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The meetings of the American Associations for the Advancement of Science and its allied societies, which are in progress in New York this week, are largely attended, and many interesting papers will be read and discussed. On another page we give an abstract of the address made by Professor James F. Kemp, as vice-president of the Geological Section of the Association; and we hope to give our readers a full account of the proceedings of that section in our next issue.

The rush to the Nome District appears to have begun from the accounts which we receive from the Pacific Coast. The number of people who are going is not as large as was expected, but is still very considerable. It is noticeable that a large proportion of them are old miners and prospectors, and there is a general absence of the "tender-foot" element from the East, which was so prominent in the Klondike rush. The many, many failures which occurred at that time have doubtless discouraged inexperienced men; and the fact that work has been abundant in the East and there have been few idle men has assisted in diminishing the number of adventurers. Accounts from Nome itself are still scanty, and the prospects there are uncertain, especially for those who expect to take machinery with them. Another month will probably furnish plenty of news and reports from the far North.

Although it has been proposed by certain parties to limit pig iron production by shutting down a number of furnaces in order to maintain prices, it is not probable that there will be any organized movement of the kind. Production is being gradually reduced from the highest point which it reached, however, by the blowing out of furnaces which have been driven hard for the last year or more, and now have to stop for repairs. There are a number of cases of this kind; not enough to reduce output below that of last year, perhaps, but still enough to make an appreciable difference in the rate of production. Should a further fall in prices follow, the number will doubtless be increased from the list of furnaces which, through their location or other causes, cannot be operated at a profit when prices are low. There is quite a number of these which have been running during the boom of the past year.

The successful operation of the new basic open-hearth steel works at Ensley is a matter of great importance to the Alabama iron-makers, and to the whole country. In addition to the rolling mills already under construction, it is understood that a rail mill is to be put up, and that the Tennessee Coal, Iron and Railroad Company, which controls the plant, is already in the market for rail contracts for next year's delivery. Basic open-hearth steel rails will be new in this country, where practically all our rails have been made of Bessemer steel; but there is no reason why they should not find a market and why, under the conditions of the Ensley plant, they should not be manufactured at as low a cost. The examples set at Birmingham and Ensley are likely to be followed elsewhere in Alabama, and we expect to see the production of steel in the South a well-established and growing industry. The "Engineering and Mining Journal" years ago recommended the work which has now been begun; and we believe that it will not be long before the Southern iron-masters realize the benefits of the change.

Copper production in the United States continues to show a fair increase, the total output reported for the first five months of the current year having been 111,942 long tons, which is a gain of 9,405 tons, or 9.2 per cent., over last year. It is noticeable that only a small part of this increase—2,665 tons—came from the large mines which report to the statistician, the other 6,740 tons coming from the "outside sources"; that is, the small mines which do not report and the smelters which handle ores having their chief values in gold, silver, lead and metals other than copper.

The increase in exports has been much larger than that in production, the total shipments reaching 73,643 long tons for the five months. Included in this, however, is some copper refined from the Chile bars which were sent over here for treatment several months ago, as well as some Boleo copper refined here and some from Mount Lyell. Making allowance for this, the exports of copper from United States mines have been very large, and amounted to over 60 per cent. of the production. The consumption of copper in Europe continues very large. The recent increase in the exports is probably due to the fact that foreign manufacturers, who had allowed their stocks to run very low, have been forced to come into the market for supplies.

On another page we give a part of a letter written to the London "Times" by Sir Lowthian Bell in an answer to a recent article in that paper. That article was one of a series on "American Competi-

tion," which the "Times" has been publishing, and it drew attention to the differences in methods and results in British and American iron works. Sir Lowthian Bell's answer is interesting because it is written by a man who is thoroughly familiar with British practice, and has taken occasion to study American practice also; and because it expresses well the British point of view. He criticises American methods not because of their results, but because the driving of our furnaces results in a comparatively short life, and claims that a British ironmaster expects his furnace to work for 18 or 20 years, or even longer. This is largely true; but the "Times," in publishing his letter for once takes the American point of view and thus anticipates the reply which we would make, and which would naturally occur to everyone familiar with the subject here. That is, that we do not object to the short life of a plant provided we can secure proportionally productions; in fact we rather prefer it. An American manufacturer with a plant carefully preserved and kept in order for 20 years would be entirely behind the times and in no position to compete with his more progressive rivals. We do not want to keep our machinery until it is obsolete; it must be replaced by the latest improvements, so that a constant change is going on. This is entirely opposed to the old-style British idea of permanence, but it is the line which we have found successful and which we and the English must follow if we are to meet successfully competitors at home and abroad.

During the last few years it has often been rumored that the famous Dowlais Iron and Steel Works in South Wales were to be sold. These works, together with many adjacent collieries, have been in the possession of the Guest family for several generations, and the territorial interest of the family is very great. At one time it was supposed that the properties were to be sold to an American syndicate, and at another there was evidence of some intention to sell the properties to a public limited company, following the lines of the Pease, Bells and Barings. There has never been any doubt that the family have wished for some time to realize on the property, as the present generation is not composed of business men, and the only thing to be considered was the best way to do it. It is not surprising to hear, therefore, that arrangements have been just completed to transfer the business to a new company which has been formed to consolidate it with that of the Patent Nut and Bolt Company, of Birmingham. This latter company is one of the largest makers of all kinds of iron work in England and its name is really not sufficiently comprehensive or characteristic of the business. The chief moving spirit is Mr. Arthur Keen, and Mr. Windsor Richards is one of his co-directors. The title of the new company will be Guest, Keen & Company, Limited, and its capital in shares and debentures £3,000,000, of this capital £1,000,000 will be allotted to the Patent Nut and Bolt Company and £1,530,000 to Lord Wimborne, the head of the Guest family, leaving £470,000 to be issued later on as developments require. We are informed that some new iron mines have recently been acquired in Spain and no doubt part of the unallotted capital will be used in payment for these. The prospects of the combined company are excellent, for Mr. Keen is an able man of business, and with Mr. Windsor Richards and Mr. E. P. Martin as technical managers, the works ought to be well handled.

THE PANUCO COPPER MINE DEAL.

In our issue of April 21st we referred at some length to the collapse of the Panuco Copper Mining Company, Limited, of Mexico, which was floated in London about a year ago. We have since heard that a section of the shareholders obtained an order from the High Court for the compulsory liquidation of the company under the direction of the official receiver in bankruptcy, so that no doubt the whole story of the promotion will come out and justice will be done to all parties. It appears that the properties were originally taken to England by two Americans, Mr. Hugh McDonnell and Judge Cleary, who at that time had an option on them. Mr. McDonnell relied chiefly on Mr. C. H. Palmer's report, and by its means interested Mr. S. W. Carlton of London, who had been a partner and was still in business relationship with Mr. Franklin Saunders and Mr. C. W. Fielding. The latter gentleman is now general mining adviser to the firm of Matheson & Company and is identified with the administration of all their mining ventures. Mr. Carlton obtained the assistance of Mr. Alfred Fellows of Newcastle-on-Tyne, who had helped the same group in connection with the organization of the Mountain Copper Company of California, and at his suggestion Mr. Thomas Down, who had been with the Tharsis Company, was sent to inspect the mine. As Mr. Down corroborated all of Mr. C. H. Palmer's statements, the rest of the business was all plain sailing, for Mr. W. Keswick, a member of the firm of Matheson & Company, was obtained as chairman, and the other directors were people associated in one way or another with this house. In our previous article we referred to Matheson & Company as the issuers or promoters of the Panuco Company, but we have since

heard that this firm, as a firm, was not the promoter, but only intended to act as commercial agent of the company. This fact makes it awkward for the members of the firm who acted in their individual capacity in the affair, and for the other people who are associated more or less intimately with the business of the firm that had a hand in the promotion of the Panuco Company. On the other hand, the firm, as a firm, should exercise more direct responsibility for all ventures housed in their offices and promoted by people so largely identified with them.

The price paid by Mr. Carlton to Messrs. McDonnell & Cleary was £195,000, of which £80,000 was in cash and £115,000 in shares. The price at which Mr. Carlton sold the property to the company was £375,000, of which £208,334 was to be in cash and £166,666 in shares, certainly a very handsome profit. The company was floated with a capital of £500,000, which provided £125,000 in cash as working capital. It is a remarkable thing that the public subscriptions to the issue were extremely small, and the bulk of the money had to be provided by the underwriters. It is well known of course that most mining flotations in London have to be supported by underwriters, who are usually stockbrokers with funds left by clients to be invested at discretion, but in the present case we might have expected a larger response from the general public. The vendor was obliged to take a larger proportion of his purchase price in shares, and as a matter of fact took £255,000 in shares and £120,000 in cash. The actual gross profit made by the vendor was thus £160,000 in shares and £40,000 in cash, but we are informed that he claims his net profit to have been no more than £15,482 in cash and £60,350 in shares. If this statement is correct, and we have every reason to believe it, we ought to be informed where the rest went to, though we can guess that it had to go in the form of heavy commissions to the various members of the group who helped him in the promotion. We ought also to be told why it was that the directors kept back from the shareholders the information which they had received as to the unsatisfactory developments at the mine, and why during this time the chairman of the company sold so many of his shares.

We quite expect to hear some startling revelations with regard to this mine before we have heard the last of it. For instance, Mr. W. Selkirk, the manager, is firmly convinced that an elaborate system of salting the samples has been in vogue, and he has already written this opinion to the official receiver. It is probable that Mr. Downs' samples were tampered with also, for his character is beyond reproach and his experience in copper considerable. By whom the salting was done we have no evidence, but we hope that the official receiver will not cease his inquiries until he finds out.

THE MOVEMENT OF SILVER.

The movement of silver for the five months ending May 31st has some features which it is of interest to consider in connection with the present appreciation in the price of the metal. The United States exports for this period amounted to a total value of \$25,184,366, whereof \$4,151,571 went from San Francisco directly to China, most of the balance going out through New York to Great Britain. The imports were valued at \$13,793,352, leaving the net exports at \$11,391,014. In quantity, therefore, we imported approximately 23,128,000 ounces—almost all in the form of base bullion—and exported 42,227,000 ounces, of 19,099,000 ounces more than we received. Both imports and exports show increases, and the gain in value of the net exports was \$655,687, or 6.1 per cent.

If we turn to the London market, which still gives us the most important record of silver movement, we find that the Board of Trade returns give the following statement of imports of silver into Great Britain for the five months:

From:	—1899—		—1900—		Changes.
	Values.	Per ct.	Values.	Per ct.	
United States.....	£3,796,249	62.2	£4,467,327	86.3	I. £671,078
Mexico & S. America .	389,133	6.4	221,423	4.3	D. 167,710
Australasia	43,292	0.7	66,443	1.3	I. 23,151
European countries..	1,810,666	29.6	396,796	7.6	D. 1,413,870
Other countries.....	69,033	1.1	26,052	0.5	D. 42,981
Totals	£6,108,363	100.0	£5,178,041	100.0	D. £930,322

There was a decrease of 18 per cent. in the total imports, by far the larger part of the loss being in the receipts from European countries. Of these it may be said that the trade is an exchange movement, which varies considerably from year to year, but on an average of several years will nearly balance, the imports and exports equaling each other. In this statement, however, we omit Russia, the trade in silver with that country being on a different basis altogether. The marked point this year was the large increase in imports from the United States. This amounted to 17.7 per cent.; while the proportion of the total silver reaching London from or through this country rose from 62.2 to 86.3 per cent. The falling off in receipts from Mexico and South America may be, and probably is, due to the larger proportion of the silver product sent here to be refined.

The exports of silver from Great Britain for the five months were as follows:

To:	1899.		1900.		Changes. Value.
	Values.	Per ct.	Values.	Per ct.	
China	£668,678	10.3	£1,256,536	22.5	I. £587,858
India	1,964,156	30.3	2,593,206	46.6	I. 629,050
Total to the East.	£2,632,834	40.6	£3,849,742	69.1	I. £1,216,908
Africa	295,812	4.6	362,981	6.6	I. 67,669
Australasia	51,275	0.8	149,750	2.7	I. 98,475
European countries..	3,353,991	51.3	945,082	17.0	D. 2,408,909
Other countries.....	145,242	2.2	254,171	4.6	D. 108,929
Totals	£6,477,754	100.0	£5,561,726	100.0	D. £916,028

Here we find a decrease in the total of £916,028, or 14.1 per cent., in spite of a large increase in exports to the East. The falling off was in the European trade, which showed a reduction of 28.2 per cent. The greater part of this was in exports to Russia, which fell from £2,179,373 in 1899 to £403,237 this year, a decrease of 81.5 per cent. This does not mean that Russia has stopped buying silver, but the requirements of that country for coinage were filled that year, and the silver bought for use in the East was shipped directly from London.

Aside from the change just noted, the prominent feature in this statement is the large increase—46.2 per cent.—in shipments to the East. More than half of this was in the exports to India, which were larger this year by 32 per cent. than last. This was due almost entirely to the fact that the exigencies of the famine have forced the Indian government to resume the coinage of rupees and to buy large quantities of silver for that purpose. This buying has ceased for the present, but it is quite probable that it will be resumed before long.

The gain in exports to China, while less in actual amount than that to India, was larger in proportion, reaching 88 per cent. A considerable part of the shipments this year have been on Russian account. If we add to the silver in the table above the shipments from San Francisco, we find that China has received this year about 17,927,000 ounces of silver, of which we have record above. In addition to this a large part of the output of the Broken Hill mines in New South Wales goes directly to China, the proportion this year being high, as is shown by the small Australian receipts in London. Estimating these shipments we must conclude that China absorbed during the five months from 27,000,000 to 28,000,000 ounces of silver. If, as now seems probable, European armies are to operate in that country on a large scale, there will be a still larger demand for the silver in which their expenses will have to be at least partly paid.

This prospect and the Indian demand have combined to cause the present rise in the price of silver, which has also been helped by some London speculation in futures. A still further rise is quite possible, and we may see silver at a higher point than it has reached for several years past. On the other hand supplies are abundant and there are still reserves in existence which a high price may bring upon the market at any time.

NEW PUBLICATIONS.

