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CONTENTS.

Table listing contents with page numbers: Editorial Notes 531, Canadian Nickel Mining 532, The Elmore Process 522, New Publications 528, Books Received 52, Correspondence 5:3, * Andrew Smith Hallidie 5:4, Wire-Rod Production in 1899 5:4, Nickel Mining in Ontario 524, * The Salt Wells of Szechuan, China W. M. Upcraft 525, British Columbia—XXX W. M. Brewer 526, Recent Decisions Affecting the Mining Industries 526, Russian Petroleum Production in 1899 527, The Geological Position of Trans-Mississippian Coals, Charles R. Keyes 528, * Water and Fuel Economy in Stamp Milling A. W. Warwick 529, Abstracts of Official Reports 530, * Mining Views in Cuba 531, The Transvaal Mining Industry for the Second Half of 1899—VII James McNaughton 532, Mine Dams 533, * An Improved Gasoline Hoisting Engine 533, Mineral Collectors' and Prospectors' Column 533, Questions and Answers 534, * Patents Relating to Mining and Metallurgy 534, * Illustrated.

Table listing regional and market information: Personal 536, Virginia 540, West Virginia 540, Wyoming 540, Obituary 536, Societies and Technical Schools 536, Industrial Notes 536, Trade Catalogues 537, Machinery and Supplies 537, Mining News, United States: Alabama 537, California 537, Colorado 537, Idaho 538, Michigan 538, Minnesota 539, Missouri 539, Montana 539, New Mexico 539, Oregon 539, Pennsylvania 540, South Dakota 540, Utah 540, Advertisers' Directory 15, 17, 18, 21, Virginia 540, West Virginia 540, Wyoming 540, Foreign: Africa 540, Australasia 540, Canada 541, South America 541, Markets: Coal: New York 541, Birmingham 541, Chicago 541, Cleveland 541, Pittsburgh 541, Shanghai 541, Slate: New York 541, Metals: Pig Iron Production 542, Birmingham 542, Buffalo 542, Chicago 542, Cleveland 542, Philadelphia 542, Chemicals and Minerals: New York 545, Liverpool 545, Mining Stocks: Market Reviews: New York 545, Boston 545, Colo. Springs 545, Salt Lake City 545, San Francisco 546, London 546, Paris 546, Dividends 546, Meetings 546, Assessments 546, Stock Quotations: New York 547, Philadelphia 547, San Francisco 547, Boston 547, Salt Lake City 547, Toronto 547, Spokane 547, Colo. Springs 548, Montreal 548, Mexico 548, Denver 548, Paris 548, London 548, Mining Co's. List of 450, Current Prices: Minerals, Chemicals, etc 450, Advt. Rates 20

The extremely interesting and suggestive article on "The Lixiviation of Gold Deposits by Vegetation," by Dr. Lungwitz, which was published in these pages last week, is worthy the attention of our readers, and we hope it will be discussed from the standpoints of the observation and experience of other observers.

The article on the "Salt Wells of Szechuan," given on another page, is a curious record of the survival of primitive methods in the Ancient Kingdom, and of the degree of success which can be attained with such methods. It is also another indication of the great field for mining enterprise which exists in China—or will exist when the country is fully opened to foreign enterprise.

The anthracite collieries on the Girard Estate in Pennsylvania in 1899 shipped almost exactly two-thirds of their product as coal of the larger sizes, and one-third as smaller steam sizes. This is not far, we believe, from the general average of the anthracite region, though the Lehigh Coal and Navigation Company reported 50.4 per cent. of its product as small sizes. That, however, was an exceptional case.

The question of saving water and fuel is a vital one to a great many mines in the West and Southwest, and any records of experience in this direction will be of service to many of our readers. The operations in Southern California which are described elsewhere show excellent results. It is to be noted that the gasoline engine played an important part in these economies. It is becoming quite a feature in South-western mining.

It appears that the Chicago operators who caused the recent flurry in the iron and steel stocks on Wall Street are to be brought into court at the suit of a stockholder in the American Steel and Wire Company. Efforts have been made to suppress the suits, but they have not been successful, and we may have a decision of interest defining just how far an official of a company can safely go in sacrificing the interests in his charge to his own profit.

The terrible accident at the Winter Quarter Mine of the Pleasant Valley Coal Company, in Utah, in which the loss of life has been nearly 300, is the worst mining accident which we have been called on to record for a long time. Thus far we have only the telegraphic accounts, and cannot yet go into the question of blame. The mine was not a fiery nor a specially dangerous one, and seems to have been in good condition. All the indications are that it was a coal-dust explosion, and we believe that investigation will show this fully.

It is perhaps natural that a British contemporary should get hold of the figures for the iron ore shipments of the Lake Superior region and publish them as the total output of the United States; but an English journal which is supposed to be a well-informed organ of the iron trade ought to know better. Perhaps, however, the figures for our total production are over-large for the British mind, and our contemporary means to break them gradually and quietly to its readers.

The Alaska bill has passed the Senate in Washington, but the various amendments proposed for regulating shore claims and other claims in the Nome region all failed. Rightly or wrongly, there has been a very general impression that most of these amendments were intended to put matters into such a shape that the beach claims could be taken up and held in large blocks by parties with capital. It is just as well that these amendments were dropped; though some legislation is certainly needed.

The collection of statistics at this period of the year involves always the puzzling question of what an ounce of gold really is. If any one reports tons of pig iron, pounds of lead or copper, we know what it means; but an ounce of gold may be anything in value from \$12 to \$20.67. If miners and companies would only adhere to the practice of reporting gold in fine ounces—pure gold—it would save a world of trouble. Many do so, but there are enough still giving production in bullion to keep the statistician busy.

German steel production in 1899 reached a total of 6,290,434 metric tons; about 1,435,000 tons more than Great Britain and 4,372,000 tons less than the United States. The particulars show that only 623,384 tons, or 9.9 per cent. of the total, were Bessemer steel made by the acid process; while 5,667,050 tons were basic steel. Of the latter, 3,973,225 tons were made in Thomas converters, and 1,693,825 tons in open-hearth furnaces. While the basic steel showed an increase of 631,154 tons, or 12.5 per cent., there was a decrease of 45,027 tons, or 6.7 per cent., in the Bessemer.

Exports of iron and steel, including machinery, from the United States in March were valued at \$11,858,387, against \$8,834,821 in 1899.

For the nine months of the fiscal year the total values were \$86,912,155, as compared with \$67,212,605 last year, the gain being rather in values than quantities. In some important items there were considerable decreases; thus pig iron shipments were only 113,367 tons this year, and 243,655 tons last year; wire rods 20,238,358 pounds, against 39,482,248; bar iron and steel 47,173,867 pounds, against 68,310,149, and plates 65,450,227 pounds, against 88,671,798. On the other hand, exports of steel rails increased from 196,496 to 227,666 tons; wire from 146,857,130 to 180,373,822 pounds; nails from 63,162,046 to 92,030,949 pounds, and the value of machinery showed a gain of \$2,223,571. Considering the great home demand, the exports show a fair gain.

The determination of the Pennsylvania Coal Company to build its own railroad line to the Hudson River, using for that purpose the bed of the abandoned Delaware & Hudson Canal, seems to indicate a new departure for the most conservative of the anthracite companies. The company has always heretofore been content to ship its tidewater coal over the Erie Railroad, and has made no effort to control other lines, so that its present determination is rather a surprise to the trade. It is especially to be noted, as the new road will end on the Hudson, 100 miles above New York, and at a port which is closed by ice three or four months in the year. It offers no special advantages for the trade of Western New England, as the only connection attainable at present—the Poughkeepsie Bridge Line—is handicapped by its high grades and generally poor condition. It seems to be sure, however, that the road will be built, and probably at an early date. It is estimated that more than two-thirds of the old canal will be available for a railroad at a moderate expense, and the rest of the line will not be a costly one; so that the investment will be as small as any one in a railroad line could possibly be.

CANADIAN NICKEL MINING.

The action of the Ontario Legislature, which is noted in another column, amounts practically to a prohibition of nickel mining in the Province, unless the taxes imposed should be remitted under the clause authorizing such action if the metal is refined in Canada. It is simply a move to compel the establishment of such works; and for that reason it has been urged for years past by several parties. The action of the Legislature was opposed by many of those most interested, large delegations from Sudbury having appeared to remonstrate against it—a natural action, since the closing of the mines would ruin the place. The "Canadian Mining Review," edited by Dr. B. T. A. Bell, opposed it in a strong argumentative article, and other authorities concurred in their judgment; but the measure was passed in spite of all argument.

The Ontario Government has, of course, the undoubted right to impose conditions on the mining of nickel, or to prohibit it altogether; but the wisdom of such action is another question. Some benefit would result to the Province from the establishment of refining works within its limits, though their extent and the number of men employed would be less than seems to be expected in Canada. On the other hand, a suspension of mining would not only throw many men out of work, it would actually put a stop to all productive industry in the Sudbury District. Really, Ontario runs the risk of losing much more than it would be possible to gain. If Ontario possessed a monopoly of the nickel deposits of the world, such action as has been taken might be successful, but under existing conditions it may result only in the profit of the producers in New Caledonia and Europe.

A restrictive policy is almost always a bad policy and will react upon those who adopt it. It is altogether likely that this will be the result of the Ontario attempt to force the nickel producers in the present case.

THE ELMORE PROCESS.

Perhaps no metallurgical invention has had such a struggle for recognition in the scientific and commercial worlds as the Elmore process for electrolytically manufacturing copper tubes, wirebars and sheets direct from unrefined copper. We are able, however, to congratulate the inventor on the fact that the process is now in successful operation both in France and England, with plenty of capital at its command and with an excellent repute for its products.

The process was invented by Mr. William Elmore and his sons some 15 years ago. Mr. Elmore had before that time designed an electrolytic refining process for Elliott's Metal Company in South Wales, and had been instrumental thereby in saving large quantities of gold and silver which had hitherto been allowed to remain in the marketed copper. Much raw American copper was treated at these works, but with the advance of metallurgical practice in the United States, this source of supply was soon lost. Mr. Elmore, with the assistance of his sons,

afterward turned his attention to the problem of manufacturing tubes and sheets direct in the electrolytic bath, and so obtaining in one process the results which usually require two processes—first electrolytic refining, and then rolling or drawing. After much experimenting they found that they could deposit the copper on a revolving mandrel and by means of agate edges pressing on the deposited copper, harden and compress the deposit. In this way a tube was gradually built up, and if the size of the mandrel was made very great the resulting tube, when cut longitudinally, could be made into a sheet. The inventors claimed that the product was not only as tough and strong but was even tougher and stronger than the ordinary tubes and sheets made by the drawing and rolling processes, but the whole of the scientific world rose up in arms against such a statement. It was argued that it was quite impossible to produce a homogeneous deposit of copper by the Elmore process and that the use of agate edges in compressing the deposit must necessarily result in the building up of a laminated tube which would collapse with external pressure, and gradually foliate in any case. No copper refiner or manufacturer would look at it, and as much more capital is required for copper manufacture than the inventors could provide themselves, the outlook for the process was not very hopeful. It was then that the notorious London company promoter, the late Baron Grant, took up the process, and exploited it for all it was worth. Fortunately, and largely through the influence of the "Engineering and Mining Journal," American investors escaped being taken in. He formed company after company, with gigantic capitals, to work the process, and received large subscriptions from the British public. Unfortunately, however, hardly any of this money went to provide capital to erect suitable works and to buy up sufficient stocks of raw copper. It all went into the pockets of the worthy Baron, and even the inventors themselves received but a paltry reward. It is not a matter of wonder, therefore, that no tubes or sheets could be turned out, or that none of the companies paid any dividend. The commercial and investing world had no alternative but to echo the previously expressed opinion of the scientific men, that the process was no good, and many people went so far as to say that the inventors as well as the worthy Baron were swindlers.

Fortunately, the French patents were not acquired by Baron Grant, but by a man who knew something about copper, the late M. Secretan of Paris. Under his direction, and with the capital at his command, the process was gradually worked up into a paying affair, and the French company now has a large business and yields a handsome profit. Directly they began manufacturing, the users of their tubes and sheets had the opportunity which they had before lacked, of thoroughly testing the inventors' claims. The French users were more than satisfied, and the high qualities of the products were soon appreciated. The English users of copper tubes were not able to buy the French products, and the English works produced nothing worth mentioning, but it is a fact that for some years now the value of the Elmore tube has been recognized by English engineers and shipbuilders, and their only cause of complaint was that they could not get a supply.

A little over a year ago, just as the English companies looked like becoming wreckage, the French company made overtures with a view of purchasing the whole of the English patents and the other assets. The terms offered were quite liberal considering the state the companies were in, but the price was only a fraction of what the English shareholders originally paid. The shareholders were inclined to kick, and in addition to this difficulty there was another serious obstacle to be overcome—how to reconcile the claims of the four English companies and how to apportion their several shares in the reconstruction. The negotiations went on for months, and on several occasions the French company seemed like withdrawing its offer in disgust. Finally, however, the recalcitrants were whipped into line and the deal put through. The whole assets were transferred to a new company called the English Electro-Metallurgical Company, Limited, and £150,000 in cash has been subscribed by the French company in order to put the works on a commercial basis and to provide the necessary raw material. It should be mentioned that the Paris house of L. Hirsch & Company is subscribing this money, and that the French company entirely controls the English one. The majority of the board are Frenchmen, but there are two of the Elmores and Mr. Firth, the steelmaker of Sheffield, to represent English interests.

There seems to be no reason now why the Elmore process should not prove a success in England. We regret that we are unable to give our readers working details of the process, for the directors maintain strict secrecy, and all employees are expressly forbidden from writing or speaking of the process. There is a long series of patents on the subject, but the main patents have not long to run. The process depends very largely on delicate manipulation; in fact it may be well described as a laboratory process on a large scale. With the main patents nearly running out, the disinclination of the proprietors to give to the public their most valuable possessions is perhaps, after all, excusable.

NEW PUBLICATIONS.

"Dynamometers and the Measurement of Power." New Edition, Revised and Enlarged. By J. J. Flather. New York; John Wiley & Sons, and London; Chapman & Hall, Limited. Pages, 404; illustrated. Price, \$3.

Prof. Flather's already well-known book appears in this edition generally rewritten and brought up to date, with the addition of five new chapters. It now includes, besides the general rules for the determination of power used and the description of dynamometers, an account of the methods and apparatus used in the measurement of water power, a subject which has been somewhat neglected; and a full description and analysis of the methods of measuring electrical power. The chapter on the power required to drive tools contains the records of many elaborate tests and experiments with iron and wood working machinery. The book is approved by experience, and the additional matter in the new edition increases its value.

Geological Survey of Canada. "Preliminary Report on the Klondike Gold-fields, Yukon District, Canada." By R. G. McConnell. Ottawa, Canada; Government Printing Bureau. Pages, 44; with map and illustrations.

This report is based on field work carried out in the summer of 1899 and is really the first publication based on a systematic and moderately detailed examination of the Klondike region, which has attracted so much attention, and about which so much has been written in a loose and general way. It does not pretend to be a complete report on the region, but is only preliminary, leaving many questions to be determined by further and more complete examination. It is full of interest and gives us much information about the general formation and characteristics of the country. Mr. McConnell is the first writer to study the geology of the region from a scientific point of view, other travelers and observers having been occupied chiefly by the superficial description of the gold deposits and their working. In other words, most of that which has been written about the Yukon has been by prospectors, and not geologists. The publication of the report in advance of the general report of the Canadian Geological Survey is timely, and will be appreciated by the many who are interested in the region. We hope to present our readers with an abstract of Mr. McConnell's work before long.

"Monopolies and the People." Third Edition, Revised and Enlarged. By Charles Whiting Baker. New York and London; G. P. Putnam's Sons. Pages, 368. Price, \$1.50.

The first part of this book was written 10 years ago, and the author finds that the period which has passed since then has confirmed his earlier views, so that very few changes have been required in this part. The second part is devoted chiefly to the new material furnished by the developments of the past 10 years and the changes which have taken place during that period. The three concluding chapters set forth the economic evils of our present industrial conditions, with some suggestions as to the principles to be followed in dealing with them. Mr. Baker's fundamental idea is that modern concentration of capital, coupled with the general use of machinery and improved methods, has largely destroyed competition and tends to extinguish that competition which still remains, leaving all the important industries in the hands of consolidations and trusts. He urges that the present state of affairs be fully recognized and measures be taken to deal with it in the public interest.

The book deserves attentive reading. While all may not agree with the author's propositions, they must at least acknowledge that he has attacked a difficult subject boldly and has said much that is worthy of attention and will inspire others to think carefully.

"Practical Methods for Determining Molecular Weights." By Henry Beltz. Translated by Harry C. Jones and Stephen H. King. Easton, Pa.; The Chemical Publishing Company. Pages, 236; illustrated. Price, \$2.

The methods for determining molecular weights have been much extended and increased during the past few years by the work of different chemists. The results have been scattered through different publications, and the work of the author consisted largely in collecting, arranging and recording the results. There is probably no other book which deals so fully and satisfactorily with the problem of molecular weight determinations; and it is so planned and arranged as to be also an excellent book of reference to the literature on the subject. The forms of apparatus used by chemists in their determinations are described and illustrated, and the manner of carrying out the experiments is very fully shown. The intention is to aid the investigator by showing what has been done, and at the same time to impress upon him the desirableness of further individual work.

In the translation some additions and omissions have been made, and such changes as additional information had made necessary. The general form of the work has been retained, and the changes have been approved by the author. The book will be found very useful in the laboratory, and also for reference to other sources of information on the subject.

BOOKS RECEIVED.

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

"The Foreign Commerce and Navigation of the United States for the Year Ending June 30th, 1899." Volume I. Prepared in the Bureau of Statistics, Treasury Department; O. P. Austin, Chief of Bureau. Washington: Government Printing Office. Pages, 1,124; with diagrams.

CORRESPONDENCE.

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

The Electrolytic Manufacture of Copper.

Sir: My attention has been drawn to a letter in your issue of April 7th, entitled "The Electrolytic Manufacture of Copper," signed Elisha Emerson. From the particulars given by Mr. Elisha Emerson, it appears that his process is similar to Mr. Henry Wilde's and many others, and is entirely lacking in novelty, a cathode being revolved at a low rate of speed for the purpose of circulating the electrolyte without stirring up the anode mud, a low current density being used.

My process is capable of depositing copper about ten times faster than it has ever been done before on a commercial scale, at the remarkably high current density of 200 amperes or more per square foot, without any burnishing apparatus. Sherard Cowper-Coles.

London, April 24, 1900.

Pulaski County, Kentucky.

Sir: Coal properties in Pulaski County, Kentucky, are being rapidly developed, and there is a great demand for mining apparatus, etc. Coal on the Cincinnati Southern Railway is commanding high prices, and mines which have been neglected for several years are being opened up. There are quite a number of parties now interested in the building of an electric railway some 30 miles southwest of this place into the Wayne County coal and oil fields. Several parties are also figuring on building a street railway plant at Somerset. Pulaski County is rich in water power, and with proper development could be made one of the finest manufacturing counties in the State. The streams in this country are rapid, and if properly controlled would furnish excellent power. Eastern capitalists investigating these fields will find it one of the best in the country. J. P. Hornaday.

Somerset, Ky., April 30, 1900.

Care of Health at Cape Nome.

Sir: I intend going to Nome and along the Alaskan coast soon, and have just received some hints from a medical friend of wide experience, which seem to me so timely that I send them to you for the benefit of your readers who may be headed in the same direction. They were hastily written, but are easily understood, and are as follows:

"The newspapers report an epidemic of typhoid fever at Nome City—300 cases and 30 deaths. The probable cause is contaminated drinking water. Better insure against it by putting a condenser on your steam engine and drinking the condensed steam. That is what we did in the Navy during the Civil War, in the ships on the blockade along the Southern coast, where we could get only bad water or none. That is safe always. Should you and your engineer catch up typhoid germs, it would be a bad job all around. Take along with you plenty of Epsom salts to clean you out, and follow with an intestinal antiseptic—the Waugh-Abbott is good—and even if one of your party should catch the fever, you will manage to come through all right. Take plenty of malted milk along for diet.

"Remember always that the pay-streak is in prevention."

I hope these notes may be of service to some of my fellow adventurers. G.

New York, April 27, 1900.

JAPANESE BRONZES.—According to the London "Engineer," the alloys used in Japanese bronzes contain a large percentage of lead, which improves the patina. The following are the constituent elements of three kinds of modern Japanese bronze: (1) Copper, 81.62 per cent.; tin, 4.61 per cent.; lead, 10.21 per cent. (2) Copper, 76.60; tin, 4.38; zinc, 6.53; lead, 11.88. (3) Copper, 88.55; tin, 2.42; zinc, 3.20; and lead, 4.72 per cent. Sometimes a little antimony is added just before casting as shown by the following analysis: Cu = 68.25, Sn = 5.47, Zn = 8.88, Pb = 17.06, and Sb = 0.34 per cent.

QUARTZ THERMOMETERS.—It is now some years, says London "Engineering," since Professor Vernon Boys showed that quartz fibres could be produced nearly as easily as those of glass, though of course, a much higher temperature was needed to fuse the former material. Since then little has been done in the matter of using fused quartz for other purposes, but from a note by M. A. Dufour, published in a recent issue of "Comptes Rendus," of the Paris Academie des Sciences, it would seem that there is a prospect that quartz may usefully be substituted for glass in certain special instruments. M. Dufour has succeeded in producing tubing of fused quartz, which, owing to its transparency, high resistance, infusibility and slight attraction for moisture, may prove exceedingly useful. M. Dufour has already employed these tubes for making high temperature thermometers, using tin to replace the mercury generally employed. This thermometer reads from 240° up to 580° C.; and as the quartz does not begin to soften till it attains a temperature of over 1,000° C., such instruments could doubtless be used up to temperatures of well over 900° C. The thermometer in question was calibrated, in boiling mercury and boiling sulphur, and for still higher temperatures the boiling points of zinc or cadmium might be used as reference points. M. Dufour has also made a mercury thermometer with a quartz tube, in the hope that the "creeping of the zero" commonly observed with glass thermometer tubes, might be avoided. Quartz fuses much more quietly than glass, gas being invariably disengaged when the latter is brought to a melting temperature. This is not the case with quartz, and hence it is suggested that a study of vacuum tubes made of the latter material might throw light on the question as to what really serves to transport the charge in case of an electric discharge in a high vacuum.

ANDREW SMITH HALLIDIE.

Andrew Smith Hallidie died at his residence in San Francisco April 24th of heart disease, from which he had suffered for several years. He was 64 years old. He was of Scotch descent and was born in Dumfries in 1836. His father was an engineer and inventor, and devised the first machinery for making wire rope, which was built in England.

In 1852 Mr. Hallidie came to the United States with his father, and settled in California. The father engaged in mining, but the son took up the study of engineering, learning his profession practically as an assistant in the field, surveying roads and ditches and building bridges. In 1855, when only 19 years old, he had charge of the construction of a suspension bridge of 220-ft. span, which carried a water conduit across the Middle Fork of the American River. In the following year he aided in starting a wire rope factory in San Francisco, where the first cable made on the Pacific Coast was turned out. This establishment subsequently developed into the California Works, of which Mr. Hallidie was president for many years.

Studying carefully the possible uses of the cable, he worked out the wire-rope tramway system which is known by his name. This was brought out in 1867, and since that time many mines in California, throughout the West and in Mexico have been equipped with Hallidie wire tramways. Their use in mountainous and broken country has



ANDREW SMITH HALLIDIE.

helped materially to solve difficult problems in transportation and even to make the operation of mines possible in many places by reducing the cost of moving the ore.

The cable railroad followed the tramway, and in 1871 a plan was completed for such a line; but it was some time before he could succeed in convincing capitalists of its advantages. In 1873, however, the Clay Street line in San Francisco was built, and its success was so great that it was soon followed by others. The hilly conformation of the city made cable lines especially suitable for its streets and quite an extensive system was established in San Francisco, before the cable road was taken up by other cities. It is by his design of this first cable that Mr. Hallidie is chiefly known, though the wire-rope tramway was also a most useful invention; and in both he made numerous improvements on his original plans.

In addition to his work in his business, Mr. Hallidie found time to contribute some excellent articles to technical papers and society proceedings. He took also an active interest in many public movements, and especially in educational work. At the time of his death he was a member of the American Society of Inventors, the American Geographical Society of New York, the California Academy of Sciences and of many other similar institutions. He was president of the San Francisco Mechanics' Institute, 1868-78 and 1893-96, and at one time vice-president of the James Lick School of Mechanical Arts. He was for many years a trustee of the Free Public Library. He had been a regent of the State University since its foundation in 1868, and was for the last 15 years chairman of the board's finance committee. In 1884 he was delegated by the commercial associations of California to present a congratulatory address to President Diaz, and he journeyed to Mexico for that purpose.

Mr. Hallidie was a member of the Pacific Union and the Sierra Club, but belonged to no secret order. He always took an active part in independent politics, but never held a salaried office. He was a member of the board appointed to prepare a new city charter for San Francisco.

He gave valuable aid to many movements in the public interest, and was a public spirited and useful citizen, who will be missed and generally regretted.

Mr. Hallidie was married in November, 1863, to Miss Martha Elizabeth Woods, of Sacramento. She survives him. He had one daughter, who is Mrs. McMicken, of Seattle.

WIRE-ROD PRODUCTION IN 1899.

The American Iron and Steel Association has ascertained from the manufacturers that the production of iron and steel wire-rods in the United States in 1899 amounted to 1,099,376 gross tons, against 1,071,683 tons in 1898, and 970,736 tons in 1897, showing an increase of only 27,693 tons, or a little over 2.5 per cent., in 1899 over 1898. As compared with 1897 the increase in 1899 amounted to 128,640 tons, or over 13 per cent. The production of 1899 was the largest in our history.

Pennsylvania made the largest quantity in 1899, with Ohio second, Illinois third and Massachusetts fourth. Three other States—New Jersey, Kentucky and Indiana—also rolled rods in 1899.

We still import considerable quantities of the finer grades of iron and steel wire-rods, particularly steel wire-rods, our total imports of rods amounting to 17,964 gross tons in the calendar year 1899 and to 15,985 tons in 1898. Our exports of steel wire-rods amounted to 16,992 tons in 1899 and to 18,510 tons in 1898. In 1899 we imported 972 tons more than we exported; while in 1898 the exports exceeded the imports by 2,525 tons.

NICKEL MINING IN ONTARIO.

We noted recently the attempt of the Ontario authorities to secure the imposition of an export tax on nickel in ores and matte by the Government of the Dominion of Canada. The object is to compel the operators of the Sudbury nickel mines to put up refining works in Canada, instead of shipping the ores or matte to the United States or England for treatment. As the duty has not been imposed, another method has been taken. The amended mining law just passed by the Ontario Legislature contains the following provisions relating to nickel and copper mines. To understand the full meaning of these, clause 10 must be read in connection with clause 7, as given below:

"Section 7. Every person carrying on the business of mining in this Province shall pay a license fee upon the gross quantity of the ores or minerals mined, raised or won during the preceding year from any mine worked by him, to be paid to the Treasurer of the Province for the use of the Province at the following rates, or such less rates as may be substituted by proclamation of the Lieutenant-Governor, namely: (a) For ores of nickel, \$10 per ton, or \$60 per ton if partly treated or reduced; (b) for ores of copper and nickel, \$7 per ton, or \$50 per ton if partly treated or reduced."

"Section 10. Where ores or minerals that have been mined, raised or won in this Province are smelted or otherwise treated in the Dominion of Canada by any process so as to yield fine metal, or any other form of product of such ores or minerals suitable for direct use in the arts without further treatment, then, and in every such case, the fees provided herein, or such proportion thereof as may be fixed by the Lieutenant-Governor in Council, shall be remitted, or if collected shall be refunded under such regulations as the Lieutenant-Governor in Council may prescribe."

The imposition of this tax will be equivalent to an export duty, and should be effectual in forcing the establishment of refining works in Canada as desired, or closing the mines for the benefit of New Caledonia, which is not desired.

STEEL IN NEW ZEALAND.—The New Zealand Government, says London "Engineering," has just published correspondence with the Esteve Steel Company, regarding the outcome of experiments made by the company in the utilization of the iron sand of New Zealand. Although the experiments had not been so full or so complete as was desired, the steel company declares the trials to have been successful, as it had succeeded in making high-class tool steel in the crucible direct from New Zealand sand. It finds no difficulty by the process in eliminating the titanic acid and other impurities. Nearly the whole of the metal in the sand is utilized, and the process of conversion occupies about three hours. The company has also succeeded in agglomerating the sand by itself, without adding any foreign matter, the lumps being as hard as stones. The pig iron produced contains only 0.07 silicon, 0.01 sulphur, 0.03 phosphorus, 0.33 manganese, and no titanium. The company has asked the Government to bear the expense of carrying on some practical experiments in the agglomeration of the sand and in making in a Siemens-Martin furnace of tool steel and soft steel, both from the sand so agglomerated and from the sand in its natural state.

LINING MINING SHAFTS.—In a discussion on the lining of mine shafts in the Liège Association of Engineers, M. Grosfils, general manager of the Fontaine l'Evêque Colliery, who introduced the subject, remarked that in shafts he had always obtained good results with oak planks 7 cm. (2¾ in.) thick and 10 to 15 cm. (mean 6 in.) wide, with double T-iron hoops spaced 75 cm. (2 ft. 5 in.) apart, an arrangement which is comparatively cheap and easily put in, while it affords a certain amount of elasticity that permits a little yielding to movements of the measures. M. Collin advocated brick lining on the score of both cost and durability, and M. Pépin, as regards maintenance, gave the preference to stone. M. Bougard called attention to the good effect produced by tarring the timbers, those in return airways especially lasting three times as long when tarred as they would otherwise. In reply, M. Grosfils acknowledged that the increasing dearth of timber might modify his views as to that material, and he agreed with M. Collin that the use of mine timbers ready cut to length had great advantage over the obtaining of supplies in the rough, as regards ease of checking and stocking, together with a very appreciable economy.

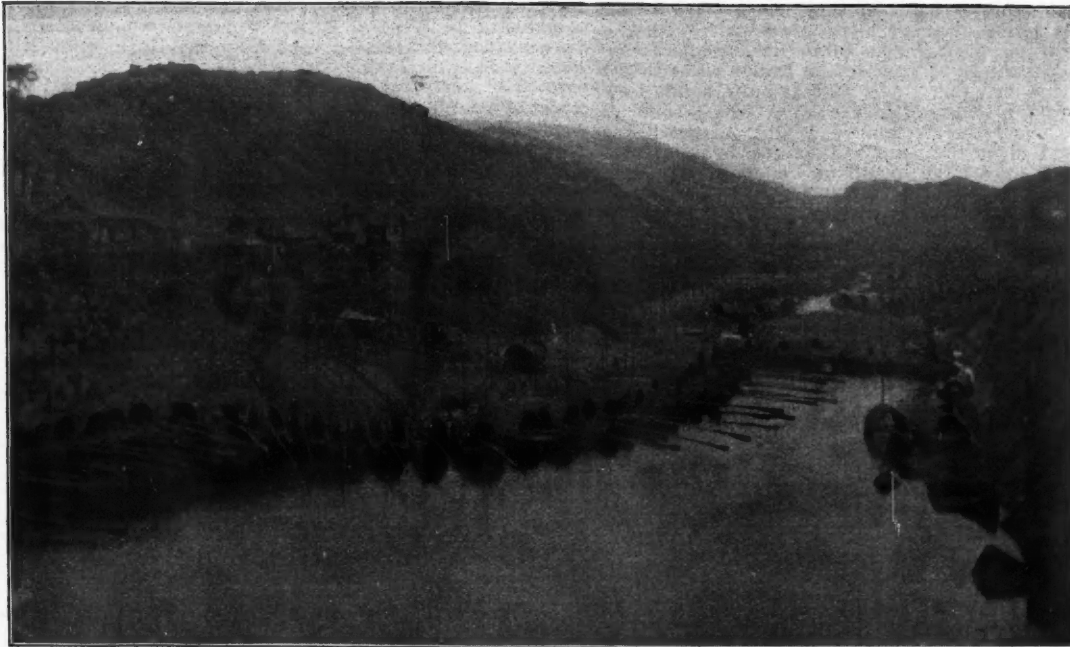
THE SALT WELLS OF SZCHUAN, CHINA.

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

The salt wells of Szchuan are one of the sights as well as one of the important industries of that great province in China. As the west-bound traveler leaves the steamer at Ichang, in the heart of China, and steps aboard the uncouth looking house boat in use by all trav-

discovered, and when, are among the things about which the Chinese give no conclusive evidence. Here they are, they have existed for a long time and so have become a part of the things that are; this is enough.

The well proper is a small opening of a few inches in diameter over which a stone is placed containing the true mouth of the well. Above this rises a crude derrick with a clumsy clattering wheel at the top; a hamper rope passes over the wheel and is attached to a long bamboo tube that goes down into the well. The other end of the rope is car-



YANGTZE RIVER AT THE SALT WELLS—BOATS WAITING FOR SALT.

elers on the Upper Yangtze, he has before him a most exciting journey through the gorges (or canyons) of the great river into the great western province of Szchuan.

As the boat emerges from the last canyon and one catches sight of the more open country to the west, he will observe in the foreground a group of straw shanties close down by the river's edge, over which

ried off into an adjoining shed and attached to a heavy wooden cylinder 50 or 60 ft. in circumference, resting on a vertical axis. When the tube has been lowered into the well four lumbering water buffaloes are hitched to the cylinder and lashed to a run, the cylinder is started, and soon the rope is all wound in, leaving the bamboo tube filled with brine, dangling between the legs of the derrick. A man seizes the tube.



SALT WORKS BY THE RIVER-SIDE AT KUCI-FU, CHINA.

a cloud of steam and smoke is always hovering. Here is the first indication of the salt trade of Szchuan. During high water in summer and autumn these salt springs are overflowed, but when the river subsides a mushroom town of straw shacks is run up, the evaporating pans are set in mud furnaces and the work goes continuously on till next high water again submerges the springs and drives the salt boilers off.

