president is Mr. Simon Bamberger, who is also interested in the mining industry of Utah. In another column we have made further mention of the company.

Auction sales were 250 shares Blue Jacket Consolidated Copper Company at 5c. per share, 5,000 shares Anchor Salt Company, 1,932 shares Lone Star Salt Company, 2,000 shares Hutchinson Kansas Salt Company, 250 shares J. T. Ewing Salt Company, and 36 shares Walton Salt Association, Limited, at \$450,000 for the lot.

Boston. Aug. 19.

(From Our Special Correspondent.)

The apathy that has prevailed in mining shares so long continues, and there seems nothing in sight to lift the market out of the ruts. But for Dominion Iron and Steel the market would be featureless. Extreme gyrations of this stock are, however, of almost daily occurrence, and keep the smartest guessing. One reason is that arbitrating is done on a large scale between this market and the Montreal Exchange. Without doubt control is held by the Canadian people, as well as of Dominion Coal. Boston has ceased to hold anything but a speculative interest in Dominion Iron and Steel, although for a day or so a prominent State street investment house has taken on large holdings. The Canadian interests are talking very bullish, and predict much higher prices. To-day the stock touched \$79.50, which compares with \$69.75 a week ago. The late selling is said to have come from Montreal sources, and is supposed to be stock that was underwritten by the banks in Montreal at \$57. Traders here think a reaction is due.

United States Mining has been fairly active, with no rise in price. The closing to-night was \$20.75. The story that a consolidation of the Bingham properties owned here, including United States, Utah Consolidated, Bingham and Boston Consolidated, does not gain any credence. The latter has reached some rich ore, and there is a demand for the stock on the curb around \$4. United States Coal and Oil, though dull, is well bought at \$16.50@17. New buying orders appeared in Arcadian Mining to-day, and the stock had a firm appearance at \$5@5.25. Copper Range Consolidated is steady at \$56.50@57.50. Santa Fe has settled to \$1.75 on free offerings. Tamarack has lost \$5, to \$170, and Osceola \$2, to \$55, due to the general weakness.

The fire at the Franklin Mine shaft was not reflected in the price of shares. A lake report is that Franklin is endeavoring to purchase the shaft house at the St. Mary's property from Arcadian to replace its No. 5. The Trimountain's mill is expected to go into commission next month. Reports come that the miners of the Merced Gold Mine, of California, over which there was such a splurge in this market in 1895, are sick of their task. No pay ore is being uncovered and expenses exceed income by about \$10,000 per month. A. S. Bigelow was the promoter and one of the largest owners. There is no market for the stock.

Calumet & Hecla sold at \$526 for a small lot, the lowest price for several years. In December, 1901, the price touched \$535, and it sold at \$533 last April. In March, 1901, the stock touched \$860, and the highest this year was \$650, on February 1. At the annual meeting the present directors were re-elected by a vote of 70,812 out of the 100,000 shares. Of this vote all but 142 shares were voted by proxy. The meeting was the usual perfunctory one, with about a half-dozen present. President Agassiz, contrary to his usual custom, made no remarks outside of those contained in the annual report.

Colorado Springs. Aug. 15.

(From Our Special Correspondent.)

The mining stock market has been treated to a premature boom of considerable size this week, and for two days it looked as if a permanent improvement had set in. But the advances had been too precipitate, and by the end of the week several marked slumps were reported. Yet the level of prices is higher for the general market than a week ago. There were some elements of strength in the upswing, in spite of the erratic action of some of the mines' leaders. Elkton made what was undoubtedly a purely professional advance, the price being boosted from 39 on August 9 to 44½ on August 13, only to fall back in the next two days to 34¼, at which figure it closed. There was considerable inside selling all the way up. The mine is showing some improvement, but there is nothing to get excited about. El Paso advanced from 60 to 64, touching the high point on August 12, after which it

declined to 61, closing at that figure. While this property is in much better shape than its neighbor, Elkton, and is apparently worth about what it is selling for, the week's advance was also professional. Isabella is advancing steadily, and this week recorded a gain of 2½c. Two factors are concerned in advancing prices; first, the gradual improvement in the mine, and, second, the undoubted negotiations looking to the merging of this company with the Empire State Company, whose property adjoins the Isabella. The merger is merely in a formative state, but it has had a potent influence recently on the price of the shares. Portland sold at \$1.80 on August 11, but to-day sold from \$1.78 down to \$1.75. Vindicator holds well on the strength of vague rumors of an approaching sale of the property. Whether or not there is anything in the report cannot be stated. Golden Cycle did not appear on the market, as all of the stock is closely held. The president of the company has officially announced that he has given an option on more than the control, so there will probably be no trading on the open market until after the option is settled. There has been considerable buying of Morning Star by the El Paso crowd, as the property adjoins the El Paso, and there is some probability of the control being sought.

San Francisco. Aug. 16.

(From Our Special Correspondent.)

Trading in mining shares is very quiet, primarily because outsiders will not increase their holdings so long as the levying of assessments continues to be the principal occupation of some companies, and, secondly, as the financial condition of others is anything but satisfactory. No wonder the market prices of Comstock shares are among the lowest on record.

The sworn reports of the mining companies, as filed this week, show cash on hand August 1 as given, with July expenses paid unless otherwise stated: Alta, \$11, with indebtedness of \$2,480; Alpha Consolidated, \$296; Andes, \$5, with indebtedness of \$713; Best & Belcher, \$2,868, with bills payable of \$15,000 on account of the Gould & Curry mill purchase; Bullion, \$681; Belcher, \$1,948, with liabilities of \$7,500, and July expenses at mine unpaid; Caledonia, \$11,737, with July expenses at mine unpaid; Consolidated California & Virginia, \$41,784; Challenge Consolidated, \$2,233; Consolidated Imperial, \$1,197; Crown Point, \$2,924, with July expenses at mine, estimated at \$398, unpaid; Chollar, \$2,159; Confidence, \$4,347, with July expenses at the mine unpaid; Gould & Curry, \$45, with bills receivable of \$15,000; Justice, \$1,672, with liabilities of \$6,455; Mexican, \$5,905; Ophir, \$3,000, with shipments of ore and concentrates to be received; Overman, \$6,558, with July expenses at the mine unpaid; Potosi, \$2,467; Savage, \$965; Sierra Nevada, \$4,027; Silver Hill, \$16,215; Standard Consolidated, \$122,550, with July expenses to be paid and bullion clean-up to be received; Syndicate, \$4,170; Union Consolidated, \$6,217; Utah Consolidated, \$209, with indebtedness of \$1,500.

Assessments are being collected by the following: Alpha, Crown Point, Chollar, Gould & Curry, Potosi, Savage and Utah.

The Syndicate Mining Company, of Bodie, Cal., has declared a dividend of 2c. per share.

Oil shares are sympathetically quiet. Among sales were Home, at \$2.95@3; Sterling, \$1.40, and Monte Cristo, \$1.22½.

The Home Oil Company will pay another 7½c. dividend on August 20, making the total distribution to that date \$420,000 on a capitalization of \$100,000.

London. Aug. 11.

(From Our Special Correspondent.)

The mining market continues to be in a state of stagnation. The amount of business is purely nominal and movements in prices are hardly noticeable. In the South African section keen watch is being kept by the controlling houses for the appearance of bears, and nowadays it is hardly worth while circulating bear reports, as their effects are soon counteracted. There is no evidence of bears in the West Australian market at present, and their raids are for a time at any rate suspended.

Two of the points on which bears in the South African market rely are the dynamite question and the labor question. As regards dynamite it is contended that the suggested import tax will give Nobels Company, at Modderfontein, a practical monopoly and that consequently the old grievance will not be entirely removed. It appears, however, that the English explosive people are not being discouraged, for one of the companies, the National Explosives Company, is already tendering for very large supplies. It is probable therefore that the proposed tax will not weigh heavily on the mine owners. The labor question is engaging the attention of the companies much more deeply than any other. In spite of many recruiting agencies, the number of natives available is far from what is required. Now that the Imperial Government has laid it down that a native shall in no way be forced to work if he prefers a lazy life, the companies are on the lookout for other sources. The importation of Asiatics would suit mine owners the best, but "Africa for the Africans" is too strong a sentiment for them.



Eventually no doubt supplies will be drawn from other native African races, so that the number of workmen may be increased somewhat. It can hardly be denied that the labor question will put a limit on the expansion of Africa as a mining country and will practically govern the rate of output of gold. There are always being suggestions made to employ white labor, but the kind of labor required is not the kind that emigrates from England. There is no opening for intelligent men such as went to the Western States of America and opened up the Rockies, for the country is in the hands of companies and there is little opportunity for individual prospecting. Possibly contract laborers from Hungary or Poland, such as are met with in the coal regions in the United States, might be obtained, but there would be almost as much objection to them as to Asiatics.

In the midst of a dull season it is surprising to find a new prospectus issued, but this week saw the appearance of the Mazoe Alluvial Gold Company, Limited, which has been formed to acquire a concession on the Mazoe River in Rhodesia for the purpose of dredging. There is very little information given as to the kind or extent of the deposits, but it is vaguely stated that the Mazoe is reputed to contain the richest alluvial deposits in Rhodesia. The whole scheme is entirely a tentative one and hardly the sort to attract support. The directors and officials are not known to the public, so the shares will not be taken up as gambling counters.

The shares of the Arizona Copper Company are now being watched by Scotch investors and it is probable that they will be in firm demand shortly. The company passed through a long period of financial worries and the various shares were somewhat complicated. Recently the finances have been reorganized and the ordinary share is now more easily understood. Large sums of money have also been spent in remodeling the metallurgical plant and the output will shortly be increased to 30,000 tons a year, the precise time being dependent on the price of copper. The shares are now an excellent investment and it will not be surprising if they are shortly in demand in London as well as in Scotland.

#### COAL TRADE REVIEW.

##### New York.

Aug. 22.

##### ANTHRACITE.

The situation at the anthracite mines shows little change. A few more men are busy and the number of mines and washeries busy is slightly greater. The operators maintain the same position as at the beginning of the strike and there is little chance that they will agree to any compromise when they are steadily, if very slowly, resuming the production of coal. The strike leaders profess to be satisfied with the situation, though reports of dissatisfaction over the relief received by the idle men continue. The talk of help from political leaders and of intervention by J. P. Morgan may keep the men idle for a while, but a break is bound to come when the miners fully realize how hopelessly they have been led astray by their leaders.