"Hand-book of Testing Materials." By Professor Adolf Martens. Translated from the German by G. C. Henning. New York: John Wiley & Sons. Volume I., 622 pages, text; Volume II., 240 pages, diagrams and illustrations. Price, \$7.50.

The author of this work, who is director of the Royal Prussian Testing Laboratories at Berlin and Charlottenburg, thus explains his purpose in compiling it in the preface to the German edition: "My book is designed to be a counselor to the constructor in all questions relating to the properties of his materials of construction. Therefore the book is divided into two, each independent and complete in itself. This first volume relates to the general properties of materials of construction, and especially to the art and science of testing materials as applied to machinery and superstructure. To the description of the customary methods of testing I have added a presentation and discussion of the most important types of testing machines and auxiliary apparatus, dwelling mainly upon the underlying principles of design, source of errors and their calibration."

The translator in his preface says: "In spite of the existence of numerous able works on the same subject I do not hesitate to come before English speaking engineers and manufacturers with a translation of Professor Martens's book, because being familiar with the others, I know that he treats the subject from the point of view so very different that to most, even the experts, the subject will appear like a new one."

We think that in this case the translator is fully justified in his estimate of the importance of the book. It possesses both novelty and high value, and is, we think, the best treatise we have seen on the technical management of tests of materials, and on the construction and operation of testing machines. To put it within the reach of English-speaking engineers is a real service, and we have no doubt that they will appreciate its value. For this reason we are the less inclined to criticize the translator, though he is at times inclined to adhere rather too faithfully to the German text, and thus give us somewhat awkward sentences, which a paraphrase would have made clearer. Engineers will find the work a valuable addition to their libraries for study and reference.

We must, however, protest, strongly against the bad German practice which the publishers have followed in putting all the illustrations in a volume by themselves. There is no reason why they could not have

been put in the text where they belong; and the separation practically doubles the work of reading the book. The diagrams are numerous, and it makes trying reading when it is necessary constantly to take the extra volume and hunt up the drawing which ought to be before us. We hope that everyone who has occasion to buy the book will join in this protest. It is a great pity that so excellent a book should thus have its usefulness diminished. American publishers have usually avoided this German and French custom, and we are sorry to see one following it now.

"Wonderland, 1900." By Olin D. Wheeler. St. Paul, Minn.: published by the Northern Pacific Railroad Company. Pages, 132; illustrated.

The Northern Pacific Company issues each year a book under this title referring to the country along its line and elaborately illustrated. It is a difficult matter, naturally, to differentiate the book from year to year. The issue for 1900 has been made of special value for reading and preservation, since a large part of it is devoted to a concise and clear history of the expedition of Lewis and Clark in 1804-1806. This was the first attempt to explore the then unknown Northwest, and though now almost forgotten, it deserves to be recalled to memory. It was a well-conducted expedition, was successful in its object and did very much to attract attention to the great unexplored territory which belonged to the United States. Under Captains Lewis and Clark for the first time white men traveled from the Mississippi to the Pacific and that they did so showed the care and judgment with which their work was performed. They were sent out by President Jefferson, and the expedition is one proof of his wonderful foresight and firm belief in the future of the United States.

For 50 years no new publication regarding this expedition has been issued, save the critical one published by Francis P. Harper, of New York, and edited by the late Dr. Coues, which was a limited and expensive edition and is now out of print. Two-thirds of "Wonderland, 1900," is devoted to the explorations of Lewis and Clark. Not only are the explorers followed throughout their whole journey and the important incidents and points of their trip brought out, but the contrasts between then and now are shown and some new material published. The Northern Pacific rails are now laid at many places along the trail that Lewis and Clark traveled. This chapter will prove not only popularly interesting but also valuable. Specially prepared maps show the route of the explorers, and some old illustrations of 90 years ago are reproduced.

The descriptions of scenery and places along the line given in the remainder of the book are interesting, and the illustrations—chiefly reproductions of photographs—are of a high class.

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.

"Investment Guide." Fourth Yearly Number, 1900. New York: compiled and published by Henry Clews & Company. Pages, 112.

"Geological Survey of Alabama. Report on the Warrior Coal Basin." By Henry McCalley. University, Alabama; State Printers. Pages, 328; with map and illustrations.

"The Indikel System; a Decimal System of Weights and Measures for English Speaking People." By A. Lincoln Hyde. Cleveland, Ohio; published by the author. Pamphlet, 12 pages.

"The Metallurgy of Lead and Silver: Part II. Silver." By Henry F. Collins. London: Charles Griffin & Company, Limited, and Philadelphia: the J. B. Lippincott Company. Pages, 352; illustrated.

"The Mechanical Equipment of the New South Station, Boston, Mass." By Walter C. Kerr. Reprinted from the "Transactions of the American Society of Mechanical Engineers." Pages, 123; illustrated.

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 Mount Morgan and Other Queensland Mines.

Sir: I have recently been on a trip to Central Queensland, and there I learned that the new mundic works at the Mount Morgan Mine have turned out very much as they were expected to, and that they are now being duplicated. The furnaces (Richard's patent) gave a little trouble at first, as they made too much flue-dust, a feature which had not been experienced in the older and first constructed furnaces; this has since been remedied, and they now work well, roasting the ore down to 0.1 per cent of sulphur. The 4 furnaces put through 750 tons of mundic ore per month, each, to that content of sulphur.

This is not a large output for such massive furnaces, but I believe there is great economy in fuel and repairs once they are erected, and in my opinion they have great merit, where a small capital outlay is not of first importance. The mechanical emptying of tailings vats has not yet been perfected, but otherwise the plant has come up to expectations. The prospects of the mine are looking as well as ever. In the duplicate mundic works now being erected, slight alterations are being made in the roasters, but in other respects the plant will be just the same as the first. None of the outside companies in the Mount Morgan district have got anything yet in their prospecting shafts.

About 100 miles south of Mount Morgan the local Mount Morgan proprietors and officials are opening up some copper shows, of which they think a great deal. Hon. John Ferguson (one of the big owners) has gone to London to float the property, for, it is said, a great sum, and a railway is to be built to the mine, after the fashion of Moz:

Lyell and Chillagoe. There seems to be some doubt about the value of the property, as the good ore is scattered and the great body of the deposit is very low grade. A thorough expert examination is needed. Brisbane, Queensland, April 25, 1900. E.

THE ENGLISH PATENT LAWS.

By Our Special Correspondent.

The English patent laws have always been considered far from perfection, owing to the fact that the granting of a patent was not prima facie evidence of the novelty of the invention. Beyond a few unimportant formalities, the inventor has little trouble to take to satisfy the authorities. If there is a similar application on the file, the inventor is informed of the fact, but the rival specification is not shown to him and no details of its contents given, and he is left to judge for himself as to whether he thinks it worth while to proceed with the patent. After a specification has been published, two months are allowed to elapse before the patent is finally sealed, in order that objection may be lodged by any parties who consider that the patent infringes their rights; but the hearing of such objections is an expensive and troublesome affair. After the patent has been once sealed the only way to invalidate it is to bring a lawsuit in the courts, and it is only the wealthy who can afford this expensive luxury.

There is no search conducted by the patent office authorities, not even among the previously published patents nor in the standard text-books, so that old ideas are continually cropping up. Nor is there any attempt made to put a stopper on obvious absurdities or to check the granting of applications that are made with a dishonest intention.

The outcry in England against this state of things has increased greatly during recent years, especially since the incorporation of the Institute of Patent Agents. The Government, however, does not see its way to make any radical alteration, but has gone so far to meet public opinion as to order a Board of Trade committee to inquire into the working of the patent acts. In the minute appointing this committee the Government says that it does not think it desirable to establish any general system of examination for novelty such as is usual in the United States and Germany, but that the committee might deliberate on the question as to how far and in what direction it may be desirable to give the examiners additional powers. It is probable that some medium course will be eventually adopted by which the search for novelty through previously published patents will be conducted by the patent officials and also that a certain number of standard text-books and proceedings of societies will be adopted as references, so that a proper definition of the expression "obviously old idea" may be obtained. Such a system, while not satisfying the demands of advanced reformers, would certainly be a great improvement on that in vogue.

THE INTERNATIONAL MINING CONGRESS.

A brief report of the opening of the Congress at Milwaukee, June 15th, was given in our last issue. After the opening it became apparent that there were two parties represented. One in favor of permanent organization, the other equally strong in favor of retaining the Congress under the present system, whereby there are no salaried officers and the delegates are appointed by governors and mayors. Under an incorporated permanent organization membership would be secured in the manner ordinarily adopted by societies and associations, and the opponents of permanent organization say it would lose its present character, and that any one who had an end to secure through the Congress could do so by paying the membership fee and joining.

At the meeting on June 20th President Montgomery appointed the committee on permanent organization as follows: President, B. F. Montgomery, Cripple Creek, Colo.; L. Bradford Prince, Santa Fe, N. M.; E. A. Taft, Chicago, Ill.; Henry H. Slack, Scranton, Pa.; T. J. Sullivan, Milwaukee, Wis.; Mrs. Ella Knowles, Helena, Mont.; Archibald Blue, Toronto, Ont.

Resolutions were passed requesting Mr. Archibald Blue, director of the Mines Department of Ontario, to address the Congress on Canadian Mining Law.

The following resolutions were introduced by former Governor Prince: "Resolved, That the magnitude and importance of the mining industry, which has now reached over \$800,000,000 of annual product, call for the establishment of a national department of mining, the chief officer of which shall be a member of the President's Cabinet.

"Resolved, That the Congress of the United States be respectfully requested to provide by law for the locating and working of mines of the reserved minerals, gold, silver and quicksilver, on Spanish and Mexican land grants."

The resolutions were referred to the committee on resolutions.

The first paper of the Congress was delivered by L. Bradford Prince of New Mexico, whose subject was "Department of Mining." He urged at much length the importance of the mining interests and the advantages which would result from a special department of mines. He summed up the arguments in its favor, and claimed that such a department would be able to secure proper legislation on mining matters. He intimated also that part of its business would be to engage in systematic prospecting and in testing new metallurgical processes.

The sessions of Thursday, June 21st, and Friday, June 22d, were occupied by the reading of papers and discussions, according to the programme given in our issue of June 16th. There was much discussion also on the future of the organization. The afternoons of each day were given up to excursions to various points of interest. The expected increase in the number of attendants on the Congress did not take place, and the delegations remained about as on the opening day.

On Saturday, June 23d, the committee on permanent organization presented a report, which was a compromise between the two parties. It provided for two classes of members, one to consist of persons interested in mining and allied pursuits, who may join the association and pay annual dues. The other class will consist of delegates from

States, counties, cities and commercial bodies, appointed for the meeting, as has been the case heretofore.

It is not easy to see how the two elements can be made to work together, or rather what inducement there is to take permanent membership and pay dues to support an association in which the transient element must be the stronger one. The Congress, however, accepted the report and adopted the plan offered by the committee.

The resolution introduced by Bradford L. Prince of New Mexico, recommending the establishment of a department of mining, the chief of which shall be a member of the president's cabinet, was adopted by the Congress with the amendment that a copy of the resolutions be forwarded to every member of the Federal Congress and to every central labor body interested in mining.

A resolution was passed directing the appointment of a committee to prepare a revision of the national mining law and to present a draft of the new law proposed at the next meeting of the Congress.

The Congress then elected officers for the ensuing year as follows:

President—L. Bradford Prince, New Mexico.
Vice-President—A. P. Swineford, Alaska.
Secretary—Erwin Mahon, Colorado.
Treasurer—Mrs. E. C. Atwood, Colorado.
Executive Committee—J. W. Adams, Georgia; Mrs. Ella Knowles Haskell, Montana; Judge P. A. Orton, Wisconsin.

It was decided to hold the next meeting of the Congress at Boise, Idaho, in 1901.

After adopting the usual resolutions of thanks, etc., the Congress adjourned.

THE KENEVAL COKING PROCESS.—The Keneval coke process which is in use at Knoxville, Tennessee, is described as follows: The new process uses an oven entirely different from any other now in use. Recent experiments have been made in the bank ovens, covering a space about 18 ft. by 25 ft., and 15 ft. high. The interior measurements of each oven are: Length, 21 ft. 6 in.; height, 12 ft.; and width, 20 in. The capacity of each oven is 20 tons. The draft is regulated by doors below the grate bars and a cover on the up-draft chimney, with which each oven is connected. The product of the experimental tests already made per ton of coal of 2,000 lbs., have been: Coke, 1,500 lbs.; ammoniacal liquor, 15 lbs.; sulphur, 60 lbs.; coal tar, 25 gals.; sulphurous acid, and 10,000 cu. ft. of gas. One-third of the gas has been used for consumption in the oven. In the recent experiment the analysis of the coal gave a little over 3 per cent. sulphur, and the resulting coke gave by analysis the following: Moisture, 0.08; sulphur, 0.81; fixed carbon, 92; ash, 5.77; volatile matter, 1.34; total, 100.00. The experiment was made with slack coal from the Brushy Mountain mines. The conversion into coke is fully completed in about 40 hours.

DEMAND FOR SULPHATES IN SPAIN.—United States Consul Washington sends from Valencia, April 24th, 1900, a copy of a letter from J. B. Carles & Co., bankers, as follows: "Sulphate of ammonia, superphosphates of lime, and nitrate of soda are three articles extensively used in Spain, and particularly in the province of Valencia, for the composition of manure. Some 50,000 tons of sulphate, 8,000 tons of superphosphates, and 20,000 tons of nitrate are annually imported into Valencia, mostly from Great Britain. Comparing the present prices of coal in Great Britain with those in the United States, we should think the latter country ought to be able to compete easily for the supply of these articles to Spain, notwithstanding the higher transport rates; and even this difference could not be very large, as we should be prepared to take full steamer cargoes of 3,000 to 5,000 tons, once the trade started; and in the meantime the boats trading regularly between the United States and Italy, or Marseilles, would no doubt be glad to call at Valencia.

"What is wanted is sulphate of ammonia of good gray, yellow, or brown color—good gray preferred—24 to 25 per cent. of ammonia or 20 to 21 per cent. of nitrogen-superphosphates of lime soluble in water, or 10 to 20 per cent. soluble in water and citrate. All the goods should come in strong, single bags of 100 kilograms (220.46 lbs.) gross each; tare, 1 per cent. Our principal seasons are January to June and October to January."