But a month's journey west is yet needed before the main seat of the salt industry is reached. Past Chungking, and midway between it and the State capital—Chentu—almost in the center of the province is Tz-lin-ching—"self-flowing well"—a large and thriving, but squalid town, that exists because of the salt wells. How these wells were

holds its lower end over a tub or reservoir, thrusts an iron pole into the tube and opens a valve, when several gallons of dirty black water rush out. The tube is then released, the cylinder is set free and the rope rapidly paid out till the tube reaches the bottom, when the performance is repeated.

The brine is conducted to the evaporating sheds through bamboo tubes plastered with lime. At certain points in Tz-lin-ching natural gas has been struck. When boring for salt they have found gas instead, but both are valuable. The gas is conducted by straw-braided, lime-plastered bamboo tubes to rude sheds, where it is distributed under rows of thick iron pans containing the brine, and the work of evaporation goes on night and day, because the Chinese have found no way

of regulating the supply of gas and no method of storage is known to them.

The salt is a hard, dirty looking mass when taken from the pans, but the Chinese are proud of the product of their wells and affirm that its power of salting is much greater than the white looking article of foreign commerce.

The method of boring these wells is a pretty good illustration of certain traits of the Chinese character that makes them so successful in spite of their lack of progress. When a site has been selected, after much incantation and ceremony on the part of the hired geomancer, a framework of heavy planking is built on three sides of the spot. On the narrow end of this frame a huge lever is arranged with the long end inside the frame. An iron jumper of 100 lbs. weight is attached to the shorter end of the lever, outside the frame, while inside six men are arranged, three on either side. At regular intervals they simultaneously step on to the long end of the lever, which sinks to the bottom of the frame under their combined weight; then all step off and the jumper descends upon the point to be bored, being twisted meanwhile by a man who sits at the mouth of the well. As these wells vary in depth from 500 to above 2,000 ft., the work of boring is continued through years, but the Chinese hang on with bull dog pertinacity, because there is cash at the end.

The salt is a government monopoly and as such affords a legitimate subject for unlimited "squeezing," to the advantage of the numerous officials who control its output and distribution.

In no single instance of Chinese enterprise could steam power and western ingenuity be more advantageously applied than in the case of the salt works of Szchuan.

BRITISH COLUMBIA.—XXX.

IRON ORE DEPOSITS OF VANCOUVER AND TEXADA ISLANDS.

Special Report of Wm. M. Brewer, Traveling Correspondent.

The possibilities of extensive iron and steel works on either Vancouver or Texada Island have never been thoroughly discussed by the public press. California capitalists being impressed several years since with the importance of the iron ore deposits on Texada Island, secured a large tract of land by Crown grant from the Provincial Government. The same syndicate erected a charcoal blast furnace at Irondale in the State of Washington, and for a time manufactured pig iron of such superior quality that it was recognized by the Union Iron Works of San Francisco as the best grade of iron they could obtain. For some commercial reason the furnace was blown out, and the shipment of iron ore discontinued, but the owners of the property kept a small gang of men on prospect work for the reason, as explained to the writer, that it was their desire to determine whether this iron ore was underlaid by copper bearing ore, because on the surface there was considerable copper associated with the iron ore.

A shaft was sunk which, for the first 50 ft., passed through ore carrying low copper values; below that point the shaft was continued vertically through country rock a further depth of 100 ft.; from the bottom of this a tunnel was driven under the main body of the iron ore, and at a level of 277 ft. below any of the workings from which ore was extracted for shipment to the blast furnace. This work the writer is reliably informed has resulted in determining that a good grade of iron ore occurs on that level, the body being about 70 ft. in thickness. This is the deepest work that has been done on any part of the iron ore deposits on either of the islands. The ore is a magnetite iron ore with phosphorus below the Bessemer limit.

The location of the deposit is at salt water, where a wharf and ore-bins have been built, which are connected with the workings in the mine by a gravity tramway. This deposit of magnetite occurs between the contact of crystalline limestone and diorite. Along the line of strike the outcrop can be traced for about 1½ miles on a southeasterly direction from the main workings. It forms prominent bluffs in many places, and every indication is present that this deposit is of vast magnitude.

On the west coast of Vancouver Island, near the entrance to Barclay Sound, iron ore very similar to that found on Texada Island occurs near Sechart Landing, as well as on Copper Island, one of a group at the entrance to the Alberni Canal. These are the only two important deposits on Vancouver Island which have been prospected to any extent. Other deposits of iron ore are known in the same vicinity, the extent of which is problematical because they have not been prospected. The representative of a syndicate from Pittsburg informed the writer some time back that he estimated that there were 6,000,000 tons of iron ore in sight on Copper Island alone.

At the Sechart deposits prospecting has been carried on for the past few years, and the owners estimate a vast quantity of ore in sight. Some of this carries copper values, and the work performed during 1899 was principally for the purpose of determining whether or not the ore carried sufficient values in copper to give the property value as a copper proposition. Because of the low price of pig iron previous to last season, the discovery of copper values would prove more important to the owners than the determination of the quantity of iron ore, and because there were no blast furnaces in the Province, these deposits of iron ore have received less attention than they merited. For the manufacture of iron, copper contents in the ore depreciate its value, but the results of deep work on the iron ore deposits on Texada Island, where it has been determined that the copper values, instead of increasing, have disappeared entirely, should encourage further exploration in order to determine the quantity of iron ore in sight.

On the West Coast of the mainland of British Columbia, at the mouth of Kildella River, Rivers Inlet, which is situated about 80 miles northerly from the northern extremity of Vancouver Island, another ore deposit of magnetite occurs between granite and limestone. This ledge of iron ore is reported to be 30 ft. wide, and the limestone on the foot-wall side about 40 ft. wide. The following analyses of this ore have been furnished to the writer, No. 1 by P. C. Gilchrist and E. Riley of London, and No. 2 by Prof. Chapman of Ottawa: No. 1: iron, 69.85; manganese, traces; silicious matters, 2.75; sulphur, 0.06; phosphoric acid, traces; moisture, traces. No. 2: Protoxide of iron, 29.20; sesquiox-

ide of iron, 67.26; oxide of manganese, traces; titanitic acid, 0.17; phosphoric acid, 0.05; sulphuric acid, 0.06; insoluble silicious matters, 3.26. The average of several analyses, made by a local surveyor, gave 69½ per cent. metallic iron and 0.01 phosphorus.

When it is considered that crystalline limestone of apparently the same grade as is being so successfully used at present for flux in the Van Anda Smelter occurs in close proximity to all the iron ore deposits on the West Coast of British Columbia and the islands, and that a good grade of coke is made at the Union Mines on the East Coast of Vancouver Island, it can readily be seen that pig iron can be manufactured cheaply in Western British Columbia. If an iron industry is established in Western British Columbia, the iron plants would not be dependent entirely on coke from the Union Mine, although at the present time no coke is manufactured from the Nanaimo, the Wellington or the Extension mines, situated near Nanaimo, on the East Coast of Vancouver Island. There are also the coal-fields in the vicinity of Port McNeill on the Eastern Coast which have never yet been opened, although some boring has been done. The extent and grade of coal in these fields are problematical until they have been systematically explored. From the best information the writer can obtain, the outcroppings would appear to indicate a good grade and a fair thickness.

There are also coal-fields on the northwest coast of the island on Quatsino Sound, owned by the Hallidie Syndicate of San Francisco, which are being developed, prospecting having been carried on since the spring of 1899. Whether this coal is suitable for coking, the writer is not informed. In addition to these occurrences of coal on Vancouver Island, there are extensive fields of anthracite coal on Queen Charlotte Island, which are owned by a syndicate of Victoria, B. C. capitalists. These have not yet been opened, but reports made on them by experts indicate that the seams are of abnormal thickness, it being claimed one seam is 18 ft.

The home consumption of pig iron in Canada would not be sufficient to warrant the erection of plants for manufacturing iron and steel on the Pacific Coast, and of course the duty would operate against any large export trade to the United States, but as an offset to this duty the Canadian Government has offered a bonus of \$2 per ton for iron manufactured from native ores, and \$2 a ton for iron rolled from native pig.

Leaving both the home consumption and export trade to the United States out of the question, there remains the trade of the Orient, which is the natural field for the export of iron and steel from the Pacific Coast, and the demand in these countries is one which should be thoroughly investigated. There will be besides, in future, a trade in Russian territory for iron and steel manufacture on this coast.

When all the features relative to iron making in Western British Columbia are taken into consideration, there is no question that a very large field for enterprising iron-masters exists, which has been absolutely neglected in the past.

RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

WORK DONE UNDER ILLEGAL POSSESSION GIVES NO RIGHT OF LIEN.—Where one unlawfully ousts the owner from mining claims, and in working of same creates debts, such debts are not legal claims for liens against the property.—Idaho Gold Mining Company vs. Winchell (59 Pacific Reporter, 533); Supreme Court of Idaho.

LAW OF MONTANA AS TO RIGHT OF ACTION.—The law of Montana (Code Civil Procedure, 1895, section 494), providing that no action for the recovery of a mining claim, lode claims excepted, or for the recovery of possession of same, shall be maintained, unless it appears that such claimant or his assigns was seized or possessed of such mining claim within one year before the commencement of the action, is not applicable to real estate patented as placer ground, and hence adverse possession of such land for one year after the issuance of the patent is not sufficient to defeat the owner of the title.—Horst vs. Shea (59 Pacific Reporter, 364); Supreme Court of Montana.

EVIDENCE AS TO VALUE OF ORE TAKEN IN TRESPASS.—In an action to recover the value of ore wrongfully taken by one from another's claim, evidence is admissible of the average assay value of samples of ore taken from the side walls of the workings and from drifts immediately adjacent to same, and shown to have been of the same general character as the body of ore removed; the weight and value of such evidence to be determined by the jury. The court will not allow the trespasser to show the entire amount of ore taken out of different claims, the average work done by each man, the number of men, etc., as this would involve the trial of extensive collateral issues, as to the comparative facility with which the ore could be mined in the different workings, and its comparative richness.—Golden Reward Mining Company vs. Buxton Mining Company (97 Federal Reporter, 413); United States Court of Appeals, South Dakota.

TERMS OF LEASE, NOT CUSTOM, BIND.—A partnership agreement between N. and F. for mining coal on the lands of the former, and a lease of coal lands made at same time to the firm by the former, providing that the firm shall pay N. as royalty on said coal 40c. "for each and every 100 bushels of coal so mined, to be ascertained from the pay rolls of said firm," and the latter contract providing that there shall be paid N. 40c. "for each and every 100 bushels of coal mined and taken from said lands, as made up and taken from the pay rolls of said works," require payment of a royalty on "entry coal," which is taken out in the construction in the mine of entries or passageways, though the cost of such entries is double the value of the coal gotten out of them, and though the practice of N. before the partnership, and afterward of the firm, was to pay by the bushel for the mining of coal in the rooms and by the yard for making the entries; the number of bushels taken from the mines being deductible from the pay rolls showing the number of yards paid for to the miners.—Jack vs. Forsyth (45 Atlantic Reporter, 50); Supreme Court of Pennsylvania.

RUSSIAN PETROLEUM PRODUCTION IN 1899.

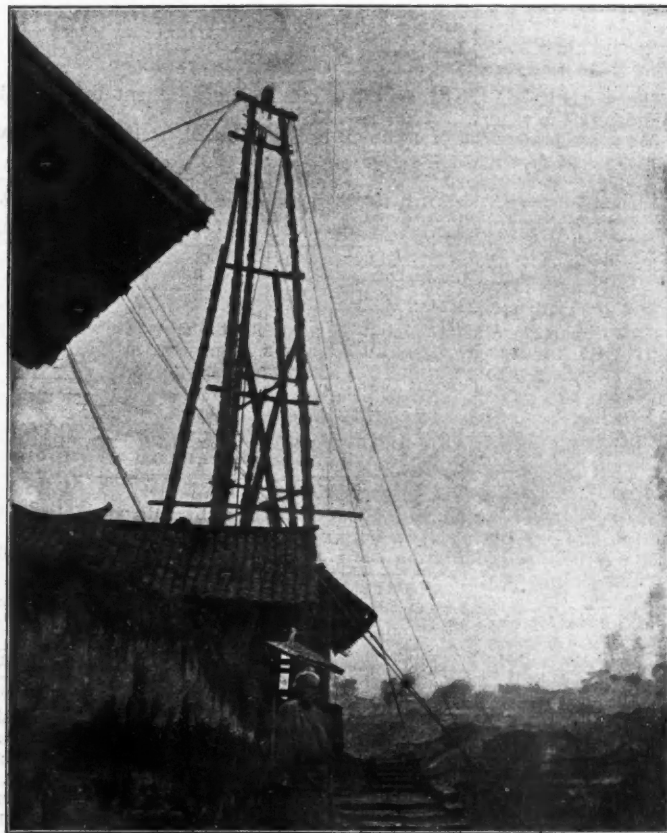
The report of Mr. J. C. Chambers, United States Consul at Baku, gives, as usual, very interesting particulars concerning the production of petroleum in that district for the year. The report says that the statistics show much more work done in 1899 than in 1898, with, however, less satisfactory results, as in 1898 the average daily production per well was 199 barrels, while in 1899 it was only 174 barrels. The increase in the daily average gross production in 1899 over 1888 was about 13,000 barrels, and, as the average number of wells producing was 212 more than in 1898, the increase in gross production per well was only 66 barrels per day, against 142 barrels in 1898. The production of the wells finished in 1899 was also much less than the production of the wells finished in 1898, as, while in the latter year the initial production of 258 wells finished averaged 653 barrels per well per day, in 1899 the production of 370 wells completed averaged only 202 barrels per well per day. This decline was principally due to the fact that there were fewer large flowing wells in 1899 than in the previous year, and can not be considered to indicate a very serious falling off in the territory, because those remarkably big flowing wells are possible at any time, and the result in 1900 may be quite as favorable as it seemed unfavorable in 1899.

Another feature of the production worthy of attention is the fact that, notwithstanding 456 wells were started drilling in 1898 and 598 in 1899, only 370 wells were completed in the latter year, and that, notwith-

standing 370 wells were completed, there were only 223 more wells producing in December, 1899, than in that month in 1898. The facts point rather conclusively to the opinion that, unless some more of the former phenomenally large wells of previous years are struck in 1900, there is little chance of much increase in the production, because the limit of drilling operations possible has probably been reached; and with nothing more than the average wells of 1899 resulting from the new work, it seems unlikely that there can be a material increase in the production in 1900.



EVAPORATING SALT BY NATURAL GAS, CHINA.



DERRICK AT SALT WELL, SZCHUAN, CHINA.

The figures for the average depth of the wells completed show only 911 ft. in 1899, against 937 ft. in 1898, and would seem to indicate that the drilling is getting shallower; but that is not the case, the decrease in the depth being due to the fact that more wells were drilled in the shallower older territory of Balakhani and Sabunchi, which wells are also smaller than wells in the newer and deeper territory.

The figures showing the loss from piping and consumption of crude for fuel at the wells give a better idea of the actual increase in production than the figures for the gross production, because the amount of crude thus consumed plays no part in the amount of production which enters into competition with the American product, and it can be readily understood that with crude the only fuel, as is the case at Baku, the increased number of wells producing and drilling increases the loss proportionately to the production unless there is a very material increase in the latter.

There is no doubt whatever that the cost of producing oil at Baku increases steadily; the expense of drilling new wells adds much to this cost, but the greatest increase in the cost is due to the increased depth from which the oil must be raised and the steadily increasing amount of water in the wells. It has been explained in previous reports that the Baku wells are not pumped in the same manner as in the

United States; that, owing to the great amount of sand always combined with the oil, the American system of pumping is impossible; that the Baku wells are worked with the bailer; but it has also been explained that the bailer used is made as large as possible. If the well is finished with 16-in. pipe, which is very commonly the case, the bailer will be as great in diameter as possible to run inside that pipe, and generally about 40 ft. long, so that it will bring up not much less than a couple of barrels at a run. The line used for running the bailer is generally a wire cable, and has to be renewed in from 6 to 9 months. With this explanation it will be understood that the deeper the well the fewer the runs of the bailer, and that with water in the wells the less oil the bailer will bring up, as the water must be kept down, or it will eventually spoil the well. From excellent authority I learn that the water is confined to no particular part of the field, but is general, varying in quantity, however, in different wells. Some wells have so much water in them that it has been found unprofitable to work them; others having less water are worked by taking a bailer full of oil from the top, another full of oil and water mixed, from the middle, and a third full of water from the bottom of the well, making three runs of the bailer for not much more than one bailer full of oil. There are other wells with still less water which can be worked by taking two or three bailers of oil to one of water. While it is said that the water in the wells comes in from the shallower exhausted oil strata it is undoubtedly salt water, very similar to the water of the Caspian Sea. The technical talent of the trade has been devoted for some years

to finding some means of overcoming this very expensive difficulty, but wholly without success. The soil at Baku differs materially from the generality of soil in the oil regions of the United States, being loose and sandy from the top to the bottom of the well, and consequently offering no solid basis for packing; even if an American packer could be inserted, the water would not be long in working around it. Attempts have been made to shut the water off by pouring into the hole outside the pipe as much liquid cement as possible, which, when hardened, answered the purpose for a time; but the water eventually found its way around the cement.

There is still another condition which must eventually add materially to the cost of production—that is, the steadily increasing royalties which must be paid for territory. Royalties at Baku are always so much per pood (36 lbs.) on the oil produced, and not, as in the United States, a proportion of the oil itself. For years the average royalty paid was not more than ½ kopek per pood (about 2c. per barrel of 42 gals.); but the higher prices realized for some years for crude have caused a very great advance in the royalty, as the Government has leased much land in the last two years at prices of from 2 to 11 kopeks per pood (8 to 46c. per barrel), and always with the stipulation that a certain amount of royalty must be paid annually, whether oil is produced or not. Much of the drilling now being done is upon this Government land, and consequently as the new wells come in the royalty increases; in a few years this item will make a great addition to the cost of producing.

The fluctuations in the price of crude at wells were confined to between 11 and 13 kopecks per pood (70 to 80c. per barrel of 42 gallons) the first half of the year, but advanced gradually till it reached 17 kopeks per pood (about \$1.05 per barrel) in November, and has remained practically at that figure up to the present. Residuum was

about 13 kopeks per pood (80c. per barrel) at the opening of the year, and remained at about that figure till July, when it commenced to advance, and reach 15 kopeks (7.7c.) in December, at which it may be quoted now. It will be seen that the highest prices for both crude and residuum were not reached until after the close of the season of Volga navigation, when, by reason of the impossibility of shipping by the Volga, the demand is greatly reduced, and residuum at least must be carried for several months till the shipping season opens; this would seem to indicate still higher prices when this season comes.

Up to the last four months of 1899 refining had for its principal object, as in the preceding year, fuel oil—residuum—as there seemed to be an almost unlimited market in Russia for that product at a good price, while the market for illuminating oils seemed to be falling off; and the price was hardly up to cost—in fact, was often below cost, and never up to a profitable figure. In the last four months of the year, however, when the advance in the price of American oil commenced to be felt, and the limit of price for residuum seemed to have been reached, conditions changed materially, and, with a high and steadily advancing price for refined oil, refining took for its principal object that product, which will be clearly seen by the following percentage statistics as to the yield of the various products for the year:

Results of refining.	Illuminat- ing.	Lubricat- ing.	Residuum.
	Per cent.	Per cent.	Per cent.
First 8 months	24.88	2.54	56.59
In September	28.08	2.23	52.78
In October	29.17	2.98	52.8
In November	31.38	3.35	48.96
In December	31.78	2.29	48.35
In the year 1899.....	26.43	2.6	54.75

The statistics of the trade are given in the excellent tables which accompany the report.

The gross production of crude oil in the Baku District was as follows, in barrels of 42 gals.:

District.	1898.	1899.	Changes.
Balakhani-Sabanchi	34,608,346	41,488,801	I. 6,880,455
Romani	12,065,839	11,831,694	D. 234,145
Bibi-Eibat	11,584,216	9,700,897	D. 1,883,319
Totals	58,258,401	63,021,392	I. 4,762,991
Wasted and consumed for fuel.....	4,858,724	6,883,969	I. 2,025,245
Net production	53,399,677	56,137,423	I. 2,737,746

The proportion wasted and used as fuel at the wells was 10.9 per cent. of the total production in 1899, and 8.3 per cent. in 1898.

The shipments from Baku for the year were, in gallons:

	1898.	1899.	Changes.
Illuminating	473,206,000	515,835,000	I. 42,630,000
Lubricating	52,105,000	57,015,000	I. 4,910,000
Residuum	1,211,805,000	1,224,305,000	I. 12,500,000
Crude	219,460,000	121,430,000	D. 98,030,000
Totals	1,956,575,000	1,918,585,000	D. 37,990,000

Of these shipments from Baku in 1899 those by rail were 416,460,000 gals., or 21.7 per cent.; by sea, 1,502,125,000 gals., or 78.3 per cent.

The shipments of oil from the Black Sea ports in 1899 were as follows, in gallons:

	Batum.	Novorossisk.	Totals.
Crude and residuum	11,765,920	8,201,100	19,967,020
Lubricating	38,736,375	38,736,375	77,472,750
Distillate	34,322,790	4,878,710	39,201,500
Refined	285,517,790	38,285,575	323,803,365
Totals	370,342,875	51,365,385	421,708,260

Concerning transportation, the report says that the export of Russian oil continues to be limited by the transportation facilities from Baku to the Black Sea. There are now two routes of shipment to the Black Sea, the first and most important being the railway from Baku to Batum direct, and the second by Caspian Sea to Petrovsk, and thence by the Vladikavkas Railway to Novorossisk. The latter route is much longer and necessitates transshipment from vessels to tanks at Petrovsk, and then from tanks into tank cars; consequently there must be greater loss than by direct shipment in cars to Batum. There is also a difference in the cost of transportation in favor of Batum, as the total freight to Novorossisk is about 22.6 kopeks per pood (11.6c. per 36 lbs.), against 16 kopeks (8.24c.) per pood from Baku to Batum; but this difference is considerably reduced by certain advantages given shippers by the Novorossisk route in excise allowance, so that the actual difference in favor of Batum is not more than 4.5 kopeks (2.3c.) per pood.

The object of the 8-in. pipe line for refined oil, under construction from the station of Mikhailova, on the Baku-Batum Railway to Batum, is to increase the capacity of the railway, the idea being to carry refined in tank cars from Baku to Mikhailova, and pump it thence to Batum. This will shorten the tank-car haul the distance from Mikhailova to Batum (143 miles) and return, and, as that section of the railway is the most expensive to operate, because of the very heavy grades over the mountains, the saving in time and expense should be considerable; as to how much it will increase the capacity of the railway, opinions seem to differ.

The money for this pipe line was appropriated five years ago, when it was stated that the line would be ready for operation by the end of 1897. In the last report Mr. Chambers stated on good authority that the line could not be a factor in the transportation from Baku to Batum before the beginning of this year, and he now adds to that the assurance that the use of the line can not take place for another three or four months from date. The line was tested with water within the last few weeks and found satisfactory, but now it has been decided not to commence the use of it until a number of self-closing valves can be placed in it for the purpose of protection against loss by breaks. From the top of the mountain, which is only a few miles from Mikhailova, there is a steady fall to Batum of probably more than 2,000 ft., so that without some preventative, in case of a break in the line near Batum, all the oil between the summit and the break would be lost; hence the idea of self-closing valves at intervals in the line.

THE GEOLOGICAL POSITION OF TRANS-MISSISSIPPIAN COALS.

Written for the Engineering and Mining Journal by Charles R. Keyes.

From the geological maps one gets but faint idea of the actual deposition and relations of the coal seams found in the great Western Interior Coal Basin. A consideration of the mine locations gives an equally vague conception of the stratigraphical horizons which furnish the chief coal output. The perusal of the general literature of the region does not help matters very much, so far as establishing relationships between the various coals is concerned. Recent work in Trans-Mississippian coal-fields has done much to relieve the uncertainties that have so long existed regarding the stratigraphy of the coals. Of late, as the special investigation has gone on, the subject has ramified in many directions, and has developed great interest in phases that were scarcely thought of before. In the present connection attention is briefly called to a single one of these many considerations—that of the stratigraphical position of seams that now, and that are in the future likely to, furnish the coal supplies of this great basin.

The generally ascribed area of the Trans-Mississippian or Western Interior Coal-field is 90,000 square miles. The rocks of this vast tract have been commonly spoken of as the Coal Measures. Stratigraphically the term covers the interval between the Lower Carboniferous Limestones—the Mississippi series of more recent writers—and the uppermost Carboniferous or Oklahoman series—the so-called Permian beds.

The earlier geologists subdivided the coal measures of the region into Lower and Upper groups, or sometimes into three members, the third one being termed the Middle. In the several States the division lines were not the same. In a general way, the Lower coal measures were regarded as the productive portion; while the Upper coal measures were considered as barren. In the main this idea prevailed for a long time, though from time to time coal seams were found at different localities in the so-called barren coal measures. This condition of affairs continued until quite recently, when a new consideration of the coal-bearing formations was taken up almost simultaneously by the geological bureaus of the four States that were most largely possessed of the coal-bearing formations. As a result of these special investigations, vigorously prosecuted, a vast amount of information has accumulated. Some of the facts have already found their way into print; but the great mass of them still remains to be published.

Not the least important of the fundamental results attained in conducting the recent geological work in the Western Interior coal-fields has been the establishment of a scheme of classification of the terranes, or geological formations, making up the coal measures, that is sufficiently broad, elastic and practically applicable to fit the entire coal-field. Its major divisions are as follows:

Carboniferous System.	Thickness—Feet.
Oklahoman Series:	
Not here differentiated.	
Missourian Series:	
Cottonwood limestones	10
Atchison shales	500
Burlingame limestones	30
Platte shales	150
Plattsmouth limestones	50
Lawrence shales	300
Stanton limestones	35
Parkville shales	100
Iola limestones	50
Thayer shales	75
Bethany limestones	100
Des Moines Series:	
Marais des Cygnes shales	200
Henrietta limestones	100
Cherokee shales	275
Mississippian Series:	
Not here differentiated.	

The terranes being the stratigraphical units, are the chief subdivisions to be regarded in the present connection. They all appear to be well defined throughout the coal-field. Over a greater part of the area the more resistant members—the limestones—form more or less prominent topographic features. In this role they appear as conspicuous ridges or eastward-facing escarpments, running with many minor sinuosities nearly parallel to one another, and separated by the lowland valleys which are worn out on the softer shales. In consequence, the individual layers of the latter are usually so covered with talus and other rock waste, and so easily weathered and converted into mixed clays and soils, that there is small chance for the shales to crop out. On the whole, the different formations are remarkably well outlined on the surface of the ground, and the stratigraphical bearings of any particular locality are readily made out with ease and confidence.

The layers of this area occupied by the coal measures are, with some minor exceptions, tilted toward the west, and are now beveled. Deformation has not yet been sufficiently marked to change this general arrangement, except perhaps at the extreme southern extremity of the great coal-fields, where the Ouachita mountains cross. Nowhere else is the lenticular character of strata and terranes better shown than in the coal measures. Inappreciation of this fact has led to great over-estimations of the actual thickness of the coal measures as a whole, and in its several parts. This error will be largely overcome when it is more carefully considered that the various formations form a series of limited, interlocking lenses, instead of continuous sheets of nearly uniform thickness over their entire extent. The slightly tilted and beveled beds, as we find them in the district under consideration, present phenomena comparable to the shingled roof of a house. If along the surface the thickness of the various outcropping strata were measured successively and then added together, a very different result would be obtained regarding the thickness than if the measurements were made in a boring. In the case of both the shingles and the tilted strata there would be enormous overestimates of values. That this is really so in regard to strata was recently shown in Central Iowa, where a test cross-section was made under very favorable conditions. The added surface measurements gave a figure three times as great as actual borings.

There are in the so-called coal measures, composing what the geologists of the region now term the Des Moines and Missourian series, seven distinctive shale formations, separated by extensive limestones. All of these seven terranes carry coal to some extent, though in several the amount is so small that it may be neglected altogether, for it is no greater than is found in almost any geological formation. None of the last named have any claim to the title of coal-bearing strata.

One important feature which has been clearly brought out by the recent investigation is the fact that the great workable coal bodies of the Trans-Mississippian Region are definitely limited in their stratigraphic extent. By this great restriction in geological range of the coals as compared with that formerly supposed, the figures for the actual available tonnage are, perhaps, not so much affected as are the figures for the areal extent of the district that can now be regarded as a possible producing field.

To present the proposition more clearly, we may tabulate the coal production of the entire region according to the percentages, in each State, that each geological formation, or terrane, supplies.

Terrane Percentages of Coal Production.

	Iowa.	Mo.	Kansas.	Ark.	Ind.	Ter.	All.
Missourian series:							
Atchison shales	0.2	...	...	...	...	...	...
Platte shales	...	...	6.0	...	...	...	1.2
Lawrence shales	...	...	0.3	...	...	...	...
Parkville shales	...	...	...	...	...	...	...
Thayer shales	...	...	0.2	...	...	...	...
Des Moines Series:							
Marais des Cygnes shales	1.0	0.1	0.8	...	...	...	0.4
Henrietta formation	15.4	18.5	0.2	...	...	...	7.0
Cherokee shales	83.4	81.4	92.5	100.0	100.0	...	91.4

It appears somewhat startling that from the Cherokee Division alone should come nine-tenths of the total coal output. Yet this is about the proportion that it will continue to supply in the future. If anything, the Cherokee percentage will increase, rather than diminish, as the Henrietta coals come from a single seam. At least, there appears to be only one seam in a locality belonging to the Henrietta, but it is not believed that it is everywhere the same continuous bed. At present, however, this median member of the Des Moines series furnishes about 7 per cent. of the total supply. The coal of the Henrietta Division lies everywhere very near the base of the formation. Hence if we should take a few feet of this terrane and add it to the Cherokee, we would have practically 98 per cent. of the entire Trans-Mississippian output of coal coming from the lowermost member of the coal measures—the Cherokee shales.

It is a noteworthy fact that south of the Boston Mountains the coal measures thicken enormously, and the coal horizons, instead of being near the base of the series, are high above the Mississippian limestones. This is believed to be explainable on the theory that a very considerable part of the Arkansas and Indian Territory coal measures are by depositions unrepresented north of the southern boundary of Missouri. In the northern portion of the field the great erosion unconformity, which everywhere is found at the base of the Des Moines series, probably represents the time when, in the south, deposition was going on. This great sequence in Arkansas lying below the horizon of all of the Cherokee, as displayed north of the Boston Mountains, is perhaps sufficiently important to receive a taxonomic rank equivalent to the Des Moines or the Missourian. The exact upper limiting horizon of this great Arkansan series is not as yet determined.

The thickness of the Cherokee shales may be taken to be about 300 ft. From this measurement it tapers out eastwardly to a feather edge. If the total thickness of the coal measures (Des Moines and Missourian series) north of Arkansas are taken at 2,000 ft., the basal one-seventh furnishes 98 per cent. of the whole output.

The thickness and areal extent of the coal beds is of special interest. The more extensive beds are generally 4 to 5 ft. thick, occasionally running up to 6 ft. This measurement prevails quite uniformly over sometimes many hundreds of square miles. There is apparently at least one or two such seams in nearly every district occupied by the Cherokee. The Pittsburg seam of southeast Kansas, the Bevier coal of north-central Missouri, the Wapello and Des Moines seams of Iowa are all generally regarded as having very considerable geographic extent.

On the other hand, the regular coal-beds may form all sizes of basins down to those which still preserve their 5 or 6 ft. of thickness, but consist of long, narrow deposits, having lenticular cross-sections, not over 600 to 900 ft. in transverse measurement. The Mammoth bed of Henry County, Missouri, is a good example of this kind. Another deposit of similar character, but of much greater areal extent, is found in Marion County, Iowa, and is 11 ft. thick.

There is another class of coal deposits that excites great wonder. These are the pockets at the base of the coal measures. They occupy old erosion gorges in the underlying limestones. Those of central Missouri are the most notable. In the Missouri Valley Mine, near Boonville, the coal seam is not less than 25 ft. thick, but is located in a trough scarcely 120 ft. across. In a similar way the Mammoth and Mastodon mines in Callaway County have the coal-bed over 60 ft. in thickness. A somewhat larger deposit near Versailles, Morgan County, is at least 50 ft. thick, and it is claimed that drillings showed 80 ft.

Erosion troughs filled with coal also occur high up in the Cherokee shales. One near Redrock, Iowa, contains a coal seam 6 ft. thick centrally, thinning out laterally to feather edges, which rise 50 ft. above the central part. The trough is not more than 100 ft. across.

From the foregoing it is not to be inferred that outside of the Cherokee shales there is to be found no valuable coals. Many of the higher and thinner seams will long continue to supply local needs and furnish limited quantities for shipment. The Nodaway coal in southwestern Iowa furnishes a very considerable proportion of the coal used in several counties. The Osage coals in east-central Kansas are the basis of an important mining industry. But the main consideration is that the coal supplies from the Trans-Mississippian field exist stratigraphically about as the percentages given in the table.

WATER AND FUEL ECONOMY IN STAMP MILLING.

Written for the Engineering and Mining Journal by A. W. Warwick.

Economy of water is so essential to mining in the arid zone of Arizona and Southern California that the efficiency of the water-saving apparatus frequently determines the success or otherwise of the entire operations. The result of this condition is that ore milling is conducted with seemingly impossible quantities of water. The successful introduction of oil engines has largely assisted in effecting this necessary economy. Many engineers figure that a 10-stamp mill will require about 800 gals. of water per hour, or about 1 1/4 miners' inches, when the water is allowed to run off with the tailings. An effective system of water saving will reduce the amount required by 75 per cent.