In the meantime though some washery coal is arriving at tidewater. Supplies of domestic sizes at Eastern points are very low indeed and retail dealers are advancing prices and doling out coal in as small lots as possible. In the West, where anthracite is ordinarily more or less of a luxury, the stringency is not causing much complaint, but in the East there is likely to be a very loud demand for relief by September 10 if coal does not come forward more freely. At the head of the lakes coal is in short supply, less than 15,000 tons being on the docks with a very small proportion of nut, the size most wanted. In Chicago territory inquiry is increasing, but reports indicate that with care supplies can be made to last till Christmas. All-rail coal will have to fill winter demands. Along the lower lakes and in Canadian territory supplies are very low. We have heard of a Montreal dealer buying a single ton from a consumer who could spare it. Along the Atlantic seaboard the situation is worst at New York City since the strike started. Householders who laid in enough coal in May to last them till now are finding trouble in getting more.

Retail prices on domestic sizes at New York and Boston have risen to \$10 per ton and there are reports of sales at wholesale at New York Harbor for \$11 alongside. Steam sizes at New York retail at: Pea, \$6.50; trickwheat, \$6; rice, \$5.25.

##### BITUMINOUS.

The Atlantic seaboard bituminous trade continues to show a strong demand that is considerably increased by slow transportation from the mines to tidewater. The railroads give heavy general freights, good excursion business and washouts along the lines as excuses for delays, but excuses do not help producers. Coal which has come through in 3 or 4 days is now a week or even 2 weeks on the way. Short car supply is affecting the speculative market more than a couple of weeks ago, though prices stay at about \$3@ \$3.10 for best grades of Clearfield, f. o. b. New York Harbor shipping ports. The labor troubles at the

mines slowly become of less importance as the men drift back to work. The miners of the Merchants' Coal Company, in the Fairmount Region, are back, having agreed to work certain hours. They were locked out because they demanded the right to come and go as they pleased. The company granted them the privilege of appointing a check-weighman.

Trade in the far East is fairly easy, but is calling for considerable coal, and there is a general desire to get contracts filled before delays in transportation come through the settlement of the anthracite strike. Consumers along Long Island Sound are short of coal, and the demand in that territory, which has felt slow transportation most, is heavy. New York Harbor trade now shows a brisk demand, while deliveries have been slower than usual on account of the scanty arrivals at tidewater. Demand in the all-rail trade has increased, and there is a slight shortage of coal for immediate wants.

Car supply at the mines is extremely variable, as for some time past. Some days it is 80 or 90 per cent of the demand, and then falls to 50 per cent. In the coastwise vessel market large craft are in fair supply, but medium-sized craft are wanted. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 55@60c.; Boston and Salem, 65@70c.; Portland and Portsmouth, 70c.; Wareham, Bath and Gardiner, 75c., with towages to last port; Lynn, 75@80c.; Newburyport, 80@85c.; Saco 80c., and towages: Bangor, 80@85c. Rates from the further lower ports are 5@10c. above these figures.

##### Birmingham.

Aug. 18.

(From Our Special Correspondent.)

There are few mines in the State which are not in full operation, and the production is quite satisfactory. The indications are that the demand this winter will be greater than ever, even with the inroads being made by oil fuel in certain parts of the South. The output this winter will be larger than ever. By September 15 the Davis Creek Coal and Coke Company, of which J. C. Mabin, Jr., is secretary and treasurer, will be ready to begin shipping coal. Track is being laid from the main line of the Birmingham Mineral Railroad to its properties, a distance of about 2 miles, and soon coal will be ready. It is expected that the daily output will be 500 or 600 tons a day at first, and within 90 days the output will be pushed to 1,000 tons a day. Later the company intends other developments in the same vicinity. The Lehigh Coal and Coke Company, opening new mines in Blount County, on the northern end of the Birmingham Mineral Railroad, will be ready by September 15 or a little later to ship. Other smaller companies are fast getting in shape to begin shipments. The Sloss-Sheffield Steel and Iron Company will begin during September to ship from its new mines at Flat Top Mountain, in Walker County. Several hundred convicts are being removed from Coalburg to these mines. The Coalburg mines will be worked with free labor.

Good prices prevail for coal, and some good contracts are being made for winter delivery.

Less than 300 members of the United Mine Workers of America are now idle in Alabama, but 5 little mines being without a wage contract.

##### Chicago.

Aug. 19.

(From Our Special Correspondent.)

The demand for bituminous coals is better than for several weeks, owing to the increased consumption by farmers for thrashing. Indiana block, Hocking and the best Illinois coal are principally used. This demand will continue for 3 or 4 weeks. Meantime the consumption of bituminous generally is rather dull. Dealers who were overstocked with Indiana and Illinois coals prior to July 17 have now got rid of their stock for the most part, and trade is once more in a normal condition. The local demand is likely to be largely increased by the general substitution of coal for natural gas in the downtown district, due to trouble with the supply of gas from Indiana. With the coming of cold weather, it is predicted by some dealers, there will be a scarcity of the better grades of bituminous and a sharp rise in price. These grades will, of course, form the natural substitute for anthracite.

Prices remain virtually unchanged until September 1, when several changes are likely to occur. Quotations to-day are: West Virginia splint, \$3.50; Youghiogheny, \$3.30; smokeless Pocahontas, \$3.75; smokeless New River, \$3.75; smokeless nut, \$3.25; smokeless run-of-mine, \$3; Indiana block, \$2.55; Indiana semi-block, \$2.10; Clinton lump, \$1.80; Indiana lump, \$1.90; Hocking, \$3.10 for city and \$3.20 for country delivery; Southern Illinois run-of-mine, \$2@ \$2.20; Northern and Central Illinois, \$1.80@ \$2; blacksmith's coal, \$3.35.

The nominal car-load price of anthracite continues \$5.90, at which price a car is sold here and there to steady customers. Authorities estimate the amount of anthracite now in yards of wholesalers at not more than 30,000 tons; the retailers of Chicago and suburbs are thought to have 150,000 to 200,000 tons. This will last until about Christmas, after which bituminous must be burnt generally in the district

supplied from Chicago, unless the strike comes to an end sooner than any one here expects.

##### Cleveland.

Aug. 19.

(From Our Special Correspondent.)

The coal trade has moved along in a rut the last week, with the supply very short and with some consumers who have depended upon the lake markets beginning to suffer. Shippers have tried in vain to persuade the railroads to give more cars. The railroad officials are willing enough, but have not the necessary motive power. All of this is resulting in a very disastrous lake situation. The coal shippers have been short of coal all the summer, and now, when the movement ought to be the heaviest, the receipts are falling below what had been expected. The lessening of the supply has emphasized the number of boats waiting for up-bound cargoes, as the docks are filled all the while with boats waiting for their turn. There has been no change of rates almost the entire summer, the charges holding now at 45c. to Milwaukee and 30c. to Duluth.

The coke supply is especially short, both for furnaces and other uses. Some 72-hour coke has been sold during the past week as high as \$4 a ton. Even at that price it is very hard to get, and deliveries are not at all prompt.

##### Pittsburg.

Aug. 20.

(From Our Special Correspondent.)

Coal.—There is an improvement in transportation, and more railroad coal mines are in operation, but a number are idle, as it is impossible to move the cars. The river mines of the Monongahela River Consolidated Coal and Coke Company continue in full operation, and many empty coal boats and barges are being rapidly loaded. Indications point to a settlement this week of the strike at the mines along the West Penn Railroad, which has been on since April 16, and in which over 1,500 miners are involved. Prices are firm, and all new business accepted is taken at a premium of from 20 to 30c. a ton above the circular prices.

Connellsville Coke.—Shipments to the Pittsburg District and Ohio points have been very bad the past few days, and both foundries and blast furnaces are very short of coke. All the railroads are more or less blockaded, and cannot move empty cars to the ovens fast enough. Prices are unchanged on contract, and there is no market on spot coke, since none is to be had.

The Oliver & Snyder Steel Company is preparing to increase its coking facilities by erecting a new plant at Vance's mills, on the Redstone branch of the Monongahela Division of the Pennsylvania Railroad. Contracts have been let for sinking the shafts to Joseph Pew, of Nanticoke, Pa. Bids are now being taken for the erection of 300 ovens and 50 double houses for the miners.

The Courier in its last issue gives the production of coke in the Connellsville field for the previous week at 251,246 tons. The shipments for the week aggregated 11,909 cars, distributed as follows: To Pittsburg and river tipples, 3,907 cars; to points west of Pittsburg, 5,709 cars; to points east of Connellsville, 2,293 cars. This was an increase of 326 cars compared with the shipments of the previous week.

##### San Francisco.

Aug. 15.

(Special Report of J. W. Harrison.)

Since the S.S. Ventura left, there have been the following arrivals from Newcastle, N. S. W.: Colony, 2,250 tons; Viking, 1,206 tons; Eulomene, 4,000 tons; Earl of Dunmore, 3,470 tons; Commandant, Marchant, 3,016 tons; Laura, 1,595 tons; Gen. Gordon, 2,465 tons; J. B. Brown, 2,167 tons; total, 20,169 tons. During the past 30 days 16 vessels have discharged their cargoes of Australian coal here, in all amounting to 44,617 tons. At present the engaged list of vessels, en route and loading at same port, only numbers 14 cargoes, with less than 40,000 tons of coal, which is all the coal that can possibly arrive here in the next 90 days. This should serve to make spot Colonial coal good property up to the end of this year. Coal freights from Newcastle are reported firm, hence but few engagements are being made. A large proportion of the Australian deliveries here for the past several weeks have been to the Southern Pacific Railroad Company. It was reported in the daily papers of last week, and has since been confirmed, that there will be a material shrinkage in the shipments of Nanaimo coal to this port. As that grade of coal has been a large factor in the past in establishing local values, its being withheld from the market should somewhat help values. Still, so long as fuel oil holds its present sway, coal has almost a hopeless case as regards any marked advance in value.

##### Foreign Coal Trade.

Aug. 21.

American export trade is quiet, though ocean freight rates are favorable, being among the lowest on record.

The fuel production of Germany in the 6 months ending June 30 is reported as follows:

	1901.	1902.	Changes.
Coal .....	53,005,149	50,992,667	D. 2,012,482
Brown coal (lignite) .....	21,237,238	20,115,783	D. 1,121,455
Coke .....	4,759,354	4,293,757	D. 465,597
Briquettes .....	4,389,645	4,198,860	D. 190,785



The imports of coal at Ruhrort and Duisburg, Germany, in the 6 months this year aggregated 3,557,336 tons, which compares with 3,764,815 tons in the corresponding period last year, showing a decrease of 207,479 tons, or 6 per cent. The total deliveries this year were 3,491,824 tons, or 166,909 tons, 5 per cent, less than for the same 6 months in 1901.