HYDRAULIC PUMPING PLANT FOR JAPAN.—The London "Engineer" describes a hydraulic plant built in England for the Muke Coal Mine in Japan. The plant consists of a triple-expansion engine and steam accumulator placed on the surface at the mine and two duplex hydraulic pumps placed underground about 3,500 ft. from the pit bottom, together with pilot pumps for pumping the water to the main hydraulic pumps, and the necessary connecting piping. The rams of the duplex hydraulic pumps are 14 in. diameter with a stroke of 4 ft., and capable of running at 14 double strokes per minute.

The system of working may be thus described. The power water is taken from an overhead tank in the engine room, and forced by means of the power engines into 7-in. pipes leading down the shaft to the hydraulic pumps, and is returned by the hydraulic pumps to the tank, so that the power water is used over and over again. There are two sets of power water pipes, one for supply and the other for return. The power engines pump the water under a pressure of 1,000 lbs. per square inch, and that pressure is retained constant by means of the steam accumulator or regulator. The accumulator consists of a steam cylinder 40 in. diameter, and a hydraulic ram 12½ in. diameter, working in a hydraulic cylinder. The hydraulic cylinder of the accumulator is in free communication with the power pipe, while the steam piston is acted on by steam at a constant pressure, this pressure being adjusted by means of a reducing valve so as to maintain a pressure of 1,000 lbs. per square inch on the hydraulic ram. The steam accumulator forms a governor to the power engine. If the power engine runs too fast, then the ram is pushed out, and made to actuate the throttle valve.

The power engine has cylinders 20 in., 29 in. and 41 in. diameter, with a common stroke of 2 ft. 4 in. The pumps are of the ram type, worked direct from the pistons. Each ram is 5¼ in. diameter by 2 ft. 4 in. stroke. There are two suction and two delivery valves to each pump.

NOTES ON LEAD SMELTING AND GOLD AND SILVER REFINING.*
THE FALLIS MANOMETER.

Written for the Engineering and Mining Journal by Malvern W. Iles.

While occupying the position of superintendent of the Globe Smelting and Refining Company, at Denver, Colo., one of my able assistants, Mr. M. S. Fallis, devised a unique and accurate manometer, which I trust will henceforth be known as the Fallis Manometer.

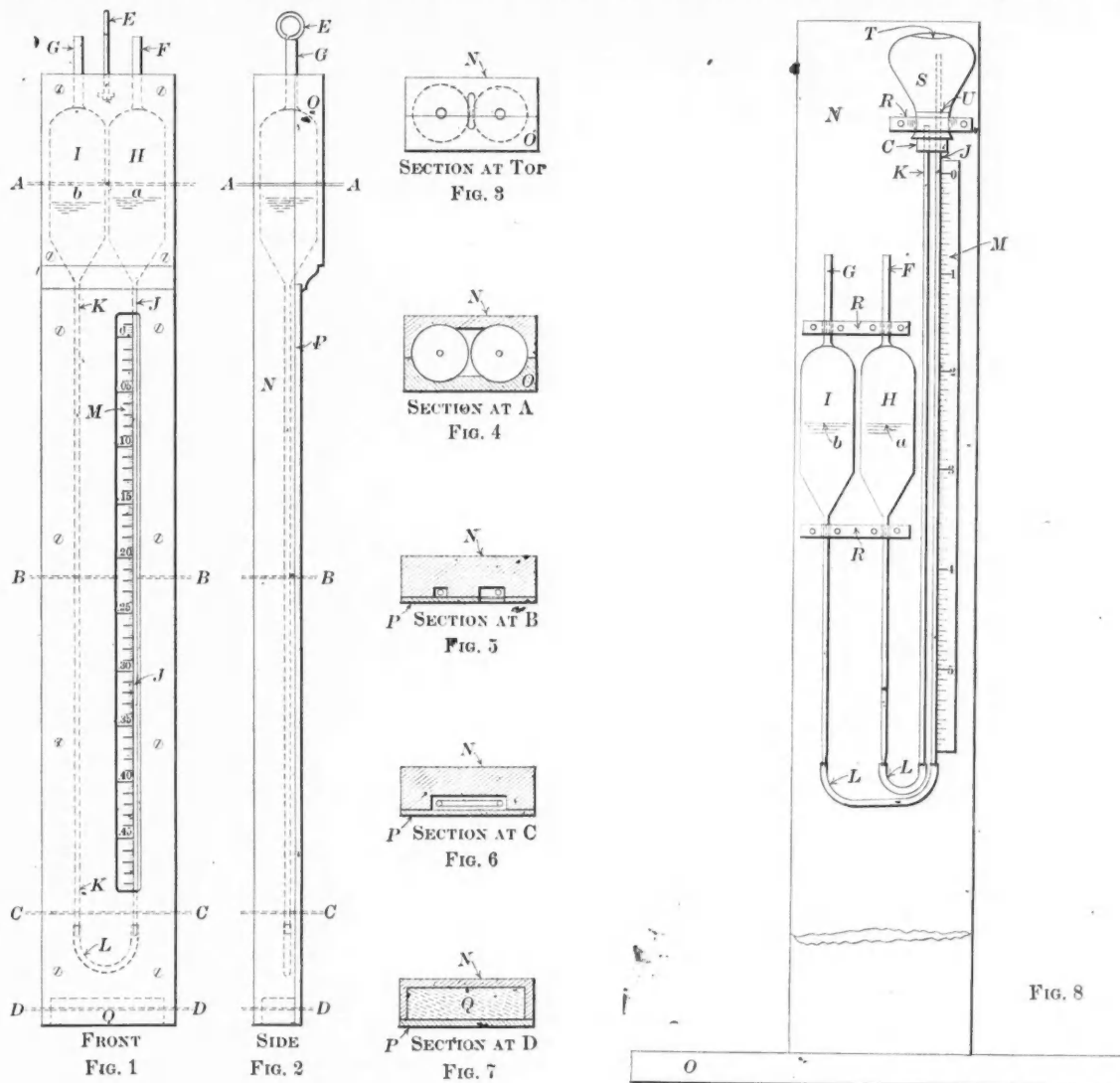
The principle of the Fallis manometer is very simple. The pressure is balanced by gravity:

First, by causing the liquid in one side of the instrument to stand higher than in the other, which difference in levels represents the height of a column of this liquid sustained by the pressure.

Second, by causing the heavier liquid in the long tube to go down on one side, thus leaving a corresponding column on the other side which is almost balanced by the lighter liquid which has displaced the heavier. The difference in the levels between the normal position of the dividing meniscus and the new position caused by the pressure represents the height of a column of liquid sustained by the pressure whose

fumes which could not have been measured by an anemometer. This measurement is made by noting the pressure caused by the impact of the gases on an exposed surface in the current of gases.

In the accompanying cut, Fig. 1 is a front elevation of the instrument; Fig. 2 is a side elevation; Fig. 3 is a plan at the top; Figs. 4, 5, 6 and 7 are sections at A, B, C and D, respectively. H and I are two glass bulbs with tubes, F and G, extending upward, and tubes, J and K, extending downward, resembling what are commonly known as pipettes, except the lower tubes, J and K, are smaller in diameter and longer than in the usual pipette. The bulbs, H and I, should have a diameter of about 1 1/2 in. The tubes, G and F, should have an internal diameter of about 3/8 in., and J and K an internal diameter of about 1/16 in. F, H and J should be in one piece of glass throughout, and likewise G, I and K. The two glass pipettes are joined at the bottom with a piece of flexible tubing, L, preferably rubber. The flexible tube, L, may be omitted, and the glass tube, J, bent at L and continued as K, making the entire glass apparatus in one piece throughout. This eliminates the undesirable introduction of rubber, which is attacked by one of the liquids used in the instrument, but at the sacrifice of an easy method of adjusting the instrument to O, as explained under the description of its operation. The pipettes as described are mounted in a wooden frame made of three pieces, N, O and P. N is grooved to receive the bulbs,



THE FALLIS MANOMETER.

weight is equal to the difference in weight of the two liquids. The sum of the weights of the columns in the two instances equals the pressure. In very delicate pressures the difference in the height of columns mentioned in the first instance is so small that it would be very difficult to accurately determine the disturbance. Therefore Mr. Fallis introduced between these two surfaces a very small connecting tube. If the area of the surface is 200 times larger than the sectional area of the connecting tube, then the liquid in the connecting tube will move 200 times as far as the surface rises. But if one liquid is employed, the movement in the small tube could not be determined; therefore, he employs two insoluble liquids whose dividing meniscus makes it very easy to determine the movement of the liquid in the small tube. To prevent these liquids from becoming mechanically mixed they must be of different weight, but to keep the instrument very sensitive they must be as near the same weight as possible, and yet preserve them from mixing.

This instrument can be made to measure pressures very accurately to one-thousandth part of an ounce per square inch. With this instrument Mr. Fallis was able to measure the velocities of very hot or acid

H and I; the tubes, F and G, the small tube, K, and a wider groove for J making room for the graduated scale at the side of J. Near the lower ends of the tubes, J and K, the wood piece, N, is plowed out between J and K, as shown in section C. This wide groove continued below the space occupied by the rubber connecting tube, L. O is grooved to admit the bulbs, H and I, and is so fastened at the bottom as to overlap the wooden face piece, P.

The wooden piece, P, is a plain flat board about 3.16 in. thick, with an opening cut over the graduated scale and tube J, as shown. This opening in P is provided with a glass cover put in and secured from the underside. The face pieces, O and P, are screwed to the back, N. At the top of N is placed an eye, E, with a nut on the lower end. This is for the convenience of suspending the instrument. At the bottom of N is placed a lead weight, Q, which is for the purpose of ensuring perpendicular suspension.

When the various parts of the instrument are assembled leaving off the face piece, P, there is introduced into the tube, G, by means of a small funnel, a small quantity of a mixture of alcohol and water. To determine the proper proportion of alcohol and water, take a beaker and place about 3 oz. of alcohol in it. Into this put 3 or 4 drops of tur-

*Copyright by the Scientific Publishing Company.

pentine, which, of course, will fall to the bottom. Now add slowly sufficient pure water to cause the turpentine to rise in a large globule to the surface, but not enough to make the turpentine spread over the surface. It must hang from the surface in a spherical globule. This test is the simplest method to ensure the proper relative specific gravity of the liquids.

Introduce this solution of alcohol and water into the tube, G, as described. Then introduce into the tube, F, sufficient turpentine to lower the meniscus between the two liquids to about the zero-point in the tube, J.

The graduated scale is determined by connecting the tube, F, with an U tube containing water, using a rubber tube to make the connection. Insert into the side of this rubber tube a glass tube forming a T. The U tube must be very carefully marked to show $\frac{1}{2}$ oz. pressure by having a mark at the water level and one $\frac{7}{16}$ in. below. Now blow gently into the glass tube, bringing the pressure up to $\frac{1}{2}$ oz., as shown in the U tube, and note the corresponding point in the tube, J. Graduate this distance on the tube, J, into fifths (— tenths of an ounce) hundredths and thousandths. This graduated scale may be made on a piece of white paper and pasted in the groove prepared for it. Now put on the cover, P, and the instrument is ready for operation. The operator will require also a piece of $\frac{1}{2}$ -in. rubber tubing about 6 ft. long and any convenient stand to suspend the instrument from.

To operate the instrument, first level it by bringing the meniscus to 0 on the scale. This is done by slightly raising or lowering either of the glass bulbs by means of the tube F or G. If the bulbs are not inclined to remain where they are placed, a rubber band placed from the tube, F, to G, will create sufficient friction to hold the bulbs wherever placed.

After leveling the instrument, to measure a draft, or pressure less than atmospheric pressure, connect the tube, G, with the chamber whose pressure is to be measured by means of the $\frac{1}{2}$ -in. rubber tube. When the chamber is hot or otherwise inaccessible, a piece of $\frac{3}{8}$ -in. iron pipe in addition to the rubber tubing will be found quite serviceable. To measure a positive pressure or pressure greater than the atmosphere, connect the tube, F, in a similar manner with the chamber whose pressure is to be measured.

Fig. 8 shows another form of the Fallis manometer which is made entirely from the apparatus usually found in any laboratory of moderate size, and may be constructed by anyone on short notice and operated with good satisfaction.

H and I are plain 100-c.c. pipettes; S is a 1-oz. parting flask, C a rubber cork with two holes; J and K are plain pieces of glass tubing about 30 in. long, having an internal diameter about $\frac{3}{32}$ in. The pipettes, H and I, are connected to the tubes K and J by means of rubber tubing. K is inserted into the cork, C, passing through it only, while J passes far enough through the cork to come within about $\frac{1}{2}$ in. of the top of the inverted flask.

This apparatus is mounted on a wooden back, N, about $\frac{7}{8}$ in. by 3 in. by $5\frac{1}{2}$ in., having a base 12 by 12 by 2 in., as shown in cut. The back, N, is grooved out for H, I and S to bring the tubes, J and K, close to the surface of N. The apparatus is held in place by rubber straps, K, secured to the back, N, by means of thumb tacks.

The apparatus contains alcohol, water and turpentine mixed to the relative specific gravity as described above for the other instrument. The alcohol and water extend from about the line, b, in the pipette, I, to the zero mark on the graduated scale, M, and from about the line, a, in the pipette, H, to about the line, U, in the flask, S. The turpentine extends from the line, U, in S, to the zero mark in the tube, J, filling the flask, S, except a small bubble, T.

To fill the instrument, pour into the pipette, H, by means of a funnel, enough of the dilute alcohol to fill it about two-thirds full, then fill it to the top of the bulb with turpentine. Place a piece of rubber tubing over F and blow gently into the tube until H is emptied and the turpentine is in S; then exhaust the air gently, and the dilute alcohol will return from I through the tube, J, passing down through the turpentine in S and through the tube, K, into the pipette, H. When the surfaces of the liquid in H and I are about level, the tube on F may be released, and the liquids will seek their equilibrium. Now adjust the dividing meniscus in J to the zero mark by adding more dilute alcohol into H or I as may be required.