As the fuel question is of nearly equal importance with the water problem in the desert, the motive power requires careful attention. Most of the desert mills are small and the efficiency of the motive power where steam is adopted, is anything but good. In the Old Dominion Mill in San Bernardino County, California, of five stamps, using a locomotive boiler and an engine with throttle governor, the writer found that the consumption of coal was about 1,500 lbs. per shift of 12 hours, and the water consumption 1,400 gals. for the same time, or about 8 1/3 lbs. coal and 7 1/2 gals. water per horse-power hour. As the engineer in charge of the mill was a very competent man, these figures may be taken as typical of the smelter mills.

At the Matterhorn Mine, in the southeast corner of the Mojave Desert, the writer has obtained some facts and figures on the minimum amount of water that will supply a 10-stamp mill. The amount of water required was surprisingly small and the purity of the water returned to the battery exceeded the most sanguine expectations.

It was originally intended at this mill to use spitzkasten, only, for the water-saving apparatus. The spitzkasten work very well where



MATTERHORN MILL, SAN BERNARDINO COUNTY, CAL.

only a small portion of the water used is to be recovered; in no case did the saving exceed 45 per cent. in our tests of the spitzkasten alone. In the first tests the so-called siphon discharge was used, but in this case, in order to prevent clogging the effluent slime, must contain not less than 80 per cent. of water. We replaced the siphon by an adjustable gate, and this worked admirably for a while, giving slimes of any desired consistency. The coarse sands bothered us considerably, so a sand box was placed before the spitzkasten to relieve the latter. The result of this arrangement was that the spitzkasten regularly delivered its slime and the final saving of water averaged nearly 80 per cent.

The following table shows the result of a month's run. The greatest possible attention was given to the water-saving apparatus during this time. It may therefore be taken that the figures given are the best possible with arrangement adopted:

Week.	Water supplied, gals.	Hours run.	Water per stamp per hour.		Per cent. recovered.
			Using once.	Actually used.	
1	13,154	82	80	16.0	80.0
2	16,760	89	95	22.2	76.8
3	15,487	81	93	19.1	79.4
4	14,850	80	92	18.5	79.8

The character of the ore crushed and the products from sand boxes and spitzkasten, together with percentages of water, are shown in the following table:

Water in product	From cop-	Sand	Spitz-
	per-table.	box.	kasten.
	Per ct.	Per ct.	Per ct.
Screen mesh:		29.8	50.1
Through 30 and on 40	0.41	1.60	....
Through 40 and on 80	9.55	18.90	....
Through 80 and on 100	19.58	15.38	3.20
Through 100	78.75	63.35	96.30
Total	99.29	99.23	99.50

As nearly as could be estimated, the sand boxes saved four-fifths of the crushed rock and the spitzkasten one-fifth. The amount of rock crushed per 12-hour shift was 17 1/4 tons, or 497 tons for the whole month.

During one month, careful measurements of water supplied to the mill were made. It was found that 80 gals. of water per stamp per hour were required by our most quartzose ore, when the water was used but once. The most clayey ore required 95 gals. water. The ore consisted of a highly kaolinized porphyry, with but a small amount of pyrites. The ore was crushed to 30 mesh screen; drop of stamps, 6 in.; discharge, 7 in. high; order of drop, 1, 3, 5, 2, 4.

From these figures, which are close approximations, it will be seen that the average percentage of moisture in the tailings was 33.86 per cent. and that the amount of water thus lost was 40,403 gals. for the month. The total water sent to the mill during the same time was 60,251 gals.; there is, therefore, a loss apparently unaccountable. It may be taken that the 20,000 gals. deficiency are due secondarily to errors in estimating and in leaks, but primarily to evaporation. The loss by evaporation may be judged by the fact that a tank 10 by 6 ft. area lost in 24 hours 1 in. in depth by evaporation, and on windy days more than twice that amount.

The sand boxes used were 4 ft. wide by 10 ft. long by 3 ft. deep, and the spitzkasten were 6 ft. wide by 10 ft. long by 6 ft. 6 in. deep. It was found that, in order to settle the slimes thoroughly, the delivery of slime and water to the spitzkasten should not exceed 92½ gals. per foot of width per hour. A convenient figure for estimating may be taken as 100 gals. of slime per foot of width. Then two of the above spitzkasten are required for a 10-stamp mill running continuously, the slime being divided between them. It is convenient, however, to have a third spitzkasten to provide for contingencies. A sand box of 4 ft. width and with any desired depth and length, should be provided for each spitzkasten.

As the amount of water sent to the mill for the month referred to would have barely supplied the boiler had a steam plant been adopted, it can be easily seen how important it is to select the right motive power. This mill was actuated by an oil engine, which gave entire satisfaction. It is very necessary, however, in using an oil engine for stamp milling purposes, to have an ample margin of power, and to have a competent man to run it. It is not safe to run an oil engine continuously to its limit of power, nor can any roustabout successfully handle it. The engine used is the Fairbanks-Morse of 34 brake H. P., and it gives absolutely no trouble. The water used for cooling the cylinder was used continuously and required 55 gals. per 12-hour shift to make up loss by evaporation. The fuel used is "Puente" distillate of 45° and is not only cheaper than gasoline but is safer and less is required. The cost of this distillate is 10½¢ per gal. at the mill in carload lots. A number of tests were made of the power required to operate a 10-stamp mill and the mean gives the following figures:

Ten stamps, 850 lbs., 6-in. drop, 90 per minute.....	Horse-power.
7 by 10-in. Rock-breaker and elevator, 25-ft. lift.....	17.85
Two 6-ft. vanners.....	4.95
All friction.....	2.50
Total.....	30.60

The power required for 10 stamps of above weight, etc., according to the usual formula is 11.6. The lost power, due to friction of cam shaft, tappets and cam and of guides, etc., is, therefore, 6.25 H. P. The average power consumed for all machinery is 27 H. P. average for the whole shift. The rockbreaker was only run for a portion of the shift. The fuel consumed during the run was 741 gals., which works out at 0.085 gals. distillate per horse power per hour, costing 1.74c. The fuel economy is, therefore, excellent as compared with small steam engines. The labor required is almost nil. The engineer also attends to the plates and battery. An engineer and helper are the entire labor required to run the whole mill, including the attention necessary at the slime and sand boxes.

Taking all points into consideration a desert mill, in spite of water economizing, can be run very cheaply and there is no doubt that the use of oil engines has very largely contributed to this result.

ABSTRACTS OF OFFICIAL REPORTS.

Girard Estate Collieries, Pennsylvania.

The Girard Estate, which is held in trust by the City of Philadelphia, includes a large tract of coal lands in the anthracite region of Pennsylvania. The collieries on this tract are not worked by the Estate directly, but by lessees. During the year 1899, which is covered by a report just issued, there were thus operated 10 collieries and three washeries, the latter being engaged in working over old culm or waste piles. Only one of these washeries, however, shipped coal during the year, the other two being engaged in putting in new machinery and making preparations for future work. The coal shipped to market during the year from all the workings on the estate was as follows, in long tons:

	-1898-		-1899-		Changes, Tons.
	Tons.	Per ct.	Tons.	Per ct.	
Lump	36,726	1.29	12,294	1.01	D. 4,492
Steamboat	60,046	5.00	42,794	3.52	D. 17,252
Broken	120,543	10.04	141,985	11.69	I. 21,442
Egg	138,730	11.55	139,351	11.47	I. 621
Stove	205,892	17.14	194,947	10.04	D. 10,945
Chestnut	275,106	22.90	274,804	22.61	D. 302
Total large sizes.....	817,043	68.02	806,105	66.34	D. 10,938
Pea	151,092	12.58	159,137	13.10	I. 8,045
Buckwheat	216,593	18.03	212,735	17.51	D. 3,858
Rice	16,456	1.37	37,052	3.05	I. 20,596
Total steam sizes.....	384,141	31.98	408,924	33.66	I. 24,783
Total shipped	1,201,184	100.00	1,215,029	100.00	I. 13,845

In 1899 the coal consumed in operating the collieries was 188,051 tons, bringing the total mined up to 1,403,080 tons.

The record of shipments kept by the estate, covering a period of 37 years, is probably the most complete of any in the anthracite region. The tables given form an interesting record of the changes in the

sizes saved in preparing the coal for market. In the table below we give this statement, taken at intervals of five years, from 1864 to 1899:

	Large Coal.		Chestnut.		Pea.		Buckwheat.		Rice.		Totals, Tons.
	Tons.	P. c.	Tons.	P. c.	Tons.	P. c.	Tons.	P. c.	Tons.	P. c.	
1864.....	106,177	90.1	11,648	9.9	.....	.....	.....	.....	.....	.....	127,825
1869.....	427,153	86.7	55,154	11.2	10,337	2.1	.....	.....	.....	.....	492,644
1874.....	791,831	81.8	111,776	11.6	64,000	6.6	.....	.....	.....	.....	966,607
1879.....	1,221,127	75.3	212,377	13.1	185,662	11.4	3,582	0.2	.....	.....	1,622,750
1884.....	979,702	69.7	167,251	11.9	177,244	12.6	82,319	5.8	.....	.....	1,406,516
1889.....	841,232	65.1	179,290	13.9	182,883	14.1	89,103	6.9	.....	.....	1,292,508
1894.....	749,500	53.6	281,807	20.2	155,452	11.1	211,505	15.1	.....	.....	1,398,264
1899.....	531,301	43.7	274,804	22.6	159,137	13.1	212,735	17.5	37,052	3.1	1,215,029

The report of Chief Engineer Heber S. Thompson says: "The average royalty received upon the 1,403,080 tons of coal produced was 30.22c. per ton. The average royalty taken upon the 1,215,029 tons was 34.89c. per ton. Upon the 1,190,814 tons of freshly-mined coal shipped by collieries, not including washeries, the average royalty was 35.34c. per ton. Upon the 24,215 tons of coal obtained from the culm banks and shipped by the washeries, the average royalty was 12.76c. per ton.

"The coal shipped to market in the 37 years of the operation of the collieries under mining leases from the city of Philadelphia, Trustee under the will of Stephen Girard, from 1863 to 1899, inclusive, has been 37,795,002 tons.

"The small coal consumed in operating the collieries and washeries in 1899 was 188,051 tons, equal to 15.48 per cent. of the coal shipped to market. Taking the mining leases separate from the washeries, the coal consumed in operating the former was 15.71c. per cent. of the shipment to the market. The largest percentage of its shipment consumed in operating by any colliery in active operation was 22.82 per cent.; the smallest, 10.26 per cent. There were 6¼ miles of new gangway opened during the year 1899, against 4 miles in 1898, and 5¼ miles in 1897. For the first half of the year the collieries averaged but half time. During the last six months full three-quarter time was made.

"Two underground fires occurred, one in Packer No. 3 Colliery, which was discovered and extinguished before it had obtained any great headway; the other in Kehley's Run Colliery, a more serious fire, and only extinguished after a courageous and persistent hand-to-hand fight of four days and nights.

"The usual care has been given to the protection of the mountain lands from forest fires and to the cultivation of a second growth of forest timber. Notwithstanding the maintenance of a forest patrol and exercise of every precaution, forest fires ran over some of the lands in April and May, and destroyed young growing timber estimated to be worth \$9,967. There were 31,500 seedlings of Scotch pine and white pine planted.

"On March 1st, 1899, a lease of the Girard Colliery culm banks was made to W. R. McTurk & Co., B. F. Bertolet, the former lessee, surrendering his lease January 1st, 1897. On May 17th shipments were suspended, pending the making of improvements for the better handling and preparing of the material. An addition was made to the main washery building, 26 by 56 ft., and the machinery of this building was re-modeled and enlarged. The shaking screens were lengthened and made double platform instead of single, jiggling machines were rebuilt, additional machines were put in, and independent engines erected to run the jiggling machines. A new building was erected 300 ft. north of the main building, and equipped with engines, breaking rolls, and screens for the preliminary preparation of the coal from the banks. In this building, to which all the material is first carried, the slate and fine refuse are removed, and the coal is broken to a size not exceeding that of broken coal. From it the coal goes to the main building, where the large coal is rebroken and all the coal is sized and recleaned. A line of heavy scrapers carries the material from the banks to the preliminary cleaning building; another line of scrapers, 300 ft. long, carries away the slate and refuse, and a third, 325 ft. in length, carries the coal partially prepared to the main building for final breaking, sizing and cleaning.

"The quantity of coal shipped daily is 250 tons, but it is expected that this will be increased to 500 tons. The shipments to market this year is 24,215 tons. The proportions of different sizes made were as follows: Chestnut, 7.39 per cent.; pea, 27.13 per cent.; buckwheat, 41.92 per cent.; rice, 23.56 per cent."

Nundydroog Company, India.

The report for 1899 of the Nundydroog Company, Limited, operating the mines of that name in the Colar District, Mysore, India, shows that the company is recovering its property, which was temporarily checked by the flooding of the workings in 1898. Like the other mines in the same district, the Nundydroog has suffered considerably during the past year from scarcity of labor due to the plague, and a good deal of extra expense has been incurred from the same cause, chiefly in providing new habitations for the native workmen. The superintending engineer, Mr. Thomas Richards, deserves special credit for his excellent management of the mine during two trying years.

The total gold produced was 43,654 bullion ounces, which realized £164,114. The tons stamped were 35,200, yielding 37,916 bullion ounces; 4,630 tons of tailings, treated in amalgamating pans, yielded 575 bullion ounces, and 46,047 tons of tailings were treated in the cyanide plant with a yield of 5,163 bullion ounces. The treatment of tailings by the amalgamating pans was abandoned in June, and a month later the additional cyanide plant, increasing the capacity from 3,000 to 5,000 tons per month was brought into use.

The production per ton has been slightly higher than in the previous year. The plant has not been working to its full capacity, nor has so much ore been treated as in 1897, for the two reasons already mentioned. The development of the mine has steadily proceeded, and the ore reserves stand at practically the same figure as a year ago. It is anticipated that if no unforeseen circumstances arise the production for the current year will show an increase, and that exploration and development will yield good results. The amount realized by the sale of the gold produced, were, as already mentioned, £164,114, while the expenses amounted to £88,000. Out of this profit a sum of £72,600 has been paid as dividend, being equal to 30 per cent. on the capital of £242,000.

MINING VIEWS IN CUBA.

The accompanying views are from photographs taken recently near Santiago, in the Island of Cuba. This province is the region where most of the mineral resources of the island seem to be concentrated, and where the only mining operations of importance have been undertaken.

No. 1 shows the Ponupo manganese mines, 24 miles northeast of the city of Santiago de Cuba. The deposit is a blanket formation covering the tops and slopes of a series of low hills. The ore lies in a clay matrix. It is mined in open cuts, and washed in log-washers. The present output is about 100 tons of clean ore per day of 10 hours.

No. 2 shows the working face of the East Mine of the Juragua Iron Company, which is the oldest and most important company now operating in Cuba.

No. 3 shows the ore shipping pier of the Juragua Iron Company, Limited, at La Cruz, on the Bay of Santiago. The mines are connected with this pier by a narrow-gauge railroad, 20 miles in length.

No. 4 shows the Lola Mine, owned by the Spanish-American Iron Company, which is now extending its operations.

The iron mines of Cuba are all in the Province of Santiago de Cuba. Numerous mining concessions have been granted, divided into some 16 groups, named respectively from the towns around which they center. Three are being worked by the Juragua Iron Company. This concern has undertaken operations of importance in the mines named

THE TRANSVAAL MINING INDUSTRY FOR THE SECOND HALF OF 1899.—VII.*

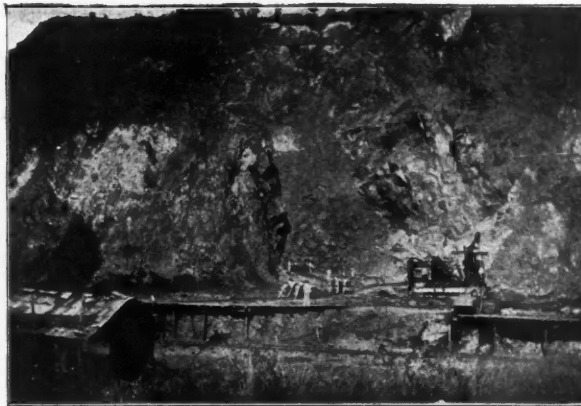
Special Correspondence of the Engineering and Mining Journal.

(Continued from Page 496.)

Continuing the report on the Rose Deep Mine, which is now operated by the Government officials, the condition of the mine machinery and the mill is further given.

Chief Engineer de Kat reports that at shaft No. 1 there is a direct-acting compound hoisting engine with Corliss gear, and cylinders 16 and 28 by 60 in., and a single-drum direct-working hoist with 18 by 48-in. cylinders; both were in good condition. The air compressor is a vertical compound King-Riedler, the steam cylinders being 19 and 30 by 42 in. The compressor worked very badly as the valves were not in good condition. The pumping engine was a horizontal tandem compound with a Corliss gear. There was also an Ingersoll-Sergeant compressor with a horizontal engine, which was found to be in fair order. The horizontal engine used to run the dynamo was in bad condition. In the boiler house there were 6 horizontal tube boilers set for outside firing, which were generally in bad condition, and required cleaning and patching.

At shaft No. 2 there was a hoisting engine with cylinders 18 by 36 in., which was in fair condition; a horizontal compound engine driv-



1. PONUPO MANGANESE MINE, CUBA.
3. ORE PIER, JURAGUA IRON COMPANY.

2. WORKING FACE EAST MINE, JURAGUA IRON COMPANY.
4. LOLA MINE, SPANISH-AMERICAN IRON COMPANY.

Juragua, not only as regards the mining itself, but also in the transportation of the mineral to the coast and the shipment of the ore at the wharves. For this purpose a railroad, several bridges and extensive wharves have been constructed. The success attained by this company, whose output, from 21,798 tons in 1884, to nearly 350,000 tons in 1893, stimulated other enterprises in the district of Santiago de Cuba.

A number of other corporations have been organized by foreign capital, notably the Spanish-American Iron Company, which has undertaken the building of a railroad of 6 km. length to the mouth of the Daiquiri, and the establishment by dredging and other works, of an artificial port at that place, and the Sigua Iron Company, which has begun the working of several mines in the group of Arroyo de la Plata. The total exportation of iron ore from Santiago, since the mines were opened in 1884, has been upward of 3,000,000 tons.

Manganese also is extremely abundant in Santiago de Cuba; numerous claims for the mining of this material have been located, and a few of them put into operation. At Alto Songo veins of manganese dioxide (pyrolusite) are developed to a considerable extent in red jasper and metamorphic formations. The mineral sites of Santa Margarita, Isabelita, Bostoyo and other localities, have revealed important deposits, though but slight effort has been given to develop them. The most notable workings at the present time are those of Cristo and of Ponupo.

COAL IN ABYSSINIA.—A report from Addis Abeba states that an important discovery of coal has been made at a place named Debrilbanons, in the Emperor Menelik's dominions. The coal is said to be of fine quality.

ing a Cornish pump which had 11 and 17 by 23-in. cylinders, and was also in fair condition, and 3 horizontal tubular boilers which were found to be very dirty. In the crusher house the machinery is driven by a horizontal Corliss engine, 18 by 39 in. The valves here were worn out. The 3 Comet crushers needed repairs, and the sorting table also had to be repaired.

The stamp mill engine is a horizontal tandem compound with cylinders 24 and 44 by 54 in. A simple engine with 48 by 54 in. cylinders is kept as a reserve. Both engines were in fair order, but needed general overhauling. In the engine room also there is a Riedler compressor with steam cylinders 23 and 37 by 48 in., and air cylinders 23 and 36 by 48 in. This was in good order with the exception of the breaking of some of the inlet valves. In the main mill the cam shaft bearings for the stamps required overhauling, with some minor repairs, and several of the ore feeders were broken. The copper amalgamating plates were not in good shape, and several of the mortars had to be relined.

The transmission of power from the mill to the crusher house was by shafting and wire-rope drive. This had not been repaired or overhauled for some time. The Government engineer criticises the arrangement of power for the reason that if the mill is stopped the crusher house is also stopped. This hardly appears reasonable, and, in fact, is not true. The only stoppage which would affect both mill and crusher room is that of the engines in the main engine room, and this is hardly likely, as there is always an auxiliary engine in reserve. As

*Previous papers in this series have appeared in the "Engineering and Mining Journal," March 10th, 1900, page 287; March 17th, page 317; March 24th, page 347; March 31st, page 377; April 7th, page 436; April 28th, page 496.

long as the engine runs, the crusher house can be run as well as the mill. The pulley which drives the power rope is run from the main shaft, and the connection is made by a friction clutch, so that the crusher house can be kept at work while the mill stopped, and this is frequently the case. The mill can also be run while the crusher station is stopped; and, in fact, this is the case regularly, as when the mine was fully at work the mill was run 7 days a week and the crusher house only 6 days. Toward the end of each week the ore storage in the mill bins was run up to its fullest capacity, or about 1,200 tons of ore, which represents about a day's supply for the mill.

The objections to centralization in mine management which are made in the chief engineer's report also seem uncalled for. The centralization of power under conditions which prevail at most of the Rand mines means economy in first cost and in working. For instance, there are very few of the mines which do not have more than one shaft, and if there is no central station there must be a crushing and a sorting station to each shaft. This would, moreover, imply a greater height and greater expense for the head-gear, with probably quite as much cost for haulage plants as under the present arrangement. The Rose Deep head-gear is only 66 ft. high above the collar of the shaft. If the sorting house had been attached directly to the shaft it would be necessary to make the head-gear at least 100, and probably 125 ft. high, while the crusher house would have been very much in the way. The haulage under the present arrangement from the shaft to the crusher house is not a difficult or expensive matter, while the location of the crusher house away from the shaft gives more room and permits a much better arrangement of the machinery. All these points are to be considered, and it may be added that the expense of running a sorting table to serve several shafts is very little greater than that for running one for a single shaft.

To resume the summary of Mr. de Kat's report, he notes some minor damage done to the mill engines which required the fitting of new keys and the making of some new gear wheels and couplings. The rope drive from the main engine to the extractor house was not in good condition, the distance being really too great, and a change was made by using an engine found in the works, and not in use, to run the machinery in the extractor house. This has the drawback that it has been necessary to carry a steam pipe a distance of 275 m., causing a good deal of loss of steam. The centrifugal pump in the extractor house required extensive repairs.

The mill boilers were in good condition, except that they needed cleaning. The repair shops were in good order, but the material had been generally used up. The signaling arrangement for the mine required some new wires and new batteries.

A supplementary report refers to the carelessness with which the mine plans had been prepared. This, however, has already been covered in the general statement of the mine surveyor. A full inventory of the property found at the mines, including all machinery, is included in the chief engineer's report.

MINE DAMS.*

By James McNaughton.

The necessity for building mine dams throughout the iron district of Michigan has been of frequent occurrence. Especially has this been true at the Chapin Mine, where the principal shaft is located in the limestone, and where the greater part of the cross-cutting to connect this shaft with the ore body is through limestone. During the sinking of the Hamilton shaft, no water of any importance was encountered until a depth of 1,460 ft. was attained, when a large water course was tapped which filled the shaft to within 80 ft. of surface in less than 36 hours.

The Ludington Mine, adjoining the Chapin, encountered water in one of the lower levels near the limestone, which entirely flooded that mine. After these two mines had been flooded for two or three years, they were bailed out, when it was found that the inflow was no greater than that previous to their flooding. This fact would indicate that the flow causing the flooding was from a large vug or reservoir, and that when it was exhausted the inflow became normal.

In the first cross-cut from the Hamilton Shaft to the Chapin ore-body, which is 750 ft. from surface, a water course was encountered, at a point south of the shaft in the limestone. This water, when first struck, had a pressure of 275 lbs. to the square inch, but by drilling several holes from the breast of the cross-cut into the water course and allowing the water to flow, the pressure, after several hours, was exhausted. The breast was blasted, and it was found that the water was flowing out through a large hole or water course in the bottom of the cross-cut. The normal flow from this point after the pressure was exhausted was 750 gals. per minute. The water course was enlarged by removing all loose rock for a depth of 18 ft., the water being syphoned out of the vug back through the cross-cut and down the shaft to the pump, which was located at a point 580 ft. lower down in the shaft. A horizontal section of the hole, after being thus enlarged, showed it to be about 7 ft. 6 in. long by 5 ft. wide. It was inclined slightly to the west.

An extra heavy 10-in. pipe, with 10-in. gate valve on upper end, was used in the vug, through which to syphon the water. A platform was made with timber around the 10-in. pipe 17 ft. below the bottom of the level. The cavity thus formed, from the platform up to the bottom of the level, was filled with a concrete composed of one part German Portland cement to two parts of sharp, clean sand, and four parts of broken limestone. Great care was taken in getting good contact between the concrete and the sides of the vug. To prevent leakage between the outside surface of the pipe and the concrete, the latter was not rammed tightly around the pipe, and the small crevices thus left were filled, after each foot in height of concrete had been completed, with a mixture of equal parts of sand and cement. After the entire cavity had been filled, the concrete was allowed to set for a week before the 10-in. gate valve above referred to was closed.

The entire flow of 750 gals. per minute was thus held back, and in

less than 12 hours the pressure on the valve had reached 276 lbs., or the same pressure as when the water was first encountered. On the second cross-cut from the Hamilton Shaft, which is 960 ft. from surface, water was encountered at the same distance south of the shaft, but at a point a little further east than on the level above. This water, like that on the first level, was struck while drilling, and showed a pressure of 355 lbs. to the square inch. The flow of water at this point was stopped by plugging the drill hole with a pine plug, through which was a pipe with gate valve attached. When the plug was firmly in the hole and secured by means of braces and yokes, the valve was closed. It soon became apparent that the breast of the cross-cut was becoming weak (there being less than 2 ft. of solid rock between the breast and water course), and it was decided to build a dam in the cross-cut 30 ft. back from the breast to prevent any sudden inrush of water to the mine, should the breast of the cross-cut fail.

This dam was made in the shape of a circular arch on its side, the arch being 6 ft. thick and having a radius of 7 ft. 6 in. On the crowing side of the arch, concrete to a thickness of 5 ft. was laid, this latter to act as a sealing device, while the stone arch provided the necessary strength. Local sandstone was used in the construction of the arch. A strong 3-in. pipe, with gate valve on outer end, extended through this dam, to carry away leakage from the end of cross-cut while the dam was being constructed. The mortar used in the construction of the arch consisted of one part of German Portland cement to two parts of sand. When the concrete and mortar had been given a reasonable time to set, the gate valve was closed, thereby accumulating the leakage in the space between the dam and breast. As soon as this space became filled with water the dam assumed the total load due to the height of water in the vug. The total load on this dam amounts to 1,840 tons, or 25.26 tons per square foot of surface exposed.

In order to avoid the necessity of penetrating the water course encountered on this level, and also to reach by a more direct route a large ore-body that was not known to exist at the time of starting the original cross-cut, a new cross-cut was started by branching off from the original one at a point some distance back from the dam last above described. When this opening had reached a point about the same distance from the shaft as the original one, only 150 ft. further west, water was again encountered while drilling. This supply was found to have the same pressure as that in the other cross-cut in this level, 355 lbs. per square inch. The effort to stop the flow at this point did not meet with success. The breast of the cross-cut was badly broken up, many small openings or vugs being exposed, although in none of them was there any water flowing. A plug 6 ft. long, with pipe and valve, was forced into the drill hole. The valve was closed and the flow stopped, but only for a short time. The plug had not reached the bottom of the hole by 2 ft., and the rock separating the inside end of the drill hole from the exposed vugs broke away.

As it was impossible to stop the flow of water from the vugs on account of their irregular shapes, it was decided to build a dam in the cross-cut at a point 58 ft. back from the breast. While preparations for starting this dam were being made, the large bailers in the Hamilton Shaft were gotten ready for use. The flow of water at this point had subsided slightly, being now only 900 gals., which, in addition to the 600 gals. normal flow at this shaft, made a total of 1,500 gals. per minute to be pumped. After the bailers were in readiness, an effort was made to still reduce the height of water in the vug by increasing the area of flow, and two other holes were drilled, both of them penetrating the vug. In this manner the flow was increased to 1,600 gals. per minute from this point, or a total for the pumps and bailers of 2,200 gals. The pressure was reduced to 68 lbs. per square inch. At this point both the pressure and flow suddenly increased, the former rising to 102 lbs. and the latter to almost 1,800 gals. per minute. This would probably indicate the existence of a second or parallel vug, which, by reason of the water being reached in the first vug, thereby weakening the intervening wall, broke through into the first vug. During 12 hours the pressure gradually reduced to 80 lbs., when there was a repetition of the occurrence, the pressure rising to 127 lbs. per square inch, and the flow increasing somewhat, although the amount could not be determined, as the last two holes drilled were immediately plugged and work resumed on the dam.

A temporary dam, built of timber and sod, was constructed near the breast. This raised the water 5 ft. high and permitted its being carried in launders past the point at which the permanent dam was to be built.

All loose rock was picked from the bottom, sides and back for a length of 22 ft. at the site of the permanent dam. After concrete to a thickness of 18 in. and for a length of 20 ft. had been laid, an 8-in. pipe, with gate valve, each capable of withstanding a pressure of 800 lbs. per square inch, was placed centrally between the two sides, the pipe extending about 1 ft. outside the dam at each end. Covering the inside end of the pipe was a screen, to prevent any of the sod or material incident to the construction of the temporary dam from clogging it. A heavy wrought-iron yoke was used to anchor the pipe into the concrete. When the concrete had attained a height of 5 ft., and had sufficiently set, the temporary dam and launders were removed, and the flow of water began through the 8-in. pipe. When the concrete had reached a point about 8 in. from the back it was discontinued. The remaining opening was filled with hard brick and cement mortar; first, because the concrete could not be properly rammed in so small a space; and secondly, to reduce the openings for cement as much as possible and thereby prevent excessive shrinkage.

There seemed no question but that this dam would stop the flow of water, provided it did not move bodily, the total load when applied being in excess of 2,500 tons. As an extra precaution, lengths of 70-lb. rails were placed horizontally in the concrete, with the flanges facing out and flush with the face of the concrete. The ends of these rails were cemented in hitches 6 in. deep, in each side-wall. Two steel girders, 13 ft. long and 32 in. deep, with 12-in. flanges, were placed vertically so as to give a perfect bearing to the face of the concrete and flanges of rails. These girders were so placed as to divide the face

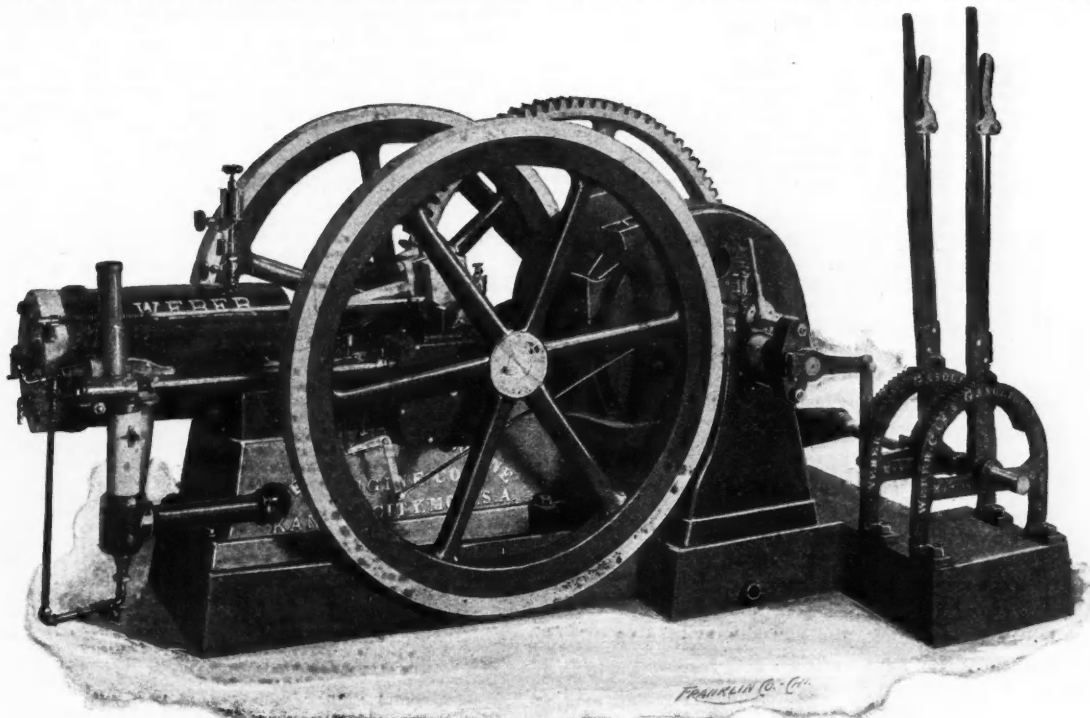
* Paper read before Lake Superior Mining Institute, 1900.

of the dam into three spaces of 3 ft. 4 in. each. The girders were cemented into hitches 16 in. deep, in the back and bottom.

In less than four weeks from the time the inside face of this dam had been completed the valve was closed, provision having been made for the air existing between the dam and breast to escape through a small pipe leading to the highest point in the back near the dam. After all the air had escaped the dam seemed to assume the load suddenly, the hand on the gauge moving from 0 to 220 instantly. In six hours the pressure had reached 340 lbs., and in the course of two or three days this water resumed its normal pressure. It is a peculiar fact that the point at which water was encountered on the first cross-cut and the two points on the second cross-cut lie in the same vertical plane. At each of the points the water, when first struck, carried large quantities of fine, sharp sand, and although attempts were made by building temporary dams to provide for settling before pumping, a large quantity of sand passed through the pump, to which the valves and plungers can bear evidence.

THE WEBER GASOLINE HOISTING ENGINE.