The total consumption of coke in Germany, as provided by the syndicate during the 6 months this year, amounted to 3,063,057 tons, as against 3,620,502 tons last year, showing a decrease of 557,445 tons, or about 15 per cent.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of August 8 that coal is scarce for this month's shipment and the market continues firm. Owing to the holidays, however, business has been much hampered. Quotations are: Best Welsh steam coal, \$3.90@4.02; seconds, \$3.84; thirds, \$3.54; dry coals, \$3.66; best Monmouthshire semi-bituminous, \$3.42@3.48; seconds, \$3.24; best small steam coal, \$2.34; seconds, \$2.10; other sorts, \$1.92.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2.5 per cent discount.

Owing to the improvement in the homeward Black Sea markets, outward Mediterranean freights continue very low, and tonnage is offering freely. Eastern freights are firmer. Some rates quoted from Cardiff are: Marseilles, \$1.10; Genoa, \$1.02; Naples, \$1.02; Singapore, \$3.12; Las Pamas, \$1.44; St. Vincent, \$1.62; Rio de Janeiro, \$2.94; Santos, \$3.24; Buenos Aires, \$3.24.

**IRON TRADE REVIEW.**

**New York. Aug. 21.**

In the iron and steel markets the demand for pig iron for prompt delivery shows no abatement. Consumers at Eastern points can find some relief in importations of Scotch and Middlesboro pig, which are likely to be of considerable size. In the West the situation offers consumers little hope. Furnaces at Pittsburg and in the valley are hampered by short supplies of coke due to the inability of railroads to get coke forward. A number of Pittsburg furnaces have withdrawn from the market for foundry iron for next year. Chicago reports some firms with no Northern iron to sell until after April 1, and spot delivery means any time this year. In most lines of finished products the demand continues strong, the only weakness being in sheets, wire and tin plates.

**Birmingham. Aug. 18.**

*(From Our Special Correspondent.)*

Spot iron is now very scarce. What little can be had now on what is termed immediate delivery is bringing a good price. Production holds up well, and furnaces are working to their full capacities. The No. 3 furnace, at North Birmingham, of the Sloss-Sheffield Steel and Iron Company, is the next to go in blast. It probably will not be ready inside of 10 days, though the work is being pushed. Shipments are steady. According to the report of the Southern Iron Committee for July, the total shipments of pig iron, steel and cast-iron pipe from the 6 Southern districts amounted to 143,559 tons, of which 127,793 were pig iron and steel and 15,766 tons cast-iron pipe. The shipments by districts were as follows:

	Pig Iron.	Cast-Iron	Pipe.
Anniston .....	17,715	4,632	...
Birmingham .....	56,851	6,897	...
Nashville .....	8,775	...	...
Sheffield .....	16,497	...	...
Middlesboro .....	6,191	...	...
Chattanooga .....	21,764	4,237	...
Totals .....	127,793	15,766	...

The export shipments during July were but 55 tons of pig and 164 tons of cast-iron pipe. Steel billet shipments in July amounted to 8,764 tons. Of the pig iron and steel billet shipments, 41,182 tons went eastward and 86,556 tons westward. Of cast-iron pipe 2,826 tons went eastward and 12,776 tons westward.

There is no change in the finished iron and steel market. The Birmingham Rolling Mills, operated by the Republic Iron and Steel Company, will this week start the plate mill, which has been out of blast for 6 weeks, undergoing repairs. It will give employment to about 50 men. The little differences at the Gate City Rolling Mills which threatened to cause a strike have been settled, and full crews are at work. Hot weather has been making the work a little hard on the men of the mills recently; otherwise there are bright prospects in the finished metal market.

The stockholders of the Valley Iron Company, recently formed, which will build furnaces and develop property in the vicinity of Sulphur Springs, Ala., will meet in Birmingham on August 26 to formally organize. It is asserted that all arrangements can be made as planned.

**Buffalo. Aug. 20.**

*(Special Report of Roggers, Brown & Co.)*

The market is quiet but firm. Were it not for liberal importations it would be impossible to keep con-

sumers in this territory supplied with iron. The aggregate of purchases for the week has been quite large, though at the moment interest is perhaps not so general as it has been. Deliveries are called for as urgently as ever, and foundries, without exception, are full of business. For delivery during the balance of the present year, we quote below on the cash basis, f. o. b. cars Buffalo: No. 1 foundry Lake Superior ore, \$25.75; No. 2, \$25.25.

**Chicago. Aug. 19.**

*(From Our Special Correspondent.)*

Continued advance of prices and active sales characterize the pig iron market. Some firms have closed their order books on Northern iron to April 1, 1903, and others have very little to sell until after that date. Spot deliveries are now understood to mean delivery some time this year; such command a premium of \$1 to \$2, on both Northern and Southern. Quotations to-day are as follows for delivery after April 1: No. 1 Northern, \$23.50@24.50; No. 2 Northern, \$23@24; No. 3 Northern, \$22@23.50; No. 1 Southern, \$22.15@23.15; No. 2 Southern, \$21.65@22.65; No. 3 Southern, \$21.15@22.15. On Southern there are occasional spot lots obtainable, these being \$26@27. Lake Superior charcoal can be picked up in small lots here and there at \$27@28.

The coke situation is worrying furnace and foundry men alike. With the prospect of an indefinite prolongation of the strike at the anthracite mines, the price of coke shoots upward; for a week it has been \$6.50@7, and predictions are made freely that it will go much higher. All coke coming in is Connellsville, West Virginia being out of the market.

Notwithstanding the coke stringency the practice of buying iron 8 or 9 months ahead continues unchecked.

Attempts to restrict sales or to curtail time between orders and deliveries have so far failed, largely through the cupidity of firms desirous of immediate profits. The speculative element in buyers also is strong and refuses to be curbed. The inequality of furnacemen's and foundrymen's contracts, those for the selling of iron being rigid and those for the disposition of manufactured products being elastic, causes a feeling of instability among dealers. Could some way be devised to make it more certain that iron bought to-day will be taken and used profitably by the foundrymen 8 months hence, all concerned in the business would breathe freer.

**Cleveland. Aug. 10.**

*(From Our Special Correspondent.)*

**Iron Ore.**—Shippers were looking this week for a vessel owner to take 50,000 tons of ore to be moved in October at 60c. from Escanaba, but the vessel interests refused to accept the offer. There has been a report since that several wild charters have been made at the advance, which is probably true. Other than this the market has been at a standstill. The rates might be reported as 75c. from Duluth to Ohio ports, 65c. from Marquette and 60c. from Escanaba. The selling prices hold nominally at \$4.25 for bessemer old range, \$3.25 for non-bessemer old range and bessemer Mesabi, and \$2.75 for non-bessemer Mesabi.

**Pig Iron.**—Sales for immediate delivery and for future shipment have been light, but demand has only slackened temporarily for future delivery, although some buyers have perhaps been frightened by this year's prices, nothing less than \$25 being asked now for No. 2 foundry for November and December delivery. For future delivery the material is becoming more and more scarce. Most of the available material has been sold up for the first half, and yet many buyers have not covered. The future prices range about \$22 to \$22.50 for No. 2 in the valley. Basic producers are not selling any material, as the buyers are not ready to close any further ahead, and there is no material for sale this year, except off irons at \$20.50. Bessemer producers are not selling anything for the second quarter of next year, and all of the material has been sold that will be produced before that time.

**Finished Material.**—Rail sales have been so heavy as to take the Steel Corporation output for the first half. All of this material was sold at the association price of 1.60c., Pittsburg. Other mills are not so particular about maintaining the association prices. One Eastern mill has already sold some tank and boiler steel for first quarter delivery at \$4 premium, while smaller mills are generally holding for the 2c. to 2:10c., which is the prevailing price for spot delivery. Structural steel is scarce for immediate delivery or for delivery during the first half of next year, but for immediate shipment is scarcer. The demand has been so heavy and material so hard to get that some jobbers selling out of stock have been forced to advance the price of material until 2.75c. is now about the minimum. The mills, which have withheld their capacity from the market to this date are inclined also to refuse orders that would tie up their output for the future. Withholding their material will, they hope, give them a strong leverage on the future market. The sheet trade is a little dull, with dealers cutting the prices on the lighter gauges of galvanized sheets, while black sheets and the heavier gauges hold steady. The base

price is 2.50c. for No. 10. Billets are getting scarce, and the price is booming, until the home billets are much more valuable than imported material, both from a standpoint of merit and of price. Bar iron is weak, while bar steel is picking up.

**Philadelphia. Aug. 21.**

*(From Our Special Correspondent.)*

**Pig Iron.**—Owing to the secrecy of the operations of importers and buyers of pig it is impossible to give with accuracy the amount of business done or now pending. A large amount of material is being ordered for the earliest possible shipment. There is a great need of more iron, and American consumers will shortly take steps to secure large quantities for forward delivery. Southern iron is practically out of the market, and Pennsylvania furnaces are sold so far ahead that buyers are unable to obtain any satisfaction. Spot lots sell above the usually quoted prices. Imports do not influence furnacemen here. They state they have enough business booked to take care of production for a long time, and are not scrambling for more. Quotations are given as follows: No. 1 foundry, \$23.50@24.50; No. 2, \$22@22.50; No. 2 plain, \$22, with an occasional shading; standard gray forge, \$21; ordinary a little less; basic iron, \$20.50@21.50; low phosphorus, \$23@24; No. 3 Middlesboro iron is quoted at \$22, and Scotch iron for quick delivery \$23, although higher figures have been rumored.

**Billets.**—The quotation for steel billets from abroad is \$28.50, c. i. f. Negotiations are pending for several lots running into some thousands of tons. American billets are quoted at \$33@34. Concessions cannot be had.

**Merchant Bar.**—Merchant bars are said to be quiet; mills are all busy, but orders for new material are not quite so brisk as they were.

**Sheet Iron.**—There is less activity, but millmen feel certain that September will open demand briskly. No. 10, 2.30c.; No. 28, 3.40c.