There will be some turpentine on the surface of the liquid in H which will do no injury, and it is well to add some also in the pipette, I, as the covering of turpentine prevents to some extent the evaporation of the alcohol in the water, which action will alter the relative specific gravity of the two liquids. The graduated scale, M, is made after the instrument is filled, in the same manner as described above for the other instrument, and this instrument is operated in the same way.

The Fallis manometer, in my opinion, is destined to prove of great service as a scientific instrument, especially for the registration of minute direct pressures, and also for small vacuum pressures. But this manometer is, I believe, of much use for various commercial and technical manufactures. The instrument can be used for properly regulating the ventilation of mines, school buildings, churches, theaters and other public buildings.

At all the large metallurgical works it seems to me to be of value, and its field will not be restricted to a lead smelter, but at the iron, copper, lead, zinc and other smelting works it should be used for the proper regulation of the drafts, and also to detect various kinds of irregularities, in the stack, at the furnaces, and the various flues, pipes, chambers and conduits about the entire plant.

This instrument has been patented by Mr. Fallis, but arrangements have been made for its manufacture.

COAL EXPORTS OF GREAT BRITAIN.—The exports of coal, coke and briquettes from the United Kingdom during May were 4,170,220 tons, as compared with 3,942,121 tons in May of last year, and 2,691,020 tons in May, 1898. Coal exports for the five completed months of the present year reached a total of 17,898,482 tons, as compared with 17,088,826 tons, in the corresponding period of 1899, and 13,800,818 tons, of £6,449,409 value, in the first five months of 1898.

ENGLISH AND AMERICAN PRACTICE IN IRON AND STEEL.

The London "Times" has recently been publishing a series of articles on the differences between practice in iron and steel making in Great Britain and the United States. To some points in these articles Sir I. Lowthian Bell, an eminent authority in the English trade, has written a reply, the substance of which, as forwarded by the Associated Press, we give below. Some comments will be found in our editorial columns. Sir Lowthian Bell writes:

"My attention has been called to a comparison instituted in the columns of the 'Times' by a special correspondent between the science and practice of the ironmasters on the opposite sides of the Atlantic. I have been actively engaged in the manufacture of iron for more than 50 years. During this period I have, in the course of many visits, made myself acquainted with almost every center of iron and steel making on the Continent of Europe, and in the last 25 years I have thrice performed a similar duty in the United States.

"I venture to doubt that the Americans themselves would agree with your correspondent in the picture he draws of British incapacity. I have looked in vain for any evidence that your correspondent has taken any trouble to make himself acquainted with what has been done, or, as he puts it, left undone by the iron trade of Great Britain, in the last half century, or is being done at the present day.

"It is, perhaps, not so easy as some may think to estimate with the necessary closeness the relative costs of production of any two establishments. These are generally reserved for those who can give as well as receive information of a commercial as well as a technical character. I see no signs in the communications of your correspondent that he has broken through the reserve generally observed by manufacturers when discussing trade subjects with strangers. This is inferred from the statement that the cost of labor in Great Britain, by reason of faulty appliances and unskilled workmen, more than suffices to cover the carriage of the ore from the mines to the Pittsburg works. This involves, in most, if not all cases, railway carriage from the mines to the shipping port, conveyance of about 1,000 miles on the lake, unloading, and carriage over 120 miles of railway to the furnaces. Added to this is the storage and rehandling that proportion required to serve during the winter months, when the frozen lake puts an end to obtaining supplies from the mines.

"With an accurate knowledge of the cost of labor at two Bessemer rail works, one of which was shown to your correspondent, I have no hesitation in saying that in this calculation he is very far wrong. This knowledge, in connection with what I learned in the United States subsequently, enables me to declare with confidence that the carriage of the raw materials to the furnaces greatly exceeds the entire labor of converting pig iron into a finished steel rail.

"We are also reproached for not following the example of American railways in the use of wagons holding three times as much mineral as the ordinary vehicles in general use on British lines. They who hold this language do not stop to compare the different conditions of traffic in the two countries. It must be admitted that, for a given quantity of material, the less the weight of the wagon the less will be the useless load to be drawn by the engine. In the counties of Durham and Northumberland, the largest iron center of Great Britain, the trucks are the property of the Northeastern Railway, and the change of this would involve a loss of four millions of capital, sent to the scrap heap.

"A strong point urged by your correspondent is the imperfections of transferring the raw materials into the furnaces. This, in the United States, is done by a system of bunkers by which the ore, fuel and flux descend by gravitation into the charging wagons. This plan was applied at the Clarence works in 1874, and is universally in use at the Middlesboro works.

"To this the American smelters have added an ingenious mode of employing electricity for raising their materials to the top of the furnaces into which they are discharged.

"In this particular instance the want of similarity consists, in the case of the Middlesboro works, in having to find room for the kilns used in calcining the ironstone, which accounts for the larger space and consequent increased distance of the stocks of material from the furnaces.

"In spite of this obstacle my firm sent one of its members to the United States to examine the mode of conducting the electric appliances. The services of a competent American furnace engineer were retained to visit and report on the propriety of our following the example of our American friends. The report showed that we had carried our plan sufficiently far; that, having regard to the further outlay, he could not recommend our adoption of electric aid.

"The rapid driving in the United States entails rapid destruction of the furnace, which is blown out after a life of 5 years, whereas 18 to 20 years is not uncommon on the River Tees. The entire make in a lifetime is as follows: America, at a make of 4,000 tons per week, equal in five years to 1,040,000 tons; America, average of 11 furnaces, as obtained by my correspondent, in 5 years, 598,000 tons; British ironworks smelting Cleveland ironstone, in 19 years, 799,000 tons.

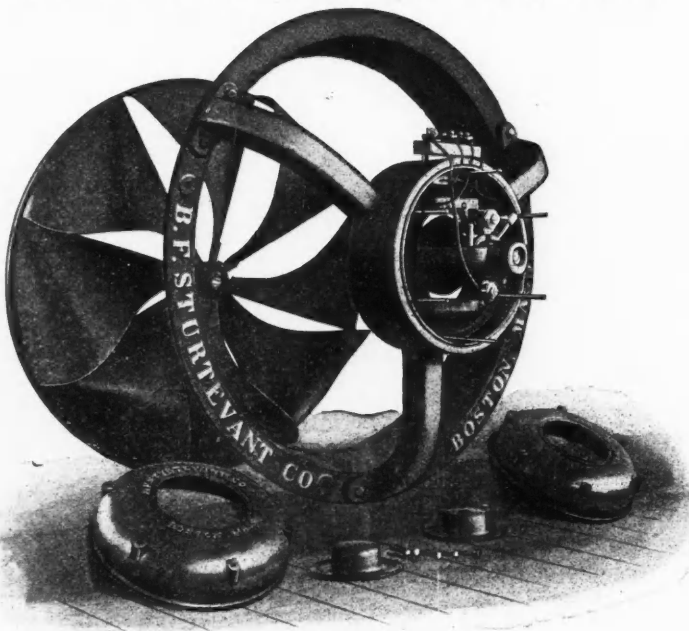
"According to these figures the American furnaces will involve about five times as much expense in repairs as those in Cleveland. At the same time it is only right to say that 800 tons per week at a Middlesboro furnace is a considerable increase on previous years, and it may well happen that the old period of life, 18 to 20 years, may be curtailed."

LIABILITY UNDER LAWS OF ILLINOIS.—Under the Miners' Law of Illinois (2 S. & C. Annual Statutes, chapter 93, sections 6, 8, 14) providing that a light must be furnished at the top and bottom of the shaft of a mine, and that the shaft must be protected by gates, and giving any person injured by a wilful failure to comply with these provisions a right to damages, a mere non-compliance with such provisions is not conclusive of wilfulness. And evidence that the State mine inspector has never made complaint of the conditions surrounding the mouth of a shaft, is not conclusive that such conditions was not the result of wilful violation of the law.—*Odin Coal Company vs. Denman.*

THE STURTEVANT ELECTRIC FANS.

The electric disk fan has become established as a local cooling device, but its ability is limited to merely stirring up a breeze. For the actual movement of air to or from buildings or through ducts a different type is required. The B. F. Sturtevant Company of Boston, Mass., is now building a type of electric propeller ventilating fan such as is shown in the accompanying illustration, which meets the latter requirements. The fan wheel is carefully designed to act against reasonable resistance and to move the air in lines parallel to the axis of the shaft. It is contained within a special circular frame casing which is conoidal in its form as it approaches the circumference of the wheel. This results in decreasing the resistance offered to the entering air. The frame carries a tripod support with annular center, within which is accurately placed and centered a bi-polar motor, consisting of a circular field ring to which the pole pieces are attached. Extending out from either side of the field ring is a yoke which contains the ring oiler bearings. The bearings are self-aligning and self-oiling, and fitted with composition sleeves which are removable from the outer end of the boxes.

Hard carbon brushes, carried in holders of a modified reaction type, are employed, and permit of easy adjustment when it becomes necessary to reverse the direction of rotation of the motor. Special light end casings with removable centers are provided, which, when applied and bolted in place, entirely enclose the motor, thereby absolutely protecting it from dust. This is a most important feature in a machine of this type, where the air, possibly laden with dust, is drawn directly across it. The movement of this air is of great service in maintaining a low temperature of the surface, while the motor itself is designed with the utmost care to avoid excessive heat. This motor is capable of con-



STURTEVANT ELECTRICAL FAN.

tinuous operation for 10 hours with a maximum temperature rise which does not exceed 60° F. The entire apparatus is ordinarily shipped complete and may be bolted directly to an opening in the wall through which the air is drawn or forced. These are built in sizes from 18 in. to 120 in. in diameter, with capacities ranging from 2,000 to 175,000 cu. ft. per minute, and driven by motors ranging from 1/6 H. P. to 14 H. P.

BRITISH COMMERCIAL AGENTS.—London "Engineering" says: "We have had cause to refer, time and again, to the small service rendered by our consular service for the advancement of commerce, and particularly to the fact that the information obtained through this channel at great cost was available by other nations as soon as it was utilized by British firms, because it was published broadcast. The alternative was suggested of submitting all reports first to chambers of commerce; but the Government have decided on another course, which will continue as an experiment for two years. Thus agents have been appointed for Russia, Switzerland, United States and Central America, and these British commercial agents in each of these countries will be at the call of any firm who desires information on any subject. They will inquire into the bona fides of contracts and the financial status of firms, report on trade processes, and conduct just such investigation as a special agent of a firm would prosecute. Of course, charges would be made for such special services, and it is quite possible that there will be objections raised to this innovation; but we think that information of a commercial nature is usually valued at what it costs, and that when a firm makes a special inquiry and gets special information on the lines suggested, the fees will not be looked upon as exorbitant. Thus for ordinary inquiries 5s. has to be paid; for inquiries involving reports as to trades, £1 1s.; and for extended inquiries, the charge, to be determined by the ambassador or minister, is not to exceed £5 5s.. If journeys are undertaken, the railway charges are to be paid, and £1 1s. a day for the agent's services, 10s. 6d. for every broken day, and £1 1s. per night for subsistence. The amount of fees can be ascertained in advance by reference to the embassy or legation. The agents will also watch and report in ordinary course on the commerce, industries and products of special districts.

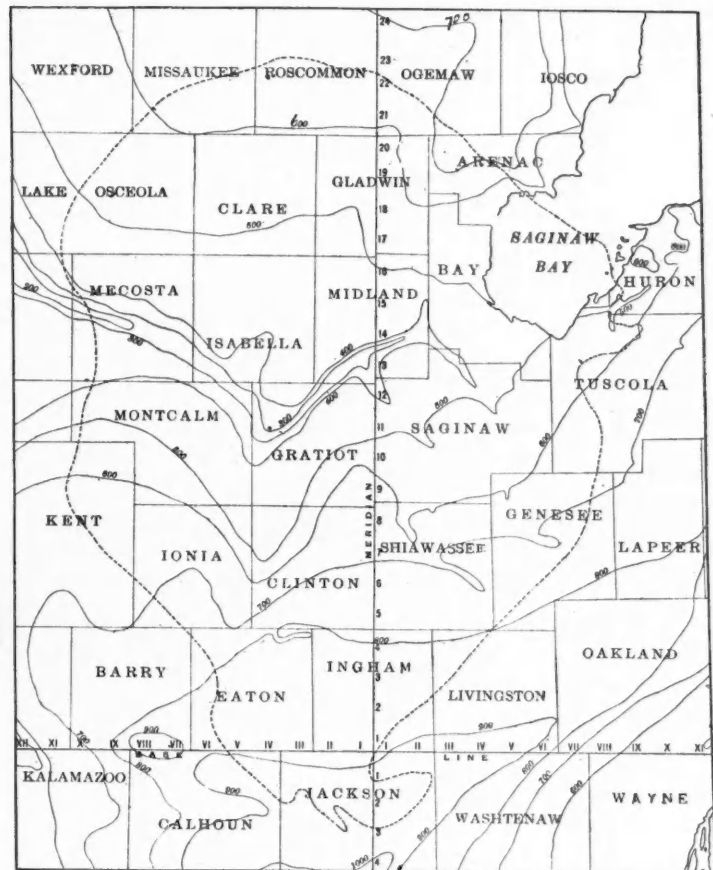
THE COAL BASIN OF MICHIGAN.

Written for the Engineering and Mining Journal by A. C. Lane.

That the coal industry of Michigan should share in the prosperity of the past two years is not surprising, but there are certain features in which it differs from the natural expansion in good times of an established district, and resembles more the opening up of a new and permanent producing field. The coal basin of Michigan has long been known, and its area variously estimated at from 6,000 to 8,000 square miles. Fig. 1 shows its general extent. This is a sketch map of the central part of Lower Michigan, showing the approximate extent of the coal basin. Also the approximate contours of the rock surface above sea level.