The Weber gasoline hoisting engine, which is illustrated herewith, is one of the latest productions of the Weber Gas and Gasoline Engine Company, of Kansas City. The engine itself consists of the ordinary standard gasoline engine built by the Weber Company, bolted to a heavy and strong base plate, on which is carried the hoisting drum, as shown in cut. The new feature of the hoist is that all end thrust on the main drum shaft is done away with, since a toggle joint friction clutch arrangement is now used, which is very sensitive and gives the operator full control of the load. The two operating levers are arranged



THE NEW WEBER GASOLINE HOISTING ENGINE.

so that the operator can handle both the clutch mechanism and the brake band and control the speed of the engine without changing his position. These operating levers when necessary can be moved to a point near the mouth of the shaft, enabling the engineer to take care of the loaded skips and buckets as they come to the surface. Another important feature in this engine is that it has both the tube and electrical ignition, so that safety on this score is doubly assured. As far as workmanship and material are concerned, little need be said, as the company's engines are quite well and favorably known all over the Western States and the Republic of Mexico.

The feature of giving a variable speed to the engine is a very good point, as it saves a large amount of fuel over the ordinary style of gasoline hoist. The operator controls the speed at any point from 50 up to 300 revolutions per minute. This is especially valuable in handling long timbers and men in and out of the mine; and when no hoisting is being done, the operator throws the lever to a point where the engine runs at its minimum speed, using simply enough gasoline to keep the engine in motion until the signal is given for further service.

ACETYLENE LIGHTING IN ENGLAND.—An acetylene town lighting plant has been installed at Hawes, Yorkshire, England. It was built on a capital of \$3,500. There are two large generators, in which the gas is washed by passing through the water. The holder has a capacity of 1,000 cu. ft. About a mile of the mains have thus far been

MINERAL PRODUCTION OF WESTERN AUSTRALIA.—The Mines Department of Western Australia reports the mineral production of the Colony, outside of gold, in 1899 at 566 tons tin; 12,852 tons iron ore, used as flux in the smelting works; 17,593 tons of limestone, also used as flux. The coal production, all from the Collie coal-field, was 57,844 tons.

MINERAL COLLECTORS' AND PROSPECTORS' COLUMN.

(We shall be pleased to receive specimens of ores and minerals, and to describe and classify them, as far as possible. We shall be pleased to receive descriptions of minerals and correspondence relating to them. Photographs of unusual specimens, crystals, nuggets and the like will be reproduced whenever possible. Specimens should be of moderate size and should be sent prepaid. We cannot undertake to return them. If analyses are wanted we will turn specimens over to a competent assayer, should our correspondent instruct us to do so and send the necessary money.—Editor E. & M. J.)

121.—A. M.—No. 1 contains calcium carbonate and quartz, may be called a limy quartzite. The green color is not due to copper. No. 2 is probably a somewhat altered hornblende rock. The green color is apparently due to iron. The red crystals are garnet. No. 3 shows crystals of brown tourmaline, associated with Iceland spar, calcium carbonate, the white mineral. No. 4 is a hornblende rock. The green mineral is hornblende, the white is mostly quartz; the rock also contains carbonate of lime, and is apparently a fresh, little altered phase of rock No. 3. The numerous small red crystals in No. 5 are probably garnets.

122.—K. N.—Soapstone.—The mineral you send contains carbonate of lime and also, apparently, of magnesia, and is between a dolomitic limestone and a magnesium silicate. It is, therefore, not true talc or steatite, and cannot be used for the same purposes as steatite. The ground rock might be useful for polishing marble, but we do not know of any demand for it for that purpose, nor of any opportunity to dis-

pose of several hundred tons monthly at New York. We doubt if a deposit of such material in Japan would find a ready market in the Eastern United States, owing chiefly to the distance, and we do not know of any chance of its bringing the price you quote.

123.—Gypsum.—A. F. Rogers in the "American Journal of Science" describes gypsum crystals from the Coal Measure shales at Lebo, Coffey County, Kansas. The twinned crystals are of particular interest because they appear to possess hemi-morphic orthorhombic symmetry rather than monoclinic. In this they resemble gypsum crystals from Girgenti, Sicily.

124.—M. R. V.—The brownish powder you send is not tripolite, and would hardly be called tripoli, though in the trade any light-colored powder containing a high per cent. of silica is called tripoli. The powder you send is too sharp for fine polishing, and its color detracts from its value. It is apparently better suited for the manufacture of fire brick than for an abrasive, and its value at New York would leave no profit after paying freight rates from Colorado.

125.—Epsomite.—According to Prof. Wilbur C. Knight, of the University of Wyoming, a deposit of epsomite, hydrous magnesium sulphate, of variable depth, occurs near Wilcox Station, Albany County, Wyoming. The deposit covers an area of 90 acres. The ground is flooded in spring to a depth of a foot or so, but in summer the water evaporates, leaving a deposit of beautiful crystals of epsomite. These

crystals deliquesce rapidly; so far as examined they are of an elongated prismatic habit and many are doubly terminated with pyramidal planes that show sphenoidal symmetry.

126.—Inesite.—In the publications of the Field Columbian Museum of Chicago, O. C. Farrington describes specimens of inesite from the San Cayetano Mine, near Villa Corona, Durango, Mexico. The occurrence is of interest on account of the rarity of this zeolite mineral which is known to occur at but three other places in the world; the manganese mines at Nazenbach, near Dillenburg, Germany; the Horstig Mine at Pajsberg, Wermland, Sweden, and at Jakobsberg, Nordmark, Sweden. In the specimens from the San Cayetano Mine the mineral occurs partly in cavities and partly intergrown with calcite and a flesh-colored manganese calcite. These fill narrow veins in what is probably an altered andesite. The inesite occurs in tufts of radiating crystals which are of the characteristic flesh-red color. The most characteristic pyrognostic reaction of the mineral noted is that when heated in the closed tube it becomes opaque, gives off water, and falls to powder. The crystals are of slender, prismatic habit, averaging about 5 mm. in length. None were found doubly terminated, the attachment at one end preventing the development of faces there. An analysis gave the following composition: SiO_2 , 44.89; MnO , 36.53; FeO , 2.48; CaO , 8.24; water of crystallization, 5.99; water, constant, 2.21.

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.—Editor E. & M. J.)

Copper in Ammonia Solution.—1. When copper is taken up with an ammonia solution, how is it precipitated?

2. Has this solution ever been tried for the extraction of this metal on a large scale?—J. L.

Answer.—Copper is precipitated from ammonia solution by iron. Zinc and some other metals could be used for this purpose, but iron is the best and most convenient.

2. The use of this solution has been suggested for obtaining the metal on a large scale, but it has never been tried practically.

Tin Ores.—Do you know of any place from which complex sulphide tin ores containing antimony, arsenic, silver and lead or any of these can be obtained in large quantities?—S. V.

Answer.—Complex tin ores carrying lead, silver and gold are found in Tasmania and in some parts of Australia. The Bolivian tin ores are associated with silver and also with bismuth. The Bolivian ores would probably meet your requirements better than any others. The Bolivian tin is all shipped to London, and you should be able to find buyers who could obtain ores for your purpose.

Cassel-Hinman Process.—Can you give any information about the Cassel-Hinman bromine extraction process for refractory gold ores? I hear that a mill was erected some three years ago at Magnolia, Boulder County, Colo., to treat telluride ores by this process, but has since been shut down. A company has been formed in London to exploit this process.—E. M.

Answer.—The Cassel-Hinman process is not now in use on a large scale anywhere. The mill which was started in Colorado is not now in operation. It is understood that the trouble was—as in all bromination processes—in the cost of the materials used and the difficulty and expense in recovering the bromine.

Fluorspar.—I notice in the "Engineering and Mining Journal" that fluorspar is quoted at \$6.50 to \$13, f.o.b. mines. For what purpose is the mineral used? How much is consumed? Who mines it?—J. C. M.

Answer.—Fluorspar is used largely in the manufacture of fluorhydric acid, which is extensively employed for cleaning iron castings. It is also used as a flux in smelting iron, in making open-hearth steel, and in melting iron in the cupola. The production at present is from 12,000 to 13,000 tons yearly. Nearly all of this is mined in Kentucky. The Fluorspar Company, of St. Louis, is the largest company producing the mineral. The Kentucky Fluorspar Company and the Eagle Fluorspar Company, of Louisville, are also producers.

Consult "The Mineral Industry," Volume VII; also articles in earlier volumes of the same work.

Iron Pyrites.—I have a large deposit of iron pyrites, analyses of which show 49 per cent. sulphur, 47.3 per cent. iron, 1.8 per cent. silica, traces of gold and silver. Can the pyrites be utilized for the sulphur values, or the residuum of iron?—S. G. S.

Answer.—The use of pyrites for the sulphur values, in making sulphuric acid, is extending in this country. It is chiefly confined as

yet to the fertilizer manufacturers and other makers of acid in the East. The price of pyrites, however, is too low for heavy freight charges, and the value of a deposit will depend almost entirely upon location. Thus large quantities of sulphur go to waste at the smelters in the West, because the freight charges are so high that it would not pay to save it. This condition exists notwithstanding an increase in the price of sulphur in recent years. The iron residuum at present has no market value, though a little of it is used with other iron ores in some blast furnaces. It could not be disposed of, however, unless the freight charges were very small.

A LARGE GERMAN COAL COMPANY.—The acquisition of the Bonifacius Colliery by the Gelsenkirchen Company, of Westphalia, says the London "Colliery Guardian," brings up to nine the number of its concessions, produced 4,547,957 tons last year, of which 4,326,231 tons were sold. The mean cost of getting for the whole year was 6.55 marks (\$1.56) per ton, or 6.3 per cent. more than in 1898. Although the mean individual useful effect of the hands has been well maintained, the profit per ton was reduced in consequence of the higher wages paid; the wage cost showed an increase of 5.2 per cent. over 1898, while it has increased by 24.5 per cent. since 1894. About one-fourth of the output, or 1,017,344 tons, is represented by coking coal, which yielded 688,240 tons of coke, in addition to large quantities of ammoniacal liquor, tar, benzol, etc. The gross profit on all sources of revenue, including the Bonifacius Colliery, was 13,681,452 marks, a figure that is reduced by sinking fund, indemnities, taxes, etc., to 5,747,895 marks, out of which 5,000,000 marks, representing a dividend of 10 per cent. on the present capital of 50,000,000 marks (£25,500,000), are available for distribution to the shareholders.

AUSTRALIAN COAL IN HAWAII.—Australia supplies most of the coal used in the Hawaiian Islands. The receipts of Australian coal at Honolulu in 1899 were 100,041 tons, against 64,776 tons in 1898, and 43,275 tons in 1897.

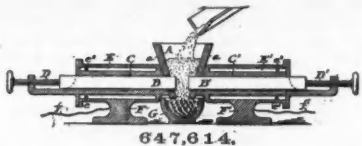
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

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

Week Ending April 17th, 1900.

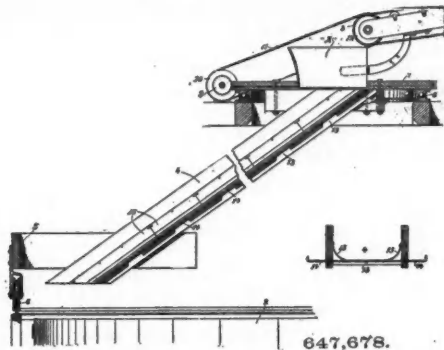
- 647,468, 647,469 and 647,470. UNITING METAL ARTICLES. William M. Brown and George H. McFraters, Johnstown, Pa. The process of joining metal articles having their surfaces to be joined of a nature to form an amalgam which consists in applying mercury to the surfaces to be united abutting the same and then applying heat and pressure to said surfaces.
- 647,514. LIQUEFACTION OF AIR. Oscar P. Ostergren, New York, N. Y., assignor of one-half to Samuel M. Gardenhire, same place. In an apparatus for the refrigeration or liquefaction of aeriform fluids the assignor of one-half to Samuel M. Gardenhire, same place. In an apparatus for the refrigeration or liquefaction of aeriform fluids the combination of a counter-current condenser having incoming and outgoing channels, a compressor and cooler connected to the incoming channels a connection from the outgoing channels to the compression-cylinder of said compressor, a second compressor, a branch from said last-mentioned connection to the power-cylinder of said last-mentioned compressor a precooler having a plurality of coils, a connection between the exhaust side of said compressor power-cylinder and one end of one of the coils of said precooler, a connection between the opposite end of the said precooler-coil and the compression-cylinder of said second-mentioned compressor, and a connection between the discharge side of said second-mentioned compressor compression-cylinder and the intake side of the compression-cylinder of the first-mentioned compressor.
- 647,531. DRYING AND PULVERIZING APPARATUS. Jonas J. Seldner, Baltimore, Md. The combination of a revolving cylinder comprising sections having internal buckets, a rotating shaft arranged centrally in said cylinder, rings clamped between said sections, central bearings for the shaft supported by said rings, frames secured on and extending radially from said shaft, and rods extending between the frames.
- 647,539. APPARATUS FOR AMALGAMATING METALS. John C. Teller, Minneapolis, Minn. The combination with an amalgamating-receptacle, of a tube or spout delivering the metal-laden fluid to the intermediate portion of said receptacle, and an agitator having inclined blades, the blades on the opposite sides of the delivery end of said spout or tube being reversely inclined, whereby the mercury and metal-laden fluid may be commingled under agitation and forced toward the delivery tube or spout.
- 647,575. COKE-LOADER. Frederick McClain, Johnstown, Pa. A coke-loader comprising a car mounted on suitable tracks and provided with driving mechanism, a platform hinged to said car at right angles to said tracks, a truss-frame mounted on the side portions of said car and provided with guiding-pulleys, winding mechanism on said car having flexible connections passing over the said pulleys to the free end of the platform for tilting the same.
- 647,601. CINDER-CAR. John M. Hartman, Philadelphia, Pa. The combination of bilateral wing plates mounted upon the housings; a car-body resting on the wing plates, the bottom of which has a curved outline; and crossing chains secured at their upper ends to the sides of the car-body and at their other ends to the extremities of the wing plates.
- 647,606. RESINOUS DOPE AND METHOD OF MAKING SAME. Russell S. Penniman and John C. Schrader, Dover, N. J., assignors to the Atlantic Dynamite Company of New Jersey, Kenil, N. J. The method of making a resinous dope ingredient for use in explosive compounds, by mixing rosin and sulphur, then highly heating the mass for vulcanizing the rosin, then cooling the mass until it has hardened, and then breaking up and pulverizing the hardened mass.
- 647,607. HIGH-EXPLOSIVE COMPOUND. Russell S. Penniman and John C. Schrader, Dover, N. J., assignors to the Atlantic Dynamite Company of New Jersey, Kenil, N. J. An explosive compound consisting of nitroglycerine and a dope, in which the ingredient relied upon to serve as a carbon ingredient is wholly composed of finely divided vulcanized rosin.
- 647,614. ELECTRIC FURNACE. Marcus Ruthenburg, Philadelphia, Pa. The combination with opposed terminals of an electric circuit of a bosh laterally inclosing said terminals, and open at the top and bottom thereof, a crucible directly beneath said bosh in relatively movable



647,614.

ble relation therewith, and an overflow outlet at the top of said crucible.

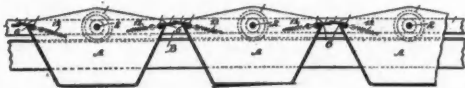
- 647,618. **GAS-GENERATING APPARATUS.** Appius C. Swain, San Francisco, Cal., assignor of one-half to Jay M. Bowers, same place. The combination, with a generating chamber, of a vertical fixing chamber connected therewith, and means for causing the gas to flow through said chamber, the interior surface of said chamber being formed of bricks laid obliquely to the wall, with broken joints between layers, whereby the free ends of the bricks present a serrated or jagged appearance.
- 647,622. **PRODUCT FOR IMPROVING COAL OR SOLID COMBUSTIBLES IN GENERAL.** Francois P. Vallet-Rogez, Lille, France. A composition of matter for improving the combustion of coal and of solid combustibles in general, which consists of a salt of bichromate, a salt of permanganate, a salt of nitrate, an alkaline salt of biborate and smoke-black.
- 647,631. **METHOD OF HARD-SOLDERING CAST-IRON.** Friedrich Pich, Berlin, Germany. The method consists in decarbonizing the abutting surfaces, depositing metallic copper on such surfaces by the action of heat on a chemical composition containing copper, applied thereto, adding solder, and melting the same.
- 647,632. **SOLDERING COMPOUND.** Friedrich Pich, Berlin, Germany. A soldering compound containing borax and a triturated mixture of finely comminuted oxide of iron and oxide of copper.
- 647,661 and 647,662. **METALLURGICAL FURNACE.** Josiah Lanyon, Pittsburg, Kan. In a metallurgical furnace, the combination, with means for distilling metal, and a condenser connected thereto of a movable supporting arm arranged to support the condenser.
- 647,663. **METALLURGICAL FURNACE.** William Lanyon and Josiah Lanyon, Pittsburg, Kan. The combination, with a screen, and a retort arranged to discharge on said screen, of a conduit having an opening below said screen, and means for moving material through the said conduit.
- 647,678. **MEANS FOR CHARGING LEACHING VATS.** Charles W. Merrill, Alameda, Cal. A mechanism for charging ore tailings or other material into a vat, tank, or like inclosure, consisting of a chute



647,678.

inclining from a point approximately above the center of the receptacle toward its periphery, said chute being revoluble with relation to the tank, and having a series of openings formed in its bottom and controlling gates therefor.

- 647,694. **ELECTRIC METAL-WORKING APPARATUS.** George D. Burton, Boston, Mass. The combination of an anvil provided with a slot, a bed electrode supported on said anvil and provided with a stud engaging said slot, said electrode being connected with one electric pole, and a swinging electrode supported above said bed electrode and connected with the other electric pole.
- 647,726. **PROCESS OF PRODUCING COPPER ALLOYS.** Gustav Pails, Elberfeld, Germany. The process consists in the following steps: First, melting copper, iron and manganese together; secondly, adding deoxidizing material thereto; thirdly, adding zinc after the deoxidizing material has been absorbed and continuing the melting until the zinc is volatilized; and finally, agitating the molten mixture until the gases and oxides have been given off.
- 647,746. **APPARATUS FOR GRINDING AND SIEVING PULVERIZABLE SUBSTANCES.** Richard J. Gasslein, Philadelphia, Pa. A machine for consecutively grinding and sieving pulverizable substances by one continuous operation, comprising grinding devices delivering the ground product directly to the sieving device, the main shaft of the machine operating the grinding devices.
- 647,750. **CONVEYOR FOR COAL ORE, ETC.** William F. Hunt, New York, N. Y., assignor to the C. W. Hunt Company, same place. In a conveyor having buckets and connections for uniting the buckets in endless series, the combination with the buckets, of lips, pivots for



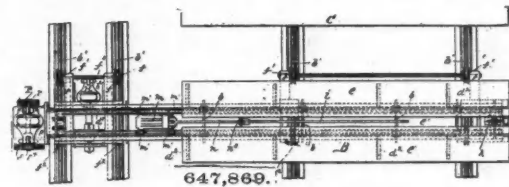
647,750.

some of the lips approximately in line with the inner edges of said lips for connecting said lips near the edges of the buckets, and means for controlling the movements of said lips on their pivots and returning them to a normal position.

- 647,752, 647,753 and 647,754. **STORAGE-BATTERY ELECTRODE.** Roderick Macrae, Philadelphia, Pa., assignor of one-half to William C. L. Eglin, same place. A unit-plate for a battery electrode, consisting of a centrally slatted structure with continuous solid edge portions one of which is provided with a projecting longitudinal bead or rib and the other of which is exteriorly grooved longitudinally.
- 647,811. **CONTINUOUS-MUFFLE FURNACE.** William Dicken, Hanley, England, assignor to William Wade, Longport, and Leonard Lumsden, Grimwade, Stoke-upon-Trent, England. The combination in a continuous circular muffle furnace or kiln for firing pottery-ware and enameled iron, with a continuous circular muffle having one opening where the goods to be fired are set in or taken out, of a turn-table or circular platform.
- 647,826. **GAS-GENERATOR.** Narcisse A. Guillaume, Paris, France. In a gas-generator operating by suction, a fuel-charging hopper closed

at its upper end by a cover secured in its closed position by hinged bolts and nuts; a sliding plate for closing the lower end of the hopper and a bolt or retaining device for securing the said plate in its closed position and means whereby the top of the hopper is prevented from being opened before the lower end of the said hopper is closed by the sliding plate.

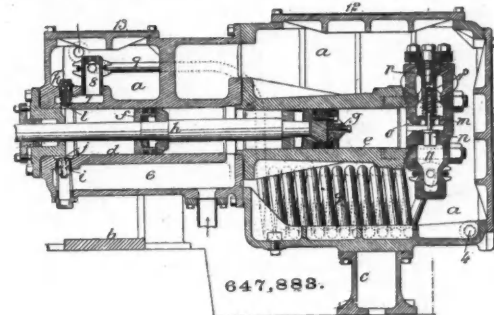
- 647,858. **PROCESS OF OBTAINING PERMANENT DEPOSITS OF METALS ON ALUMINUM.** Eduard Mies, Budesheim, Germany. The process consists in boiling the aluminum in a solution of a mixture of a phosphate of a metal, a free acid and a compound capable of attacking aluminum in the presence of said acid, then washing the aluminum and effecting the deposition electrically in a solution of the salt of the metal to be deposited.
- 647,860. **ROLLING-MILL.** Frederick McClain, Johnstown, Pa. The combination of the cylinders, connections thereof with a rock-shaft, arms on said rock-shaft bearing link connections with a movable track supporting one end of said table, movable posts secured to said track and provided with guides in which to operate.
- 647,869. **FURNACE-CHARGING APPARATUS.** Peter C. Patterson, McKeesport, Pa., assignor to the National Tube Company, New York, N. Y., and Pittsburg, Pa. The combination with a furnace, of a



647,869.

main frame, two flat-topped longitudinally-extended tables supported on the main frame leaving a space between them, and a longitudinally-reciprocating charging carriage traveling in the space between the tables and carrying a forwardly-extended pushing-rod supported with its forked end in line with the table tops.

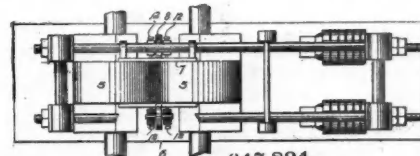
- 647,883. **COMPRESSOR FOR AIR, ETC.** Henry C. Sergeant, Westfield, N. J., assignor to The Ingersoll-Sergeant Drill Company, New York, N. Y. The combination in a compound compressor, of cylinders and pistons for successive compressions, a water-box in which said



647,883.

cylinders and their valves are contained, a cooler consisting of a plurality of coils of pipe arranged in said water-box, a discharge pipe from the first or low-pressure cylinder having a plurality of branches communicating with said coils at one end of each, a chamber of communication common to the other ends of the several coils and a valved communication between the said chamber and the high-pressure cylinder.

- 647,894. **PULVERIZING ROLL.** Arnold Baromettler, Georgetown, Colo. The combination with a pair of pulverizing rolls of equal length having their axes in the same horizontal plane, of wheels mounted



647,894.

adjacent and engaging the ends of both the rolls at the extremities of the tangential line between them, whereby an ore receptacle is formed bounded by the rolls and wheels.

- 647,904. **CONCRETE CONSTRUCTION.** Ernest L. Ransome, New York, N. Y. A metallic coil so embedded in a concrete joint that the axis of the coil is about in line with and parallel to said joint.

GREAT BRITAIN.

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

Week Ending March 24th, 1900.

- 6,777 of 1899. **SULPHATE OF SODA TREATMENT.** W. Garroway, Glasgow. Treating acid sulphate of soda by heating it with nitrate of soda, thus producing nitric acid and neutral sulphate of soda.
- 8,883 of 1899. **SLATE DRESSING MACHINE.** G. Watson, Llanrwst, North Wales. A safety guard for machinery for dressing slates.
- 9,145 of 1899. **ELECTROLYTIC PRODUCTION OF SODA.** J. W. Kynaston, Liverpool. In the electrolytic production of soda, means of obtaining caustic soda from the sodium amalgam formed.
- 25,161 of 1899. **STRONTIUM CARBONATE MAKING.** A. Wenz, Magdeburg, Germany. A method of producing strontium carbonate from celestine.

Week Ending March 31st, 1900.

- 5,564 of 1899. **SOLIDIFYING PETROLEUM.** B. Hofman, Paris, France. Making petroleum solid by adding soap and stearine and coal dust or peat fiber.
- 7,963 of 1899. **HARDENING STEEL.** H. Maton, Roubaix, France. For hardening steel tools after sharpening, a mixture of borax, sal ammoniac, common salt and resin to be applied when the steel is cherry red.
- 547 of 1900. **MAGNETIC SEPARATOR.** C. Q. Payne, New York, U. S. A. An improved form of magnetic separator for use in connection with slightly magnetic substances.
- 1,962 of 1900. **SHAKING TABLE.** W. G. Dodd, San Francisco, U. S. A. An improved shaking table.

PERSONAL.

Mr. James A. Boggs, a St. Louis mining man, has bonded gold properties in Shasta County, Cal.

Ex-Gov. Cleaves of Maine has been spending a week in Leadville looking after mining interests there.

Mr. John Lannerman of the Montreal Gold Fields has returned to Rosslund from a short visit to California.

Mr. John Stanton, of New York City, is in the Portage Lake district, upper Michigan, inspecting various mines.

Mr. T. H. Jackson, mining engineer of Pennsylvania, has been examining mining properties in Nevada County, Cal.

Mr. Theo. F. Van Wagenen has been at Yuma, Ariz., making an expert examination of a large gold dredging proposition.

Col. A. G. Brownlee, who is interested in the purchase of the Stanley Mine at Idaho Springs, Colo., will reside in Denver.

Mr. P. C. F. West, civil and mining engineer of the Calumet & Hecla mine, has returned to Calumet after a visit in the East.

Mr. Mark Smith, a mining man of Leadville, leaves May 10 for Pennsylvania and New York, on a vacation of several months.

Mr. William S. Gage, mining engineer of New York, is in California, where he will examine properties in the interests of Eastern parties.

Mr. J. H. Inkster, a mining engineer of Rosslund, B. C., has returned to Rosslund after several months' absence on the Pacific Coast.

Mr. Don. Cameron of Leadville, Colo., has gone to Joplin, Mo., to look after the interests of the Smith-Moffat people of Colorado.

Mr. S. J. Sullivan, manager of the Penn Mine, at Leadville, Colo., will direct mining operations for the Chihuahua Mining Company at Chihuahua, Mex.

Mr. Ernest Gayford, for a time metallurgist at the Mercur Mill, Mercur, Utah, is to go to Deer Lodge, Mont., to take up work at the new Horseshoe Mill.

Mr. Edwin Durant, chief financial manager of the British American Corporation at Rosslund, has returned from London to Rosslund after an absence of 3 months.

Mr. H. W. Hammond, president of the Plumas Development and Mining Company of Pittsburg, Pa., has been examining mining properties in Plumas and San Bernardino Counties, Cal.

Mr. W. C. Wallace, of Columbus, O., representing Ohio capitalists, has been in Gilpin County, Colo., arranging to start work on the Gold Coin Placer Company's property on North Clear Creek.

Mr. W. S. Grammer, formerly with the Colorado Fuel and Iron Company, has accepted a position with the Dominion Steel Company of Nova Scotia, as superintendent of its Newfoundland mines.

Mr. William I. Medill, late manager of the State Ore Sampling Works, at Idaho Springs, Colo., has resigned to accept the position of assayer and chemist for the Southern Smelting Company at Oakdale, Ga.

Messrs. J. C. Kortz and son, C. L. Thayer, W. E. Brooks and W. A. Miles, all eastern stockholders of the Lida Mining Company and the New Monarch Mining Company have been visiting in Leadville, Colo., looking after their interests.

Mr. F. L. Grammer, for 4 years in charge of Lackawanna furnaces and interests in Lebanon County, Pennsylvania, has resigned to accept the position of superintendent of the American Steel and Wire Company furnaces in the Cleveland district, O.

Mr. T. Mayne Daly, president of the Brandon & Golden Crown Mining Company of Greenwood, B. C., is on an extended trip to the Eastern States and Provinces. Mr. Daly will visit New York and Washington, D. C., before returning to Rosslund.

Mr. James Bowron, vice-president and treasurer of the Tennessee Coal, Iron and Railroad Company, who has been abroad for 3 or 4 weeks, traveling on business and pleasure combined, is expected to return to the United States within the next few weeks.

Mr. Robert Edwards and Mr. Will McCurdy of Houghton, Michigan, of the Michigan College of Mines, have left Houghton for Rosslund, B. C. Mr. Edwards will take charge of the operations of the Pontiac Mining Company. Mr. McCurdy will open an assay office at Rosslund.

Mr. Edward H. Lynde, formerly superintendent of the North Steel Mill of the Lackawanna

Iron and Steel Company, at Scranton, Pa., has been appointed superintendent of the company's entire North works, Mr. Theodore G. Wolf, superintendent of the rail mill, retiring.

Dr. G. W. Maynard of New York recently arrived on the west coast of Vancouver Island, B. C., from San Francisco, to organize development work on the John Bull group of mineral claims on the Alberni Canal. He expects to be engaged there for the next 3 or 4 months, in the erection of a wharf, bunkers and a tram track, connecting the mine with the wharf. He will put a large force of men to push development work on the properties, and hopes to be shipping ore in the near future. The character of the ore on this group is a chalcocopyrite, carrying good copper values, together with low values in gold.

Mr. Sol. Haas, president of the Sloss-Sheffield Steel and Iron Company, has been granted leave of absence for 3 months, and will go to Virginia and the East for his health. Mr. Haas has been in bad health for many months now. He succeeded Mr. Thomas Seddon several years ago as president of the Sloss Iron and Steel Company, and when the latter was absorbed by the Sloss-Sheffield Steel and Iron Company, he was elected president. Mr. T. H. Aldrich, who was a few months ago elected vice-president and general manager of the mines of the company, will act as president during the absence of Mr. Haas. Mr. Aldrich was for years connected with the Tahaba Coal Mining Company and later with the Tennessee Coal, Iron and Railroad Company, and is one of the best posted iron and coal men in the South.

OBITUARY.

Charles P. Haughian, president of the Chrome Steel Works, in Brooklyn, N. Y., died May 2d at his home in that city. Mr. Haughian was born in County Armagh, Ireland, 58 years ago, and came to this country with his parents when a child. During the Civil War he was superintendent of a large gun foundry in Brooklyn. Several years ago he perfected a process for making chrome steel, used in making safes, stamp shoes and dies and drills. A sister and a brother survive him.

Edward Owen Leech died in New York City, April 29th, of a complication of disorders following an operation for appendicitis. Mr. Leech was the youngest director of the Mint in the history of the country when in office. He was born in Washington in 1850, and was the son of Daniel T. Leech. Mr. Leech received his education at Everett Institute, and the Columbian University, from which institution he was graduated in 1869. In 1873 he became one of the assistants of Dr. Linderman, the first director of the Mint, and was appointed director of the Mint in October, 1889, by President Harrison. He resigned his position in 1893 to become cashier of the National Union Bank, of New York City. Upon the consolidation of that institution with the National Bank of Commerce he was elected second vice-president of the surviving corporation.

SOCIETIES AND TECHNICAL SCHOOLS.

Rose Polytechnic Institute.—The annual catalogue of this engineering school at Terre Haute, Ind., gives particulars of the courses offered in mechanical, electrical and civil engineering, architecture and chemistry. The course of study is 4 years and the catalogue lays stress upon the amount of time devoted to shop and laboring work.

Clausthal School of Mines.—The Royal Mining School of Clausthal, in the Hartz Mountains, Germany, probably the oldest mining school in the world, has issued its annual catalogue. The total number of students in 1898-99 was 238. The regular course of study for a degree is 3 years and degrees are given for mining engineer or metallurgical engineer.

Syracuse University.—The 1899-1900 catalogue shows development of the University for the past year. A page of statistics shows the progress from 1871, when there were 41 students, to 1,402 students in 1899-1900. There are 136 professors and teachers.

An important showing is the large number of students in the college proper (Arts courses). In 1875 the registered number was 149.

The department of English offers 20 courses; history, 11; political economy, 7; sociology, 5; philosophy, 8; mathematics, 22; civil engineering, 22; astronomy, 6; physics, 8; electrical engineering, 10; chemistry, 8; biology, 7; botany, 7; geology, 5.

New Zealand Institute of Mining Engineers.—At the meeting at the Thames School of Mines, the register for 1899 included 49 financial members, 21 associates and 3 students. Messrs. Alex. Whitley, F. H. Johnson and E. H. Hardy were elected new members, and Mr. F. C. Bunyard an associate. The resignation of Mr. Frank Merricks, of London, one of the founders of the institute, was accepted with regret.

The proposed union with the Australian Institute of Mining Engineers was discussed at length and was unanimously adopted. The executive committee of the Australasian Institute has since voted to admit the members of the New Zealand Institute subject only to condition regarding their financial status.

Engineers' Club of St. Louis.—At the meeting on April 18th, 36 members and 40 visitors were present. The paper of the evening was a discussion of "Electrical Impressions on Photographic Plates," by Prof. Francis E. Nipher, of Washington University. In the course of experiments with photographic plates covering 5 years, Prof. Nipher made some remarkable discoveries. His manner of handling rapid plates by preliminary exposure to daylight and subsequent development and fixing by the bright light of a lamp is unique and extraordinary compared with the ordinary methods of photography. A large number of interesting slides were thrown on the screen, prepared from negatives, exposed to electrical discharges from a Holtz static machine. Plates were shown exhibiting the characteristic features of positive and negative electrical impressions from bronze weights, keys and wire gauze. The plates made from positive current electrical impressions showed characteristic radial lines, those from negative current were readily distinguished by a cornea, or halo, around the object. Prof. Nipher also showed results on plates previously exposed to light in connection with X-ray work. If, while the Cooke's tube is acting on the plates, they are still exposed to the ordinary light of a room they develop as positives. The shadows are dark and high lights bright. If they are in a plate-holder when exposed to the X-rays, the pictures are like those formed in the regular way, and they are apparently as clearly defined. The advantage of the method is that the plates may be developed by the light of a lamp. The developer being weak and cool, the process may go on for an hour if desired and all of the details may be studied as they appear. In this way, details sometimes obscured by overdevelopment may be seen as they appear, although they might not show in the fixed negative. The development of such plates in darkness is liable to fog the plates. All this work appears to be leading to the solution of the important question of the separation of light into its component elements.