**Muck Bars.**—Quotations to-day are \$35.50@36, with a moderate demand, but the mills are sold up.

**Pipes and Tubes.**—Demand has slackened, but order books at mills are full enough to make manufacturers indifferent.

**Plates.**—Owing to the inability of consumers to get orders filled large orders have recently been placed abroad, and deliveries have been promised within a short time. Contracts for delivery 3 to 4 months hence are being placed. Smaller buyers are again in the market, but their inquiries have not resulted in placing orders for prompt delivery. For later deliveries it is intimated that slight concessions have been made.

**Structural Material.**—The demand for beams and angles is very great, and early deliveries still sell at a premium. For late deliveries mill owners are not particularly anxious. Very large requirements are in sight.

**Steel Rails.**—There are no new developments beyond the general statement given out that orders are going to the mills constantly, and the outlook is for a continuation of the heavy demand.

**Old Rails.**—Old iron rails are strong at \$25@25.50 and old steel rails at \$21.

**Scrap.**—Urgent instructions have been given for the purchase of heavy steel scrap on the basis of \$20, but it is doubtful whether that figure will be accepted. Low phosphorus is quoted as high as \$29, but \$28 is the general price. Cast borings are worth \$10; country scrap \$18, with an active demand; steel axles are nominally \$26, but none are selling. Car wheels nominally \$21; choice wrought iron turnings, \$19; No. 2 light scrap, \$15.50.

**Pittsburg. Aug. 20.**

*(From Our Special Correspondent.)*

**Pig Iron.**—Shipments of coke have been very poor, and valley furnaces are not making nearly a normal output, 10 being banked this morning, out of a total of 33, with 2 or 3 likely to be banked before the day is over. The Pittsburg furnaces are differently situated from those in the valleys, and aim to keep considerable stocks of coke on hand, but unless the situation improves are likely to have trouble. Buying has been of smaller volume, but about 10,000 tons of foundry pig iron, Northern and Southern, have been sold here this week, nearly all for delivery next year. Bessemer, basic and mill iron are very quiet. A number of furnaces have withdrawn from the market on foundry iron for next year, and prices are a shade higher. About all the large foundries have covered, but there are many small ones which have yet to buy. We quote prices for late delivery as follows: Bessemer, \$21.25@21.50, valley; gray forge, \$20.75@21.25, Pittsburg; No. 2 foundry, \$22@22.25, Pittsburg. Bessemer iron for 1903 delivery might be bought at \$21, valley.

**Steel.**—Prices for forward delivery show a declining tendency, and no interest is taken in the market. It is possible bessemer billets could be bought for forward delivery as low as \$31, and open-hearth a trifle



higher, but for guaranteed early delivery sales of small lots have been made around \$33 for bessemer or open-hearth. Plates are firmer, and for immediate shipment 2.25c. is the minimum, although for next year 1.60c. can be had.

**Sheets.**—The market continues very dull. Consumers and jobbers are holding off from placing forward contracts, but mills are quite firm at 3c. for No. 28 gauge in large lots, but car-load lots are offered as cheap as large lots. There is a fair trade from store, but prices show only a slight margin above mill prices. Sheets made from scrap can be bought at about \$2 a ton below regular steel sheets. There is not so much cutting on galvanized sheets, and the market seems fairly firm at 75 per cent off in car-loads and 75 and 2½ per cent off in large lots. With the higher spelter market these prices hardly represent the cost of galvanizing above the cost of black sheets. Jobbers' prices for small lots from store are 70 and 10 to 70 and 5 per cent off.

**Ferro-manganese.**—Transactions have been light. Domestic is out of the market. English ferro is quoted at \$52.50 in large lots, but the German product might be had as low as \$51.50@51.75. On small lots prices run up as high as \$55.

New York. Aug. 22.

**Pig Iron.**—Prices for spot iron continue high, though consumers find relief in imports of Scotch and Middlesboro pig. The market is inclined to be quiet, and quotations for delivery this year are largely nominal. Some No. 2 Northern has sold at \$23. We quote for 1903 delivery, Northern irons at tidewater: No. 1X, foundry, \$23@25; No. 2X, \$22@23; No. 2 plain, \$21@22. For Southern iron on dock, New York, No. 1 foundry, \$22@23; No. 2, \$21.75@22.25; No. 3, \$21@21.50. Middlesboro pig has sold at \$18.50, and is quoted at \$19.

**Cast Iron Pipe.**—The market shows no especial change, 8-in. pipe being quoted at \$34.25, gross ton, at tidewater.

**Bar Iron and Steel.**—We quote large lots on dock: Refined bars, 1.95@2.05c.; common, 1.90c.; soft steel bars, 2@2.10c.

**Plates.**—The market continues very strong. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 2.05@2.30c.; flange, 2.15@2.40c.; marine, 2.25@2.50c.; universal, 2.05@2.25c.

**Steel Rails.**—The local market is rather quiet, with quotations unchanged. Standard sections are quoted at \$28, f. o. b. mills for 1903 delivery; light rails, \$30 @35, according to weight.

**Structural Material.**—Demand is still strong. Imports of foreign material have been restricted by various conditions imposed by makers. We quote for forward delivery on large lots at tidewater as follows: Beams and channels, 2@2.30c.; tees, 2@2.25c.; angles, 2@2.25c.

Cartagena, Spain. Aug. 9.

(Special Report of Barrington & Holt.)

**Iron and Manganiferous Ores.**—Since our last report 3 cargoes have been shipped from this port, aggregating 11,220 tons, making a total of 216,180 tons since January 1, this year. Transactions continue on a very quiet scale, owing, no doubt, to the holidays, both in this country and the United Kingdom. The business tone, however, is very confident, and prices continue firm, with upward tendency. Freight rates for the United Kingdom are about 3d. to 6d. higher, while those for the United States are about 9d. lower than they were in the middle of last month.

Quotations are per ton, f. o. b. shipping port: Ordinary 50 per cent iron ore, 6s. 6d.@6s. 9d.; special low phosphorus ore, 50 per cent iron, 7s.@7s. 6d.; special ore, 50 per cent iron, 3 per cent manganese, 6 per cent silicon, 8s. 6d.; specular ore, 58 per cent iron, 9s.; magnetic ore, 60 per cent iron, 5 per cent silicon, 11s. 6d. for lumps and 9s. 6d. for smalls. For manganiferous ores quotations are: No. 1, 20 per cent iron and 20 per cent manganese, 14s. 3d.; No. 1 B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d. All grades of manganiferous ores are rated at 11 per cent silicon and under 0.03 phosphorus. Iron pyrites are quoted at 11s. on basis of 40 per cent iron.

#### CHEMICALS AND MINERALS.

(See also wholesale prices current on page 268.)

New York. Aug. 21

**Heavy Chemicals.**—In some quarters there has been an improved demand for forward shipment, but there is little doing for immediate delivery. With the resumption of work at the glass plants in the near future, business is expected to grow materially in alkali and caustic soda. Bicarb. soda has stiffened under light stocks and so has sal soda. Bleaching powder is firmer, and according to report the American production is to be increased. The Dow Chemical Company, of Detroit, Mich., is enlarging its plant to double capacity. A short time ago this company issued new treasury stock to the amount of \$115,000 to pay for these im-

provements. We quote domestic chemicals per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 82½c.@87½c., for prompt shipment, and 75c.@77½c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.85@1.87½ for futures; bicarb. soda, ordinary, 95c.@1.00, and extra, \$3; sal soda, 65c.; chlorate of potash crystals, \$8.25, and powdered, \$8.50 in New York; bleaching powder, off-test, \$1.35—best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali; high-test, 90c.@92½c.; caustic soda, high-test, \$2.25; sal soda, 67½@70c.; chlorate of potash, \$10.25 @10.75; bleaching powder, prime brands, Liverpool, \$1.75; Continental, \$1.62½@1.70.

**Acids.**—New business is light. Deliveries on contracts is better in sulphuric and muriatic acids.

Exports of copper sulphate from New York in July amounted to 176,050 lbs., which is the smallest quantity reported in any month this year, and compares with 302,884 lbs. in July, 1901. In the 7 months ended July 31, 1902, the exports aggregated 22,964,431 lbs., against 36,964,948 lbs. in the corresponding period last year, showing a decrease of 14,000,517 lbs., or nearly 30 per cent. Of the shipments this year Italy received 14,591,810 lbs. (27,499,645 lbs. in 1901); Austria, 3,653,366 lbs. (3,450,856 lbs. in 1901); Germany and Holland together, 1,648,768 lbs. (1,411,166 lbs. in 1901); France, 1,025,139 lbs. (1,855,751 lbs. in 1901); Belgium, 350,598 lbs. (201,847 lbs. in 1901). Other importers were Greece, French Africa, Spain, Portugal, Russia, Central and South America, and the West Indies. The average invoice value of this year's exports was \$4 per 100 lbs., which compares with \$4.57 in the corresponding period last year. Part of this year's decrease of 57c. is attributed to lower ocean freight rates, but competition abroad has no doubt also been keen.

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

Blue vitriol . . .	\$4.60@5.00	Oxalic, com'l . . .	\$4.60@5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.	1.50
Muriatic, 20 deg.	1.62½	bulk, ton . . .	13.50@15.50
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.	1.05
Nitric, 36 deg. . .	4.00	Sulphuric, 60 deg.	1.20
Nitric, 38 deg. . .	4.25	bulk . . . . .	15.00@20.00
Nitric, 40 deg. . .	4.50	Sulphuric, 66 deg.	1.20
Nitric, 42 deg. . .	4.87½	Sulphuric, 66 deg.	1.20
		bulk . . . . .	21.00@23.00

**Brimstone.**—Very little brimstone is obtainable on spot, and all sorts of prices are quoted. For shipment, however, importers ask \$22.25 per ton for best un-mixed seconds, and \$1.50 less for thirds.