The output has been not at all proportionate to this large area. The total product up to 1898 was only 1,861,444 tons. The last few years have, however, shown a rapid increase; in 1896 there were 83,150 tons mined; in 1897 the total was 188,638 tons; in 1898 it was 290,711 tons; and for six months ending November 30th, 1899, it was 283,898, which would indicate a production for the year 1899 of about 560,000 tons.*

The reasons for this late development of the Michigan coal-field were in part temporary and not likely to hinder its development in the future. Others are of a more permanent character. In the first place, the coal



MAP OF MICHIGAN COAL REGION.

area was originally very densely forested and the exploitation of lumber wealth has been for years one of the great industries of Michigan. As a by-product, slabs, sawdust and waste were turned out, which were burned to get rid of them, and furnished an abundant supply of cheap fuel. Then the coal of Michigan, as it occurred and has been mined for many years around Jackson, Corunna, Grand Ledge and Sebewaing, was a bituminous coal of not extra good quality, which was rather too sulphurous to serve for anything but a common steam coal, for which purpose, as we have said, saw-mill waste was an important rival. The following table shows the character of the Michigan coal as indicated by earlier analyses:

Early Analyses of Michigan Coals.

Locality.	Fixed carbon.	Volatile matter.	Water.	Sulphur.	Ash.
Sebewaing, E. Spedel, 1892.....	41.52	44.58	4.82	3.38	5.70
Sebewaing, W. H. Coffron, '89.....	40.45	47.92	4.46	3.05	4.04
Corunna	43.44	38.78	3.03	3.57	11.17
Corunna Coal Co., T. Kincaid, Pres.	45.319	39.476	3.968	2.688	8.549
Jackson, cannal, Winchell.....	45.00	49.00	2.00	2.00	2.00
Jackson, Rominger.....		44.00			

Another characteristic of the coal is its situation, which has retarded development in the past, but has points of advantage for the future. It is the farthest north of the interior well-known coal basins—the only one within the great Lake region. This places it at a short distance, mainly by water, from a large region where domestic coal consumption is high owing to severe winters. This should be a distinct advantage. But on the other hand it is in a region heavily covered with drift dur-

*There is some discrepancy in the figures as to the actual production for 1899. Some mines have practically all their output spoken for, and are mere appendices to such large works as the North American Chemical Company. Others sell in the open market. There is a tendency perhaps to ignore slack in making returns, especially such as is not sold.

ing the great ice age, and but little cut up since, a region full of lakes. Hence two great and permanent causes of slow development. 1. The coal hardly anywhere crops out. 2. The coal lies almost wholly below water level, and very largely in an artesian basin where fighting the water is one of the most important problems that face the miner.

At least one coal mine in the Jackson District and two in the Sebawaing District have been wrecked by being flooded. Very frequently the roof, which is fairly solid shale, will slack up rapidly when exposed to water or weather.

Only in the comparatively insignificant district from Williamston to Grand Ledge, which produced only about 5,000 tons last year, and in a few spots about Jackson, is any coal found which can be worked without pumping, or otherwise than by shaft.

The general mode of occurrence of the coal, as has been indicated in my report on coal in Lower Michigan, is not unlike that of Ohio, Illinois or Iowa. It is generally nearly flat, rolling but a few feet to the hundred, although occasionally near faults it may dip as much as 10°. The thicker spots occur in small areas, troughs or pockets, which are often but a few acres, and from that up to a few hundred. There is, however, an almost continuous seam of workable coal from Saginaw to St. Charles. There are some indications that the lower parts are often the thicker, though frequently the coal keeps its thickness over the roll or hill. The coal is liable to be cut out by sandstone channels coming in from about, and also by channels filled with unconsolidated drift, sand, gravel, etc., sometimes called washes. These may be 100 ft. or so deeper than the general level of the rock surface, and of course in approaching them the roof is likely to be treacherous and water may come in. The coal is also likely to be pinched out by the horsebacks which may represent the limits of the old swamps. Thus a drilling within the coal basin is by no means sure to find workable coal. Probably a third fail to find anything worth mentioning, and less than a third find anything promising. Considering that the holes in the newer districts range from 100 to 300 ft. deep, it is easy to see that there is a preliminary expense involved which must retard development. Many of the areas have been first struck in putting down artesian wells for farmers, and then later proved up more carefully by borings. The usual thickness of the areas worked is from 2½ to 4 ft. There is more or less black band ore associated, but little or no attention has been paid to it. There is a considerable body of coal measures in the State, as is shown by the following record at Midland:

	Total depth.		Surface deposits.
Pleistocene.	285 285		Micaceous white sandstone, fresh water.
	318 33		Black soft shale.
	345 27		Sandstone, brine at 420.
	420 65		Hard shale.
Coal measures....	455 35		Sandstone.
	525 70		Hard shale.
	575 50		Hard sandstone.
	582 7		Black shale.
	709 118		Calcareous (Fe CO 3) shale.
	745 45		Black shale.
	810 65		
Subcarboniferous conglomerate and perhaps Kaskaskia...	920 110	Parma.	White sandstone.
Burlington and Keokuk.	970 50	Grand Rapids.	Argillaceous limestone.
	1,050 80		Plaster bed, fairly pure anhydrite.
	1,130 80		Calcareous shale.
	1,205 75		Limestone.
Kinderhook..	1,300 100	Marshall.	White sandstone, somewhat ferruginous.

This particular record is in a drift channel and near by it is not over 200 ft. to bedrock from the same level. So that we can safely say there are at least 600 to 700 ft. of coal measures above the level of the subcarboniferous conglomerate and the Maxville limestone of Ohio, equivalent to the Kaskaskia and subcarboniferous limestone.

On the margin of the basin the coal occurs close above, in fact, probably in hollows eroded in, the subcarboniferous limestone, which corresponds to the Maxville of Ohio; whereas in the center the coal appears to be higher up. For instance, around Midland, coal appears at a depth of about 200 or 300 ft. It thus appears likely that the coal occurs more or less in overlapping seams arranged in echelon, as in Ohio. The records around Saginaw and Saint Charles show the most coal horizons, some five or six at least.

Of the 7,000 or more square miles of coal basin there are said to be over 200,000 acres under lease, estimated to yield an average of 4,500 tons per acre.

It should be said that only 1,000 tons per foot per acre are generally allowed in Michigan. The wasteful room and pillar system is universally employed. The Verne Mine did use the long-wall system, but abandoned it. The roof came down faster than they could keep up with it. There has been the past summer very serious difficulty in getting enough cars, and, consequently, in giving steady employment. In many cases I heard miners say they were only working 3 or 4 days a week, mainly or entirely owing to lack of cars. The labor commissioner reported the average of 21.3 days per month. It has been, consequently, necessary to adopt a method of working which could be easily dropped and taken up again. Another objection to long-wall working is found in the fear that in shattering the roof too much water may be let in.

The following is a list of the mines from the labor commissioner's report, with annotations:

Jackson County.—Oldest district, now nearly worked out. Some boring is still done, but so much has been done that it is hardly likely that any more large bodies of coal will be found unless at greater depth than usual (50 to 100 ft.), which is, however, quite possible in the north end of the county.

1. New Hope Coal Mining Company, S. Jenkins, Manager, Jackson, Mich. Is working a narrow body of coal. See analysis below:

2. Trumbull Mine, four miles from Jackson, adjacent to and a continuation of the old Woodville Mine, probably not unlike in quality.

Eaton County.—The post office for all the following mines is Grand Ledge, Mich.:

3. Grand Ledge Coal Company, Fargo Boyle, Manager.
4. Bates Mine, O. L. Bates, Manager.
5. Arnold Mine, V. Allen, Manager.
6. Pratt Mine, Rufus Pratt. This is the farthest north and the coal is thickest, about 30 in.
7. Wilkinson Mine, R. Wilkinson.

Besides these there are smaller workings of the nature of gopher holes. This district has the advantage of being largely above drainage level, so that one can work directly into the side of the hill. On the other hand the coal is generally under 2 ft. thick and has a good deal of sulphur. The following is an analysis made for the Geological Survey by A. N. Clark of the Agricultural College: Moisture, 7.00; volatile combustible, 39.10; fixed carbon, 46.40; ash, 7.50; total, 100.00. The sulphur is 3.42; Fe₂O₃ (+ some Al₂O₃?) 5.32.

This district will hardly be of more than local importance unless some other more important seams are found. There is a considerable thickness of coal measures in this region, but so far as yet known the lower seams are thin. There is, however, considerable prospecting all along to the east from here to Cohoctah, and the signs are not altogether unfavorable, and in times past a little coal mining has been done along the Cedar River. To the west and southwest comparatively little has been done, though the coal measures extend that way for some miles.

Shiawassee County.—8. Corunna Coal Company, Tod Kincaid, manager. 9. Owosso Coal Company, R. E. Travis, Manager.

The post office of both these mines is Owosso, but they are about 6 miles east, and the present workings are not far from each other. The Corunna Company has been working for a long time, and the analyses above given are probably of their coal.

In the table below will be found one of the coal of the Owosso Coal Company, made for the Geological Survey (No. 4):

	Table of Analyses.*						
Pximate analysis.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Moisture	10.15	10.67	7.79	7.58	5.93	6.09	4.52
Volatile matter..	33.14	33.59	34.74	35.70	46.59	39.59	40.57
Fixed carbon....	53.95	53.80	52.58	52.96	44.64	46.06	42.16
Ash	2.76	1.94	4.89	3.76	2.84	8.26	12.75
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total sulphur....	1.10	1.01	1.01	1.50	3.07	5.72	6.92
Volatile sulphur	1.00	0.98	0.82	1.48	3.05	5.68	6.87
Sulphur in ash...	0.10	0.03	0.19	0.02	0.02	0.04	0.05
Sp. weight.....	1.269	1.260	1.285	1.27	1.244	1.34	1.36
Ultimate analysis.							
Water	10.15	10.67	7.79	7.58	5.93	6.09	4.52
Carbon	71.11	71.67	71.37	72.88	72.42	68.07	63.59
Hydrogen	4.74	4.90	4.48	4.81	5.73	5.26	4.73
Nitrogen	1.40	1.30	1.40	1.45	1.50	1.49	1.19
Oxygen	8.84	8.49	9.25	8.04	8.53	5.15	6.30
Ash	2.76	1.94	4.89	3.76	2.84	8.26	12.75
Volatile sulphur.	1.00	0.93	0.82	1.48	3.05	5.68	6.87
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calorimeter test,							
B. T. U.....	12,726	12,868	12,836	13,016	13,502	12,714	12,099
Calories	7,070	7,149	7,131	7,231	7,501	7,063	6,717

1. Section of main coal, Pere Marquette, shaft No. 1 (42 in.).
2. Section of main coal, Standard, shaft (44 in.).
3. Section of main coal, J. H. Somers, shaft No. 1 (35 in.).
4. Section of main coal, Owosso Coal Co.
5. New Hope Coal, Jackson (select lump).
6. Michigan Standard Coal Co., Sebawaing (sample from bins).
7. Central Coal Mining Co., West Bay City.

Huron County.—10. The Michigan Standard Coal Company, X. B. Konkel, manager, Sebawaing, Mich.

This is not so old a field as the previous fields, but was developed about 1833. Two mines, however, the Sebawaing Coal Company and the Saginaw Bay Coal Company, have been flooded and abandoned. There are a number of strong flowing wells near by. The coal is often over 4 ft. thick. The three shafts are within a mile of each other. Besides the old analyses we may add a new one (No. 6). It will be seen that the Sebawaing coal is a hot steam coal, but full of sulphur. It is rather inclined to run and coke on the grate, like all the sulphurous coking coals.

The whole area of coal measures cannot be more than a few hundred acres in this county, but they are known to extend south into Tuscola County, and borings have shown that that county will in time be productive.

(To be concluded.)

A NEW SLAG CONVEYOR.

A new slag conveyor which has recently been put up at the Lake Superior Smelting Works at Dollar Bay, Michigan, is described by the Houghton "Mining Gazette." Heretofore the slag has been carried from the copper smelting furnaces in trucks, but now it has become necessary to carry it a greater distance.

The conveyor runs east from the blast furnace in the cupola building directly over a swamp. The distance from the furnace to the outer sheave is a little less than 600 ft. There are four towers ranging from 23 to 28 ft. in height, and in each of these are two sheaves carrying the endless cables upon which the slag pots are hung. These towers are substantially built of 60-lb. T-rails; no foundation is used excepting lateral rails to which the uprights are bolted. Thus the towers may be readily moved and no excavation or masonry is needed.

The endless steel cable is 1¼ in. in diameter and 1,175 ft. long. It passes around horizontal sheaves 4 ft. in diameter, one directly in front of the tap hole in the blast furnace and the other at the eastern extremity of the runway. The outer sheave is firmly set in heavy timbers, while to the inner sheave, which is similarly reinforced, is communicated the power which drives the cable. The power is transmitted by another endless cable running from a shaft which projects into the north end of the cupola building from the engine house. The sheave over which the power cable runs turns on the same shaft with a small

*All made by H. J. Williams for the State Geological Survey.

gear, and by means of a friction clutch the gear is set in motion, engaging the main gear of the sheave shaft.

The slag pots are the same as those used in the hand trucks. To the lugs a ball has been fixed, and this is suspended from the cable of the conveyor. An angle in the suspending rod prevents interference with the tower sheaves. From the apex of the bail to the rim of the pot runs a small rod, holding the pot upright. A stud projects from this rod, and in the angle thus formed runs a wire, which is suspended between two of the towers. A disc attached to this wire disengages the rod and dumps the pot. This trip wire is wound on reels fixed to the towers, thus the position of the trip disk may be varied and a new dumping point established. Eight pots are suspended from the conveyor cable at regular intervals.

The loading is done by means of a lever which picks the empty pot from the suspending rod. It is swung to a traveler running to the spigot through which the molten slag streams from a tank under the tap hole of the furnace. Another traveler brings a laden pot back to the lever and it is swung into position. The cable is stopped for the transfer, but this is done instantly and easily by means of the friction clutch.

Four men—two on each shift—will be required to operate the plant, where heretofore five men on each shift, or 10 employees, have been needed to cart away the slag by hand. The slag pots have a capacity of 300 lbs. and it is estimated that 10,000 tons a year is run out of the blast furnace.

PRE-CAMBRIAN SEDIMENTS IN THE ADIRONDACKS.*

By James F. Kemp.