INDUSTRIAL NOTES.

The Carnegie Company has secured a contract from the Mexican Central Railroad for a pier at Tampico, which will require 10,000 tons of steel beams.

The United States Mineral Wool Works at Stanhope, N. J., are again in operation. Ten men are employed and about 20 tons of slag and limestone is used for each run of 2 days.

The Tidewater Steel Company of Chester, Pa., now has every furnace in operation. In the open hearth department of the plate mill 5 furnaces in all are running. Two of these are entirely new, while the other 3 have been in operation some time.

The blast furnace at Stanhope, N. J., is now running with a full force of men, about eighty being employed. Over 100 tons of Bessemer pig are turned out daily. The first order to be placed with the Musconetcong Iron Company since work at the furnace began is by the Bessemer Steel Works, of Danville, Pa.

The Pittsburg Gas Engine Company of Pittsburg, Pa., recently incorporated, is to make gas engines under the patent held by H. M. McCall. The incorporators are Thos. M. Rees, David A. Rees, M. M. Rees, of James Rees & Sons, large engine and boat builders, and H. M. McCall and Jos. H. Blackmore. The company will begin in a small way.

The Williams Patent Crusher and Pulverizer Company of St. Louis, Mo., maker of crushers, pulverizers, shredders and grinders for every mineral and material, is shipping to coke plants, cement and fertilizer factories, tanneries and ore mines. Additional iron-working tools have been installed in the machine shop and the erecting department.

The Carnegie Steel Company has placed an order with the Morgan Construction Company of Worcester, Mass., for 2 billet mills and a merchant rod mill for its plant at Duquesne, Pa. The amount of the contract approaches \$500,000 and the order is interpreted as meaning that the Carnegie company is to become a producer of rods for independent companies.

The Jeanesville Iron Works Company of Jeanesville, Pa., and Denver, Colo., is now building an electric station pump for the Delaware, Lackawanna & Western Company, with a capacity of 800 gal. per minute on a 750 ft. lift. This is the largest electric pump ever built for so high a lift. The company is also building some electric sinkers for use in Mexico.

C. J. Buchanan, consulting engineer to George V. Cresson & Company, of New York City, reports that business in the crushing and concentrating department is fairly good. The company recently shipped to Gen. A. J. Warner, of the Cherokee Mining Company of Georgia, 2 carloads of machinery consisting of Buchanan granulators, crushing rolls and other mining machinery.

J. S. Rogers, of New York City, president of the Lanyon Zinc Company, is now in Iola, Kans., arranging for building a big zinc rolling mill for the company. The plans for the mill are all completed and work on the buildings will begin within a month. The exact location is not settled, but it will be somewhere near Iola. Material for sinking 20 new gas wells has arrived and 19 new wells will be started at once. Zinc shingles will be manufactured, as well as block and sheet zinc.

The S. H. Supply Company of Denver, Colo., recently shipped 4 carloads of tanks from Aspen to Parral, Mex. This firm recently dismantled the Holden Lixiviation Works at Aspen, Colo., the White Lead Works and Grant Mill at Denver, Colo., and many other buildings and mills throughout the west. The firm devotes its entire time to dismantling mining and milling plants and its warehouses at Denver contain a quantity of modern machinery.

The Berlin Iron Bridge Company, of East Berlin, Conn., has a contract for furnishing the power plant for the new Electric Railroad Company at Wauregan, Conn.; a large power house for the Atlantic Coast Lumber Company at Georgetown, S. C.; the City Square station for the Boston Elevated Railroad at Charlestown, Mass.; a large power house for the American Railway Company at Bridgeton, N. J.; and a new power house for the Lexington & Boston Railway Company.

Messrs. Chas. H. Besly & Company of Chicago, Ill., reports good sales of "Pecora" machinery paints. Of these paints, flat steel color is in paste form for engines, tools and general machinery; egg shell gloss enamel finishing paint is for engines, tools and general machinery; "Dresden" machinery enamel is for radiators, gas engines, etc.; iron filler is for making iron castings smooth, while "Pecora" blow-hole cement is stated to stand under the planer lathe, file and other finishing operations, and can be washed with the knife.

The Phoenix Bridge Company, of Phoenixville, Pa., has, it is reported, been awarded the contract to build the St. Lawrence River Bridge at Quebec at a price aggregating some \$4,500,000. All of 27,000 tons of steel will be needed for the undertaking. The structure is to be 150 ft. above the river and 76 ft. wide, with 3 spans, 2 of 600 ft. each and 1 of 1,800 ft. There will be 4 railroad tracks, a driveway and walks on each side. It will take the Bridge Company some 3 years to turn out the work, complete the structural material and erect the bridge.

The Howard Axle Works of the Carnegie Steel Company, at West Homestead, Pa., which have been under erection for about 9 months, are in operation. They are said to be the largest axle works in the world and have an annual capacity of about 280,000 axles. J. B. Hardie, who superintended the construction of the plant, has been made general superintendent. The Pressed Steel Car Company, under its 10-year contract made with the Carnegie Steel Company for plates and axles, will consume the greater part of the output. With the completion of this plant, the axle department of the Lower Union Mills of the Carnegie Steel Company in Pittsburg will be abandoned.

TRADE CATALOGUES.

Straus & Company of New York City, manufacturers of boiler compound, issue a little pamphlet describing "Boilerine," which is sent free on application. The pamphlet contains a long list of users and a number of testimonials.

The Cling-Surface Manufacturing Company of Buffalo, N. Y., is sending out illustrated folders and pamphlets calling attention to the claim that belts dressed with "Cling-Surface" can run slack with no loss in power. Numerous testimonials are given.

"Ideal Special" engines are described in an illustrated folder issued by A. L. Ide & Sons of Springfield, Ill. These are "Ideal" engines with flat balanced valves in place of the regular type, driven direct from the eccentric rod. They are built in sizes from 40 to 750 H. P.

The Bullock Electric Manufacturing Company of Cincinnati is issuing a series of illustrated bulletins describing various electrical machines that it manufactures. Bulletin No. 34 A tells of railway light and power generators, Type "I." These generators are designed to be direct connected and are stated to be compact and highly efficient. Bulletin No. 36 describes marine lighting and power sets, Type "N-I." The com-

pany states that it has sought to fill the exacting demands of weight, space and durability in these sets.

The Gates Iron Works of Chicago, Ill., manufacturer of mining machinery has issued the 1900 edition of its general catalogue, a well-bound book of 238 pages. Different styles and sizes of the famous Gates rock crusher and cre breakers are shown there; the Dodge and Blake crushers and Gates revolving screens, elevators and mine cars are next illustrated, and then follow descriptions of the Gates crushing rolls and the Bradley Chilian mill. For fine pulverizing there are the Clark tube mill and the Jenisch ball mill. Ore feeders and stamp batteries come next, including the Tremaine steam stamp, also amalgamating barrels and fans. For concentrating mills, the Gates Company manufactures Hartz and one-compartment all iron jigs, Gates' vanners the Hallett stratifying table, revolving puddles, and hydraulic classifiers, also trammels and revolving sand pumps. For smelting plants the company makes water jacketed furnaces either square or round, fan-heaters and slag pots, also Connellsville blowers and several styles of roasting furnaces and kilns. The Gates Company makes and erects cyanide plants also, and the present catalogue will be of use to all men interested in metallurgy.

MACHINERY AND SUPPLIES WANTED.

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

We also offer our services to foreign correspondents who desire to purchase American goods of any kind, and shall be pleased to furnish them information, catalogues, etc.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, and have no pecuniary interest in buying and selling goods of any kind.

GENERAL MINING NEWS.

ALABAMA.

Talladaga County.

F. V. Evans, formerly auditor for the city of Birmingham, Ala., is interested in marble quarrying. A company has been formed with Eastern capital, and land containing a large quantity of marble has been purchased which is to be developed on a great scale. Much of the "slack" of the marble quarry is being contracted for by furnace companies in the Birmingham district for fluxing.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

New Western Mining and Reduction Company.—This company has a canvas plant running at Plymouth, which appears to do good work economically. T. C. Woodworth is superintendent.

Nugget.—Rich rock carrying high grade sulphurets is being taken from this mine at Ione. The mill is in operation.

Calaveras County.

(From Our Special Correspondent.)

Commodore.—A test run of 200 tons of rock taken from this mine is to be milled at the Ford Mill. On the result will depend future operations.

Harris.—At the 400 ft. a sump is being sunk, and a station is to be cut and drifts started. This property, 1½ miles from Angels, is operated by the Oriole Mining Company.

Plymouth Rock.—A small force of men is now employed on this property, 6 miles north from Milton. It is a concentrating proposition. The property is developed by a large open cut and a tunnel run on the vein. A shaft has also been sunk.

El Dorado County.

(From Our Special Correspondent.)

Starlight.—Enough ore has been blocked out to run the 10 stamp mill at this mine, 2½ miles south from El Dorado, all summer. The ore is conveyed from the shaft to the mill by a wire ropeway. So far the mine has paid the expense of sinking the shaft, the construction of 2 hoists and the mill, besides paying a good dividend.

Kern County.

(From Our Special Correspondent.)

Johannesburg Mill.—The last clean-up at this mill yielded about \$10,000. Most of the ore came from the Butte and Gold Coin mines.

Val Verde No. 2.—In the east drift of this mine at Johannesburg, a 5 ft. body of ore has been opened up and in the west drift a new ledge 9 ft. wide is being developed. The 10 stamp mill can run for months on the ore in sight.

Nevada County.

(From Our Special Correspondent.)

Giant King.—The bond on this mine, 1½ miles

south from Washington, held by San Francisco parties, has been extended and the property will be thoroughly developed.

Shasta County.

(From Our Special Correspondent.)

Bully Hill Smelter.—Grade for the foundations of the roasters is almost completed and building stone and brick are contracted for. The smelter will probably be constructed by San Francisco parties. A bridge across the Pitt River will be constructed at once to facilitate hauling machinery.

Elizabeth Gold Mining Company.—This company is making arrangements to erect a 40 stamp mill on the Iler Mine, 3 miles northwest from Keswick. The tailings, which are said to average \$5 per ton, are to be milled and cyanided.

Lower Springs District.—The Corinne Tunnel has developed a 3-ft. ledge, which assays \$57 in gold and \$3 in silver.

The drift on the Spagins property, now owned by Michigan capitalists, is in 150 ft., and will be continued to 250 ft. A shaft is to be sunk.

Sierra County.

(From Our Special Correspondent.)

Pilgrim.—This old mine, about 5 miles from Forest City, is about to be opened by New York parties. A mill is to be erected. The property has been idle for 14 years.

Trinity County.

(From Our Special Correspondent.)

On Jessup Gulch, between Eastman and Deadwood Gulches, a 3-ft. ledge of very rich ore, said to assay \$100 per ton in gold has been encountered by prospectors. For several years miners have sought the ledge which supplied the Gulch with gold.

Golden Jubilee.—The McCloud-Hunting Mill is to be moved to this mine on Coffee Creek as soon as possible. J. C. Steele is superintendent.

North Fork Placer Mining Company.—This company has been running a tunnel during the winter on its property on the North Fork of Coffee Creek and its branches, 13 miles south from Callahan, Siskiyou County. This will give an outlet for the tailings from the upper channel.

Tuolumne County.

(From Our Special Correspondent.)

Bicknel.—The shaft is down 65 ft. and a 40-ft. ledge has been developed. The Dorsey Ditch has been repaired and will furnish cheap power.

Dutch.—On the 9th level the ore body is exposed for a distance of 140 ft., and drifting is continued north and south in good ore. Drifts are also being run on the 10th and 12th levels. The 20-stamp mill and all the machinery will be run by electric power. There is some talk of enlarging the milling capacity. The property is at Quartz Mountain.

Goldwin.—The flume from a point near Nigger Gulch to this mine, a distance of 2,600 ft., is almost completed, as is the road to the mine. Underground work will not be resumed until the surface improvements are completed. The property is 2 miles south from Carter. W. H. McClintock is superintendent.

Hope.—The tunnel is now in 600 ft. on this mine near Sonora, and some very rich ore has been taken out.

Longfellow.—In the west drift at the 400 ft. level of this mine, near Big Oak Flat, a 4-ft. ledge of quartz was encountered. Some of the ore is very rich.

Never-Sweat.—This mine, 1 mile north from Columbia, is to be re-opened and the 100-ft. incline shaft pumped out and retimbered.

Rawhide.—The main shaft is down 1,800 ft. on this property. A large force of men are at work. It is reported that negotiations for the sale of the mine are still on.

COLORADO.

Fremont County.

(From Our Special Correspondent.)

Besides the large chlorination plant of the Union Gold Extraction Company, which now is in course of construction at Florence, under the superintendency of John E. Rothwell, the Dorcas Mining, Milling and Development Company, of which J. M. Hower is manager, will break ground this week for a 100-ton cyanide plant. The former Economic Reduction Works have been leased by Mr. Bonnevie, the inventor of a new agitation system applied to the cyanide process, and will start up before long. Eastern capital will also erect a smelter in this vicinity, but the location is not settled yet, and both Canon City and Florence are trying to get the prize.

Gilpin County.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—A. K. Flack et al. to the Cripple Creek Union Gold Mining Company, the London group of 6 claims; D. Porter et al. to the Fisk Gold Mining and Milling Company, the Pederson lode; M. Klein et al. to L. Sternberger, the Monte Cristo lode; N.

A. Sears to H. J. Hawley, $\frac{1}{2}$ interest in Success lode; C. J. & O. E. Adams to T. McKenna, $\frac{1}{2}$ interest in General Sherman, General Sheridan and John Arkins lodes.

Lotus.—One lift of 100 ft. has been completed and another lift started, which, when completed, will make the shaft 800 ft. deep. S. S. Johnson, Russell Gulch, is manager.

Surface Water Hinders Operations.—The deep snows are occasioning much extra labor at the big mines, from handling the seeping surface water.

Machinery Receipts.—Three carloads of mill machinery for Hendrie & Bolthoff, contractors on the big mill at Black Hawk, for the Boston & Denver Mining and Milling company, a 100-H. P. engine for the Colorado & California Shareholding Mining and Milling Company, and a gasoline hoisting plant for the East Boston Mine.

Mills.—The Avon and Brooklyn mills on North Clear Creek have started, the Avon on ores from the Fourth of July property, and the Brooklyn under the management of Prof. E. C. Lindemann, treating ore from the Cashier group, operated by the Seneca Gold Mining Company.

Lake County—Leadville.

Iron Silver Mining Company.—At the annual meeting, May 1st, 1900, in New York City, the following were elected directors: Ashley Pond, L. H. Peirce, Fremont Woodruff, T. S. Coolidge, Josiah H. Baker, James H. McMillan, W. P. Stevens, Homer A. Hoyt, Henry A. Taylor, J. Wyman Morris, W. R. Cobb. At a subsequent meeting of the directors the following were elected officers: Ashley Pond, president; Homer A. Hoyt, vice-president and transfer agent; Fremont Woodruff, secretary and treasurer; executive committee, Ashley Pond, L. H. Peirce, Fremont Woodruff, W. P. Stevens, James H. McMillan.

(From Our Special Correspondent.)

Ore Production.—The daily tonnage averages 2,800 tons with a prospect of a still further increase as soon as the roads are in better condition.

Alps Consolidation.—Lessees have secured a 3 years' lease on a number of blocks of ground of the Alps and Helvitia and will push development and prospecting at once.

Bimetallic Smelter.—The plant has been shut down a week undergoing repairs. The Arkansas Valley and Union plants are running full force.

Double Decker.—This old time proposition between Yankee and Brece Hills, which has been idle years, is to resume work under the direction of lessees headed by Wallace Colby. The Snow Storm and Fairplay properties, adjoining, are also included. In past workings the Double Decker produced \$100,000 in gold. The new operators will sink deeper.

Eurydice.—This claim on the California Gulch slope of Brece Hill has resumed work under the direction of lessees who are looking after a rich gold ore shoot.

Gold Coin Group.—These properties, comprising the Edith Nos. 1 and 2, and the Gold Coin, near Alma, have been leased to Leadville people headed by Dr. A. McLean. Considerable development and prospecting are mapped out, the lessees feeling confident that they have the extension of the rich Orphan Boy Mine.

Home Mining Company.—The ore bodies in all the 3 claims show up better than ever. The new hoisting plant is being put in on the Penrose, and shipments for the claims will average over 400 tons a day during May.

Last Rose of Summer.—This property, the Emmet, the Robinson and some 10 acres of ground adjoining have been secured by an eastern syndicate, headed by H. B. Collins. A big plant of machinery has been purchased and the work will be conducted through the Last Rose of Summer claim. The acreage is at the foot of Carbonate Hill, below the Yak Tunnel.

Mab.—Shipments average 100 tons per day of a good grade lead, and iron sulphides from the 1,000-ft. level. Some new work has started at the 700-ft. level.

Neusitz Placer.—The new shaft on this property, which is to develop virgin territory, is down 65 ft., and Manager Dennison is now arranging to put in machinery. When the top of the porphyry is reached a diamond drill is to conduct exploration.

Tarshish Mining Company.—This new shaft, on the Seneca Reserve, is making good headway and has struck the porphyry at a depth of 465 ft. The contract calls for a depth of 700 ft., at which point it is expected to encounter the old Adams ore shoot.

Mineral County.

Shipments of ore from Creede for the week ending April 24th were 123 cars or 2,384 tons.

Bachelor No. 2.—The shipments from this lease at Creede are now 50 tons weekly.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Lillie Gold Mining Company, Limited.—Ac-

ording to a circular recently issued by the American directors, it has been decided to discontinue temporarily the payment of dividends because the lower levels are in a barren streak, and though considerable development work has been done of late in ground heretofore unexplored there is but little ore in reserve. The shaft is now about 1,000 ft. deep and the directors have decided to sink another 200 ft. The company has been paying dividends at the rate of about \$11,250 per month and has paid altogether nearly \$350,000. On April 9th the cash in the treasury was \$95,553. This property 2 or 3 years ago, passed into the hands of an English company. It is situated next to the Vindicator Mine on Bull Hill. A large treasury reserve will give the company a chance to open up new ore bodies.

Margery Gold Mining Company.—A block of 500,000 shares of this company's stock has been sold to Messrs. Fred Williams and H. A. McIntyre, of Denver. The price paid was $7\frac{1}{2}$ ¢ a share, or a total of \$37,500. The Margery Company was lately offered \$50,000 for its May-Be-So claim, which, however, was declined and the purchase of the stock is to secure the property. The transfer resulted in the election of a new board of directors, with Fred Williams, president; J. L. Lindsay, vice-president; W. H. McIntyre, secretary.

Pinnacle Gold Mining Company.—At the annual meeting the following directors were elected: Chas. Farnsworth, F. M. Woods, Frederick Farnsworth, F. E. Brooks and S. L. Callwell. The reports of the officers show the company to be in good shape. At the date of the last meeting it was \$6,000 in debt and at present there are over \$24,000 in the treasury. The bulk of the ore taken out was from the Whipp and Glenn lease on the Lansing and McCluer and a portion of the Blacktail claims. The total amount shipped from that lease being \$254,824.38 gross value to date. The total royalties received since last report amounts to \$36,691. This property is on the north slope of Bull Hill and was not thought to be in the producing district until last year.

Portland Gold Mining Company.—This company recently purchased the controlling interest owned by G. B. Wilcox and others in the Total Wreck claim, which is completely surrounded by the Portland property. It is understood that the price paid was on the basis of \$40,000 for the whole.

Strattons Independence Limited.—This property has been in the hands of the English company a year and it is understood that the final payment was recently made. A statement, credited to T. A. Rickard, consulting engineer, gives the following: Up to May 1st, 1899, the mine produced \$4,871,860, out of which \$2,574,164 was profit. The production for the past year was \$3,000,000, of which \$2,000,000 were paid in dividends. The mine has yielded a grand total of \$7,000,000, of which \$4,500,000 has been profits. This has been obtained from 85,000 tons, which shows that the average value has been a little less than 4 oz. per ton. It is understood that there is \$12,000,000 worth of ore in sight compared with \$7,000,000 when the English company took charge.

Victor Gold Mining Company.—This mine, which has done only development work lately, has been shut down entirely. It has not been in a very good shape for some time. The stock is mostly held by the Moffat people of Denver, and in France.

IDAHO.

Elmore County.

Gold King.—At this claim, in the Dixie District, 25 miles from Mountain Lane, a shaft is down 300 ft. The claim is stated to show a vein of good cyaniding ore 40 ft. wide. Dan Reber is owner.

Idaho County.

A good-sized ledge of gold ore is reported found near the Middle Fork of the Clearwater River, 8 miles from the mouth of the Locksaw, by D. J. Wheeler and others. The ledge is stated to be a granite and porphyry contact, the ore resembling that found in the Buffalo Hump District. The claims are on Cougar Mountain, 17 miles from Newsome.

Nez Perces County.

Blue Jacket.—This claim is situated in the Upper Snake River copper district, 70 miles from Lewiston. F. J. Johnesse bonded the claim last fall, and a crosscut from a 50-ft. wide incline shaft is said to show 18 ft. of copper ore, sulphide oxides and carbonates, carrying small values in gold and silver.

Owyhee County.

Dernier Ressort.—This company, with \$200,000 capital, has been incorporated to work 3 claims on War Eagle Mountain, near Silver City, a short distance from the Cumberland Mine. The incorporators are O. G. Laberee, of Spokane, and a Montreal syndicate, consisting of Ernest Gault, Andrew A. Wilson, John R. Meeker, Geo. F. Smithers, Rudolph Forget and Frederick C. Henshaw, who are among the principal holders of Virtue Consolidated stock. The claims have

been explored by a 1,000-ft. tunnel, on the ledge, which has exposed free milling ore the entire distance. The tunnel will be continued and a shaft sunk on the ledge at its mouth. The company is making preparations to put in a 10-stamp mill.

Virtue Consolidated.—The new mill at the Cumberland Mine, near Silver City, is running satisfactorily.

Shostone County.

Blue Grouse.—Work on this claim progresses. W. Zumhof has succeeded W. H. Leashure of Moscow as superintendent.

Hunter.—This mine and mill are $\frac{3}{4}$ mile east of Mullan. The present mill started work last March. It has a capacity of 300 tons of crude ore in 24 hours. Mr. Olin is superintendent. The ore is conveyed from the mine to the mill by means of a wire cable 4,000 ft. long. It is dumped on grizzlies, the finer ore passing to the ore bin below. The coarse ore goes to a "C" size Comet crusher and is also discharged to the ore bin below, whence it is fed by automatic feeders to a set of 12 by 36-in. rolls; from there it passes into an elevator and is raised 25 ft. to a set of revolving screens, one 2-sections and two 3-sections by 48 in. diameter which are sized to 11 m., 7 m., 9 m., 3 m., and 5 m. The 5, 7, 9 and 77 ms. are fed on the 8 3-compartment jigs; the 3 m. passing on to a No. 2 hydraulic separator and is fed to 8 4-compartment jigs. The slimes are passed to 2 settling tanks, each 50 ft. long. From these they are fed to 4 double-deck Wilfley tables. From there the concentrates pass to a large concentrates bin, from whence they are loaded automatically into cars.

The building is 50 by 110 ft. with 3 floors. The first floor contains the concentrates bin and settling tanks, also one 5-ft. Huntington mill, one set of 12 by 36-in. rolls and 2 elevators. The second floor is 14 ft. above and on it are eight 4-compartment jigs, 2 separators, 2 settling tanks and 4 double-deck Wilfley tables.

The third floor is 5 ft. higher and contains 8 4-compartment jigs, 2 sets of 12 by 36 rolls and one elevator. The power comes from a 20-in. Leffel wheel and a 50-ft. head will develop 80 H. P. The machinery was furnished by Fraser & Chalmers of Chicago, Ill.

Sixteen to One.—The mill at this mine, near Wallace, which recently closed down may start up again. The ore mined carried a high per cent. of zinc, about equal to the lead, and the loss in concentrating and smelting by present methods was too great to leave a profit. A new lead of ore is reported out.

MICHIGAN.

Iron—Marquette Range.

Iron ore shipments to lower lake ports are well under way. Of the large companies the Cleveland-Cliffs Company has about as much ore in stock now as it had at the opening of navigation last year. While the tonnages at the Ishpeming mines are probably less, owing to the clean sweep of the stockpiles made last summer, the difference is more than compensated for by the gain at the mines in other parts of the range, whose product was a very small factor in last year's shipments. For instance, the company is working 3 mines at Michigamme that were non-producers last year.

Copper—Houghton County.

(From Our Special Correspondent.)

Atlantic Mining Company.—This company is repairing its coal dock and trestles at the old mill to be ready for coal shipments.

Calumet & Hecla Mining Company.—This company has let to Con Kihan of Sault Ste. Marie a contract to cut in 10,000,000 ft. of timber yearly. This timber will come from Whitefish Bay, along Lake Superior. The contract will extend over a number of years.

The company is to try belt conveying machinery made by the Robins Conveying Belt Company, of New York City, at both mine and mill. At No. 14 shaft on the Osceola lode belt conveyors will be installed instead of the wood and iron sorting tables, which are usually used. At both the Calumet and Hecla mills belt rock conveyors 400 ft. long will be installed. F. Batchelor is now at the mine and will superintend the installation of the machinery.

Franklin Mining Company.—The company has signed a contract granting to Thomas G. Mays, of Dubuque, Ia., the exclusive right to treat all sands on the old Franklin millsite on the shore of Portage Lake. Mr. Mays agrees to have his plant in operation by July 1st, and to give 15% of all minerals extracted to the mining company, providing the sands produce 3/10% mineral. If they produce more than 1%, 20% of the mineral goes to the company. Mr. Mays retains the right to rescind the contract at the end of 90 days. He is treating the Quincy sands, where a large sand pump weighing 1,350 lbs. has arrived.

Isle Royale Consolidated.—Henry Mack, recently of Marquette, has been appointed assistant superintendent of surface work.

Osceola Mining Company.—This company has put in another slime table at its mill. Sur-

veyors are running the lines for an extension of the Hancock & Calumet Road from the main line to the new shafts at the South Kearsarge location. The rails will be laid this summer.

Copper—Ontonagon County.

(From Our Special Correspondent.)

Mass Consolidated.—This company has decided to erect a mill on Keeweenaw Bay, at La Frenier, and has purchased 35 acres of lands. The mill will contain one stamp head with a daily capacity of 500 tons of rock, and is to be in readiness by next January. Construction will begin at once. The Duluth, South Shore & Atlantic Road will haul rock from the mine to the mill.

Iron—Menominee Range.

Florence.—At this mine, at Florence, 80,000 tons of ore are in stock.

Mansfield.—This mine, at Mansfield, is about to put in a new 2-drum first-motion hoist, with 5½-ft. drums and 14 by 21 in. cylinders; also a Leyner compound air compressor with a capacity of 17 No. 3 drills. The 9th level is showing up well, the ore body averaging 16 ft. wide there, and it has been opened for 275 ft. in length. The ore is said to run 64% and 0.020% phosphorus. About 300 tons of ore will be taken out daily during the shipping season. Ed Searls is general superintendent, and about 165 men are employed.

Norway.—This old mine, at Norway, owned by the Penn Mining Company, is expected to be a large shipper this year.

MINNESOTA.

(From Our Special Correspondent.)

The Eastern Minnesota road has let a contract to A. Guthrie, of St. Paul, for building 50 miles of line paralleling the main line of the Duluth, Missabe & Northern road from near Mountain Iron to the St. Louis River. This will save about 45 miles of haul for all Eastern ore trains from the Virginia district, where the road now has the Commodore and Saunry mines under traffic agreement. The line will be ready in 1901. The Commodore Mine will give the road from 350,000 to 450,000 tons this year. A. Guthrie built this line to the Commodore, and is building a line into the Clark, in T. 58, R. 20, ore from which will be hauled by the Eastern road.

All roads are running their regular schedule of ore trains, and the boats are beginning to come at the rate of a dozen a day.

The Bessemer Iron Mining Company, incorporators W. J. Olcott, J. B. Cotton and G. D. Swift, has been incorporated with \$50,000 capital. The incorporators are the local heads of the Consolidated Company. The United Mining Company has filed articles; incorporators, B. G. Segog, G. P. Tvedt and J. O. Milne; capital stock, \$50,000. The company is understood to represent others than the incorporators. The Union Ore Company has been incorporated, the incorporators being understood to represent in equal parts the Republic Iron and Steel Company and the American Steel Hoop Company.

Iron—Mesabi Range.

(From Our Special Correspondent.)

The recent find of Hawkins, Moon, Vivian and Wallace, reported last week, as sold to the Minnesota Iron Company, is still in the hands of the finders, the Minnesota Company refusing to close the purchase unless more time was granted. The ore is much like beach gravel, a Bessemer hematite, running high in iron.

Corrigan, McKinney & Co.—This firm has a lease on 80 acres in section 29, T. 58, R. 20, lying between the Pillsbury and Clark mines. The fee is held by Longyear & Bennett, and the mine will be the Monro, the middle name of J. M. Longyear. It is a fine body of ore, and will be opened at once. A traffic contract has been made with the Eastern Minnesota road, the latter turning over to the lessees a 40 lying beside the Stevenson Mine in T. 57, R. 21. Corrigan, McKinney & Company are now on the Mesabi, as on the Menominee, the largest individual operators, and their shipments in good years after 1900 should be not less than 1,000,000 tons annually for a long period.

John T. Jones et al. have paid the money for the fee of 160 acres in T. 58, R. 19, s w of s e of section 17, w ½ of n e of 20, and n w of s e of 20. On this property a large body of ore, estimated at from 10,000,000 to 12,000,000 tons, has been found, much of it beneath the taconite that in the early days of the range was supposed to limit explorations. The full extent of the ore has not been shown.

E. D. Parmalee & Company have optioned 11 40-acre tracts of State land lying in T. 58 and R. 18 and 19, and will explore at once. On the land in T. 58, R. 18, a good Bessemer ore has been found. There is a State royalty on this of 25c. a ton.

Fayal Iron Company.—Lands that will form an extension of the Fayal Mine have been leased by the Minnesota Iron Company from the C. Hill Company and others. They are in section 8, T. 57, R. 17, joining the east side of the Fayal.

Jeffries Explorations.—A large and fine deposit of ore has been shown on the n w of the s e of 10, T. 58, R. 18, for the Oliver Iron Mining Company, where work has been going on for

some time. The land adjoining, belonging to the Champion Iron Company, will probably be explored at once.

Union Ore Company.—This company has secured what is known as the "Jones 40," being the n e of n w of 9, T. 58, R. 17, and will work it at once. It adjoins the Commodore on the east and the Franklin on the north, and contains a large body of high grade low phosphorus ore. The sum of \$400,000 is paid for the property in a royalty deal.

Iron—Vermillion Range.

(From Our Special Correspondent.)

Chandler Iron Company.—This company is shipping about 2,500 tons a day. The company has established a new grade, a lump ore for which there is considerable demand, for open-hearth steel plants. The company is exploring on 3 sides of the town of Ely, and has 12 drills going.

Minnesota Iron Company.—This company has 3 diamond drills working in section 30, with other explorations there, and has 4 diamond drills working in the bottom of its Soudan mines. Its daily shipments are about 2,000 tons. At Armstrong Lake its explorations are pushed with vigor. This company will ship a good deal of lump ore also.

Oliver Iron Mining Company.—This company, at its Pioneer Mine, is shipping 1,800 tons a day. The shipment of stock will not begin for some time. The mine is installing a heavy crusher. The mine's No. 2 shaft is now down about 100 ft., and will be sunk nearly 1,000. At No. 1 there are 200,000 tons stocked. At the Savoy No. 2 shaft is down 200 ft., and is being sunk rapidly. The mine is shipping its daily hoist, about 500 tons. At the Zenith 800 tons is the daily shipment. At the Sibley, a new mine, lying between Zenith and Savoy, a shaft is down 120 ft. Machinery is being set up and the property prepared for a big business. All these shafts are 3-compartment. The company will soon begin exploring again in section 30, on the McDonald 40.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—There was no change in the price of either zinc ore or lead except that no extra high grade zinc ore was on the market. The highest price reported for zinc ore was \$31.50 per ton; lead sold at \$27 per 1,000 lbs. There is an active demand, with no surplus anywhere in the district. Many of the mines producing low grade ore containing a large percentage of mundaic are shut down and will not start until ore goes much higher.

During the corresponding week last year top grade zinc ore brought \$53.50 per ton, and lead \$25.50 per 1,000 lbs. The sales of lead were less than this by 233,800 lbs. of zinc and 222,280 lbs. of lead, but the value was greater by \$91,354. For the first 17 weeks of last year the sales of zinc were greater than this year by 8,515,830 lbs.; the lead sales less by 3,636,960 lbs., and the value greater by \$611,488.