With regard to the Sicilian brimstone market, Messrs. Emil Fog & Sons, of Messina, write us under date of August 1 as follows: Exports of brimstone from July 1 to June 30 amounted to 438,000 tons, against 521,500 tons last year, showing a decrease of 83,500 tons. Quite contrary to expectation, the only country showing a considerable increase in consumption is the United States, which imported 19,300 tons more than last year. This is evidence that the so much dreaded transformation in the plants of the American paper mills has not taken place. The reduction in exports to France and Italy is very considerable, being 72,000 tons. These countries use sulphur exclusively for vines, and a reaction is most probable on cessation of the present crisis. Prices are still kept up by the Anglo-Sicilian Company, which obstinately refuses to reduce them. Many people abroad think that the syndicate may be obliged to lower rates from want of sufficient capital to hold such an immense stock. This is a mistake; the only means to obtain a reduction is to buy a very large lot—50,000 or 100,000 tons—when 2s. or even 3s. could be saved. Instead of uniting for such a purpose, speculators are selling short a few thousand tons each. When the steamers are chartered probably a slight momentary advance may occur. Dissidents' lots amount to only a few hundred tons daily, and are bought by speculators. We quote f. o. b. per ton: Best un-mixed seconds, 81s.; best thirds, 74s.; refined block sulphur, 85s.; refined roll sulphur in 3 cwt. casks, 95s. 9d.; sublimed flowers, pure, in bags, 99s.; sublimed flowers, current, 90s. 9d.

**Freights.**—A rise is expected in September. Last rate paid was 7s. 3d. for ballast lots to New York and 11s. to Gutujewsky. Philadelphia, Boston, 7s. 6d.@8s.; Portland, full cargo, 7s. 6d.; Swedish ports, 12s.

**Pyrites.**—Consumption is growing, and prices are firm. The Davis Sulphur Ore Company has 3 steamers here from Spain with over 10,000 tons pyrites. Recently a cargo of 3,190 tons Pilley's Island pyrites arrived at Philadelphia. Ocean freight rates are easier, and this week 9s. (\$2.16) was booked from Huelva, Spain, to New York. This rate is the lowest in months.

Quotations are f. o. b. Mineral City, Va.: Lump ore, \$5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, \$5, and fines \$4.75. Spanish pyrites 13c.@13½c. per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

**Sulphate of Ammonia.**—Trading is only moderate

at \$2.95@3 per 100 lbs. for spot, and \$2.87½@2.90 for shipments.

**Nitrate of Soda.**—This market continues quiet. The steamer *Valentia* with 38,000 bags is due this week at New York, and the *Corinthia* with 42,000 bags is booked to arrive at Baltimore next week. Quotations ex-ship are \$1.85 per 100 lbs., and sales have already been made on this basis. Futures are offered at \$1.85 for this year, and \$1.82½ for 1903; but these prices may be shaded on actual business. The coast market is reported quiet but firm, as higher prices are anticipated. Ocean freight rates are generally firmer; hence importers are not anxious to do business at present prices. The Chilean producers' committee is considering a reduction in the export quota to the quantity actually consumed in the 12 months ended July 31. The present annual quota of exports is based on 30,500,000 qtls., while the consumption in the past year has been a little over 27,000,000 qtls. This means that the combination will likely reduce the exports about 3,500,000 qtls. for the year ending March 31, 1903. Should this be done, higher market is expected. At present prices in Europe, which are lower than last spring, consumption may ultimately improve, unless quotations are again forced up by speculators.

Concerning the European statistical position it is learned that during the 7 months ended July 31 the exports from Chile to Europe amounted to 555,173 long tons; imports were 713,200 tons; deliveries, 802,480 tons; loadings reported from Chile, on August 1 were 66,221 tons; visible supply, including stocks and cargoes afloat on August 1, 344,900 tons. Compared with the corresponding period last year increases noted in 1902 are 50,985 tons in the exports from Chile and 9,920 tons in the visible supply on August 1. Decreases were 114,780 tons in imports; 133,550 tons in deliveries, and 24,974 tons in loadings at Chilean ports on August 1. The falling off in deliveries of over 14 per cent is due to high prices.

**Phosphates.**—New orders are not plenty, but miners do not feel uneasy, as they know the Europeans must buy sooner or later. Judging from statistics the exports of Florida high-grade rock are in excess of the past two years, owing chiefly to the improved trade with Germany and other continental countries. Tennessee and South Carolina phosphate exports are smaller than last year; but domestic trade is improving.

The exports of Florida high-grade rock in the 6 months ending June 30 are reported by Messrs. Auchincloss Brothers, as below, in tons of 2,240 lbs.:

Destination.	1901.	1902.	Changes.
Baltic ports . . . . .	37,480	43,364	I. 5,884
Continental . . . . .	130,539	134,836	I. 4,297
Mediterranean . . . . .	5,750	12,166	I. 6,416
United Kingdom . . . . .	13,400	22,030	I. 8,630
Total . . . . .	187,169	212,396	I. 25,227

The increase this year is equal to 13.5 per cent, due chiefly to the improvement in British trade. The distribution of this year's exports shows that Germany received 114,611 tons, and Holland, 29,021 tons, making together 143,632 tons, or 68 per cent of the total reported by all countries. Other importers included Belgium, 16,018 tons; Norway and Sweden, 13,042 tons, and Austria, 4,041 tons.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%) . . .	\$6.50@7.00	6½@6¼d.	\$9.68@9.88
*Fla. land pb. (68@73%) . . .	3.00@3.25	4½@5½.	6.65@7.00
Fla. Peace River (58@63%) . . .	2.25@2.50	4½@5d.	5.70@6.00
*Tenn., (78@82%) export . . .	3.25@3.50	5½@6d.	8.58@9.36
*Tenn., 78% domestic . . . . .	3.00 . . . . .	.....	.....
*Tenn., 75% domestic . . . . .	2.75@3.00 . . . . .	.....	.....
*Tenn., 73@74% domestic . . . . .	2.40 . . . . .	.....	.....
*Tenn., 70@72% domestic . . . . .	2.10@2.25 . . . . .	.....	.....
So. Car. land rock . . . . .	3.25 4½@5d.	.....	5.67@6.30
So. Car. river rock . . . . .	2.75@3.00 . . . . .	.....	.....
Algerian (63@68%) . . . . .	.....	5¼@6¼d.	7.15@8.13
Algerian (53@58%) . . . . .	.....	4½@5d.	5.32@5.58

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

#### METAL MARKET.

New York. Aug. 21.

#### GOLD AND SILVER.

##### Gold and Silver Exports and Imports.

At all United States Ports in July and Year.

Metal	July.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports . . . . .	\$2,875,120	\$7,670,808	\$32,399,346	\$27,947,045
Imports . . . . .	4,076,113	1,594,421	20,004,063	14,781,765
Silver:				
Exports . . . . .	\$3,338,747	\$3,671,814	\$92,272,749	\$26,199,848
Imports . . . . .	2,562,073	2,456,547	17,697,339	14,677,285
Excess. I. . . . .	\$1,200,993	\$6,978,387	\$12,342,263	\$13,165,280
Excess. E. . . . .	\$1,276,674	\$1,215,267	\$14,515,410	\$11,522,563

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



**Gold and Silver Exports and Imports, New York.**  
For the week ending August 21 and for years from January 1:

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$709,730	\$8,277	\$224,685	\$989	E. \$705,439
1902.....	24,513,808	1,529,422	16,384,009	809,653	E. 38,200,142
1901.....	25,795,318	1,864,884	20,690,844	2,506,637	E. 42,112,641
1900.....	36,368,965	1,685,131	25,303,384	2,915,976	E. 57,071,242

**Financial Notes of the Week.**

Indications point to a favorable revival of business in the fall. Speculative markets just now are in the hands of professional operators, as outsiders are awaiting further developments in commercial circles before investing. A shipment of \$500,000 in gold to Buenos Aires, Argentina, is noted this week.

Exports of merchandise from the United States continue to decrease, the total value for July being \$430,000 less than June, which until then were the lightest since August, 1898. July exports were valued at \$88,807,960, as compared with \$109,452,510 for July last year. Imports in July, on the other hand, were the largest for any July in six years, and were in excess of any month this year except March. For the seven months ending July 31 the imports and exports are as follows:

	1901.	1902.
Exports .....	\$831,305,132	\$727,004,123
Imports .....	506,523,539	535,548,362
Excess exports.....	\$324,781,593	\$191,455,761
Add excess of exports, gold.....	.....	13,165,280
Add excess of exports, silver.....	.....	11,522,563
Apparent balance of exports.....	.....	\$216,143,604

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending August 16, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$814,883,600	\$884,810,300	\$929,148,000
Deposits .....	894,317,800	964,629,200	960,246,000
Circulation .....	28,083,600	29,039,000	32,105,100
Specie .....	168,922,900	181,711,100	170,838,000
Legal tenders.....	75,213,600	77,868,100	76,350,100
Total reserve.....	\$244,136,500	\$259,579,200	\$247,188,100
Legal requirements.....	223,579,450	241,157,300	240,061,500
Balance surplus.....	\$20,557,050	\$18,421,900	\$7,126,600

Changes for the week, this year, were increases of \$2,653,200 in loans and discounts, \$603,000 in deposits, and \$224,900 in circulation; decreases of \$630,400 in specie, \$1,123,500 in legal tenders, and \$1,904,650 in surplus reserve.

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

	—1901.—		—1902.—	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.....	\$181,711,100	.....	\$170,828,000	.....
England .....	188,602,650	.....	184,503,815	.....
France .....	490,553,720	\$223,881,025	523,989,440	\$224,433,120
Germany .....	171,675,000	70,120,000	185,210,000	68,500,000
Spain .....	70,015,000	84,950,000	71,070,000	97,265,000
Nethl'ds .....	31,253,500	27,856,000	24,472,500	33,208,500
Belgium .....	15,436,500	7,718,500	15,683,335	7,841,615
Italy .....	79,345,000	9,661,500	80,725,000	10,138,000
Russia .....	351,110,000	37,295,000	368,180,000	44,300,000

The returns of the Associated Banks of New York are of date August 16 and the others August 14, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has been quiet to steady. Any advance in price has been met by liberal offers, and as a result the upward tendency has been checked, and at the same time supplies are absorbed at current rates.

The United States Assay Office in New York reports receipts of 82,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to August 7 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India .....	\$4,692,210	\$3,925,445	D. \$766,765
China .....	376,008	112,380	D. 263,628
The Straits.....	79,976	70,550	D. 9,426
Totals .....	\$5,148,194	\$4,108,375	D. \$1,039,819

Receipts this week were \$77,500 in bar silver from the United States, \$5,500 from the West Indies, and \$7,500 from Australia; total, \$90,500. Shipments were \$165,500 in bar silver to India.

Indian exchange has been weakened by the good money supply in the country, coupled with the purchases of silver by the mint and the freer offering of

council bills. Hence council bills sold in London at 15.90d. per rupee.