Stratigraphical geology had its rise in those old mining regions of Germany, the Hartz, the Erzgebirge and Thuringia, and speaking as the author does in a lecture room of our oldest American School of Mines, it gives especial pleasure to note this connection and to render to the ancient art of mining her just due. There is no doubt in the author's mind that the keen observation of miners had convinced them that there was some regular succession in the rocks, long before this principle found accurate, scientific expression in printed form; but, as far as we know, it was first formally stated by Johannes Gottlob Lehmann, a Prussian mining official, in connection with some profiles or cross-sections of the Hartz and the Erzgebirge which he prepared about the middle of the last century. Lehmann had observed that flat and undisturbed beds rested upon earlier, tilted strata and upon crystalline rocks, both of which latter he assumed as his original base, but with whose relations he did not concern himself. A few years later, in Thuringia, George Christian Fuchsel dealt in a tectonic way with the coal measures, the Permian and the later systems, but it was not until the close of the eighteenth century that William Smith made known the use of type fossils in English geology; nor was it until 1808 that Cuvier and Brougniart, working upon the extremely regular deposits of the Paris Basin, established for France, if not for the world, the use of fossils on a large scale. They brought out a definite system, which anticipated by a few years the issue of William Smith's famous geological map of England.

From this time forward the study of the stratigraphy of the fossiliferous rocks has progressed rapidly until so much has now been accomplished that, even in regions of very violent change, the problems of the Paleozoic may be considered to be in a high degree solved and the range of work upon its series and stages has become chiefly faunal and biological. The course of geological investigation has tended ever downward to lower and lower horizons, and it may be said that in recent years the chief problems of stratigraphic interest have involved that tempting yet elusive series of sediments which lies below the limits of well-preserved and recognizable fossils. These remains of organisms, which are so abundant and useful in the Paleozoic, disappear in the most remarkable way as we go below the Cambrian, and yet there are few geologists who do not confidently believe that in some corner of the world not yet fully explored they will be found in satisfactory abundance. Traces of the life are already known. Walcott in the West, Matthew in the Maritime Provinces, and Barrois in Brittany, have met with encouragement, but the great discoveries remain for the future, because, as yet, the evidence is meager; amounts to little more than a stimulus for further work. Despite the lack of organic remains, however, the elucidation of the genetic and structural problems supplied by these ancient sediments is of the highest scientific interest and importance because it carries us ever further and further back toward the primeval conditions on our planet. Year by year the circle of the recognized Algonkian closes in on the admissible Archean, and year by year the ancient gneissic areas yield up the secrets of their pedigrees.

A vast amount of work toward solving the problems of the pre-Cambrian rocks has been done by Peach and Horn in Scotland, by Irving and Van Hise in the Lake Superior Region, by Pumpelly, Dale and others in the Green Mountains, by Nason and Wolf in New Jersey, and by Adams in Quebec and Ontario. The chief area of pre-Cambrian rocks within the limits of New York State are comprised in the Adirondacks. Much the same problems are presented here as those which confront the student of the Ontario-Quebec Region. In outline the Adirondack area is somewhat like a circle which has been flattened on the east along Lake Champlain and pulled out to a crust on the west toward the Thousand Islands. It covers about 12,500 square miles, and its diameter is nearly 125 miles. The surface consists almost entirely of crystalline rocks, and in these metamorphosed representatives of both sedimentary and igneous rocks are present. All but the small trap dikes have suffered severely from dynamic processes, sometimes to an extraordinary degree, and there are instances where the sediments are hardly, if at all, to be recognized as such. Sufficiently numerous examples, however, remain which can with certainty be referred to their

original sediments, and great probability as to origin can be established for others. While deeply buried, the sediments have been invaded by an enormous mass of plutonic eruptives of whose nature and succession we now have much evidence. So extensive has been this igneous invasion on the east that the sediments have been broken up into small and often isolated areas whose relations are difficult to decipher. On the west, as shown by C. H. Smyth, Jr., the sedimentary rocks are more extensive, although everywhere pierced by eruptives. After the intrusions, dynamic metamorphism of a pronounced type crushed, sheared and mixed up the rocks; upheaval and faulting disguised the relations, and erosion removed or obscured the evidence, so that a very complex problem is afforded. In the Eastern Adirondacks, however, it does not appear that close folding has taken place to any large extent, if at all. On the contrary, despite the dynamic metamorphism, the decipherable dips in sediments and the contacts between limestones and neighboring gneisses are quite flat, and low folds, if any, seem to be the rule. Nevertheless, crushing and granulation are very widespread and have often produced mashing in the rocks of all sorts, except the later trap dikes. The mashing cannot be due to the larger intrusions, because they exhibit it as much as the sediments, and it must therefore have followed their entrance. It preceded the Potsdam period, and it must have taken place under a considerable load, else there would have been more severe folding. From this brief general statement it will be seen that the problems possess their own individual characters, and, in a measure, seem to differ from those of other regions, unless it be Quebec and Ontario.

The earlier workers in the Adirondack Region did not make any serious contributions to the stratigraphy of the pre-Cambrian rocks. Detailed field work has been required, and this has only been attempted by C. H. Smyth, Jr., H. P. Cushing, the author, and their assistants, on the west, north and east, respectively, all advancing, however, in close, sympathetic touch.

The most easily recognizable rock is a coarsely crystalline white limestone. It is at the same time the widest in occurrence and the most significant evidence of the presence of the old sediments. While at times of considerable purity, as at the marble quarries at Gouverneur, it is generally more or less richly impregnated with graphite, apatite, quartz, pyroxene, hornblende, phlogopite, trochite, scapolite, chondrodite, garnet and feldspars. The silicates tend to be aggregated into streaks and bunches that owe their shape in large part to the shearing and stretching effects of dynamic metamorphism. In the larger bunches less common minerals, such as titanite, pyrrhotite and tourmaline, are met. Most of the minerals just cited have been, without doubt, produced by the regional metamorphism of more or less silicious limestones. Such are quartz, pyroxene, hornblende, biotite, graphite, apatite and feldspar; but others, such as tourmaline, scapolite, titanite, and to some degree apatite, are the result of contact metamorphism, as Smyth has so well shown for the west side of the area. Regarding the origin of these limestones it need only be said here that they are, beyond question, calcareous and magnesian sediments which involved silicious, ferruginous and aluminous admixtures, in some cases very richly. During metamorphism the latter elements supplied the necessary materials for the production of the various silicates. The limestones appear to be loss pure and consequently more charged with silicates on the east than on the west, and to present smaller cross-sections, though we must omit from this statement the contact zones of St. Lawrence County. Graphite, too, is reserved for special consideration. The limestones exhibit many interesting proofs of having yielded to pressure like a viscous substance. They have flowed around the harder inclusions and bordering rocks, have moulded themselves into their irregularities and have behaved in all respects like a plastic material.

The Quartzites.—These are far less abundant than the limestones and have received but little attention from observers. In former papers reference has been made to thin sulphur-yellow beds which accompany the limestones near Port Henry. These are friable quartzites, and contain much sillimanite, graphite and pyrite. At Hague, on Lake George, and at a point five miles west of the lake shore, interesting graphite mines have been opened, which show undoubted fragmental sediments. A bed some 6 to 15 ft. thick has been faulted once, so as to be exposed in two places. It dips to the west at an angle of 10°, and contains abundant flakes of graphite, all of which show a rubbed and streaked appearance from much shearing. The rock contains little else than quartz and graphite and cannot reasonably be interpreted otherwise than as a sandstone which has been richly charged with some carbonaceous matter, either originally organic or subsequently introduced as some liquid hydrocarbon. Beneath and above the graphitic quartzite is a garnetiferous gneiss, richly charged with sillimanite. Above the upper sillimanite gneiss is still more quartzite, and all rest on a granitic gneiss. The author interprets the succession as one which involved a sandstone, porous enough to admit the carbonaceous matter now represented by the graphite, which was interstratified with a somewhat calcareous, sandy shale which has now been changed to the garnetiferous sillimanite gneiss. The author is inclined to regard the granitic gneiss as the foundation on which the sediments were deposited. The largest exposure of quartzite yet recorded is in the town of Lewis, about three miles north of Elizabethtown, in Essex County. In a considerable number of other places these quartzites have been noted, and as a rule they have shown a pronounced banded, if not bedded, structure, and have almost always exhibited graphite.

The paper then discusses the minor associates of the limestones and passes on to a consideration of the sedimentary gneisses. In intricate relations with the limestones in many localities are gneissoid rocks which are characterized by a very pronounced and persistent banding, and the banding is regular and runs for very considerable distances. The transition from dark bands consisting of prevailing bisilicates to lighter ones containing quartz and feldspar, is abrupt, and can only be accounted for by changes in sedimentation. They differ entirely from the short tentacles which are produced by the stretching of the minerals of an eruptive rock. Graphite is very common in these gneisses and is of much significance. Fragmentary and isolated exposures make it very difficult to determine the actual thickness of these rocks.

*Abstract of vice-presidential address before Section E (Geology and Geography) of the American Association for the Advancement of Science, June 25th, 1900.

Besides the gneisses just described there are others which are more massive and uniform, and yet which give strong evidence from their general relations and associations of belonging in the sedimentary series with the limestones. They are almost always rusty on their outcrops, as distinguished from the certain eruptives. Microscopic examination gives additional arguments for regarding them as altered sediments.

After these general considerations the paper proceeds to a somewhat extended statement of the general distribution of the metamorphosed sediments and then to descriptions of several geological sections across the Adirondack area. The significance of the graphite in the rocks is discussed at length, and after reviewing the conditions of the problem the author concludes that the mineral has been derived from the sedimentary rocks, but also that whatever its origin it has great value as an indicator of sediments.

The more important points of recent work on the Adirondack sediments may be summarized as follows: The sedimentaries are much more widely distributed than was formerly supposed, but they are absent from a wide central area, where only massive gneisses and eruptive rocks have thus far been met. The rocks indicate the original presence of shales as well as of limestones and sandstones. All the sediments have been thoroughly recrystallized and metamorphosed, and the associated igneous rocks are plutonic, or deep-seated types. Both these facts indicate former burial at very considerable depths and the subsequent removal of some thousands of feet by erosion. These rocks are certainly pre-Potsdam in age, and the relations of the strata force the conclusion that they are likewise pre-Cambrian, and that they suffered their metamorphism in pre-Cambrian time. It was not a load of paleozoic sediments which rendered possible the deep-seated metamorphism of the

Last year a delegation of the American Institute of Mining Engineers visited the mines of Nevada County, and were much interested in examining the Pennsylvania Works; they were unanimous in the statement that it was one of the best and most complete mills they had ever seen. The Risdon Iron Works have placed many mills at mines, but it is believed none will reflect more credit upon them than this mill of the Pennsylvania Mine.

ABSTRACTS OF OFFICIAL REPORTS.

Flemington Coal and Coke Company, West Virginia.

The report presented at the recent annual meeting of this company showed assets as of date April 30th, 1900, as follows: Real estate and mining rights, \$3,300,000; treasury stock, \$57,500; construction, \$360,363; cash, accounts receivable, supplies, etc., \$142,585; total, \$3,860,448. The liabilities were: Capital stock, \$2,500,000; bonds, \$500,000; bills, accounts and balances payable, \$168,268; total, \$3,168,268, leaving a balance of \$692,180 to surplus account.

The report stated that the output of the company had been increased from an average of 600 tons per working day to 1,000 tons. When certain new buildings and other improvements are completed, which will be within a few months, the output would be increased to 1,500 tons. A complete trolley system had been installed in the mines capable of handling 4,000 tons of coal per day. The Baltimore & Ohio Railroad Company had put in four sidings on the property during the year, and, also, at its own expense, weighing scales, so that the cars could now be weighed at the mines instead of at the nearest weighing point as heretofore.



PENNSYLVANIA MILL, GRASS VALLEY, CALIFORNIA.

pre-Cambrian sediments and the Plutonic textures of the intrusions, but a load of pre-Cambrian rocks which have disappeared. What those rocks were is an interesting subject of speculation.

THE PENNSYLVANIA MILL AT GRASS VALLEY, CALIFORNIA.

By Our Special Correspondent.

The accompanying illustration of the quartz mill at the Pennsylvania Mine, at Grass Valley, California, shows one of the most complete and best constructed plants on the Pacific Coast; the mill was furnished by the Risdon Iron and Locomotive Works of San Francisco, and was designed and erected by W. S. May of Grass Valley. It consists of 10 stamps weighing 900 lbs. each, with the Barbour self-tightening cam, a valuable improvement on the old-style key cam. The stamps crush about 4 tons of ore each during 24 hours. It is a steel mill and equipped with all modern appliances for saving gold. Johnston concentrators, three in number, of the 6-ft. pattern, are used, and their work in saving the sulphurets is excellent. A sand plant has recently been constructed by Mr. May for the company, and is of the Gates patent; this is proving a valuable adjunct to the property, being modern in every particular and saving practically all the values.

The mill is run by electricity, the Stanley Manufacturing Company of Pittsfield, Mass., furnishing the 80-H.-P. motor. The machinery throughout is furnished with ball-bearing, self-lubricating journals. The hoisting works near the mill are also fitted out with all modern and necessary appliances. There is a double-cylinder double-reel hoist of the Corliss bed pattern, firmly set in concrete foundation. The hoisting machinery being operated by steam, is capable of working the mine to a depth of 2,500 ft. This hoist was also built by the Risdon Iron and Locomotive Works, and is so arranged that, together with the mill, the whole is almost automatic.

The buildings of the mill rest upon solid concrete foundations; the floors of both the concentrator and amalgamating rooms are also of concrete. The woodwork is carefully and thoroughly done, the whole enclosed with No. 28 galvanized corrugated iron.

Mr. Bennet Opie is superintendent of the mine, and takes pleasure in showing interested visitors about the works, priding himself much on their completeness.

The president further reported that all incumbrances, liens, etc., against the property had been paid off except the bonded indebtedness, the ordinary current expenses and a balance on the electric tramway system, which is payable during the next year and a half.

The average profit of the company, it was stated, at the present price of \$1.10 per ton at the mine, should be about 30c. per ton, but at present the company was delivering some coal on old contracts taken at 85c. per ton. When these were out of the way the company should make its full profit.

The stockholders by a two-thirds vote authorized an increase of \$500,000 in the capital stock of the company, the new stock to be held in the treasury for the present and to be used only for the purpose of building a large coke plant and opening up another part of the mine.