As compared with the preceding week, the sales were less by 34,850 lbs. of zinc and 204,120 lbs. of lead, and the value less by \$7,879. Following is the turn-in by camps of the Joplin District for the week ending April 28th:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin.....	2,349,500	548,870	\$50,063
Galena-Empire.....	2,322,190	320,510	43,320
Cartersville.....	1,228,730	238,650	24,874
Webb City.....	485,120	26,950	7,762
Onorogo.....	743,580	2,750	11,083
Neck City.....	94,120		1,459
Aurora.....	1,215,000	21,420	14,056
Belleville.....	356,850	12,200	5,684
Central City.....	185,600	5,400	2,744
South Jackson.....	249,070	7,550	3,441
Cave Springs.....	77,250		1,082
Stotts City.....	225,370		3,493
Carl Junction.....	137,320		1,982
Carthage.....	91,370		1,083
Wentworth.....	498,900		7,753
Granby.....	533,000	24,000	7,800
Duenweg.....	405,140	17,410	5,773
Dade County.....	42,950		32
District total....	11,237,170	1,225,770	\$193,760
Total 17 weeks...	163,446,390	19,091,740	\$3,012,486

Mining Land Sales.—The Dividend Mine, on the land of the American Zinc, Lead and Smelting Company, north of Joplin, has been sold to Massachusetts parties, represented by A. E. Hathaway, of Worcester, Mass., for \$30,000. The Joplin Land and Mining Company, chartered by Joplin men, has filed a deed for 15,000 acres of land in Cyclone, Center and Mountain townships in McDonald County, the consideration being \$100,000.

New Companies.—The Superior Mining Company, chartered under the laws of Missouri, with a capital of \$30,000; officers: H. H. Martindale, president; H. E. Webster, secretary, and W. W. Butcher, of Duluth, Minn., treasurer. The Kaw Zinc Mining Company, capital \$100,000; incorporators: Charles M. Gregory, Cottonwood Falls, Kans.; Arthur G. Crocker, Matfield Green, Kans.; J. M. Mason, Kansas City, and others.

The Missouri & Kansas Zinc Mining Associa-

tion has appointed a committee to collect a cabinet of specimens to be sent to the International Mining Congress at Milwaukee in June. After the Congress closes, the display will be presented to the University of Wisconsin. The exhibit will be a very handsome one.

MONTANA.

Beaverhead County.

Polavis.—W. V. Butler of Polavis has taken a bond and lease on this mine, owned by New York men, which has lain idle nearly 2 years. The first work done will be to run a raise from the 2,000-ft. tunnel.

Cascade County.

Diamond R.—Water has been turned into the 2-mile flume; the jigs and hydraulic sizers are in place at the concentrator, and the tables are put up. This Neihart concern will soon be ready for business.

Flathead County.

Diamond Hitch.—About 6 men are developing this claim, owned by Spokane men, situated on Grouse Mountain, 12 miles from Troy. Martin Grace is manager. A tunnel has been run 160 ft. and a shaft sunk 100 ft.

Little Spokane Mining Company.—This company ran a tunnel 400 ft. on its Little Spokane claim, near Troy, but has stopped work. The ore values are chiefly lead and silver. D. R. Peeter and other Kalispell men are the principal owners.

Madison County.

Lake Shore.—Work at this mine, near Sheridan, is being pushed, and a 20-stamp is to be erected.

Park County.

St. Julien.—J. F. Nolan is owner of this mine in Emigrant District, near Livingston. He is to put in a roller mill and a Cammett concentrator, also a 40 H. P. engine and boiler. The mill is to have a capacity of 40 tons daily.

Silver Bow County.

Boston & Montana.—The annual stockholders' meeting of the Boston & Montana was held in the office of the company at Butte April 26th; 144,262 shares were represented, all by proxy. The Heinze interest, representing 250 shares, was represented by the local law firm of the company. The following directors were elected, the Heinze stock not voting: A. S. Bigelow, W. J. Ladd, Leonard Lewisohn, Joseph S. Bigelow, Edward C. Perkins, Frank Klepetko and Edwin H. Grew. Edward C. Perkins succeeds the late Joseph G. Ray. A resolution, against which the Heinze shares were voted, was adopted ratifying the actions of the board of directors during the past year. The auditors report was also ratified. Mr. Edward C. Perkins, the newly elected director, has acted as attorney for the Boston & Montana Company, and was elected to the board chiefly because of the fact that as such his services as counsel would be conveniently at hand. He represents no special interest.

Washoe.—Judge Knowles, the United States judge in Montana, has rendered a decision setting aside the deed of the Pacific mine to the Washoe Company. The Pacific belonged to the Davis estate. The administrator sold it to Marcus Daly against the protests of the Davis heirs in 1895. They brought suit subsequently to set the deed aside. The Washoe Amalgamated properties, and the Pacific Mine was a valuable asset of the Washoe. Since Daly bought it 5 years ago, it has, according to report, yielded immense quantities of ore. The case will go to the Supreme Court.

NEW MEXICO.

Socorro County.

Mogollon District.—The Graham Company is working a force of 56 men in the Confidence Mine, at Silver City. At Mogollon the Last Chance has 12 men at work in the mine and 16 in the mill; Deep Down Mine, 12 men; Little Fannie Mine, 32 men, and the Cooney, 23 men in the mine and 9 at the concentrators. The Cooney Company is shipping 5½ tons of concentrates daily.

OREGON.

Baker County.

Virtue Consolidated.—The crosstuck from the Virtue workings tapped the collateral lead at a depth of 750 ft. The pay streak is narrow, but runs high in gold.

Grant County.

Cougar.—This mine, 3 miles north of Granite, has its chlorination mill in successful operation. John Larkin is manager.

Magnolia.—This mine and 10-stamp mill, 4 miles from Granite, it is said, reverted to its original owners, by the failure of the purchasers to meet the last payment when due. It is one of the properties W. L. Vinson and T. K. Muir were managing for an English syndicate. The plant is covered with liens and the mill shut down. The purchase price was \$25,000. The mill and other improvements cost about \$50,000. Bad management is alleged.

May Queen.—This mine, 4 miles from Granite, has begun crushing ore with 10 stamps and 4

concentrating tables, handling about 30 tons daily. A Fremont, Neb., company has been developing the property about 3 years, and 4 tunnels and many drifts are driven. G. J. Barrett is secretary of the company, and John Thomsen is resident manager.

Strassburg.—A rich streak is reported in this claim, on Olive Creek, at the end of a 200-ft. tunnel. This is one of the oldest patented properties about Granite, but lay idle 2 years before work was resumed, 6 weeks ago.

Union County.

Simmons Mountain.—These mines at Cornucopia, 25 miles northeast of Baker City, are reported bonded by New York men for a large sum.

PENNSYLVANIA.

Bituminous Coal.

Bessemer Coke Company.—The company has turned out a quantity of coke at its new Griffin Works, in the Klondike District of the Connellsville region; making them pioneer coke producers in this field. Their plant is laid out for a block of 250 ovens, but they have nearly completed 100, and are now waiting for railroad connections with the Southwest Pennsylvania Railroad, which is building a branch from Lachrone. Analyses show this coke to be uniform in character, and equal to coke made in other districts of the Connellsville region. The following is the last analysis taken: Volatile matter, .26%; fixed carbon, 89.15%; ash, 9.85%; sulphur, .73%; phosphorus, .009%.

SOUTH DAKOTA.

Custer County.

(From Our Special Correspondent.)

The Iron Mountain Gold Mining Company.—This company, recently organized, has shipped iron ore to the Omaha smelter and regular shipments are to be made there and to Denver from now on. The officers are: J. L. Logan, Cincinnati, O.; vice-president, Samuel Scott, Custer, S. D.; secretary and treasurer, W. W. Hinton, Covington, Ky.

Copper Reef.—Men have begun sinking to connect with a 200 ft. tunnel on this property, 2 miles southeast of Custer. A shipment of ore to Denver recently is said to have averaged well in copper and gold.

Pearson.—A 4-ft. vein of mica has been found on a claim 1 mile south of Custer, owned by R. C. Pearson, of Adams, Neb.

Spodumene Shipments.—H. Reinbold & Company have given a contract to Frank McLaughlin, of Custer, to deliver during the season, 500 tons of spodumene from the Etta tin mine, east of Hill City.

Lawrence County.

Boston & South Dakota Gold Mining Company.—At the annual meeting in Boston, May 1st, the old board of directors was re-elected: Edwin C. Holman, president; Joseph Underwood, general manager; Benjamin Varnum Howe, treasurer; Charles H. Barney, vice-president; Jos. B. Martin, secretary; and Frank D. Underwood and Charles A. Kilham were added.

(From Our Special Correspondent.)

Bullion.—Dr. H. H. Muggley, of Chicago, has commenced pumping out this mine, near Galena, east of Deadwood.

Detroit & Deadwood.—This company has bonded a large tract of mining ground on Anna Creek, west of Deadwood and a contract has been let for a 100-ton cyanide plant, to be erected under the supervision of W. D. Parker, of Deadwood. The plant is to be in operation by August 1st.

Grantz.—Otto Grantz has increased the force of men at his mine, in the North Lead District and will begin taking out ore from the rich shoot in a few days.

Omaha Mining Company.—This company, organized to work the Ogden process for reducing low grade ores, has leased the tract of Homestake tailings on Whitewood Creek, 5 miles below Deadwood. The tailings will be concentrated by sluicing and the product will be hauled to Deadwood. The officers of the company are: President, S. A. Flower, Deadwood; C. H. Cornell, Valentine, Neb., treasurer; J. A. Ogden, Deadwood, secretary and general manager, and J. W. Fowler, Deadwood, attorney.

Placer Mining.—Placer mining has begun earlier than usual, owing to heavy rains. It is likely that the season will be very good.

Pennington County.

(From Our Special Correspondent.)

Big Hit Mining Company.—This company has begun development on the Bismarck Mine, 2 miles west of Keystone. The large concentrating plant, found to be a failure, will be remodeled completely. The company has a large amount of ore exposed. John G. Mattes, of Keystone, is general superintendent of the mine.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—During the week ending April 28th there were sent forward from the several smelters 20 cars, or 841,123 lbs. lead-

silver bullion; 5 cars, or 291,929 lbs. copper bullion. In the same week there were shipped from the different camps 90 cars, or 3,598,780 lbs. lead-silver ore, to smelters outside of the State.

Cyanide Products.—Consignments of products from cyaniding mills, received in April at the Salt Lake office of the Consolidated Kansas City Smelting and Refining Company, aggregate \$80,000, or about \$15,000 more than for the same month in 1899, not including the product of the De La Mar-Mercur mines.

United States-Centennial-Eureka Smelting.—There is much speculation on the Boston report of the proposed union of United States and Centennial Eureka, as the mines are in different districts, widely separated, having but little in common. Each, however, has bodies of moderate grade ore, and it is not improbable that a joint smeltery may be decided upon. It is very doubtful if the union of the 2 companies will go farther than this and the smeltery may be independent of either.

Carbon County.

Pleasant Valley Coal Company.—One of the worst mining disasters ever known in the West occurred at this company's No. 1 and No. 4 mines at winter quarters, near Scofield, on the morning of May 1st. The day shift, numbering nearly 400 men, were at work when an explosion in No. 4 workings, of unknown origin, wrecked that part of the mine and spread to the No. 1 workings, which adjoin. The force of this explosion was terrific, men were blown 200 ft. along the gangways and their bodies shockingly mangled. The men in No. 1 workings apparently died by suffocation rather than by wounds, the flame of the explosion creating an immense volume of gas that suffocated all miners who did not reach open air within a few minutes. This gas and the wrecked workings interfered with recovering the bodies, but enough have been recovered to show the appalling loss of life. Over 200 bodies have been taken out so far, and the total deaths may reach 300. In one place the bodies of over 50 men were found within the radius of a hundred feet. The miners were nearly all Americans and Welshmen, the former coming mostly from Utah, with some from Tennessee and Colorado. A large number were married.

The mine was the largest in the State, and has been worked over 20 years. The seam is of good thickness and the coal of excellent quality, finding a ready sale along the line of the Rio Grande Western Railroad and at other points in Utah, Idaho, Nevada and Montana. The total output of the mine in 1899 was over 400,000 tons.

As every man near where the explosion started was killed, the exact origin will probably remain unknown. Still it was probably due to much the same cause as the recent explosions in West Virginia and Washington. The mine was worked heavily, the workings were probably extended relatively faster than the ventilating machinery was increased. The workings were dry and are described as showing little gas, and the miners made no complaint of foul air. These are ideal conditions for a dust explosion. An amount of fire damp, innocuous by itself, when mingled with dust makes an extremely dangerous mixture. The present explosion is said to have been started by the explosion of some powder; in any event under the conditions given a small explosion could spread by the dust throughout the mine workings with the terrible results noted above. It is quite possible that there will be no evidence found to show that the company was in any way to blame in this case, but there is apparently need of a State mining law in Utah that shall insure enough air at the headings to prevent the accumulation of gas in even small amounts.

Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week ending April 28th the total carload shipments from the 3 railroad points of the district was 106 cars of ore and 5 cars of concentrates, as follows: Centennial-Eureka, 39 cars; Swansea, 12 cars; Gemini, 10 cars; Grand Central, 10 cars; South Swansea, 7 cars; Mammoth, 5 cars ore, 3 cars concentrates; Godiva, 5 cars; Uncle Sam and Hamburg, 5 cars; Ajax, 4 cars; May Day, 4 cars; Carissa, 3 cars; Bullion-Beck, 2 cars concentrates; Buckeye, 2 cars ore.

Emerald.—April 22d the shafthouse was burnt and the timbers for 30 ft. down the shaft. There was no one about the mine at the time. The fire under the boiler is supposed to have been banked, but may have started the blaze. No time is being lost in replacing the damage.

Mammoth.—The ore uncovering in 1900-level is a disappointment. President McIntyre says it is not the continuation of the main shaft mined on 1800-level. No noteworthy developments have been made on 800-level.

Plute County.

(From Our Special Correspondent.)

Annie Lawrie.—Engineer John T. Breckon states that plans for 150-ton mill are being prepared. Power will be electricity generated on

the ground through the company's water rights. Messrs. Kimberly, Huck and Filer are expected here before May 10th, when the new manager will be installed.

Holland.—Explosion has been in progress all winter to good advantage and will continue more energetically this season.

Sevier.—A Salt Lake paper has a story of a bond being given on this property. Up to May 1st such is not the fact.

Snyder Improvement Company.—On April 27th at Salt Lake City the transfer of the 40 claims of the Snyder company to P. L. Himberly of Sharon, Pa., and L. C. Huck, of Chicago, for \$100,000 was consummated. Other claims involved in the deal, which are under bond to the Snyder Improvement Company, necessitate a payment of \$12,000 additional, May 1st and one of \$38,000 on November 1st. Owing to threatened law suits the deal came near falling through and chief credit for it is due to Willard F. Snyder. The Kimberley-Huck Syndicate thus secures the Snyder townsite, valuable water rights, timber, as well as some rich mining ground. No time is to be lost in making the territory productive.

Salt Lake County.

(From Our Special Correspondent.)

Fortune.—April shipments were 100 tons. It is believed the balance of the machinery for the mill will be received the coming week.

United States.—J. W. Nellis, on May 1st, turned everything over to A. F. Holden, who is again managing director. It is probable that the company's Salt Lake office will be given up, or consolidated with that of the Centennial-Eureka, of which company Mr. Holden declines to talk on United States affairs. W. B. Devereux has finished sampling the mines, and it is understood his report will be in the hands of the directorate in Boston about May 10th.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—In the week of April 28th the total smelter products shipped from the camp was 2,908,890 lbs., contributed as follows: Silver King, crude, 708,790 lbs., concentrates, 328,850 lbs.; Daly West, crude, 1,102,680 lbs.; Ontario, crude, 318,050 lbs.; Anchor, concentrates, 204,710 lbs.; Valeo, crude, 253,810 lbs.

Tooele County.

(From Our Special Correspondent.)

Geyser-Marion.—Current expenses are reduced one-half, but the mill is little more than making expenses.

Sacramento.—This property is again looked on with favor, since the management decided to equip the mill with a roasting annex.

VIRGINIA.

Wise County.

Toms Creek Mining Company.—Two men were smothered at the Pine Run Mine owing to a mine casing taking fire. Several others were overcome by the smoke, but were rescued. The fire was extinguished by flooding the mine.

WEST VIRGINIA.

Chief Mine Inspector Paul has returned from a tour of the coal mines of the State. He reports that there was never as great activity in the coal trade as at present. There is not an idle mine or an idle miner in the State, except a few in the West Virginia Central division, where a small strike is in progress. The output of both coal and coke promises to be nearly a third larger for 1900 than for 1899. In every region except the Flat Top there are new mines opening, and in that region they are so close that there is no room for any more along the railroad. Extensive improvements in the mines and coking plants are under way to increase capacity.

WYOMING.

Carbon County.

Kurtz-Chatterton.—The tunnel at this mine at Grand Encampment has been driven 1,400 ft. Another 4-ft. vein of concentrating ore is reported cut, carrying gold and copper. The first carload of machinery was shipped from Chicago April 1st and it is being hauled in from Fort Steele. C. E. Knapp is general manager of the company and Geo. R. Adams superintendent.

FOREIGN MINING NEWS.

AFRICA.

Rhodesia.

The gold output for March is reported at 6,286 oz. crude, which is a decrease of 328 oz. from last year. For the three months ending March 31st the gold output was 17,761 oz. crude, which compares with 19,401 oz. in 1899; showing a decrease of 1,640 oz., or 8.4% this year.

AUSTRALASIA.

Tasmania.

Mount Lyell Mining Company.—This company reports for the four weeks ending April 4th a total of 22,791 tons ore smelted. The total return was 847 tons copper, 58,864 oz. silver and 2,186 oz. gold. The average yield was 3.72% copper, 2.59 oz. silver and 0.10 oz. gold to the ton.

CANADA.

British Columbia—East Kootenay District.

Sullivan.—At this claim, near Kimberley, 20 car-loads are reported ready to ship. The values are in lead and silver. A 10-drill compressor is to be installed, built by the Canadian Rand Drill Company. Chas. H. Wolf is manager.
(From Our Special Correspondent.)

Rossland Ore Shipments.—The output of ore from Rossland mines from January 1st to April 25th, inclusive, amount to 37,000 tons.

Athabasca.—The March run of the mill was 416 tons; value of bullion recovered, \$9,201; value of concentrates, \$1,473; total, \$10,674; average per ton, \$25.06.

Slocan Star.—About 95 men are at work.

Summit Camp.—The ore shipments from January 1st to April 25th amounted to 2,600 tons.

White Water—Ore shipments for April amounted to 336 tons.

Ymir.—The management of this Nelson mine is installing 3 additional boilers, which will give an increase of 240 H. P.

British Columbia—Yale District.

(From Our Special Correspondent.)

Kimberly Group.—E. C. Wood has returned from Kamloops to Rossland, having completed the purchase of this group of 7 claims, 4 miles south of Kamloops, on behalf of Windsor, Ont. and Cleveland, O., parties. The price paid was \$48,500. The purchasers are organizing a company with a capital of \$1,000,000.

Yukon District.

Statistics collected by Mr. Charles G. Yale, of the United States Mint at San Francisco, show that the receipts at mints, assay offices, private refineries and smelters for the calendar year 1899 from the Northwest Territory (Klondike) were \$15,986,627 gold and \$267,390 silver, a total of \$16,254,107. This shows a marked advance in output for the Klondike field, since the increase over the previous year is \$5,028,198.

SOUTH AMERICA.

British Guiana.

The gold entered at the Mines Department in March, on which royalty was paid, amounted to 9,305 oz., against 9,679 oz. in 1899. This is a decrease of 374 oz., or 2.8% this year.

COAL TRADE REVIEW.

New York.

May 4.

Anthracite.

So far as retail buying is concerned the dull season in the anthracite coal trade is fairly on, with little movement to be expected before late summer. Of wholesale buying, however, there is considerable. At Boston the low ocean freights and the knowledge that the large concerns are in a position to advance prices later is leading to buying, and quite a bit of coal is going forward to points east of Cape Cod. At New York trade, both wholesale and retail, is quiet.

In the West there is little activity at the head of the lakes or in Chicago territory. The lake freights obtainable for return cargoes just now are thought so favorable, however, that there is a large movement of coal from Buffalo. The movement is not in response to any immediate needs, but buyers at points up the lakes are laying in supplies to avoid the possibility of getting caught this year as they were last fall. There is also a fair movement to inland points through the canals.

The Anthracite Operators' Association held its annual meeting at the Waldorf-Astoria May 2d. Judging from the reports of some of the after-dinner speeches which appeared next day the dinner was excellent. However, rosy prophecies will not have much influence with the interests opposed to the projected Delaware Valley & Kingston Railroad, and there are people who say that those interests are pretty sure to come out on top in the present contest.

There is nothing to show that any widespread strike at the collieries is impending. The labor leaders evidently do not feel that the miners are well organized yet, and unless some company furnishes a grievance by a palpably unjust or arbitrary act there may be no general strike this year.

There is no talk about cutting prices and quotations are maintained as well as they have been. The small sizes continue in great demand and are likely to be scarce all summer. We quote for free-burning white ash coal f. o. b. New York: Broken, \$3.05@3.20; egg, \$3.30@3.50; nut, \$3.60@3.70; stove, \$3.60@3.70; pea, \$2.40@2.80; buckwheat, \$2.10@2.35.

The Schuylkill Coal Exchange states that its return rate for stove coal sold in April was \$2.46, and the rate of wages for the last half of April and first half of May is 1% below the \$2.50 basis.

Notes of the Week.

The Lehigh Valley Coal Company makes the following statement for March and the 5

months of the fiscal year from November 1st to March 31st:

Earnings.....	March. \$1,282,697	Year. \$5,976,532
Expenses	1,358,979	6,181,040
Loss	\$76,282	\$204,508

For the four months there was a decrease of \$185,717 in gross earnings, and of \$228,585 in expenses.

The statement of the Philadelphia & Reading Coal and Iron Company for March and the nine months of the fiscal year from July 1st to March 31st, are as follows:

Earnings.....	March. \$1,718,973	Year. \$22,236,992
Expenses	1,708,362	2,498,567
Net.....	\$10,211	\$1,738,425

For the four months there was a decrease of \$3,809,381 in earnings, of \$3,013,136 in expenses and of \$796,245 in net earnings.

Bituminous.

In the Atlantic seaboard soft coal trade the demand has dropped off and prices are falling. Enough coal is going forward to supply all wants. The consumers of George's Creek coals are not stocked up, but they are getting enough Clearfield and other coals to keep going. The outlook at the collieries is better so far as labor troubles are concerned. The miners in all the regions about George's Creek have returned to work, and the George's Creek men have appointed a committee representing employees only to meet the executives of the various companies. The miners show a desire to return to work, and the present outlook is that the strike will not last over a week or 10 days longer.

Trade in the Far East is quiet. There is considerable coal on the market at Boston, and not much demand. Along the Sound there is plenty of coal offered consumers, who do not have to hunt for it. There is no trouble in getting coal at New York harbor ports, nor is there any complaint of short supply from the all-rail trade.

Transportation from mines to tide is good, and the cheaper grades of coal are coming through in plentiful supply. Car supply may be called fairly up to demand. In the coastwise vessel market, shippers find plenty of large craft but vessels under 1,000 tons burden are hard to get. Ocean freight rates are 80c. from Philadelphia to Boston, and 65@70c. from Philadelphia to Providence, New Bedford and the Sound.

As noted above, prices have fallen, and Clearfield coal can be had for as low as \$2.55 f. o. b. New York Harbor ports.

Birmingham, Ala. April 30.

(From Our Special Correspondent.)

The Alabama coal market shows no signs of weakening, and the disturbance to the production caused a week or two ago by the excessive rains and the high water following them was felt. The mines are once again in full working order, and the transportation to and from the mines is now easier.

The manufacture of coke is on the increase in Alabama. The Republic Iron and Steel Company has let the contract for 2,000,000 fire brick, with which they will build 400 coke ovens at Thomas, between here and Pratt City, in addition to those already in blast at that place. The operators have no fears whatever except as to the signing of a new contract with the miners. The leaders of the miners have nothing to say; the miners are all too busy even to talk of the prospects. It is confidently hoped there will be no troubles with labor this year.

Cleveland, O. May 3.

(From Our Special Correspondent.)

Coal cargoes have not been nearly as plentiful during the past week, as the vesselmen had anticipated, and there has been some difficulty in maintaining the rates which have heretofore prevailed. There is a prospect that the movement will be a little freer next week, but it is not anticipated that the market generally will show much improvement. The coal men did not figure on doing much business before the latter part of this week, and the start being made some days earlier made it impossible for them to take care of the vessels which were offered. The present rates are 50c. to the head of Lake Superior, 55c. to Portage, 60c. to Green Bay, Manitowoc and Sheboygan, and 65c. to Milwaukee.

Chicago. May 1.

(From Our Special Correspondent.)

Anthracite Coal.—There is very little doing, buying having evidently settled down to a demand for small lots, with moderate delivery. Anthracite is in plentiful supply, several boatloads having augmented stocks. Shipments by rail are behind last year. Prices are somewhat unsteady.

Bituminous coal is in heavy supply, and with the large shipments the stocks are being enlarged from week to week, the demand being less than supply. Prices are decidedly uncertain. Coke has picked up considerably in supply, but

as yet the demand is beyond receipts. Prices are firm.

Pittsburg.

May 2.

(From Our Special Correspondent.)

Coal.—There is no change in the coal situation, the wage differences as to labor outside the mines remaining unsettled. Nothing was accomplished at the conference between committees of the coal combinations and the United Mine Workers, and an adjournment was taken until to-morrow. The situation will be serious unless National President John Mitchell, of the miners' organization, recedes from the position that the outside labor must be given an increase of 20%. All the mines in the district are being operated to their fullest capacity, and a large supply is being loaded on the river. The lake season opened last week, and coal is being shipped from the Pittsburg District to the Northwest. The shipments to that section this season it is believed will exceed all previous years. Owing to the low stage of water in the rivers no coal was sent to the Southern markets this week. Prices remain unchanged, and no further increase is expected until fall.

CConnellsville Coke.—The coke situation is easier, but there is no danger of a slump in prices. The prices of the past month or two were unusually high on account of the urgent demand for coke, but these rates are not likely to continue, as most of the furnaces are fairly well stocked up. Furnace coke is still quoted at \$4@4.25, and foundry, \$4.25@4.50. Of the 20,138 ovens in the region, 19,629 are active and 509 are idle. The production for the week was 216,901 tons, and the shipments aggregated 11,418 cars, distributed as follows: To Pittsburg and river tipples, 2,845 cars; to points west of Pittsburg, 6,409 cars; to points east of Connellsville, 2,164 cars.

Shanghai, China. April 5.

(Special Report of Wheelock & Co.)

Coal.—Good Japan coal is firm, while common kinds are difficult to move, of which stocks are large. Small lots of Cardiff have sold at 19@19.25 taels per ton ex-godown, but the market is now firmer. Sydney Wollongong is still very quiet. Arrivals of all kinds of coal during the fortnight were 28,515 tons, mostly Japanese. We quote, per ton, as follows: Welsh Cardiff, 20.50 taels; Australian Wollongong, cargo ex-godown, 13 taels; and other sorts, 6.50@7 taels; Chinese Kaiping lump, ex-godown, 7.50@8.50 taels, dust 5 taels, and mixed 5.50@6 taels; Japan, all contracted for.

Kerosene Oil.—Business at the Tea Shop is very small, and the spot market for all kinds is weak. Importers are firm in their demands for cargo to arrive, but no transactions have been reported. It is difficult to give reliable quotations. Arrivals during the fortnight were 94,700 cases American oil and 110,000 cases Russian.

Stocks are: American, 782,700 cases; Russian, 704,600; Sumatra, 66,400; total, 1,553,700 cases. We quote, per case, as follows: American Devoe's, 2.25½ taels; Russian, Batum, Anchor & Crescent Chop, 2.12 taels; Star & Crescent Chop, 2.08 taels; Ram Chop, 2.09 taels; bulk oil, 2.05 taels; Sumatra Langkat, bulk oil, 2.05 taels.

SLATE TRADE REVIEW.

New York.

May 4.

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

Size, inches	Monson or Br'n. or ville.	Bangor.	Bangor Ribbon.	Alb'n. or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n	Unf'd G. Green.	Red.
24 x 14	6.10	3.50	3.00	3.25	3.10	5.10	3.15	3.75	.....
24 x 12	6.60	3.50	3.00	3.25	3.10	5.25	3.15	3.75	.....
22 x 12	6.80	3.50	3.25	3.50	3.25	5.25	3.15	4.00	.....
22 x 11	6.50	3.75	3.25	3.50	3.25	5.25	3.15	3.75	.....
20 x 12	6.90	3.75	.....	3.50	3.25	5.25	3.15	3.75	.....
20 x 11	6.80	.....	.....	3.75	3.50	5.25	3.15	.....	.....
20 x 10	6.80	4.50	3.50	3.75	3.50	5.25	3.15	4.25	.....
18 x 12	6.80	3.75	.....	3.50	3.25	5.25	3.15	3.50	11.00
18 x 11	7.00	.....	.....	.....	.....	.....	3.15	3.75	.....
18 x 10	7.20	4.50	3.50	3.75	3.50	5.35	3.15	4.00	11.00
18 x 9	7.10	4.50	3.50	3.75	3.50	5.35	3.15	4.25	11.00
16 x 12	6.80	3.75	.....	3.50	3.50	.....	2.95	3.50	.....
16 x 10	7.10	4.25	3.50	3.75	3.50	5.25	2.95	4.00	11.00
16 x 9	7.00	4.25	.....	3.75	.....	5.35	2.95	4.25	11.00
16 x 8	7.20	4.50	3.50	3.75	3.10	5.35	2.95	4.25	11.00
14 x 10	6.60	3.75	3.25	3.25	.....	5.25	2.85	3.75	11.00
14 x 9	6.50	.....	.....	.....	.....	.....	2.85	3.75	11.00
14 x 8	6.60	3.75	3.25	3.25	3.10	5.10	2.85	4.25	11.00
14 x 7	6.40	3.75	3.25	3.25	3.10	5.10	2.60	4.25	11.00
12 x 10	6.80	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 9	5.60	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 8	5.50	3.50	.....	3.00	2.80	4.85	2.60	3.50	9.50
12 x 7	5.00	3.25	.....	3.00	2.80	4.85	2.50	3.50	9.50
12 x 6	4.80	3.25	.....	3.00	2.80	4.75	2.50	3.50	9.50

A square of slate is 100 sq. ft. as laid on the roof.

In Brownsville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bangor are 50c. extra when full 3-16 in. Intermediate sea green, \$2.35@2.55; purple, \$3.50@4.25; purple

variegated, \$2.50@3.15; red variegated, \$6@8 per square, according to size.

More orders for roofing slate are being booked, and nearly all the quarries are in full blast. Production is steadily increasing, and in the Vermont region quarrymen are endeavoring to maintain prices on a profitable basis, though some are still practicing the cut-rate policy. Stocks of desirable sizes of sea green roofing slate are comparatively small, and dealers complain of slow deliveries. In the Pennsylvania regions there is still some dispute as to prices for roofing slate. Those in the export business are non-committal as regards their prices, but we understand sales are being made at rather low prices when we consider the ruling high freight rates.

The shipments of slate from Slatington and Walnutport, Pa., for the week ending April 26th amounted to 4,167 squares roofing slate, 833 cases school slates and 187 crates blackboards. A better demand is reported for slate flour. Black bolted, in bags, is quoted \$8.75 per short ton, and if barrells at \$9.25, f. o. b. New York. Red and olive flour in carload lots is worth \$20 per ton.

Slate pencils for home consumption are quoted as follows: Plain 5-in. pencils, \$1 per thousand, and for 7-in., \$1.50. For blunt pencils a 5% discount is allowed in addition to the regular discounts for quantities.

Export trade continues quiet. Of the recent shipments 12,000 pieces of roofing slate were sent to South Africa by the Slatington-Bangor Slate Syndicate. Freight rates are strong at 15s. to London.

The exports of slate from the United States in the first three months of this year are compiled by us as below:

	Roofing		Manufactures
	Squares	Value	
January	14,151	\$72,103	\$4,489
February	12,062	60,312	6,701
March	6,249	31,245	10,978
Total	32,462	\$163,660	\$22,168
Total 1899	61,637	284,017	32,726

The total value of exports in 1900 shows a decrease of \$130,915 as compared with 1899. The movement of roofing slate in 1900 was less in quantity by 29,175 squares and \$120,357 in value, and the mill stock \$10,558 in value. The United Kingdom and Australasia continue to take most of our exports of roofing slate.

IRON MARKET REVIEW.

NEW YORK, May 4, 1900.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From	
	May 5, 1899	May 4, 1900		Jan., '99	Jan., '00	
	F'ces.	Tons.	F'ces.	Tons.	Tons.	
An'racite & Coke	197	246,359	260	283,350	4,177,865	5,088,548
Charcoal	20	4,925	29	7,025	89,473	131,491
Totals..	217	251,275	289	4,267,338	4,267,338	5,220,039

The market is still a waiting one, purchasers generally holding off in expectation of the general fall in prices which certain parties are industriously predicting. Some decreases are probable, but there are no signs yet of any heavy break. Bessemer pig is firm still; foundry iron is weaker in the West, though Southern furnacemen are very firm in their views, and are supported by the active inquiry for export. In finished material there are few signs of a break. Though little business has been done, there is plenty in sight. The level of values is below the high figures named in January and February, but there is no reason to doubt that a good business at fair prices is ahead for some time to come.

The Phoenix Bridge Company has taken the contract for the great bridge over the St. Lawrence, at Quebec, for which some 28,000 tons of steel will be required. Bids have been called for on the material for completing the new East River bridge in New York, which will amount to about 18,000 tons.

Notes of the Week.

Imports of iron ore into the United States in March were 95,215 tons, against 37,351 tons last year. For the three months ending March 31st they were 276,236 tons, against 89,207 tons last year, an increase of 187,029 tons.

Birmingham, Ala. April 30.

(From Our Special Correspondent.)