The foreign merchandise trade of Great Britain in the 7 months ending July 31 is reported as below:

	1901.	1902.
Imports .....	£305,416,327	£306,790,912
Exports .....	162,966,169	161,404,744
Excess, imports.....	£142,450,158	£145,386,168

This shows an increase of £1,374,585, or 0.4 per cent in imports, a decrease of £1,561,425, or 0.9 per cent in exports, and an increase of £2,936,010, or 2.5 per cent in the balance of imports. The movement of gold and silver for the 7 months is given as follows:

	1901.	1902.	Changes.
Gold: Imports .....	£13,631,490	£12,849,327	D. £782,163
Exports .....	5,168,959	5,512,702	I. 343,743
Excess imports.....	£8,462,531	£7,336,625	D. £1,125,906
Silver: Imports .....	£6,922,404	£4,727,346	D. £2,195,058
Exports .....	6,951,456	5,701,891	D. 1,249,565
Excess, exports.....	£29,052	£974,545	I. £945,493

Of the silver imported this year £3,789,493, or 80.2 per cent of the total, was from the United States.

**Prices of Foreign Coins.**

	Bid.	Asked
Mexican dollars.....	\$0.49 3/4	\$0.42
Peruvian soles and Chilean pesos.....	38 3/4	42
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	3.88
Twenty marks.....	4.75	4.80
Spanish 25 pesetas.....	4.78	4.82

**OTHER METALS.**

**Daily Prices of Metals in New York.**

AUGUST	Silver			Copper			Spelter		
	Sterling E. change	N. Y. Cts.	London Pence.	Lake Cts. per lb.	Electrolytic per lb.	London £ per ton.	Lead per lb.	N. Y. cts.	St. L. cts.
15	4.87 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
16	4.87 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
17	4.86 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
18	4.86 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
19	4.86 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
20	4.86 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25
21	4.86 1/4	52 1/2	24 1/2	11 1/4 @ 11 1/2	11 1/4 @ 11 1/2	28 1/4 @ 28 1/2	4.05 @ 4.10	5.37 1/2 @ 5.50	5.25

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

**Copper.**—The dullness which we have had to report for some time past continues. Although somewhat lower prices have again been named, they have not yet proved sufficiently attractive to induce heavy purchases, buyers continuing to hold off. The improvement in London in standard copper encouraged European buyers to make some offers, which led to business. We quote Lake copper at 11 1/2 @ 11 1/4 c.; electrolytic in cakes, wirebars and ingots at 11 1/4 @ 11 1/2 c., in cathodes at 11 @ 11 1/2 c.; casting copper at 11 1/4 c.

The London market for speculative sorts, which closed last Thursday at £51 10s. for spot, £51 15s. for three months, ruled at about these prices until Wednesday of this week, when spot improved to £52 2s. 6d., and three months to £52 10s. At the close the market is cabled at £51 16s. 3d. for spot, £52 3s. 9d. for three months.

Statistics for the first half of August show a decrease in the visible supplies of 1,000 tons.

Refined and manufactured sorts we quote: English tough, £55 10s. @ £56; best selected, £56 @ £56 10s.; strong sheets, £68 10s.; India sheets, £66 10s.; yellow metal, 6d.

Exports of copper from Atlantic ports in the week ended August 19 are reported by our special correspondents as follows: Great Britain, 57 tons; Germany, 998; Holland, 1,197; Italy, 52; Austria, 225; Malta, 15; Japan, 5; Argentina, 30; total, 2,579 tons. Imports were 4 cases copper plates and 2,858 tons ore.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the producing companies, was as follows for July and the 7 months ending July 31, stated in long tons (2,240 lbs.) of fine copper:

	July		Seven months—	
	1901.	1902.	1901.	1902.
U. S., reporting mines.....	18,585	22,749	131,379	140,497
U. S., outside sources.....	3,400	4,000	24,000	26,700
Total, U. S.....	21,985	26,749	155,379	167,197
Foreign reporting mines.....	9,254	9,210	56,101	61,756
Totals .....	31,239	35,959	211,480	228,953
Exports, U. S.....	6,824	11,733	54,851	109,699

**Tin.**—The end of last week the market was fairly active, but during this week it relapsed into dullness. At the close we quote spot at 28 1/4 c., August at 28.15c., September at 27 3/4 c.

The foreign market, which closed last Thursday at £124 15s. for spot, £122 10s. for three months, was up to £127 15s. for spot, £124 12s. 6d. on Friday. On Monday it was £127 10s. for spot, £123 for three months, and on Wednesday moved to £128 and £124 5s., respectively. On Thursday it reacted, and the closing quotations are cabled as £126 15s. for spot, £125 5s. for three months.

**Lead.**—The market is unchanged. We quote St. Louis at 3.97 1/2 @ 4.05c.; New York at 4.05 @ 4.10c.

From abroad the quotation for Spanish lead is cabled as £11 1s. 3d. @ £11 2s. 6d., with English 5s. higher.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: Lead is unchanged. Missouri brands are quoted at 4c., and desilverized, 4.05c. Trading is of a hand-to-mouth character.

**Spanish Lead Market.**—Messrs. Barrington & Holt, of Cartagena, Spain, write us under date of August 9 as follows: The price of silver during the week has been 13.25 reales per oz. Exchange has gone up by 15 centimos to 34.40 pesetas to £1. The local quotation for pig lead on wharf has been 61 reales per qtl., which on above exchange is equal to £9 18s. 7d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports were 188,037 kilos pig lead and 1,636 kilos silver bars to Marseilles, France.

**Spelter.**—The demand for spelter, both for early and distant shipment, continues very strong, and the premium for spot metal is disappearing in so far as the sellers are raising their prices for September and October shipment. Consumption in the brass, as well as the galvanizing trade, is very good. We quote St. Louis at 5 1/4 c.; New York, 5 3/4 @ 5 1/2 c.

The foreign market has advanced, good ordinaries being quoted at £18 17s. 6d., specials 5s. higher.

**St. Louis Spelter Market.**—The John Wahl Commission Company telegraphs us as follows: Spelter is a little easier. Latest sales are on a basis of 5.15c., East St. Louis. It looks a little as if we had reached top.

**Spanish Zinc Ore Market.**—Messrs. Barrington & Holt, of Cartagena, Spain, write us under date of August 9 as follows: The price at the mines for blende and calamine continues very firm, and demand is good at top prices, notwithstanding the recent weakness in the price of spelter.

**Antimony.**—We quote Cookson's at 9 3/4 c.; Hallett's at 8c.; Hungarian, Italian, Japanese and U. S. Star at 7 1/4 c.

**Nickel.**—The price is now quoted by leading producers at 40 @ 47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

**Platinum.**—Consumption continues good, and prices are firmer. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities is worth 73 1/2 c. per gram.

**Quicksilver.**—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices are steady, and the quotations are \$45.50 @ \$46.50 per flask for domestic orders. For export orders \$44 per flask is quoted. The London price remains £8 15s. per flask, with the same figure quoted from second hands.

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

	Per lb.	Per lb.	
Aluminum.....	33 @ 37c.	Ferro-Tungsten (37%).....28c.	
No. 1, 99% ingots.....	31 @ 34c.	Magnesium .....	\$2.75
No. 2, 90% ingots.....	4c.	Manganese, pure (N.Y.).....	60c.
Rolled sheets.....	20 @ 23c.	Mangan'e Cop. (20% Mn) 32c.	
Alum-bronze .....	33 @ 39c.	Mangan'e Cop. (30% Mn) 38c.	
Nickel-alum .....	1.50	Molybdenum (Best).....	\$1.82
Bismuth .....	50c.	Phosphorus .....	50c.
Chromium, pure (N.Y.).....	80c.	Copper, red oxide.....	70c.
Copper, red oxide.....	50c.	American .....	50c.
Ferro-Molyb'dum (50%).....	\$1.25	Sodium metal.....	50c.
Ferro-Titanium (10%).....	90c.	Tungsten (Best).....	62c.
Ferro-Titanium (20 @ 25%).....	55c.		

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

**Average Prices of Metals per lb., New York.**

Month.	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January .....	23.54	26.51	4.000	4.350	4.27	4.18
February .....	24.07	26.68	4.075	4.350	4.15	4.01
March .....	26.32	26.03	4.075	4.350	4.28	3.91
April .....	27.77	25.93	4.075	4.350	4.37	3.98
May .....	29.85	27.12	4.075	4.350	4.47	4.04
June .....	29.36	28.60	4.075	4.350	4.96	3.99
July .....	28.38	27.85	4.075	4.350	5.27	3.95
August .....	.....	26.78	.....	4.350	.....	3.99
September .....	.....	25.31	.....	4.350	.....	4.04
October .....	.....	26.62	.....	4.350	.....	4.23
November .....	.....	26.67	.....	4.350	.....	4.29
December .....	.....	24.36	.....	4.153	.....	4.31
Year .....	28.54	.....	4.334	.....	.....	4.09

Average Prices of Copper.

Table with columns: Month, New York (Electrolytic 1902, 1901, Lake 1901), London Standard (1902, 1901). Rows: January to December, Year.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, London (1902, 1901), N. Y. (1902, 1901), Y. Y. (1902, 1901). Rows: January to December, Year.

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

DIVIDENDS.

Table with columns: Name of Company, Date, Per Share, Total, Latest Dividend, Total to Date. Rows: Amalgamated Copper, Am. Coal, Bartolome, Breece, Calumet & Hecla, Cincio Senores, Con. Mercur, General Chem., Gold Coin, Golden Crele, Guadalupe, Gwin, Helena, Homestake, S. D., Homestake, extra, Natividad, N. Y. & Hond., Rosario, Ontario, Ohio & Ind. Nat. Gas., Pacific Coast Borax, Peerless Oil, Penoles, Phila. Gas, Rambler-Cariboo, Sta. Gertrudis, Standard Oil Co., U. S. Steel Corp., Va.-Car. Chem.

ASSESSMENTS.

Table with columns: Name of Company, Location, Delling, Sale, Amt. Rows: Alpha, Annandale, Blue Ext., Brunswick Con., California, Emerald, Gould & Curry, Hale & Norcross, Homestake, Humboldt, Kern River Oil, Little Chief, Mariana Malsicano, Mayday, Monte Cristo, New Montezuma, Old Home Con., Pacific, Paria Copper, Potosi, Powling, Purjue Surprise, Red Wing, Red Wing Extension, Savage, Springfield, Tomboy, Ultimo, Uncle Sam Con., Utah Con., Wellington Oil, Willietta.

STOCK QUOTATIONS.