Broken Hill Proprietary Company, New South Wales.

The report of this company for the second half of 1899 shows that the total ore taken out was 206,193 tons, of which 70,128 tons came from the open-cut and 136,065 tons from the underground workings. The total was 3,500 tons more than in the first half of the year. The tonnage of ore, concentrates, etc., smelted was 95,154 tons, or 4,910 tons less than in the first half-year. The average yield from the ore smelted was 18.48 per cent. lead and 22.68 oz. silver per ton. The refinery treated 18,980 tons of silver-lead bullion, the result being: Soft lead, 18,240 tons; hard (antimonial) lead, 304 tons; silver, 2,568,566 oz. fine; gold, 9,676 oz. fine; by-products containing 1.6 tons lead. The parting plant treated 361,249 oz. dore bars, from which were separated 9,676 oz. fine gold.

The directors' report says: "Work in the open-cut has proceeded satisfactorily during the period under review, though the large amount of dead work involved in the removal of batter material has considerably restricted the supply of the particular class of ore required for the leaching and chloridizing plants, which have consequently not been able to work full time. This, it is anticipated, will be obviated in the near future, and as soon as the excavations are more advanced. A most extensive and complete air compressor plant of 900 H. P. has been erected at the mine, and is working satisfactorily. This was required chiefly in connection with the increased extraction of the sulphate ore which is contemplated shortly, and also with the views of centralizing the distribution of power, whereby economy in costs may be obtained. Underground nothing of sufficient importance has occurred to warrant espe-

cial reference, except that in McBryde Shaft, at the No. 5 level, the oxidized ore body has proved to be of greater extent than anticipated, and as a result the average silver contents of ore sent to the smelters has increased.

"The extension of the concentration plant is not yet fully completed, unavoidable delays having occurred through the inability of contractors to supply the special material required. The latest advices indicate that this difficulty is now being overcome, and the general manager has already started a section of the extension with which he is well satisfied. Your directors are giving attention to the question of magnetic separation, and, while, they believe a satisfactory solution is to be found in that direction, experiments in hand are not sufficiently advanced to permit of any definite statement in regard thereto being made at this present stage. At Port Pirie the whole of the various plants have been working smoothly and without interruption, except so far as stoppages for the necessary and usual repairs demanded, satisfactory results having been obtained.

"In order to deal with the increased quantity of concentrates which will shortly be produced, another roasting furnace is being erected. It is now nearly ready for use, and when complete this plant will consist of five furnaces. The bin accommodation for the storage of concentrates and other products that require to go to the roasters has been increased, and the railway viaduct lengthened accordingly. A copper-smelting reverberatory furnace has been erected for the treatment of the low-grade copper matte produced, which will bring it up to a higher grade than it has been used to ship in the past, in addition to which it will permit the company to purchase such parcels of copper ore as may be advisable. The briquetting of concentrates and fine ores has progressed satisfactorily, and the success of the method adopted is now assured. Over 12,000 tons of material have been put through the machine originally obtained, and two more of the same type are under order, advices stating that they have been shipped from New York.

"The gross profit for the half-year amounts to £144,492, which, after deducting £34,130 for depreciation on the various plants, leaves a net profit of £110,362. The sum of £62,935 has been expended in construction, and two dividends, each of 1s. per share, or £96,000 in all, have been distributed among shareholders. A further amount, £1,000, has been transferred to the insurance fund, which now stands at £4,000."

RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

"DATE OF LOCATION" IS MATERIAL TO VALIDITY.—Under the laws of the United States (Revised Statutes, section 2324), which provides that the records of mining claims shall contain the name or names of the locators, the date of location, and such a description of the claim or claims located, by reference to some natural object or permanent monument as will identify the claim, the date given is material, and must be correct, and not a fictitious or fraudulent one. Where the locator of a mining claim on government lands fraudulently antedates his location, notice for the purpose of defeating an actual locator on same, such location is fraudulent as against the rightful claimant and also the government.—*Muldoon vs. Brown* (59 Pacific Reporter, 720), Supreme Court of Utah.

RIGHTS OF OCCUPANT UNDER LOCAL MINING RULES.—Where party had held, occupied, and had been in possession of mining claims under color of title, in pursuance of law and the local rules and regulations of the mining district, for more than twenty years prior to the attempted location of another, such claims were not public mineral lands of the United States, and the first party could maintain a suit to enjoin the latter's location, though there was no evidence of the transfer of the original locator's title to him.

Where at the time of the location notices were posted on same, and subsequently recorded in the records of the mining district, and the claims were marked by monuments, so that the boundaries could be readily ascertained, the location was valid.—*Risch vs. Wiseman* (59 Pacific Reporter, 1111); Supreme Court of Oregon.

DRAWBACK ON NITROGLYCERINE IN DYNAMITE.—On the exportation of dynamite and other explosives manufactured by the Independent Powder Company of Terre Haute, Ind., in the production of which all of the glycerine used was imported, a drawback will be allowed equal in amount to the duties paid on the glycerine so used less the legal deduction of 1 per cent. The quantity of such glycerine shall be determined by allowing 46.2 lbs. of the same for each 100 lbs. of nitro-glycerine contained in the exported articles. When the glycerine used in the manufacture of dynamite, or other explosives, was refined in the United States from imported crude glycerine, the quantity of crude glycerine so used shall be determined by adding to the allowance of 46.2 lbs. of glycerine for each 100 lbs. nitro-glycerine contained in the exported article 22 per cent. of such allowance.

The drawback entry must show the number and size of cartridges and other packages contained in each shipping case, the trade names or marks by which the several forms and grades of the explosive are designated, the quantity of each kind or grade, and the percentage of nitro-glycerine contained in each grade, respectively. The weights of the several kinds of uniform packages shown by the drawback entry shall be tested by a United States weigher when ordered by the collector. Samples may be taken or sworn samples furnished, as ordered by the collector, to be submitted to the appraiser for his report relative to the requisite conditions noted. Before the liquidation of any such drawback entry, there must be filed with the collector at the port of exportation a sworn formula or statement by the proprietor and foreman of the factory where the explosives are made, showing the percentages of nitro-glycerine used in the manufacture of the several brands or grades of explosives made in such factory for exportation, and no drawback shall be allowed on any excess over the quantity taken in the manufacturer's formula so filed without special instructions from the Department.—Circular of Treasury Department, Washington, June 16th.

SOME MODERN ASPECTS OF A PRACTICAL CLASSIFICATION OF ORE DEPOSITS.*

By Charles R. Keyes.

The recent advancements in geology have done much to further our knowledge respecting the ore deposits. The principles formulated by the geological branches known to specialists as Geomorphy, or geographical geology in its new and most modern sense, Petrology, including the application of the microscope to rocks, and Geotechnics, or the structural aspects of geology, have opened a field of inquiry concerning the ore bodies that has never been thought possible.

The microscopical examination of rocks has already given us a new science. The study of the massive crystallines under the microscope have enabled us to take up in a philosophic way the consideration of the metamorphic rocks which had heretofore utterly defied all attempts to solve the riddle of their nature. Rock alteration has come to be recognized as an ever active universal result. Ore formation is only an incidental effect of general rock change.

So far as the immediate genesis of ore bodies is concerned, the modern ideas regarding the general metamorphism of rocks as revealed through the microscope have vastly broadened our conceptions. It is from this quarter that we are in the future to expect greatest aid in solving most of the ore problems now perplexing us. It is chiefly upon the principles of general rock metamorphism as now understood by petrographers that the accompanying classificatory outline is based.

With regard to ore deposits, modern geology emphasizes three great propositions: First, ore bodies are with few exceptions essentially surface deposits—that is, they are confined to a very limited zone near the surface of the earth's crust; second, existing ore bodies are, except in a few instances, of very late geological formation, probably few dating back before the Tertiary; third, ore bodies are concentrated chiefly by means of circulating waters which have come from below, from above, and from the sides, it being unimportant which direction. These are the principles which are to completely revolutionize our ordinary notions concerning the genesis of ore bodies, and which are bound to place the consideration of ore deposits upon a strictly scientific footing.

The application of the modern principles of rock metamorphism to the ore deposits is fraught with danger of making the whole subject of ore genesis unnecessarily complicated; and therefore at the very outset thwarting the very object it is sought to attain. This is especially true when we come to consider questions of ore classification. We are confronted at once by the labyrinthine complexity of any classification that is based directly upon the metamorphic processes as we now know them to be generally operating upon the rocks. Any classification of ore bodies in order to be made useful to the fullest extent must, first of all, be simple; second, it must be capable of being readily applied in the field; and third, it must be a guide to proper exploitation. No matter how refined and well-fitting a scheme may be, if it does not meet with these three requirements it is not likely to be adopted, or even considered by practical men.

One difficulty that is usually met with in attempting to consider ores, and in arranging them according to the physical processes involved in their production, is that they are in their nature general or generic, and therefore cannot be used in making distinctions that are only specific or of much lower taxonomic rank. They have to be eliminated altogether in specific considerations.

When the agencies are given primary importance in the classification of ore deposits, we would expect to have the nearest approach to the highest type of systematic schemes—the genetic. However, most of the latest attempts to classify ores according to origin are fatally faulty in that there is almost complete failure to recognize the essence of the genetic principle. Genetic Plan is an attractive title. It is widely used in other departments of science; but, as usually applied to the ores, the plans thus far proposed seem to be really genetic in name only. A truly genetic arrangement of ore deposits must first of all take into account the metallic accumulations as ore bodies. Then their relationships to the physical agencies or processes forming them should be pointed out.

To refer ore deposits directly to the causes producing them instantly does away with the very principle lying at the base of all classification. From this practical standpoint ores of all descriptions are jumbled together. Instead of orderly, helpful arrangement, there is chaos worse confounded. For instance, a classification of ores having the chemical mode of deposition as the principal criterion meets with the very same difficulties that does a chemical classification of rocks. To be sure, it is possible to form such a scheme for rock masses, but in practical geological work it is perfectly useless. Classification of ore bodies, in which chemical formation is the primary standard, falls equally short of meeting the requirements.

A purely genetic classification of ore deposits is, therefore, neither practicable nor desirable. The very definition of the term ore makes it inadvisable to even attempt to construct a practical scheme that is, in its nature, strictly genetic. While some such systematic plan for rock masses may be in a general way formed, and while ores may be regarded as rock bodies, the unscientific character of the group of substances going under the name ores, makes a similar scheme for the ore deposits almost worthless.

The fact that an ore is any metallic substance that accidentally accumulates locally in sufficient quantity to be utilized by man, precludes in practice the establishment of any close relationships between the different deposits, based strictly upon genesis. A parallel case is found in botany. A classification of useful fruits would give small indication of their morphological and genetic relationships.

The physical and chemical agencies immediately involved in the formation of ore deposits must therefore be conceded to be of minor importance in classification. Metasomatism, which in the "genetic"

*Summary of paper presented at Washington Meeting of the American Institute of Mining Engineers.

schemes gives rise to a primary group of ore deposits, is a general process, and should find no place in any classification. The same is true of many other chemical modes of activity. All these are of vast importance in the consideration of ores, but surely not as criteria of classification.

As all classification must be regarded in a measure more or less practical in its bearings, so one of ores should be of such a character that, as one of its most conspicuous features, it can be made useful in their development. With these ends constantly in mind a systematic scheme of ore deposits loses many of the difficulties usually encountered.

Attempts to systematically arrange the ore deposits have usually proved very unsatisfactory. This is due partly to the fact that no strictly scientific scheme of classification is possible, and partly to the fact that the practical mining phases of the question and the fundamental geological principles have not been properly co-ordinated. In this adjustment seems to lie the most hopeful outlook.

The usual criteria used in ore classification have given diverse results according as special stress has been placed on this or that feature. From the standpoint of mining, for example, mineral content is of first importance; in the most scientific plan possible, it is last. So, also, to the miner, ore origin is of least interest; to the theoretical scientist it receives attention before all else.

While the principal factors that have been relied upon as criteria in the classification of ore deposits are not many, they have been used so differently and with such varied values that the subject has become much more complex than might be expected. It is neither necessary nor desirable at this time to review these criteria and the varied senses in which terms have been employed. There, however, may be mentioned some of the most conspicuous standards. These are: Ore content, form of ore body, mode of chemical formation, mode of physical formation, lithological character of filling, texture, position with reference to structure of country rock, and origin with reference to country rock. The manner of deposition of an ore as a geological formation thus not only becomes an important practical feature, but in classification a prime factor.

For the most part, ore bodies are geologically secondary formations. With some exceptions, they have accumulated long after the country rock has been formed. While it has been widely recognized that close relationships exist between the formation of most ore bodies and the character of their matrix, the vastly broader generalizations regarding the intimate association of ores with geological structures have not received so much attention.

As a usual thing, the exploitation of ore bodies has been carried on in accordance with rules which the experience of the individual has pointed out. Where an operator, untrained in scientific earth lore, begins mining in an undeveloped district, his method of attacking the various problems presented is most likely to be after that of his nearest observations elsewhere. He may hit upon the right plan at once; but the chances are ten to one that he will not. Only after repeated trials and many failures, and after much fruitless expenditure of time and energy does he finally attain satisfactory results.

When, however, a specially trained geologist undertakes to make an investigation of a mining property, he first of all gets his bearings, as it were, with regard to the geological structure of the region and the distribution of the rock formations. At once he eliminates nine-tenths of the chances of failure in arriving at the best plan for operation. Instead of a great game of chance, the development becomes a strictly business proposition.

These two methods of procedure indicate the essential differences between the old and new ways of carrying on mining operations. In fine, the intelligent exploitation of ore deposits must have a broad geological basis.

The nearest approach to a truly genetic classification of ore deposits is one which presents as prominently as is possible the underlying principle of cause and effect. All products must find accurate expression in terms of the agencies. Only then are the broader distinctions in classification made possible. The various taxonomic groups are clearly separable only when it is recognized how and in what manner the component parts of the materials dealt with are influenced. Under one set of agencies and conditions ore materials are affected in one way; under another set of conditions they act altogether differently. It is inferred, therefore, that the primary groupings of ore bodies find their best expression when based upon the manner in which the agencies affect them, and the way in which the implied nature of these agencies is interpreted.