The furnacemen claim that no concessions are being made, and the quotations in public prints are still at the figures which have prevailed for some time. There are rumors, however, that the quotations have tumbled from \$1 to \$4 per ton, the latter figure hardly to be believed; but there is no corroboration. The fact that the furnacemen continue to dispose of much iron for export, with delivery the latter part of the year, is somewhat significant. The furnaces in blast are making but little surplus iron. The local demand is on the increase. Both Vice-President A. M. Shook, of the Tennessee Coal, Iron and Railroad Company, and

J. W. McQueen, secretary of the Sloss-Sheffield Steel and Iron Company, stated last week that there were no indications that the continued rumors and hard assaults being made on the market would have any effect, and that if the furnace companies could hold out as long as they have they certainly could hold a little longer. Conditions in the Birmingham District, as far as work and steady employment of the many thousand employees goes, are most favorable.

Mr. William Jacks, of Glasgow, a member of one of the largest pig iron firms in the world, has been in Birmingham for the past week looking over the iron and steel industries of this section of the world. He takes an optimistic view of the iron market, and pays special attention to the Birmingham District. He says that Alabama iron is growing in favor in England, Scotland and other foreign countries, and that all surplus iron manufactured in this portion will find a way to foreign shores. He does not believe that the market can remain down very long. There is too much iron needed and the stocks are too low. Mr. Jacks passed favorable comment on the iron and steel works seen in this neighborhood.

The Southern Iron Committee recently held a meeting in Nashville, Tenn., and has issued a classification of rates, giving the steel men of this district a little better rate than has been in vogue. Steel billets are to be given a special iron classification, while steel wire, rods and nails will have a special rate also. The steel plant at Ensley on Thursday turned out 600 tons of steel. Only 6 of the 10 furnaces are in blast. The steel wire, rod and nail mill, adjacent to the steel plant, belonging to the Alabama Steel and Wire Company, is now operating every one of its departments, making rods, wire, barbed wire, nails and staples. Within a month or 6 weeks every machine in every department will be in operation.

Secretary G. H. Schuler, of the Alabama Steel and Wire Company, stated last week that the cut of \$1 per keg in nails and \$1 per 100 in wire was partly intended for the Alabama concern.

The supply of raw material is sufficient now, and no trouble is being experienced in this State from that cause. There will be a number of Italian laborers brought into the State to work in the ore mines, colored labor not being procurable in sufficient strength. The Hattie Ensley furnace, belonging to the Sloss Company in the Sheffield District, is about to go into blast, and work of repairing the Lady Ensley furnace in the same territory has been started.

The following quotations are still given: No. 1 foundry, \$18.50; No. 2, \$17.50; No. 3, \$16.50; No. 4, \$16@16.50; gray forge, \$16; No. 1 soft, \$18.50; No. 2, \$17.50.

The blowing in of the Dimmick pipe plant at North Birmingham will be delayed several weeks now on account of a serious accident which occurred there last Saturday. The heavy truss work on the roof gave in and 13 men were precipitated to the ground and crushed by the heavy timbers. Two were killed almost instantly, two others were fatally hurt, and the balance more or less injured.

Buffalo. May 2.

(Special Report of Rogers, Brown & Co.)

The iron market in this vicinity is not only dying, but is actually dead, as far as sales are concerned. There is one grain of comfort—the present state of affairs cannot continue. The prices mentioned below in some cases have been cut, but on Coke Bessemer, and particularly charcoal iron, they are very firm. Shipments on existing contracts are keeping right up, showing foundries in general are melting just as much foundry iron as they were before it was decreed the American Steel and Wire stock was to be reduced. We quote on the cash basis, f. o. b. cars, Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$23; No. 2, \$22.50; Ohio strong softeners, No. 1, \$23.50; No. 2, \$23; Jackson County silvery, 8%, \$30; Southern soft No. 1, \$23.50; No. 2, \$22.50; Lake Superior charcoal, \$26; coke malleable, \$23.

Chicago. May 1.

(From Our Special Correspondent.)

Pig Iron.—The uncertainty in steel and iron circles has had the effect of checking business, the tendency being to hold off until the situation has cleared. Sales of the week have been only in small lots. The call for iron on old contracts has not lessened, consumers apparently being just as eager for iron as they were 3 or 6 months ago. There is ahead of the market an enormous business, and the probability that any severe break in prices will occur is remote. Many furnaces are still sold ahead for months, and this, with other conditions will doubtless create a steady market. Quotations are as follows: Lake Superior charcoal, \$24.50@25.50; local coke foundry No. 1, \$23@24; No. 2, \$22.50@23; No. 3, \$21.50@22; local Scotch foundry No. 1, \$23@24; No. 2, \$22.50@23; No. 3, \$21.50@22; Southern coke No. 1, \$22.35@23.35; No. 2, \$21.35@22.35; No. 3, \$20.35@21.35; Southern No. 1 soft, \$21.35@22.35; No. 2 soft, \$20.35@21.35; Southern silveries, \$26.50@27; Ohio strong softeners, \$24@25; malleable Bessemer, \$24@25; coke Bessemer, \$24@25.

Cleveland, O. May 3.

(From Our Special Correspondent.)

Iron Ore.—The sales market is practically dead, and is likely to continue so for some time to come. The existing depression in iron and steel lines, combined with an opening of navigation earlier than anticipated and a consequent jam of vessels at the head of the lake ports, has also resulted in weakening the transportation market very materially. A still further influence in this direction has been exerted by the grain market, which was expected to furnish cargoes for a considerable portion of the vessels on their first trips. The chartering from Escanaba to Ohio ports opened at 90c., or 10c. lower than the season contract rate and consequently at least 10c. lower than had been anticipated. Yesterday, however, another cut was made, and the tariff went down to 80c. Shippers from the head of the lake are not ready for "wild" tonnage yet, but the vessel owners contend that the rate at the opening will not be below \$1.25. Many shippers, however, are inclined to the opinion that the market will not start off better than \$1.10.

Pig Iron.—The market continues to be absolutely devoid of activity. The Bessemer furnacemen, who have a comparatively small proportion of the year's product unsold, are confident that the present prices will be maintained; but this is by no means the case with the foundry grades. Sales of the latter are now being made only in 50 and 100 ton lots, and consumers are becoming more conservative than ever, in view of the prospect of further labor troubles. The coke supply shows a slight improvement of late, but the supply of cars is as unsatisfactory as ever. We continue quotations: Bessemer, \$24 in the Valley; No. 1 foundry, \$23; No. 2, \$22.50; gray forge, \$21.50; Lake Superior charcoal, \$25.50.

Scrap.—The market shows weakness in spots, and there is an absence of movement in almost all lines. This may be expected to continue as long as the present waiting conditions prevail in other branches of the trade. The continued quotations are: Steel melting stock, \$21.75; No. 1 cast, \$16.50; No. 1 wrought, \$19.50; iron rails, \$24.50; car wheels, \$23.50; turnings, \$13.50; borings, \$12.

Philadelphia. May 3.

(From Our Special Correspondent.)

Pig Iron.—Sales since Monday have been limited to five brands of foundry on a basis of \$23@23.25 for No. 1 X. As to No. 2 X prices are hard to name, though some business was done at \$21.75. No. 2 plain has been quoted down to \$19.50 for some brands. Forge iron is uncertain, and very little is selling. There is a halting all around.

Billets.—Hourly news is awaited from the mills relative to billets, which are quoted at \$34.

Bars.—Quite a number of large buyers are trying the effect of delay. Mill-men visiting here this week from the Schuylkill Valley say that the present indifference of buyers will have no effect. Prices are weak, and 1.85c. is the general quotation for refined. Tested and special steel bars are also off.

Skelp.—The work promised in skelp is now coming along, and the mills are busy.

Merchant Steel.—Agents report no desire of consumers to buy at present, except where they need a little material to patch out. The impression is that all merchant steel quotations will be shaded before long.

Plates.—Boiler plate orders for small lots have been pushed in actively for a few days. Tank plate quotations are solicited on large lots. In a general way prices are pointing downward, and therefore it is dangerous to give out figures to-day which may be falsified to-morrow.

Structural Material.—Shapes are in quite active request, based on 2.40c. for angles. Quite a number of small orders have been gathered up this week. The 27,000-ton order taken by the Phoenix people is of course for distant delivery. There are other big jobs to be bid on early.

Steel Rails.—The stereotyped reports are doled out to-day of big prospects and firm prices, but there is something in the wind. Quoted at \$35.

Old Rails.—Old iron rails have weakened \$1, and old steel rails are held firmly.

Pittsburg. May 2.

(From Our Special Correspondent.)

All the uncertainty regarding prices for Bessemer pig iron was dispelled this week when the independent producers and the Bessemer Pig Iron Association got together and decided to maintain the price at \$24 Valley furnaces, which means \$24.90 Pittsburg. It is given out authoritatively that a lower rate will not obtain this year, and talk of big cuts in steel prices is therefore without foundation. The output of both the Association and independent furnaces is sold into August. Buying for future delivery, however, has stopped on account of the recent reports regarding a probable slump in prices. It is believed that confidence will soon be restored. The pig

Iron producers control the market to such an extent that it is impossible for steel makers to cut their prices without doing so at a loss. With pig iron at \$24, billets cannot be made at a profit at less than \$31. Manufacturers have shaded prices a trifle in some instances, but this is not taken as an indication of a weakness of the market. The foundry iron market is not as strong as it was a month ago. The only serious cut in prices was the recent one in wire and wire nails. In this market wire nails have been \$3.20 a keg, and were cut to \$2.20. As a result cut nails were reduced this week from \$2.50 to \$2.05 a keg. The hardware dealers are puzzled over the situation, and consumers are only buying for their immediate wants. The disturbance in the market did not have any effect on the prices of sheets. The American Steel Sheet Company formally took over yesterday the properties and business of the W. De-wees Wood Company, McKeesport, and its subsidiary interstts, the Wellsville Plate and Sheet Iron Company, Wellsville, O., and the Woodson Steel Company. The latter concern has a site on the Monongahela River above McKeesport and is erecting a big steel plant. The market for pipe and tubes is not as good as it was anticipated it would be two months ago, when the National Tube Company promised all its employees at the McKeesport, Continental and Pennsylvania plants an advance in wages amounting to about 10%, to take effect on May 1st. It has kept the promise, but announced that former wages will be restored on June 1st. The export business has fallen off, which is attributed to the war in South Africa. There has been no advance in prices this year. All the plants of the combination are in full operation, and there is a good volume of business, but not what was expected at the opening of the year.

Pig Iron.—No sales of any consequence of Bessemer pig are recorded for the week, but the price remains firm at \$24 Valley and \$24.90 Pittsburg. Inquiry for foundry iron is falling off, and there were but few sales, buyers only taking small lots. As a result prices are somewhat lower. No. 2, which was quoted last week at \$22.25, has dropped, and is quoted this week at \$21.75@22. The stocks of foundry iron in this district are almost depleted.

Steel.—Bessemer steel billets are quoted this week at \$31, but there were only a few sales of small lots. Open-hearth billets are also lower than last week, and the price ranges from \$33.50 to \$36. Tank plate has declined during the week from 1.80c. to 1.70c.

Sheets.—The sheet market is in a satisfactory condition, and the inquiry is good. Prices have been advanced 0.10c., and No. 27 is quoted at 3.20c. and No. 28 at 3.30c.. No sales for extended delivery are being made, and it is believed a further advance in prices is contemplated.

Ferro-manganese.—The demand still keeps up, but prices are not as strong as a week ago. Small lots are quoted at \$125, but a much lower price can be obtained for a good order.

New York, May 4.

The local iron market remains unsettled, with buyers looking for lower prices. In foreign trade we note 3 locomotives and tenders, valued at \$36,000, shipped to Sweden; a purchase of 2 locomotives and a large amount of railroad material for Mexico; shipments to England of \$100,000 worth of machine tools, and nearly 750 tons of finished machinery; also orders for and shipments of machine tools, aggregating \$75,000, to Germany and Austria.

Pig Iron.—In spite of the weakness in certain lines of finished goods, pig iron prices show little change, and we continue to quote for delivery to July, Northern brands, tidewater delivery: No. 1X foundry \$23@23.50; No. 2, \$21.50@22; No. 2 plain, \$20.50@21; Southern brands, New York delivery: No. 1 foundry, \$22.50@23; No. 2 foundry, \$21.25@22; No. 1 soft, \$22.50@23; No. 2 soft, \$21.25@22; No. 3 foundry, \$21.25@21.50.

Bar Iron.—Quotations are nominally 2@2.05c. for large lots of common on dock; refined bars 2.10; but these prices may be shaded.

Plates.—The market continues rather weak, but considerable material is changing hands. We quote for large lots at tidewater: Tank, 1/4-in. and heavier, 1.95@2c.; tank, 3/16-in., 2.05@2.10c.; shell, 2.15c.; flange, 2.25c.; marine, 2.35c.; firebox, 2.50c.; universals, 2.10c.

Steel Rails and Rail Fastenings.—There is no change. A good market is open abroad in case the mills find orders short here. We quote for standard sections, \$35 f. o. b. Eastern mills. Smaller rails are quoted: 12-lb., \$40; 16-lb., \$40; 20-lb., \$40; 30-lb. to 40-lb., \$38; 40-lb. to standard, \$36, with the usual advance for small orders. We quote angle bars, 2.30c.; fish plates, 2.30c.; spikes, 2.70c.

Structural Material.—The Carnegie Company will furnish the material for the viaduct and erected work of the underground railroad. The approaches to the New East River Bridge will take 18,000 tons of steel; bids will close May 31st. Prices are without change. We quote in large lots at tidewater: Beams, 2.40@2.45c.; channels, 2.40@2.45c.; angles, 2.40c.; tees, 2.40c.

METAL MARKET.

New York, May 4.

Gold and Silver.

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

Metal.	March.		Year.	
	1899.	1900.	1899.	1900.
GOLD.				
Exports	\$1,109,845	\$1,064,350	\$3,433,258	\$3,159,298
Imports	3,187,575	1,921,036	14,728,825	5,308,536
Excess	L. \$2,077,730	L. \$ 856,686	L. \$11,295,567	E. \$2,350,702
SILVER.				
Exports	5,057,653	5,452,422	14,757,533	15,006,265
Imports	3,125,859	3,149,146	7,681,738	8,065,576
Excess	E. \$1,931,794	E. \$2,303,276	E. \$7,075,795	E. \$6,940,689

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

Gold and Silver Exports and Imports, New York

For the week ending May 3d, 1900, and for years from January 1st, 1900, 1899, 1898, 1897.

Per-iod.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$2,692,315	\$46,424	\$794,181	\$180,429	E. \$3,259,643
1900..	6,786,400	1,316,348	13,054,354	1,584,812	E. 16,939,394
1899..	1,888,763	5,536,775	9,513,656	1,009,307	E. 5,056,537
1898..	4,426,339	62,913,330	12,188,145	1,600,626	E. 47,377,922
1897..	6,592,387	1,373,557	14,397,678	774,928	E. 18,841,282

Exports of gold were to Great Britain, Germany and the West Indies; imports were from the West Indies. Exports of silver went chiefly to London; imports were from Mexico and South America.

The United States Assay Office in New York reports the total receipts of silver at 69,000 oz. for the week. Total since January 1st, 1,837,000 oz.

Average Prices of Silver per oz. Troy.

Month.	1900.		1899.		1898.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January...	27.30	59.30	27.42	59.36	26.29	56.77
February...	27.49	59.76	27.44	59.42	25.89	56.07
March.....	27.59	59.81	27.48	59.64	25.47	54.90
April.....	27.41	59.59	27.65	60.10	25.95	56.02
May.....			28.15	61.23	26.31	56.98
June.....			27.77	60.43	27.09	58.61
July.....			27.71	60.26	27.32	59.06
August.....			27.62	60.00	27.48	59.54
September...			27.16	59.89	28.05	60.98
October.....			27.10	59.88	27.90	60.42
November...			27.02	59.87	27.93	60.60
December...			27.21	59.89	27.45	59.42
Year.....			27.44	59.58	2.76	58.26

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

Average Prices of Metals per lb., New York

Month.	COPPER.		TIN.		LEAD.		SPELTER	
	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.
Jan.....	15.58	14.26	27.07	22.48	4.65	4.18	4.65	5.34
Feb.....	15.78	17.02	30.58	24.20	4.675	4.49	4.64	6.28
March....	16.29	16.35	32.90	23.82	4.675	4.37	4.60	6.31
April.....	16.76	17.13	30.90	24.88	4.675	4.44	4.71	6.67
May.....		17.20		25.76		4.44		6.88
June.....		16.89		25.76		4.43		6.88
July.....		17.10		29.63		4.52		5.82
August....		17.42		31.63		4.57		5.65
Sept.....		17.34		32.74		4.58		5.50
October...		16.94		31.99		4.575		5.32
Nov.....		16.49		28.51		4.575		4.64
Dec.....		15.85		25.88		4.64		4.66
Year.....		16.67		25.12		4.47		5.75

Commencing with March 17th, the prices given in the table for copper are the averages for electrolytic copper; this is the case for both 1899 and 1900. The average price for Lake copper for the year 1899 was 17.61c. For January, 1900, the average price of Lake copper was 16.35c.; for February, 16.08c.; for March, 16.55c.; for April, 16.94c.

Prices of Foreign Coins.

	Rid.	Asked
Mexican dollars.....	\$.47 3/4	\$.49
Peruvian soles and Chilean pesos....	.44	.46
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	3.90
Twenty marks.....	4.75	4.88
Spanish 25 pesetas.....	4.78	4.82

Financial Notes of the Week.

Business continues active and no especial changes are to be noted. The gold movement which began in a small way last week shows an increase, and it is understood that at least \$3,000,000 will be shipped on Saturday's steamers. This is due to the high rates of interest in London and Berlin.

The silver market has ruled very steady and strong this week, with advancing tendencies on special orders, probably for the English mint. It closes firm at 27 9/16d. in London.

The statement of the United States Treasury on Wednesday, May 2d, shows balances in excess of outstanding certificates as below, com-

parison being made with the statement of the corresponding day last week:

	April 25.	May 2.	Changes.
Gold.....	\$2,044,655	\$79,461,991	D \$2,562,694
Silver.....	9,451,001	8,807,830	D 643,163
Legal tenders.....	10,023,189	12,588,568	I 2,565,379
Treas. notes, etc....	657,778	837,941	I 180,163
Totals.....	\$102,170,623	\$101,606,309	D \$480,314

Treasury deposits with national banks amount-

Imports and Exports of Metals.

Port.	Week, May 2.		Year 1900.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum.....long tons		**8	42	33
Antimony ore.....			989	989
" regulus.....			397	397
Chrome ore.....			151	151
Copper, fine.....	2,351	504	37,258	8,367
" matte.....			989	989
" ore.....			640	640
" ash.....			41	41
Ferro-Chrome.....			10	10
Ferro-manganese.....		**12	152	152
Iron ore.....			7,874	7,874
" pig, bar, rod.....	607	**105	2,652	1,573
" pipe.....	204		4,918	124
" plates, sheets.....			502	43
Lead.....	1,778	1,650	30,266	30,266
" ore.....			7,300	7,300
" dross.....			24	24
Manganese ore.....			4,584	4,584
Metals, old, scrap.....	7	**428	1,201	3,758
Composition.....			906	906
Nails.....	371		10,033	10,033
Nickel.....	54		724	55
" ore, matte.....			2,821	2,821
" Rail's material.....	60	**175	485	1,617
" Rails, old.....			206	518
" Spiegeleisen.....			1,300	1,300
" Steel bars, plates.....	90	**476	3,095	8,055
" rails.....	3,756		17,432	18
" wire.....	1,205		6,710	18
" not spec'd.....	85	**20	2,925	1,139
Tin.....		615	3	9,581
" dross or ashes.....			3	3
" and black plates.....			1546	11,815
Zinc.....	22	**4	2	58
" dross.....	20		311	50
" ashes, skim.....	10		466	20
" ore.....			6,050	6,050
†Baltimore.				
Chrome ore.....long tons	351		16,736	2,930
Copper, fine.....			1,703	1,703
" matte.....			155	155
Ferro-manganese.....			17,522	17,522
Iron pig, bar, etc.....	33		1,338	11,849
" ore.....			78,489	78,489
" pyrites.....			4,150	4,150
Manganese ore.....			384	384
Metals, old & Rails.....			1,175	1,175
Nails.....	10		1,583	1,583
Pipe, iron & steel.....	52		85	85
Silicon.....			85	85
Spiegeleisen.....			857	1,388
Steel, bars, etc.....	149		20	611
" wire.....			35,521	67
" rails.....			204	1,368
" and blackplates.....				
*Philadelphia.				
Antimony.....long tons			5	5
Chrome ore.....			200	200
Copper, fine.....			1,417	1,417
" ore.....			6,872	6,872
Iron, pig.....			486	486
" ore.....			8,104	8,104
" pyrites.....			34,334	34,334
Manganese ore.....			3,500	3,500
Spiegeleisen.....			143	143
" and black plates.....			127	1,557
Zinc ore.....			1,500	1,500

Total United States.††

Articles.	March, 1900.		Year, 1900.	
	Expts.	Impts.	Expts.	Impts.
Antimony.....long tons		34		681
" ore.....		382		730
Copper fine.....	17,607	2,829	45,311	10,683
" ore & matte.....	1,081	833	2,161	4,103
Iron, pig & bar.....	9,125	6,697	28,979	22,645
" ore.....	120	95,215	120	276,286
Iron & steel plates.....	3,311	606	7,514	4,003
Iron & steel rails.....	32,808	1	67,329	288
" wire.....	8,130	194	19,736	453
Lead, pigs, bars.....			280	603
" & old.....	241	591	21,883	20,155
Lead in ore, etc.....	6,723	7,269		
Manganese ore.....			135,418	135,418
" and oxide.....			575	575
Nickel " & matte.....	277		2,291	2,291
Nails, cut.....	989		12,522	12,522
" wire.....	3,848		144	144
Quicksilver.....	37			
Steel, billets, rods, etc.....	4,771	3,502	11,282	10,552
Tin.....	34	3,292	54	8,11

ed to \$110,886,176, a decrease of \$691,542 during the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending April 28th gives the following totals, comparison being made with the corresponding weeks in 1899 and 1898:

	1898.	1899.	1900.
Loans and discounts	\$70,198,100	\$70,038,400	\$77,548,600
Deposits	658,503,300	883,595,300	852,062,500
Circulation	14,254,300	13,936,700	21,128,300
Reserve:			
Specie	158,892,800	189,168,400	163,468,900
Legal tenders	50,737,700	67,255,100	66,621,000
Total reserve	\$209,130,500	\$246,423,500	\$230,089,900
Legal requirements	164,625,825	220,898,825	213,015,625

Balance, surplus... \$44,504,675 \$25,524,675 \$17,074,275
Changes for the week this year were increases of \$7,075,300 in loans and discounts, \$9,433,100 in deposits, \$1,629,300 in specie, \$2,908,900 in legal tenders, and \$2,179,925 in surplus reserve; a decrease of \$261,800 in circulation.

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

Banks.	1899.		1900.	
	Gold.	Silver.	Gold.	Silver.
N.Y. Ass'n.	\$189,168,000	.....	\$163,468,900	.....
England	156,359,615	.....	163,342,325	.....
France	363,607,970	\$241,459,850	388,833,835	\$226,861,855
Germany	144,130,000	74,250,000	135,610,000	69,855,000
Spain	58,270,000	62,825,000	68,445,000	78,465,000
Aus.-Hun.	150,220,000	52,330,000	183,050,000	48,135,000
Neth'l'ds.	19,175,000	34,255,000	24,340,000	29,770,000
Belgium	14,745,000	7,375,000	14,565,000	7,285,000
Italy	77,005,000	13,790,000	77,390,000	8,660,000
Russia	485,615,000	25,115,000	422,500,000	36,415,000

The returns of the Associated Banks of New York are of date April 28th, and the others are of date April 26th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports gold only.

Shipments of silver from London to the East for the year up to April 19th, 1900, are reported by Messrs. Pixley & Abell's circular as follows:

	1899.	1900.	Change.
India	\$1,423,300	\$1,533,160	I. \$109,860
China	409,630	138,460	D. 271,170
The Straits	24,907	70,990	I. 46,083

Totals..... \$1,857,837 \$1,742,610 D. \$115,227
Arrivals for the week this year were \$335,000 in bar silver from New York, and \$13,000 from Australia; total, \$348,000. Shipments were \$115,800 in bar silver to India.

Indian exchange has been weak, and Council bills sold in London at an average of 15.97d. per rupee. The Indian Government proposes to supplement its cash resources by borrowing 3 crores of rupees in India. No indication has yet been given as to when the loan will be issued. Apparently an effort is to be made to postpone the issue until the easy-money period.

Imports of specie at San Francisco in March were \$47,650 gold and \$255,508 silver. For the three months ending March 31st the imports were:

	Coin.	Bullion.	Totals.
Gold	\$79,676	\$ 71,762	\$151,438
Silver	76,330	518,521	594,851
Totals	\$156,006	\$590,283	\$746,289

In 1899 the total for the quarter was \$6,590,509; but this included \$5,606,208 gold from Australia, and none has come from that country this year. The receipts this year were from: Mexico, \$637,463; British Columbia, \$18,319; Central America, \$21,241; Australia, \$5,630; South America, \$1,280; Hawaiian Islands, \$59,140; China, \$3,216.

The coinage executed at the mints of the United States in April and four months of this year is reported by the Bureau of the Mint as below:

Denominations	April		Jan.-April	
	Pieces.	Value.	Pieces.	Value.
Double eagles	646,100	\$12,922,000	2,324,513	\$46,490,260.00
Eagles	.....	.....	374,891	3,748,910.00
Half eagles	.....	.....	39,150	195,750.00
Quar. eagles	.....	.....	88	220.00

	April	Jan.-April
Total gold	646,100 \$12,922,000	2,738,642 \$50,435,140.00
Dollars	2,922,000 \$2,922,000	10,512,377 10,512,377.00
Half-dollars	1,004,000 502,000	1,728,377 864,188.50
Quarter-dollars	1,328,000 332,000	3,435,090 2,767,090.50
Dimes	1,740,000 174,000	3,400,377 1,990,377.70

	April	Jan.-April
Total sil.	6,994,000 \$3,980,000	19,076,221 \$16,134,033.70
Five c. nickels	1,589,000 79,450	7,294,877 361,743.85
One c. bronze	4,405,000 43,080	19,987,377 199,878.77

Total mnr. 5,892,000 \$122,480 27,222,754 \$661,622.62
Total c'n'g. 13,532,100 \$16,974,480 49,037,617 \$67,130,796.32

As compared with March, the coinage in April shows a decrease of \$411,376 in silver, but an increase of \$325,760 in gold.

Other Metals.

Daily Prices of Metals in New York.

Apr.-May.	Sterling Exchange	Silver.		Copper.				Spelter.		
		Fine oz.	London.	Lake, cts. @ lb.	Electrolytic @ lb.	London, # @ lb.	Tin, cts. @ lb.	Lead, cts. @ lb.	N. Y. cts. @ lb.	St. L. cts. @ lb.
28	4.88	59 3/4	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	.....	29 3/4	4.65 @ 4.70	4.60	4.50
30	4.88	59 3/4	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	76 1/2	30	4.65 @ 4.70	4.60	4.50
1	4.88	59 3/4	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	76	30 1/4	4.65 @ 4.70	4.55	4.45
2	4.88	60	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	76 1/2	30 1/4	4.65 @ 4.70	4.55	4.45
3	4.88	60	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	75 3/4	29 3/4	4.65 @ 4.70	4.55	4.45
4	4.88	60 1/2	27 1/2	16 1/4 @ 17	16 1/4 @ 16 3/4	75 3/4	29 3/4	4.65 @ 4.70	4.55	4.45

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

Copper.—The market has been very dull; not that there is any complaint against the volume of business done by the manufacturers, which is about as large as it has been, but there is a lack of confidence in present prices and a doubt that they can be maintained. A material change in values can hardly be looked for if there is not going to be either a decided falling off in the consumption or an unlooked-for increase in the production, of neither of which conditions are there as yet any symptoms. Prices are a fraction lower; or, to state it more correctly, the views of buyers are. We quote Lake copper, 16 1/4 @ 17c.; electrolytic, in cakes, bars or ingots, 16 1/4 @ 16 3/4c.; electrolytic cathodes, 16 1/4 @ 16 1/2c.; casting copper, 16 1/2c.

In the London market, the changes have been more pronounced. Standard copper, which last week closed at £77 5s. for spot and £76 5s. for three months, has since declined to £75 15s. for spot and £75 for three months prompt. It closes at £75 5s. @ £75 7s. 6d. for spot and £1 2s. 6d. lower for three months.

Refined and manufactured sorts are quoted: English Tough, £79 @ £80; Best Selected, £80 @ £81; Strong Sheets, £87 10s.; India Sheets, £84 10s.; Yellow Metal, 7 1/4d.

Statistics for the second half of the month show an increase in the visible supplies of 800 tons.

Lead is without quotable change, the price in New York remaining at 4.65 @ 4.70, and at St. Louis 4.55 @ 4.57 1/2c.

The London market is unchanged at £16 17s. 6d. @ £17 for Spanish and £17 @ £17 2s. 6d. for English lead.

Imports of lead into the United States and re-exports of foreign lead are reported by the Bureau of Statistics of the Treasury Department for the three months ending March 31st as below, in pounds:

	1899.	1900.
Lead in ores and bullion	58,058,568	45,250,768
Lead, metallic	283,918	1,349,580
Total imported	58,342,486	46,600,348
Exports of foreign lead	40,424,277	49,052,529
Excess, imports	17,918,209	.....
Excess, exports	.....	2,452,181

Of the imports this year 43,119,245 lbs. (92.5%) were from Mexico, 3,167,603 lbs. (6.8%) from Canada, and only 313,706 lbs (0.7%) from other countries. The exports this year exceeded the imports, reducing the accumulated stocks.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: The lead market is quiet. Soft Missouri lead is worth 4.55c., and chemical 4.57 1/2c., East St. Louis.

Tin displayed considerable strength early in the week, the price for spot and near-by delivery advancing to 30 1/4c., but some of this gain was lost toward the end of the week, when the metal was offered at 29 3/4c., and to-day it closes at 29 3/4c.

Transactions were very few and for small quantities only. Consumption in this country appears to be not quite so good as it has been, and on its maintenance appears just now to depend the course of the market.

In London the prices have moved within a narrow range, the market advancing slowly but steadily to £137 for spot and £136 10s. for three months, until yesterday, when there was a drop of £1 to £136 for spot and £135 15s. for three months, the closing price to-day being £135 7s. 6d. @ £135 10s. for spot, and 7s. 6d. lower for three months.

The statistics for the month of May show a decrease in the visible supplies of 3,000 tons.

Imports of tin into the United States for the three months ending March 31st were: East Indies, 7,360,113 lbs.; Australasia, 313,656 lbs.; Great Britain and Holland, 10,309,984 lbs.; other countries, 198,613 lbs.; total, 18,182,366 lbs.,

against 18,665,475 lbs. in 1899. This shows a decrease of 483,109 lbs. this year. Visible supplies of tin May 1st are reported as below, in long tons, of 2,240 lbs.:

	Store.	Afloat.	Totals.
London	4,940	1,476	6,416
Holland	1,338	1,507	2,845
U. S. exc. Pacific ports	2,985	3,935	6,920
Totals	9,273	6,918	16,191

The total supplies show a decrease of 1,370 tons or 7.8%, as compared with April 1st; and a decrease of 3,938 tons, or 19.6% from May 1st, 1899.

Spelter.—The market keeps dull, notwithstanding the extremely heavy exports which have been and are still being made. We quote the metal at 4.60 New York, and 4.45 @ 4.50 St. Louis.

The London market, too, has receded still further, the quotation at one time having been as low as £21 15s. for good ordinaries.

Exports of spelter or metallic zinc from the United States in March were 6,288,944 lbs., against 3,505,917 lbs. in 1899. For the three months ending March 31st the exports were 12,273,932 lbs., against 9,373,597 lbs. last year; an increase of 2,900,335 lbs. The exports of zinc ore for the three months were 10,408 tons, against 7,107 tons last year; an increase of 3,301 tons.

Antimony.—We quote Cookson's 10 1/2c.; Hallett's, 9 3/4c.; U. S. Star, 9 1/2 @ 9 3/4c.

Nickel.—The price of this article continues 45 @ 50c., according to size of order.

Platinum.—Consumption has increased and prices are higher. For ingot platinum in large quantities \$18.20 per Troy oz. is quoted in New York.

Chemical ware (crucibles and dishes), best hammered metal, from store in large quantities, is worth 70 1/2c. per gram.

Quicksilver.—The New York quotation is unchanged at \$51 per flask for large lots; for small orders \$52.50 @ \$54 is asked. San Francisco quotations are \$51.50 for local deliveries, and \$46.50 @ \$47 for export.

The London price is now £9 10s. per flask, with the same figure quoted from second hands.

Exports of quicksilver from all United States ports for the three months ending March 31 were 319,004 lbs., against 382,668 lbs. last year; a decrease of 63,664 lbs.

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

	Per lb.	Per lb.
Aluminum	.....	.....
No. 1, 90% ingots	33 @ 37c.	Ferro-Titanium (20%) \$1.00
No. 2, 90% ingots	31 @ 34c.	Ferro-tungsten (37%) 40c.
Rolled sheets	42c. up	Magnesium 2.75 @ 3.00
Alum.-bronze	20 @ 23c.	Manganese (over 99%) 1.05
Nickel-alum	33 @ 39c.	Mangan's Cop (20% Mn) 32c.
Bismuth	..... \$1.70	Mangan's Cop (30% Mn) 38c.
Chromium (over 99%)	1.10	Molybdenum (Best) 1.45
Copper red oxide	60c.	Phosphorus 40 @ 50c.
Ferro-Molyb'dum (50%)	1.05	Tungsten (Best) 1.00
Ferro-Titanium (10%)	90c.	.....

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

LATE NEWS.

A dispatch from Pittsburg says: "The American Steel Hoop Company of Pittsburg and the Republic Iron & Steel Company of Chicago have formed the Union Ore Company and secured a lease on 40 acres of the best ore land in the vicinity of Virginia, Minn. The land is in the Mesabi Range and not far from the large holdings of the Oliver Mining Company."