NEW YORK.

Table with columns: Company and Location, par val, Aug. 14, Aug. 15, Aug. 16, Aug. 18, Aug. 19, Aug. 20, Sales. Rows: Amalgamated c., Mont., Anaconda, g., Colo., Best & Belcher, Nev., Brunswick, g., Cal., Comstock T. S., Nev., Comstock Bonds, Nev., Con. Cal. & Va., g. s., Nev., Cripple Creek c., Colo., Crown Point, Nev., Daly, Utah, Elkton, g., Colo., Golden Fleece, Colo., Greene Con., c., Mex., Hale & Norcross, Nev., Horn Silver, Utah, Iron Silver, Colo., Isabella, g., Colo., Jack Pot, Colo., Little Chief, s. l., Colo., Mexican, s., Nev., Mine Securities, U. S., Mollie Gibson, g. s., Colo., Ontario, s. l., Utah, Ophir, s., Colo., Portland, g., Colo., Potosi, g. s., Nev., Quicksilver, Cal., Quicksilver pf., Cal., Small Hopes, Colo., Standard Con., g., Cal., Tenn. c., Tenn., Union c., N. C., White Knob, g. s., Ida, Work, g., Colo., Yellow Jacket, Nev.

\*Per cent

Coal, Iron and Industrial Stocks.

Table with columns: Company and Location, par val, Aug. 14, Aug. 15, Aug. 16, Aug. 18, Aug. 19, Aug. 20, Sales. Rows: Am. Agr. Chem., U.S., Am. Agr. Chem. pf., U.S., Am. Sm. & Ref., U.S., Am. Sm. & Ref. pf., U.S., Col. Fuel & I., Colo., Col. & H. C. & I., Colo., Crucible Steel, U. S., Crucible Steel, pf., U.S., Int'l S. Pump, U.S., Int'l S. Pump pf., U.S., Mong. R. Coal, Pa., Mong. R. Coal pf., Pa., National Lead, U.S., National Lead pf., U.S., Phila Nat. Gas., Phila Nat. Gas. pf., Pittsburgh Coal, Pa., Pittsburgh Coal pf., Pa., Republic I & S, U.S., Republic I & S, U.S. pf., Sloss-Shef S. & I., Ala., Sloss-Shef S. & I. pf., Ala., Standard Oil, U.S., Tenn. C. I. & R., U.S., U. S. Cast I. Pipe, U.S., U. S. C. I. Pipe, pf., U.S., U. S. Red. & Ref. Co., U.S. Red. & Ref. pf., U.S., U. S. Steel Corp., U.S., U. S. Steel Corp. pf., U.S., Va.-Car. Chem., U.S., Va.-Car. Chem. pf., U.S., W'house Elect., Pa., W'house Elect. pf., Pa.

Total sales, 329,275 shares.

† Ex-Dividend.

BOSTON, MASS.\*

Table with columns: Name of Company, par val, Shares listed, Aug. 14, Aug. 15, Aug. 16, Aug. 18, Aug. 19, Aug. 20, Sales. Rows: Adventure Con., c., Allouez, Amalgamated, c., Am. Gold Dredging, Am. Z. L. & Sm., Anaconda, c., Arcadian, c., Atlantic, c., Bingham Con., g. s., Bonanza Dev., Breece, Colo., British Columbia, Cal. & Hecla, c., Centennial, c., Central Oil, Cochiti, Con. Mercur, g., Copper Range Con., Daly-West, g. s., Dominion Coal, Dominion Coal, pf., Dominion I & S., Elm River, Franklin, c., Guajalato Con., c., Isle Royale Con., c., Mass Con., c., Mayflower, c., Michigan, c., Mohawk, c., Mont. Coal & Coke, Mont. & Boston, c., N. E. Gas & Coke, Old Colony, c., Old Dominion, c., Osceola, c., Parrot, s. c., Phoenix Con., c., Quincy, c., Rhode Island, c., Santa Fe, g. c., Shannon, c., Tamarack, c., Tecumseh, Trinity, c., United Copper, United States, g., U. S. Coal & Oil, Utah Con., g., Victoria, c., Washington, c., Winona, c., Wolverine, c.

\* Official Quotations Boston Stock Exchange. Total sales, 101,664 shares.

PHILADELPHIA, PA. §

Table with columns: Name and Location of Company, par val, Aug. 14, Aug. 15, Aug. 16, Aug. 18, Aug. 19, Aug. 20, Sales. Rows: Am. Alkali, Mich., Am. Cement, Cambria Iron, Pa., Cambria Steel, Pa., Penn. Steel, pf., Susq. I. & S. Pa., United Gas L. Pa., Warwick I & Steel.

§ Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 9,008 shares.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.\*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Anaconda, and others with columns for par value, shares, and prices.

\*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 375,920 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Anaconda, and others with columns for par value, shares, and prices.

MEXICO.

Aug. 9.

Table of stock quotations for Mexico listing companies like Durango, Guanajuato, and others with columns for shares, last dividend, and prices.

ST. LOUIS, MO.\* Aug. 18.

Table of stock quotations for St. Louis, Mo. listing companies like American Lead, Central Lead, and others with columns for shares, par value, and prices.

SPOKANE, WASH.\* Aug. 14.

Table of stock quotations for Spokane, Wash. listing companies like American Boy, Black Tail, and others with columns for par value, shares, and prices.

LONDON.

Aug. 8.

Table of stock quotations for London listing companies like Anaconda, Copiapo, De Lamar, and others with columns for authorized capital, par value, and last dividend.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS.

July 31.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Huta-Bank, and others with columns for country, product, and prices.

SALT LAKE CITY.\* Aug. 16.

Table of stock quotations for Salt Lake City listing companies like Ajax, Ben Butler, Bullion-Beck, and others with columns for shares, par value, and prices.

TORONTO, ONT. Aug. 19.

Table of stock quotations for Toronto, Ont. listing companies like Ontario, Olive, British Columbia, and others with columns for par value, shares, and prices.

\*From our Special Correspondent.

Total sales 49,000 shares. \*Reported by Hunner & Harris.

All mines are in Utah. \*By our Special Correspondent. Total sales, 115,965 shares.

Total sales, 27,000 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.  
(See also Market Reviews.)