A dispatch from Quincy, Mass., May 3d, says: "The labor troubles which have existed between the granite manufacturers and the cutters of this city since March 1st ended this afternoon, when the cutters in mass meeting voted to accept the latest proposal of the manufacturers, that 8 hours shall constitute a day's work, with a minimum wage of 33c. per hour, the existing piece bill of price to be advanced 14%, the same to hold good for 5 years. The cutters accepted the above with a slight modification as to the length of time the settlement shall last. Their desire is to test the proposition uninterruptedly for 3 years, and at the end of that time if any differences arise to submit to arbitration."

By Telegraph.

(From Our Special Correspondent.)
Salt Lake City, Utah, May 3.—Winter Quarters Mine of the Pleasant Valley Coal Company, at Scofield, is the scene of the most horrible catastrophe in the annals of Western mining. On May 2d over 300 men went to work, of whom less than 50 are alive. What caused the first explosion probably will never be known. Some idea of its force may be gleaned from its carrying a horse and boy out of the main tunnel and across a gulch as though shot from a cannon. Already 247 bodies have been recovered and the relief parties are still at work. Winter Quarters was always counted the safest coal mine in the West and men have been eager to work there, and there has never been a hint of negligence or complaint against the company.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 560.)

New York, May 4.

The imports and exports of chemicals, etc., at all United States ports in March were as below:

Articles.	March.		Year, 1900.	
	Imports.	Exports.	Imports.	Exports.
Bleaching Powder, lbs.	18,659,367	.....	41,955,377	452
Caustic Soda, lbs.	900,364	67,759	2,334,377	232,881
Sol. Soda, lbs.	545,440	.....	1,318,446	.....
Soda Ash, lbs.	9,867,825	6,500	30,472,030	8,500
Chlorate of Potash, lbs.	120,618	116,800	266,589	120,720
Copper Sulphate, lbs.	.....	10,391,926	.....	22,210,694
Nitrate of Soda, tons.	8,897	190	29,987	672
Muriate of Potash, lbs.	8,403,028	.....	21,652,747	114,794
Phosphate rock, tons.	6,615	52,516	99,942	142,507
Pyrites, "	38,504	.....	96,977	.....
Brimstone, "	25,819	201	43,200	206
Salt-peter, lbs.	1,390,077	.....	3,851,111	.....

All the imports show an increase over February, excepting nitrate of soda and phosphate rock, which show a falling-off. The exports were also larger in all articles with the exception of bleaching powder, caustic soda and muriate of potash, which were notably less than February.

Heavy Chemicals.—Prices are very little changed from last week. Fewer contracts are being booked, and impression is that with the completion of the soda ash plant of the Columbia Chemical Company at Baberton, O., orders for 1901 and 1902 delivery will be taken at lower prices than those now ruling. This plant will have a capacity of 120,000 tons a year, and it is intimated by the Pittsburg glass people who are interested that later on a 240,000-ton plant will be erected. When the company was incorporated some months ago soda ash makers doubted the intentions of the promoters, but now that a plant is actually being erected some uneasiness is manifest in the trade. This concern will supply the soda ash needed by the Pittsburg Glass Company, which is an important consumer. It is also likely that other glass makers will buy the surplus product. We quote per 100 lbs., as below:

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York.	In New York.
Alkali, 58% 48%	80@85 85@90	95@1.00 1.00@1.05	85@90 1.02@1.05
Caustic Soda, high test	\$1.35@1.50	2.25@2.30	\$2.50@2.60
powd 60% 70@74% 88%	..... ..... .....	3.00@3.25 3.25@3.50 3.50@4.00	..... ..... 3.75@4.00
Sol. Soda "conc.	70@80 1.15@1.75	..... .....	67@72 1/2 1.60@1.65
Bicarb. Soda, "extra	1.25@1.37 1/2 3.25@3.50	..... .....	1.75@2.00
Bleach Pdr., Eng. prime, other br'nds.	..... .....	..... .....	1.87 1/2@2.00 1.62 1/2@1.75
Chl. Pot. cryst. powd.	..... .....	9.50@9.75 9.75@10.00	10.00@10.25 10.25@10.50

Acids.—Contract deliveries are good, especially for sulphuric and muriatic acids. Blue vitriol is stronger and further large exports are reported.

Quotations as below are for large lots delivered in New York and vicinity, per 100 lbs., unless otherwise specified:
 Acetic, No 8 in lbs. \$1.62 1/2
 Blue Vitriol, 5.25@5.50
 Aqua Fortis, 38° 3.62 1/2
 Aqua Fortis, 35° 3.87 1/2
 Aqua Fortis, 40° 4.12 1/2
 Aqua Fortis, 42° 4.50
 Muriatic, 18° 1.20
 Muriatic, 20° 1.35
 Muriatic, 22° 1.50
 Nitric, 38° \$3.87 1/2
 Nitric, 38° 4.12 1/2
 Nitric, 40° 4.37
 Nitric, 42° 4.75
 Oxalic 5.85@6.00
 Sulphuric, 66° 1.20
 Sulphuric, 60° 1.05
 bulk 50° ton 11.00
 Sulphurous, 100% SO₂ anhydrous, 8.00@10.00

Brimstone.—Dull. Recently a cargo of Japanese sulphur arrived at San Francisco. Spot best unmixed seconds are quoted \$21.50@21.75 per ton, and shipments \$21@21.25, while best thirds hold at about \$2 less per ton. Great Britain imported in the three months ending March 31st a total of 4,627 long tons, against 5,197 tons in 1899.

Pyrites.—A charter of 1,797 tons is noted from Huelva, Spain, to Pensacola at 13s. Great Britain is increasing its imports of pyrites, for in the three months ending March 31st it received 206,542 long tons, as against 164,909 tons in 1899. The domestic demand is filled principally by deliveries on contract. The Piley's Island pyrites mines, worked by the Sulphur Ore Company, were advised were closed down about three months ago, as they are practically exhausted. As all the available supply of these pyrites has been sold we withdraw our quotations.

We quote: Mineral City, Va., lump ore, \$4.50 per long ton (basis 42%), and fines, \$4.20. Charle-mont, Mass., lump, \$5.50, and fines, \$5. Spanish pyrites, 13@15c. per unit, according to percentage of sulphur contents, delivered ex ship New York and other Atlantic ports. Spanish pyrites contain from 46% to 51% of sulphur; American, 42% to 44%.

Fertilizing Chemicals.—The United States Menhaden Oil and Guano Company, incorporated a few weeks ago with a \$200,000 capital stock, is now declared the successor of the American Fisheries Company, the late menhaden combine. The new company's stock is to be increased to \$2,000,000 or \$2,500,000, and it will have a working capital of \$500,000. Capt. N. B. Church, head of the old combine, is president of the new company. Sulphate of ammonia, foreign gas liquor, to arrive is quoted at \$2.92 1/2@2.95 per 100 lbs., and on spot at \$2.97 1/2@3, while domestic gas is worth \$2.85@2.90 f. o. b. Boston. High grade Western blood holds at \$2.05@2.10 per unit, f. o. b. Chicago; tankage, \$1.95 and 10 f. o. b. Chicago for 9 and 10; domestic steam ground bone, \$21@22 per ton.

Phosphates.—The Florida high grade rock shipments last month, when compiled, will probably show 55,000 or 60,000 tons, and it is believed May will also be large. Prices, f. o. b. Fernandina, are unchanged, though it is said as low as \$7.50 has been quoted for high grade rock. We understand some large miners and exporters are not quoting for next year's business, as they are already well sold up and anticipate more money for their product. The official inspection of the South Carolina mines showed the industry to be in a good condition, and rock is bringing a satisfactory price. The shipments from Charleston, S. C., in the three months ending March 31st amounted to about 60,205 tons, as against 56,100 tons in 1899. Tennessee phosphates are in fair request, and unchanged in price. The foreign market for American phosphates is quiet, as superphosphate manufacturers are holding off from buying in anticipation of obtaining lower prices. On the other hand, reports are current that a good supply of Christmas Island phosphate are being offered in the European market, but as it is quoted above the high grade stuff from Florida, business is limited.

The exports of phosphates from the United States in the quarter ending March 31st were about as follows, comparison being made with last year, in long tons.

	1899.	1900.	Changes.
Florida.....	135,511	88,841	D. 46,670
Tennessee.....	20,330	31,810	I 14,480
S. Carolina.....	23,273	18,856	D. 4,417
Total tons.....	179,114	142,507	D. 36,607

The Florida phosphates were chiefly rock, which amounted this year to 67,214 tons, or 76% of the State's total, showing a decrease of 37,027 tons as compared with 1899.

The shipments of phosphates from Bone, Algeria, in the two months ending February 28th amounted to 35,633 metric tons, against 44,375 tons in 1899, showing a decrease of 8,742 tons in 1900. The ocean freight rate to consumers in Germany is about \$3.50 per ton, to Stettin, while to Gothenburg, Sweden, it is \$3. We quote as follows:

Phosphates.	Per Ton F. o. b.	C. i. f. U'n'd Kingdom or No Sea Ports.	
		Unit.	Long ton.
*Fla. hard rock (77@80%)	\$8.00@8.50	8 1/2@8 3/4	\$12.87@13.06
*Fla. land pebble (68@73%)	4.35	7d	9.80
*Fla. Peace River (58@63%)	3.00@3.50	6 1/2@6 3/4	7.80@7.95
*Tenn. rock (78@81%)	3.25@3.75	7@7 1/2	10.06@11.25
*Tenn. rock (70@75%)	2.25@3.00	.....	.....
*So. Car. rock, undried	3.75@4.00	.....	.....
*So. Car. rock, dried	4.50@4.75	.....	.....
*So. Car. rock, ground	6.00	.....	.....
Algerian, rock (63@70%)	.....	7d	9.30
Algerian, rock (58@63%)	.....	6 3/4d	8.18

*Fernandina. †Mt Pleasant. ‡Fetteressa. Concentrated phosphates, 13@15%, average P₂O₅, 6 1/2c. per unit (\$9 per ton). Tennessee acid phosphates, high grade, \$12 per short ton, and low grade, \$10, f. o. b. Nashville.

Nitrate of Soda.—An arrival of 26,017 bags at the port is noted. The market is weaker, and spot sold down to \$1.80 per 100 lbs. When the steamers in port have been discharged we look for a reaction in prices. Futures, however, remain firm at \$1.75, owing to the continued high freight rates and scarcity of tonnage.

Messrs. Jackson Brothers, of Valparaiso, Chile, advise us under date of March 24th that transactions during the fortnight have been very limited, as producers maintain their former prices, while buyers have had their limits reduced. For near deliveries sellers show an inclination to accept somewhat lower figures, but the scarcity of disposable tonnage and the high freights ruling eliminate all possibility of doing business. The production in February was 2,169,190 qtls., making a total for the two months of 4,848,500 qtls., as against 4,298,000 qtls. last year. The world's consumption in the two months of 1900 is advised as 6,729,539 qtls., against 6,086,529 qtls. in January-February, 1899, showing an increase of 643,010 qtls. We quote 95%, March-April, 4s. 11d.; April-May, 5s.; June, 5s. 1d.; July, 5s. 2d.; August, 5s. 2 1/2d.; September-December, 5s. 3 1/2d., all ordinary terms, with few sellers, the majority holding for higher prices. The refined quality can be had at 5s. 3d. for April-June, and 5s. 5d. for July-December delivery. The price of 4s. 11d., with 3s. 9d. all around freight, stands

in 7s. 1 1/2d. per cwt. net cost and freight, without purchasing commission. Sales for March 10th-24th aggregate 227,000 qtls., at 5s@5s. 4 1/2d., deliveries extending from April 1st to November 1st.

Messrs. Mortimer & Wisner in their monthly statement of nitrate of soda, dated New York, May 1st, give the following statistical information:

	1900.	1899.	1898.
	Bags.	Bags.	Bags.
Imp. into Atlantic ports from West Coast S. A., from Jan. 1, 1900, to date.	327,563	184,283	257,673
Imp. from Jan. 1 from Europe	2,063	.....	.....
.....	329,616	184,283	257,673
Stock in store and afloat May 1, 1900, in New York	34,573	15,852	18,391
Boston.....	.....	.....	.....
Philadelphia.....	.....	.....	.....
Baltimore.....	19,585	500	.....
Norfolk, Va.....	.....	.....	.....
Charleston.....	.....	.....	.....
To arrive, due Aug 15, 1900.	237,350	347,000	286,000
Vis. supply to Aug 15, 1900	291,508	363,362	304,391
Stock on hand Jan. 1, 1900..	9,586	58,406	15,383
Deliveries in April.....	86,220	86,609	52,477
Deliveries since Jan. 1 to date	285,044	226,337	254,665
Total yearly deliveries....	.....	976,592	967,525
Prices current, May 1, 1900	\$1.82 1/2	\$1.65	\$3.00

Liverpool. April 24.

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

The market for heavy chemicals is firm generally, but there is not much fresh business reported, buyers being pretty well filled up on contracts.

Soda ash is in moderate supply and quotations vary according to export market. We quote range for tierces about as follows: Leblanc ash, 48%, £4 15s.@£5; 58%, £5 5s.@£5 10s. per ton net cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. per ton net cash. Bags are 5s. per ton under price for tierces.

Soda crystals are firm at £3 2s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets.

Caustic soda, while not particularly active, is firmly held owing to scarcity. High strength is especially scarce. We quote spot range: 60%, £9 5s.; 70%, £10 5 s.; 74%, £10 15s.; 76%, £11@£11 5s. per ton, net cash.

Bleaching powder is rather dull, although quotations are nominally unchanged at £7@£7 5s. per ton, net cash, for hardwood packages.

Chlorate of potash is in light demand at 4 1/4@4 1/2d. per lb., net cash.

Bicarb. soda is selling at varying prices, according to destination, prices ranging from £5 5s.@£5 15s. per ton, less 2 1/2% for the finest quality in 1 cwt. kegs., with usual allowances for larger packages.

Sulphate of ammonia is slow of sale at about £11 12s. 6d.@£11 15s. per ton, less 2 1/2% for good gray, 24@25% in double bags f. o. b. here.

Nitrate of soda is inactive, and rather lower at £8 15s.@£9 per ton, less 2 1/2% for double bags f. o. b. here, as to quality and quantity.

MINING STOCKS.

Complete quotations will be found on pages 547 and 548 of mining stocks listed and dealt in at:

Boston.	Philadelphia.	Montreal.
Colo. Springs.	Spokane.	London.
Denver.	Salt Lake.	Mexico.
New York.	San Francisco.	Paris.
	Toronto.	

New York. May 4.

Amalgamated Copper stock has been unfavorably affected by the litigation now going on in the Montana courts. Hence sales of it were made at \$88 1/4, showing a loss of nearly 4 points during the week. On Thursday only \$88 was bid. Anaconda also fell from \$46 to \$44 1/4 on sales. British Columbia Copper sold at \$11 1/2@ \$11 1/4. More has been done in Union Copper of North Carolina; sales were reported at \$7 1/2@ \$8 1/4. Arizona lead is said to have brought \$15 1/4@ \$16 1/4 on curb, apparently among insiders. American Smelting and Refining is weaker at \$36 1/2@ \$37 1/2 for the common, and \$88 1/4@ \$88 1/2 for the preferred. Arizona Copper Smelting sold at \$10 1/2@ \$11.

Standard Consolidated of California sold at \$4.15, and after declaring a 10c. dividend receded to \$3.87 1/2. Plymouth was strong at 16c.

Kingston & Pembroke of Ontario brought 40c., and Alice of Montana, 50c. Ontario, of Utah, sold at \$9, and Horn Silver at \$1.25. The Colorado shares are in most request. Portland, of Cripple Creek changed hands at \$2.60; Isabella at \$1.30; Work, 25c. the lowest price for a long time, Garfield, 18@17 1/2c.; Alamo, 16c.; Pharmacist, 14@12 1/2c.; Cripple Creek Consolidated, 14 1/2c.; and Mollie Gibson, 24c. A sale of Iron Silver was made at 70c., of Lacrosse at 15c., and Dimkin, 9c.

Of the Comstocks Consolidated, California & Virginia sold at \$1.55@1.50, Ophir at 66c.; Mexican, 33c., and Yellow Jacket, 20c.

Listings on the New York Stock Exchange are \$325,000 additional preferred stock of the American Tin Plate Company.

Boston. May 2.

(From Our Special Correspondent.)

Far from any improvement this week, we have had an exceedingly dull and narrow market. The transactions in mining stocks have been too small to excite any interest at all, and prices were at every one's mercy. It was not a market where any effort to start a boom in any stock would be encouraged. It looks as if we were in for a period of stagnation.

Calumet & Hecla sold at \$750; Boston & Montana at \$296; Butte & Boston at \$70; Osceola at \$67. In the gold stocks Cochiti was quoted at \$11; Gold Dredging at \$4; Merced at \$8; Santa Ysabel, \$1½. In the general list United States Oil sold at \$19½, while Dominion Coal brought \$45; New England Gas and Coke, \$19. Montana Coal and Coke sold at \$8.

At the special stockholders' meeting of the Santa Ysabel Gold Mining Company, April 30th, at Cheyenne, Wyo., 100,000 shares of the 130,000 outstanding were represented, all of which had been pledged to vote in favor of the reorganization plan, which calls for the formation of a new company, with a capitalization of 150,000 shares, par \$5; 20,000 shares to be held in the treasury, and present stockholders to have the option of exchanging old shares for new shares by payment of \$1 per share. It is expected that practically all the details of the reorganization of the company will be arranged during the next month. Work will probably be again started on the property.

It must be comforting to the people whose strong-boxes are full of stocks bought at big prices on Thomas W. Lawson's recommendations, to read of his new steam yacht, and other evidences of wealth. If they have lost, they can see that their money is doing somebody good.

Colorado Springs. April 30.

(From Our Special Correspondent.)

The market has shown considerable activity and strength the past week, and appears to be in a far more satisfactory condition than for several months. On account of the recent severe storms in this section the ore shipments from the camp have been greatly impeded, which will reduce the output for April probably 50%. Trading in nearly all classes of stocks is much heavier, and many stocks have made notable advances, the most prominent being that of Portland, which has all but touched \$3. Specimen is a good trader, with a record last week of 58,000 shares at 12½@12%. The general opinion seems to be that the market will continue to improve, barring further smelter trouble.

W. S. Stratton emphatically denies the recent reports concerning the formation of several large English corporations for the purpose of floating the properties in Poverty Gulch, and on Globe and Tenderfoot hills, recently purchased by him. The properties have been secured by Mr. Stratton solely on his own account, and he has no intention of placing them in the hands of any English or American corporation. W. A. Ramsay, Mr. Stratton's secretary, has cabled from London that the final payment of \$4,000,000 has been made on Stratton's independence.

Salt Lake City. April 28.

(From Our Special Correspondent.)

Business in Utah mining shares continues in light volume, by far the larger portion being professional. General prices are a shade lower and soft. On last Saturday Mammoth promised to supply at least a little sensation, and higher prices, which proved in part true for the first half of the week, selling up to \$2.45, with brisk trading. The chronicled ore uncoverings were less extensive than reported, and with large offerings the past two days the shares softened to \$2.20 at the close. This reaction showed in other shares.

Total April dividends, \$327,500. Sales of the week, as reported, were 81,160 shares, which sold for \$43,040.

Ajax appears in better form. Bullion-Beck did business at \$3. Centennial-Eureka's apparent weakness is inexplicable, unless based on the rumor, sent adrift from Boston, of a proposed amalgamation with United States. The Daisy is finally abandoned; the shares are a complete loss. Daly-West sold during the week at \$19@ \$19.12, with good demand for the shares. Dexter is in better form, and there are more hopeful reports from the mines. Eagle and Blue Bell sold to-day at \$1.

Mercur afforded a pleasant astonisher, the shares being carried above \$5 on the cutting into large bodies of base ore. In fact, developments recently made, and the measuring up of the reserves, in connection with the pending consolidation of the De La Mar's mines have shown that the Mercur holdings possess greater merit than the management realized, and it is said the officers are less keen for the union than they were in January. It is now said that President Dern and Captain De La Mar will meet in Rome, about May 10th, when it is to be hoped the matter will be amicably adjusted.

San Francisco. April 28.

(From Our Special Correspondent.)

The market has been very dull this week, with hardly an incident worth recording. It continues to be wholly an inside market, with no public interest manifested at all. Prices were easier.

Consolidated California & Virginia was quoted \$1.50@1.55; Caledonia, \$1.30@1.35; Hale & Norcross, 32@34c.; Chollar, 22@23c. Outside the Comstocks, the only stock quoted was Standard Consolidated, at \$3.50.

On the Producers' Oil Exchange transactions have not been very large this week, but prices were generally firm, and more interest is being shown in the market.

Some quotations noted here are: Home Oil, \$4@ \$4.10; Yukon Oil, \$1.15; Barker Ranch, \$1.15.

London. April 17.

(From Our Special Correspondent.)

The Easter holidays have interfered with the mining market this week, though, speaking candidly, there was very little business to interfere with. The African market is quite dead, and the general public are becoming more mystified every day as to the future conduct of the war and the general results. Statements are made by Boer information that the gold mines will not in any case be damaged, but such statements are felt to be simply devices to obtain Continental sympathy for the peace delegates. The fact that the Boers have wrecked all the collieries in Natal on their abandonment of their various positions argues the worst for the gold mines of the Rand.

The West Australian market has been rather firmer, but the influence is quite temporary and has nothing to do with the main question now before the shareholders, how the various mines are to deal with their low grade ores and the sulphides and tellurides.

The only section of the market which has exhibited any real backbone is that devoted to the shares in copper mining companies. It is the general impression nowadays that the high price of copper will continue indefinitely. With trade advancing in every country in the world, and with no large new supply of copper there is good reason for this hopefulness. Whether the expectation is well founded or not it is certainly fixed firmly in the copper shareholder, for no one seems at all eager to realize at the present high quotations of the various shares.

Very little is heard of American and British Columbian shares nowadays, and the British public does not seem to care much about the Atlin and Cape Nome booms. The only echo of British Columbia that we have had this week is the announcement that the Hall Mines, Limited, have resolved on a reconstruction with a view of raising more money. I mentioned a month ago that the old board of directors had confessed to failure and that a proposition was being considered by which the whole assets would be sold to Canadians and the company wound up.

It turns out that these negotiations fell through, as the parties could not be induced to buy the properties at the prices demanded. Reconstruction was practically the only alternative, for there are some £25,000 debentures held by the bank as a security for overdraft, and there are also other holders of debentures for a like amount. These debenture holders would, no doubt, step in and take the property over if the shareholders did not do something. The scheme of reconstruction involves the exchange of ordinary £1 shares in the old company for an equal number of £1 shares in the new company credited with 15s. paid, so that there is 5s. per share liability. The total ordinary shares are 250,000 so that a large amount of working capital will be available. The holders of 25,000 £1 preference shares in the old company will receive an equal number of ordinary shares in the new company, credited as fully paid, and the debentures will, of course, remain as before. The name of the new company is to be the Hall Mining and Smelting Company, Limited.

Paris. April 29.

(From Our Special Correspondent.)

The market continues active in most of its departments. The chief exception is in the South African gold stocks. In these but little change is shown in prices, but there has been very little movement. People are neither buying nor selling just now, but are waiting for further developments.

In copper stocks there has been much activity. The metallurgical shares remain strong. In the coal stocks a large movement is developing and prices are advancing.

Le Nickel shares are again higher. The reported intention of Canada to impose an export duty on nickel ores and matte will, it is held here, at once reduce the production there and leave the market open to the New Caledonia producers.

The foreign commerce of France for the three months ending March 31st is reported by the Ministry of Commerce as below:

	1899.	1900.
	Francs.	Francs.
Imports.....	1,123,191,000	1,130,037,000
Exports.....	802,980,000	897,699,000
Excess, imports.....	320,211,000	241,338,000

The increase in imports was 15,846,000fr., and that in exports was 94,719,000fr., leaving a decrease of 78,873,000fr. in the balance of imports.

Work at the Exposition is very active, but there is still very much to be done before visitors can find a satisfactory show.

Azote.

DIVIDENDS.

NAME OF COMPANY.	Latest Dividend.			Total to date.
	Date	Per share.	Total.	
Amanda Con. Colo....	June 1	.01	10,000	10,000
Am. Steel Cast'g.com	May 8	\$3.00	.....	.....
Bethlehem Steel.....	June 1	.50	150,000	.....
*Boston-Aurora, pf....	May 5	.17	3,280	55,440
*Boston & Colo. Sm....	Apr. 25	.30	4,500	297,000
*Boston Duenweg.....	May 1	.10	4,000	32,000
*Boston Little C'rl, pf	May 1	.10	10,000	130,000
Boston & Montana.....	May 29	10.00	1,500,000	17,200,000
*Boston-Pr'vid'nce, pf	May 2	.05	750	11,250
*Bullion Beck, Utah....	May 15	.10	10,000	2,488,400
*Bunker Hill & Sull....	May 4	.07	21,000	906,000
†Cambria Steel.....	May 15	.50	160,000	.....
*Central Lead, Mo.....	May 15	.50	5,000	167,000
DeLamar, Idaho.....	May 9	.12	45,000	2,394,000
*Delta, Mo.....	May 1	.01	885	8,575
*Empire State, Idaho....	May 15	.30	29,554	465,808
*Mont. Ore Purch.....	May 21	1.00	80,000	1,520,000
†National Carbon, pf....	May 15	1.75	78,750	236,250
†National Salt, com....	Aug. 1	1.50	52,500	.....
*New York Zinc.....	May 2	.25	7,000	50,000
*N. Y. Hond. & R'sario	May 12	.10	15,000	1,235,000
†Pressed Steel Car, pf.	May 28	1.50	187,500	.....
" " " " " " " "	May 21	1.50	187,500	.....
Standard Con. Cal.....	May 21	.10	20,000	3,939,226
Standard Oil.....	June 15	10.00	.....	.....
*Swansea, Utah.....	May 10	.05	5,000	231,500
†U.S. Cast I. P. & F. pf.	June 1	1.75	.....	.....
†Warwick I. & St., extra	May 10	2.00	.....	.....
" " " " " " " "	May 10	.50	.....	.....

* Monthly. † Quarterly. § Extra.

ANNUAL MEETINGS.

Name of Co.	Locat'n.	Date.	Place of Meeting.
Alamo.....	Utah....	May 21.	Salt Lake City, Utah
Amalg'm'd C'r'r	Mont....	June 4.	52 Broadway, N. Y.
Anaconda.....	Mont....	May 16.	Anaconda, Mont.
Anchoria Leland	Colo....	May 15.	Colo. Springs, Colo.
Boston & Colo. Sm	Colo....	May 10.	Argo, Colo.
Bunker H. & Sull	Idaho....	June 17.	San Francisco, Cal.
Constellation.....	Utah....	May 7.	Park City, Utah.
Crown Point.....	Nev....	June 7.	San Francisco, Cal.
Church.....	Cal....	May 7.	San Francisco, Cal.
Dominion Coal.....	N. Scotia	June 1.	Boston, Mass.
*Klton Con.....	Colo....	June 4.	Colo. Springs, Colo.
*Golden Star.....	Utah....	May 24.	Salt Lake City, Utah.
Goleta.....	Cal....	May 19.	San Francisco, Cal.
Homestake.....	Utah....	May 7.	Salt Lake City, Utah.
Justice.....	Nev....	May 7.	San Francisco, Cal.
Mayflower.....	Colo....	May 5.	Colo. Springs, Colo.
National Con.....	Cal....	June 6.	San Francisco, Cal.
Penn. Coal.....	Penn....	May 16.	Dunmore, Pa.
Quicksilver.....	Cal....	June 19.	20 Nassau St., N. Y.
Quincy.....	Mich....	June 7.	45 Broadway, N. Y.
*Raven.....	Colo....	June 4.	Colo. Springs, Colo.
*Tievauxee.....	Utah....	May 8.	Salt Lake City, Utah.
Tornado.....	Colo....	May 10.	Colo. Springs, Colo.
Union Copper.....	N. Car....	June 4.	East Orange, N. J.
Va. Iron, Coal & Coke.....	Va....	May 15.	Pulaski, Va.
Velardena M.&S	Colo....	May 7.	Denver, Colo.
Wyandot.....	Mich....	May 14.	Boston, Mass.

*Special meeting.

ASSESSMENTS.

NAME OF COMPANY.	Loca tion.	No	Delinq	Sale.	Am't.
Acorn.....	Utah	2	Apr 21	May 12	.60%
Alaska.....	Utah	23	Apr. 25	May 14	.02
Alpha Con.....	Nev.	64	May 21	June 14	.03
Belcher.....	Nev.	70	May 29	June 19	.15
Best & Belcher.....	Nev.	70	May 11	Way 31	.15
Bunker Hill.....	Utah	4	Apr. 27	May 15	.09%
Chollar.....	Nev.	51	Apr. 25	May 16	.15
Confidence.....	Nev.	34	Apr. 14	May 9	.20
Eureka Con. Drift.....	Cal.	.....	May 8	.....	.04%
Eureka Swansea Ext.	Utah	1	Apr. 16	May 15	.00%
Kutonia.....	Utah	1	May 4	May 24	.01
Four Aces.....	Utah	4	Apr. 26	May 16	.02
Goleta Con.....	Cal	1	Apr. 30	May 28	.06
Gould & Curry.....	Nev.	85	Apr. 10	May 2	.15
Grape Vine Canyon.....	Cal.	2	May 8	May 29	.07
Hale & Norcross.....	Nev.	4	Apr. 9	Apr. 30	.10
Hilda Gravel.....	Cal.	.....	May 7	.....	.01
Independent.....	Utah	1	May 20	May 9	.02
Independent.....	N. Mex	1	May 3	May 21	.10
Jenny Lind.....	Cal.	.....	May 31	.....	.01
Joe Bowers Ext.....	Utah	7	May 21	June 8	.10
Justice.....	Nev.	.....	May 29	.....	.05
Lucky B'd.....	Utah	.....	Apr. 3	May 21	.02
Marina Mariscano.....	Cal.	23	May 7	May 28	.62
Mariposa Com'l.....	Cal.	16	May 10	June 5	10.00
Maxfield.....	Utah	7	Apr. 30	May 28	.09
Mayflower.....	Utah	.....	May 1	May 20	.00%
Meteor.....	Utah	.....	Apr. 14	May 17	.60%
Mountaineer.....	Cal	18	May 18	.....	.20
Osceola Con.....	Cal.	9	Apr. 28	May 21	.01
Potosi.....	Nev.	55	Apr. 18	May 9	.15
Reward.....	Cal.	.....	May 12	.....	.10
Savage.....	Nev.	100	May 8	May 28	.02
Silver Park.....	Utah	2	May 7	May 26	.02
Siskiyou Con. q.....	Cal.	.....	May 22	.....	.03
Skagit Cumb'l'd Coal	Was.	7	Apr. 17	May 15	.01%
Snow Flak.....	Utah	.....	Mar. 1	Mar. 31	.05
South Paloma.....	Cal.	2	Apr. 23	May 14	.006
Tetro.....	Utah	12	Apr. 28	May 19	.01
West Morning Glory	Utah	4	May 17	June 7	.00%
Yellow Jacket.....	Nev.	3	Apr. 10	May 15	.15

STOCK QUOTATIONS.

Table of stock quotations for New York, listing companies like Alamo, Anaconda, and others with columns for location, par value, and prices for various dates from April 27 to May 3.

Table of stock quotations for Boston, Mass., listing companies like Adven's Cons, Aetna, and others with columns for par value, number of shares, and prices for various dates from April 26 to May 2.

Table of coal and industrial stocks, listing companies like Am. Sm. & Ref., Am. S. & W. Con., and others with columns for par value and prices.

Table of official quotations from the Boston Stock Exchange, listing various stocks and their prices.

Table of salt lake city, Utah, stock quotations, listing companies like Ajax, Horn Silver, and others with columns for shares, par value, and prices.

Table of Philadelphia, Pa., stock quotations, listing companies like Am. Alkali, Bethlehem Iron, and others with columns for par value and prices.

Table of Toronto, Ont., stock quotations, listing companies like Ontario, Alice, and others with columns for par value and prices.

Table of California oil stocks, listing companies like Belcher, Best & Belcher, and others with columns for par value and prices.

Table of Spokane, Wash., stock quotations, listing companies like Butte & Boston, Conjecture, and others with columns for par value and prices.

Table of California and Producers Oil Exchanges, listing companies like Anaconda, Barker, and others with columns for par value and prices.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Anacosta, Anaconda, Arg. J., etc., with columns for Par, Apr. 21, Apr. 22, Apr. 24, Apr. 25, Apr. 26, Apr. 27, and Sales.

Colorado Springs Mining Stock Exchange. Total sales, 1,749,970 shares.

MONTREAL, CANADA.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, Barrado and Cab., etc., with columns for Par, Week, Apr. 30, and Sales.

Montreal Stock Exchange. Total sales, 358,840 shares.

MEXICO.

Table of stock quotations for Mexico, listing companies like Durango, Barrado and Cab., etc., with columns for No. of shares, Last div'd, Prices, and Sales.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing companies like Anacosta, Anaconda, Arg. J., etc., with columns for Par, Apr. 21, Apr. 22, Apr. 24, Apr. 25, Apr. 26, Apr. 27, and Sales.

Official Quotations Denver Stock Exchange. Total sales, 75,100 shares.

PARIS.

Apr. 12.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, etc., with columns for Country, Product, Capital Stock, Par value, Latest divs, and Prices.

LONDON.

Apr. 20.

Table of stock quotations for London, listing companies like Alaska Goldfields, Alaska-Mexican, etc., with columns for Country, Authorized capital, Par value, Last dividend, and Quotations.

DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest), Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest). The table lists numerous mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. This table is corrected up to and including April 26th. Correspondents are requested to forward changes or additions.