Abrasive—			Barium			Graphite—Am. f.o.b. Provi-			Paints and Colors—			
	Cust. Meas.	Price.		Cust. Meas.	Price		Cust. Meas.	Price		Cust. Meas.	Price	
Carborundum, f.o.b. Niagara			Oxide, Am. hyd. cryst.....	lb.	\$0.02½	dence, R. L. lump.....	sh. ton	\$8.00	Metallic, brown.....	sh. ton	\$ 19.00	
Falls, Powd., F. FF. FFF..	lb.	\$0.08	Sulphate (Blanc Fixe).....	"	.02	Pulverized.....	"	30.00	Red.....	"	16.00	
Grains.....	"	.10	<b>Barytes—</b>			German, som. pulv.....	lb.	.01¼@.01½	Ocher, Am. common.....	"	9.25@10.00	
Corundum, N. C.....	"	.07@.10	Am. Crude, No. 1.....	sh. ton	9.00	Best pulverized.....	"	.01¼@.02	Best.....	"	21.25@25.00	
Chester, Mass.....	"	.04¼@.05	Crude, No. 2.....	"	8.00	Ceylon, common pulv.....	"	.02¼@.03¼	Dutch, washed.....	lb.	.04¼	
Barry's Bay, Ont.....	"	.07¼@.09¼	Crude, No. 3.....	"	7.75	Best pulverized.....	"	.04@.08	French, washed.....	"	.01¼@.01½	
Crushed Steel, f.o.b. Pitts-	"	.05¼	German, gray.....	"	14.50	Italian, pulv.....	"	.01¼	Orange mineral, Am.....	"	.07¼@.08	
burgh.....	"	.03¼	Snow white.....	"	17.00	<b>Gypsum—Ground.....</b>			Foreign, as to make.....	"	.08¼@.11¼	
Emery, Turkish flour, in kegs.	"	.05@.05¼	<b>Bauxite—Ga. or Ala. mines:</b>			8.00@8.50	Fertilizer.....	"	7.00	Paris green, pure, bulk.....	"	.12
Grains, in kegs.....	"	.03¼	First grade.....	lg. ton	5.50	Rock.....	lg. ton	4.00	Red lead, American.....	"	.05¼@.06	
Naxos flour, in kegs.....	"	.05@.05¼	Second grade.....	"	4.75	English and French.....	"	14.00@16.00	Foreign.....	"	.08¼@.08	
Grains, in kegs.....	"	.03¼	<b>Bismuth—Subnitrate.....</b>			<b>Infusorial Earth—Ground.</b>			Turpentine, spirits.....	gal.	.46¼@.47	
Chester flour, in kegs.....	"	.03¼	lb.	1.40	American, best.....	"	20.00	White lead, Am., dry.....	lb.	.04¼@.04½		
Grains, in kegs.....	"	.05@.05¼	Subcarbonate.....	"	1.65	French.....	"	37.50	American, in oil.....	"	.05¼@.05¾	
Peekskill, f.o.b. Easton, Pa.,	"	.01¼	<b>Bitumen—"B".....</b>			German.....	"	40.00	Foreign, in oil.....	"	.07@.09¼	
flour, in kegs.....	"	.02¼	"A".....	"	.05	<b>Iodine—Crude.....</b>			American, red seal.....	"	.06¼	
Grains, in kegs.....	"	.02¼	<b>Bone Ash.....</b>			100 lbs	2.45	Green seal.....	"	.07		
Crude, ex-ship N. Y.; Ab-	"	.02¼	".....	"	.02¼@.02¼	<b>Iron—Muriate.....</b>			Foreign red seal, dry.....	"	.05¼@.06¼	
bott (Turkey).....	lg. ton	26.50@30.00	.....	"	.07¼@.07¼	lb.	.05	Green seal, dry.....	"	.08¼@.08¾		
Kuluk (Turkey).....	"	22.00@24.00	<b>Bromine.....</b>			"	.01¼					
Naxos (Greek) h. gr.....	"	26.00	".....	"	.40	Nitrate, com'l.....	"	.01¼				
Garnet, as per quality.....	sh. ton	25.00@35.00	<b>Cadmium—Metallic.....</b>			True.....	"	.04				
Pumice Stone, Am. powd.....	lb.	.01¼@.02	100 lbs.	2.00@2.50	<b>Oxide, pure copperas col.....</b>			.....	"	.05@.10		
Italian, powdered.....	"	.01¼	<b>Calcium—Acetate, gray.....</b>			Purple-brown.....	"	.02				
Lump, per quality.....	"	.04@.40	" brown.....	"	1.30	Venetian red.....	"	.01@.01½				
Rotenstone, ground.....	"	.02¼@.04¼	.....	"	.90	Scale.....	"	.01@.03				
Lump, per quality.....	"	.08@.20	<b>Carbide, ton lots f.o.b. Niagara</b>			<b>Kaolin—(See Clay, China.)</b>						
Rouge, per quality.....	"	.10@.30	Falls, N. Y. or Jersey City,	sh. ton	75.00	<b>Kryolith—(See Cryolite.)</b>						
Steel Emery, f.o.b. Pittsburg..	"	.07	Carbonate, ppt.....	lb.	.05	<b>Brown.....</b>						
<b>Acids—</b>			Chloride.....	100 lbs.	.75@.90	<b>Nitrate, com'l.....</b>						
Boracic crystals.....	"	.10¼@.11	<b>Cement—</b>			<b>gran.....</b>						
Powdered.....	"	.11¼@.11½	Portland, Am., 400 lbs.....	bbl.	1.70@1.90	<b>Lime—Com. abt. 250 lbs.....</b>						
Carbonic, liquid gas.....	"	.12¼	Foreign.....	"	1.65@2.25	<b>Finishing.....</b>						
Chromic, crude.....	"	.20	"Rosendale," 300 lbs.....	"	.75	<b>Magnesite—Greece.</b>						
Hydrofluoric, 30%.....	"	.06	Slag cement, imported.....	"	1.65	<b>Crude (95%).....</b>						
48%.....	"	.05	<b>Ceresine—</b>			Calcined.....	lg. ton	6.50@7.00				
0%.....	"	.11	Orange and Yellow.....	lb.	.12	Bricks.....	sh. ton	17.50@18.00				
Sulphurous, liquid anhy.....	"	.05	White.....	"	.13¼	Am. Bricks, f.o.b. Pittsburg..	"	175.00				
<b>Alcohol—Grain.....</b>			<b>Chalk—Lump, bulk.....</b>			<b>Magnesium—</b>						
Refined wood, 95@97%.....	gal.	2.43	Ppt. per quality.....	sh. ton	2.50	<b>Carbonate, light, fine pd.....</b>						
Purified.....	"	1.20@1.50	.....	lb.	.08¼@.08	<b>Blocks.....</b>						
<b>Alum—Lump.....</b>			<b>Chlorine—Liquid.....</b>			<b>Chloride, com'l.....</b>						
Ground.....	100 lbs.	1.75	Water.....	"	.10	<b>Fused.....</b>						
Powdered.....	"	1.80	<b>Chrome Ore—</b>			<b>Nitrate.....</b>						
Chrome, com'l.....	"	3.00	(50% ch.) ex-ship N. Y.....	lg. ton	24.75	<b>Sulphate.....</b>						
.....	"	2.75@3.00	Bricks, f.o.b. Pittsburg.....	M	175.00	<b>Manganese—Powdered.</b>						
<b>Aluminum—</b>			<b>Clay, China—Am. com., ex-</b>			<b>70@75% binoxide.....</b>						
Nitrate.....	lb.	1.50	dock, N. Y.....	lg. ton	8.00	<b>Crude, pow'd.....</b>						
Oxide, com'l, common.....	"	.06¼	Am. best, ex-dock, N. Y.....	"	9.00	<b>75@85% binoxide.....</b>						
Best.....	"	.20	English, common.....	"	12.00	<b>85@90% binoxide.....</b>						
Pure.....	"	.86	Best grade.....	"	17.00	<b>90@95% binoxide.....</b>						
Hydrated.....	100 lbs.	2.60	Fire Clay, ordinary.....	sh. ton	4.25	<b>Carbonate.....</b>						
Sulphate, pure.....	"	1.50@2.00	Best.....	"	6.00	<b>Chloride.....</b>						
Com'l.....	"	1.15@1.25	Slip Clay.....	"	5.00	<b>Ore, 50%, Foreign.....</b>						
<b>Ammonia—</b>			<b>Coal Tar Pitch.....</b>			<b>Domestic.....</b>						
Aqua, 16°.....	lb.	.03	gal.	.08	<b>Marble—Flour.....</b>							
18°.....	"	.03¼	<b>Cobalt—Carbonate.....</b>			<b>Mercury—Bichloride.....</b>						
20°.....	"	.03¼	lb.	1.75	<b>Nitrate.....</b>							
20°.....	"	.05¼	Nitrate.....	"	1.50	<b>Nic—N. Y. gr'nd, coarse.....</b>						
<b>Ammonium—</b>			Oxide—Black.....	"	2.20@2.30	<b>Fine.....</b>						
Carbonate, lump.....	"	.08¼	Gray.....	"	2.28@2.40	<b>Sheets, N. C., 2x4 in.....</b>						
Powdered.....	"	.09	Smalt, blue ordinary.....	"	.08	<b>3x3 in.....</b>						
Muriate, grain.....	"	.05¼	Best.....	"	.20	<b>3x4 in.....</b>						
Lump.....	"	.08¼	<b>Copperas.....</b>			<b>4x4 in.....</b>						
Nitrate, white, pure (99%).....	"	.12	100 lbs.	42¼	<b>Copper—Carbonate.....</b>							
Phosphate, com'l.....	"	.09	lb.	.18@.19	<b>Chloride.....</b>							
Pure.....	"	.12	Nitrate, crystals.....	"	.35	<b>Nitrate, com'l.....</b>						
<b>Antimony—Glass.....</b>			Oxide, com'l.....	"	.19	<b>6x6 in.....</b>						
Needle, lump.....	"	.30@.40	<b>Cryolite.....</b>			<b>Mineral Wool—</b>						
Powdered, ordinary.....	"	.05¼@.07¼	<b>Explosives—</b>			<b>Slag, ordinary.....</b>						
Oxide, com'l white, 95%.....	"	.08¼	<b>Blasting powder, A.....</b>			<b>Selected.....</b>						
Com'l white, 99%.....	"	.12	<b>Blasting powder, B.....</b>			<b>Rock, ordinary.....</b>						
Com'l gray.....	"	.07	<b>"Rackarock," A.....</b>			<b>Selected.....</b>						
Sulphuret com'l.....	"	.16	<b>"Rackarock," B.....</b>			<b>Nickel—Oxide, No. 1.....</b>						
<b>Arsenic—White.....</b>			<b>Dynamite (20% nitro-glycer-</b>			<b>No. 2.....</b>						
Red.....	"	.06¼@.07	<b>ine).....</b>			<b>Sulphate.....</b>						
<b>Asphaltum—</b>			<b>(30% nitro-glycerine).....</b>			<b>25@30, cold test.....</b>						
Ventura, Cal.....	sh. ton	32.00	<b>(40% nitro-glycerine).....</b>			<b>15, cold test.....</b>						
Cuban.....	lb.	.01¼@.03¼	<b>(50% nitro-glycerine).....</b>			<b>Zero.....</b>						
Egyptian, crude.....	"	.05¼@.06	<b>(60% nitro-glycerine).....</b>			<b>Summer.....</b>						
Trinidad, refined.....	sh. ton	35.00	<b>(60% nitro-glycerine).....</b>			<b>Cylinder, dark steam ref.....</b>						
San Valentino (Italian).....	lg. ton	16.00	<b>(75% nitro-glycerine).....</b>			<b>Dark, filtered.....</b>						
Seyssel (French), mastic.....	sh. ton	21.00	<b>Glycerine for nitro (32-2-10°</b>			<b>Light filtered.....</b>						
Gileonite, Utah, ordinary.....	lb.	.03	<b>Be.).....</b>			<b>Extra cold test.....</b>						
Select.....	"	.06¼	<b>Feldspar—Ground.....</b>			<b>Gasoline, 86°@90°.....</b>						
<b>Barium—</b>			<b>8.00@9.00</b>			<b>Naphtha, crude, 68°@72°.....</b>						
Carb. Lump, 80@90%.....	sh. ton	25.00@27.50	<b>Flint Pebbles—Danish, Best..</b>			<b>"Stove".....</b>						
.....	"	26.00@29.00	<b>French, Best.....</b>			<b>Linseed, domestic raw.....</b>						
Powdered, 90@90%.....	lb.	.01¼@.02	<b>Fluorspar—</b>			<b>Boiled.....</b>						
Chloride, com'l.....	100 lbs.	1.67¼@1.76	<b>Am. lump, 1st grade.....</b>			<b>Calcutta, raw.....</b>						
Chem. pure cryst.....	lb.	.05	<b>2d grade.....</b>			<b>Ozokerite.....</b>						
Nitrate, powdered.....	"	.05¼	<b>Gravel and crushed, 1st gr..</b>			<b>Paints and Colors—</b>						
			<b>2d grade.....</b>			<b>Chrome green, common.....</b>						
			<b>Ground, 1st grade.....</b>			<b>Pure.....</b>						
			<b>2d grade.....</b>			<b>Yellow, common.....</b>						
			<b>Ground, 1st grade.....</b>			<b>Best.....</b>						
			<b>2d grade.....</b>			<b>Lampblack, com'l.....</b>						
			<b>Foreign, lump.....</b>			<b>Refined.....</b>						
			<b>Ground.....</b>			<b>Litharge, Am. powd.....</b>						
			<b>Fuller's Earth—Lump.....</b>			<b>English flake.....</b>						
			<b>100 lbs.....</b>			<b>Glassmakers'.....</b>						
			<b>Powdered.....</b>									
			<b>.....</b>									

THE RARE EARTHS.

	Cust. Meas.	Price
Boron—Nitrate.....	lb.	\$1.50
Calcium—Tungstate (Schee-	"	.90
lite).....	"	10.00
Cerium—Nitrate.....	"	35.00
Didymium—Nitrate.....	"	40.00
Erbium—Nitrate.....	"	20.00
Glucinum—Nitrate.....	"	30.00
Lanthanum—Nitrate.....	"	.60
Lithium—Nitrate.....	oz.	.06¼@.07
Strontium—Nitrate.....	lb.	.45@.50
Thorium—Nitrate 49@50%.....	"	.25
Uranium—Nitrate.....	oz.	40.00
Yttrium—Nitrate.....	lb.	8.00
Zirconium—Nitrate.....	"	

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