This is perhaps more clearly expressed by the accompanying chart, in which the groups and main categories of ore depositions are set forth, and with which some of the general forms of ore bodies which miners commonly recognize are paralleled.

Groups.	Categories.	Miners' Forms
I.—Hypotaxic (Mainly surface deposits).	Aqueous transportation.	Placers, beds.
	Residual cumulation....	Pockets (in part).
	Precipitative action.....	Bog-bodies, layers.
II.—Eutaxic (chiefly stratified formations.)	Original sedimentation.	Bedded veins; strata.
	Selective dissemination.	Impregnations (in part).
	Emponed amassment....	Masses (in part); some segregations.
	Fold filling.....	Saddle reefs.
	Crevice accretion.....	Gash veins, some stock-works
	Concretionary accumulation.....	Nodules.
III.—Ataxic (Predominantly unstratified and irregular bodies).	Metamorphic replacement.....	Fahlbands (in part).
	Magmatic secretion....	Masses (in part), some lenses.
	Metamorphic segregat'n.	Stocks, lenses.
	Fumarole impregnation.	Contact veins, impregnations (in part)
Preferential collection....	Chambers (in part); pockets (in part).	
Fault occupation.....	Some linked veins, true veins.	

Viewed broadly from the geological and practical standpoints, the consideration of the major division of ore deposits according to the plan of Whitney, and as afterward adopted by Newberry, Phillips and others, seems to harmonize more nearly than any other distinctions drawn with the most modern conceptions in regard to the real nature and relations of metalliferous bodies. This scheme regards ore bodies as (1) surface deposits, (2) stratified deposits, or (3) unstratified deposits. With the new interpretations of the manner of most ore depositions, and the dependence of their character largely upon the condition imposed by the local rock surroundings, this triple subdivision can be, it is believed, readily adapted to the more advanced conceptions. Although not by any means the same, or based upon the same grounds, or even bearing the same terminology as that of Whitney, it still seems mere justice to credit him with originating the main idea.

The chief merit of this primary subdivision is that it now recognizes to its fullest extent the two great groups of geological agencies, which we are accustomed to call hypogene and epigene processes. The surface or superficial ores, as a special phase of epigene action, constitute a small group by themselves, and hence need not be considered with either of the other two. The ores incorporated under the term Eutaxic are "stratified" only in the sense that they are associated almost exclusively with the stratified rocks, and their mode of occurrence is dependent upon the geological structure of these terranes. In the same way the Ataxic ores prevail largely among the "unstratified" or massive formations, or, when in the clastics, are wholly independent of the laws governing stratified structures.

While the names used by Whitney are not all we could desire in the matter of exact nomenclature, it still seems that, with some modification of the original ideas held by that author, they can be used as alternate terms to meet present requirements. It appears better in all cases of this kind, when the conceptions are modified, to retain something of the old terminology, especially when it is widely known. While the followers of Whitney may not be able to recognize at once the change in meaning, nor the new applications and extensions of his term, the utilization of old names gives at once to all who have been accustomed to them something of a general idea of the new.

In considering this classification of ore deposits the main points which it is aimed to emphasize are:

- (1) The chief feature wherein the classificatory scheme presented differs from others is in the prominence given to geological occurrence and the direct operation of the geological processes as essential factors in the genesis of the ore bodies.
- (2) The nearest possible approach to a purely genetic classification of ore deposits is believed to be found in their geological relationships, and not in their direct chemical formation or physical shapes.
- (3) The chemical reactions so widely used as criteria of ore classification are to be regarded as general agencies, and therefore they are not available in the specific determinations of the groups of ore bodies.
- (4) In the discovery and exploitation of ores, structure is of first importance; not so much the structure of the individual ore body itself, as the geological structure of the enclosing country rocks.
- (5) The primary groupings appear to be best indicated when based upon the geological occurrence of the ore bodies, as governed by the kind of geological processes operating.
- (6) The secondary groupings are best based upon the general form of the ore bodies as geological formations produced by the grander categories of geological agencies.
- (7) The ternary groupings are best based upon the specific phases of the geological processes involved in the formation of ores as ore bodies.
- (8) The source of the ore materials is an unessential factor in their classification; the great practical question is: How are ores best exploited? In this connection it matters little what was the original condition of the ores. Nor have we to do very much with the detailed, complex and usually theoretical chemical reactions that are supposed to take place before the final stage of the ores as we find them is reached.
- (9) Very similarly appearing ore bodies may be formed by very different methods; a fact, while apparent in all classifications, does not necessarily vitiate any.
- (10) The present scheme is merely suggestive. It is the barest outline of what is believed to be capable of much further expansion into a comprehensive, rational and general plan.

STEEL MANUFACTURE IN AUSTRALIA.—The first open-hearth steel furnace in Australia was started up recently at the Eckbank Iron and Steel Works, at Lithgow, New South Wales. The furnace will use imported pig iron and steel scrap.

THE DISSOCIATION OF AIR.—The mechanical dissociation of air on commercial lines is proposed by Prof. Raoul Pictet, of Geneva, according to the London "Engineer." The air at atmospheric pressure is to be admitted to an apparatus like a condenser cooled by liquid air. The low temperature thus produced will cause the oxygen and nitrogen to separate by gravity, and the former will be drawn off at the bottom, and the nitrogen at the top; while the carbonic acid which liquefies at this temperature will be drawn off into tubes. It is said that 500 H. P. will produce 500,000 cubic feet daily.

RUSSIAN MANGANESE ORE.—The shipments of manganese ore from the mines in the Caucasus last year were as follows, in long tons:

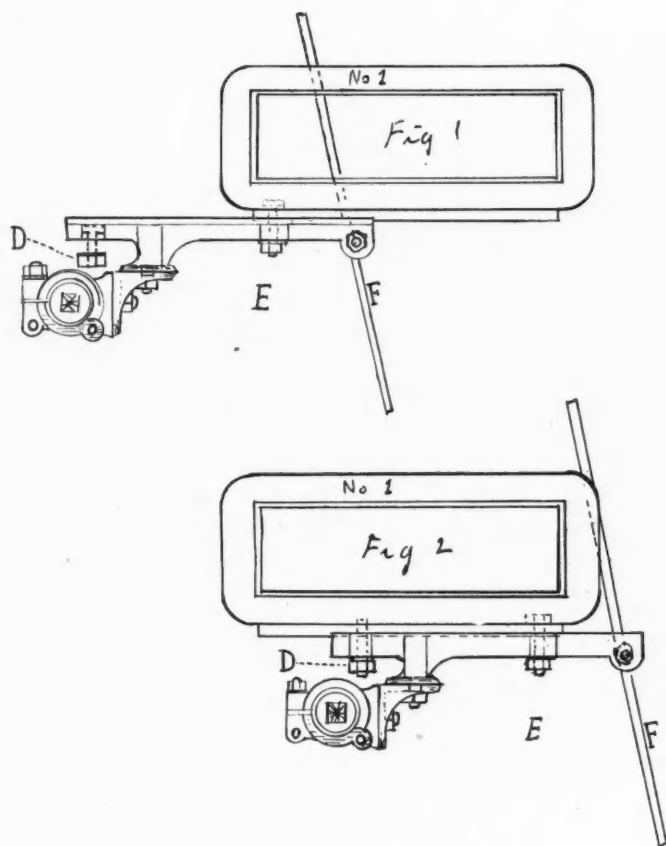
	1898.	1899.	Increase.
To foreign countries.....	250,246	362,285	112,039
To Russian points.....	32,070	54,055	21,985

Totals 282,316 416,340 134,024
Of shipments last year 352,245 tons were from Poti and only 10,040 tons from Batum. Many delays are caused in shipping by slow methods of loading and by the inability of the railroad which runs to mines of the Sharopan District, to handle the ore promptly.

THE ELMORE HAND ROCK DRILL.

We illustrate herewith a very recent improvement in the mechanism of the Elmore hand rock drill. This improvement is in the length of the standard or support upon which the drill rests. The retaining bar is dispensed with and an increase of support 12 in. in length is attained, enabling the operator to drill a true hole from 20 in. to 4 ft. in depth. An ordinary miner can strike from 80 to 100 blows per minute with much less exertion than he can strike 30 with a sledge. The weight of blows—from 100 to 500 lbs.—can be easily adjusted to suit the nature of the rock he is working in. One man can easily handle the machine. The handle or lever is fastened with a corrugated joint and can be adjusted to any desired position to suit the operator. Each movement of the lever withdraws the drill, turns and sets it back against the rock at the bottom of the hole before it receives the blow of the hammer. No matter where the shot is required, the driller can stand or sit in an easy, natural position while working. The manner in which the machine is fastened to the bar permits the putting in a shot at any angle without changing position of bar, which can be placed either in a perpendicular or horizontal position in shaft, drift or tunnel, as the nature of the space requires.

This tool is especially adapted to stoping. No special bit is required, the ordinary flat or plug bit, same as in hand drilling, being used.



THE ELMORE HAND ROCK DRILL.

The Elmore Hand Rock Drill Company, of Chicago, has met with considerable success during the past three years in placing this machine on the market. The company has sent a number of these machines to Australia and other foreign countries.

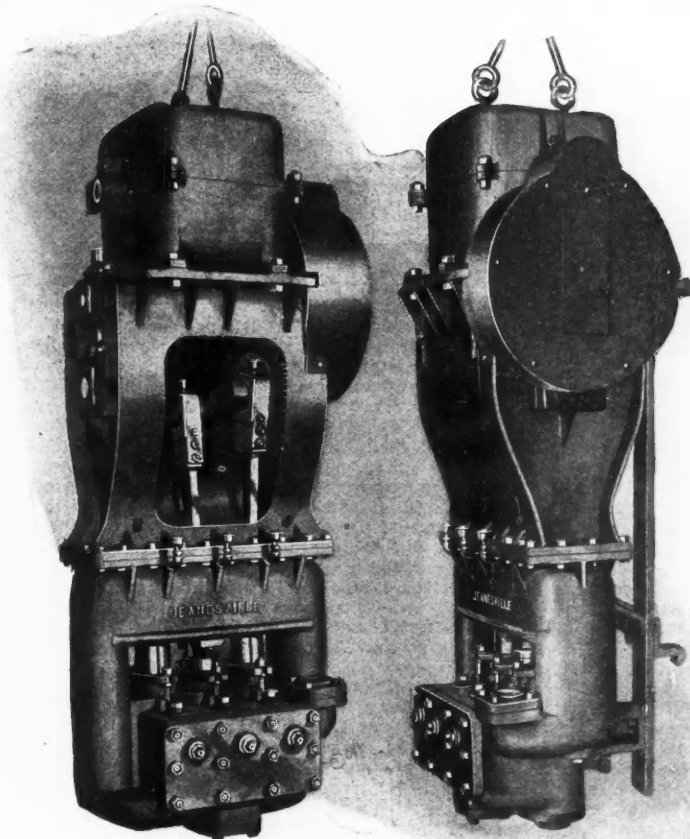
THE JEANESVILLE ELECTRIC SINKING PUMP.

The accompanying illustration shows a triplex sinking pump operated by electric power, which has just been brought out by the Jeanesville Iron Works Company, of Jeanesville, Pa. This type of pump has been designed to meet a demand for a sinking pump which is run by an electric motor, the current being taken from any available source. By its use the steam pipe can, of course, be entirely eliminated from the shaft with all its attendant drawbacks.

The design contemplates three single acting plungers operated from common crank shaft with crank pins placed 120° apart. The resultant action of these three plungers is to produce a continuous and constant stream to the column pipe and reduce to a minimum the shock and jar thereon. The water cylinders are cast in one piece and are connected to the guides by hollow castings which form a vacuum chamber on one side and air chamber on the other. The valves are the same as used in the Jeanesville steam sinker, where their excellency has been proved, and are accessible through hand holes at face of valve chamber. Each plunger is cast on end in hard close grained iron, and is bolted to a crosshead guide which is fitted with bronze adjustable shoes. Each connecting rod is fitted with bronze adjustable bearings at each end. The crank shaft is of best open-hearth steel and is driven by two gears fitted over the discs which form the outside

cheeks of the two end cranks, thus relieving the shaft of at least one-half the strain that would be brought upon it if driven as is usual by a single gear at one end, also economizes space, in that no extra room whatever is required for these gears, and what is equally if not more important places them inside the main bearings, which feature all who have had any experience with overhung gearing will appreciate. All the gearing is machine cut and of such strength as to give a most liberal factor of safety on actual requirements. The crank shaft gearings are completely enclosed in a cast-iron frame. All parts are completely accessible for oils and inspection through a large hand plate. The motor is placed upon the top of pump frame and connects the crank shaft by proper designed gearing to give the desired speed to pump. The pump frame is made to receive any make of motor which is adapted to this kind of work, and they may be either direct or three phase current.

The advantages claimed for this type of pump by the makers are: 1. Compactness, yet obtaining complete accessibility of vital parts. 2. Smoothness in operation, which is accomplished by the three plungers working in combination with the air and vacuum chamber at each side of working barrel. The effect of this is to eliminate all shock and jar upon the connecting pipes, even when run at high rate of speed. 3. The machine is entirely enclosed, there being no projecting parts to be knocked off in operating and lowering same into mine. 4. All bearings



THE JEANESVILLE TRIPLEX ELECTRIC SINKING PUMP.

are made adjustable for wear and are accessible for oiling and attention. 5. Complete priming valves. 6. There are no inverted packing boxes upon the plungers to catch sand and grit, as in the case of a double acting pump.

The machines are furnished complete, with all needed tools, etc. This pump is made in various sizes, the smallest having plungers 3½ in. diameter and 8-in. stroke, and occupying, with the motor, a space 25 in. by 31 in. by 7 ft. The largest size has plungers 5½ in. diameter by 8-in. stroke, and the size over all is 38 in. by 39 in. by 10 ft. The weights vary from 2,500 to 3,500 lbs., and the motors are made to suit any electric system in use.

OIL-TANK BOATS ON THE VOLGA.—The tank vessels employed in carrying naphtha in the Kasan District, from Rybinsk to the mouth of the Volga, with all the tributary rivers except the Oka, were counted last winter, and comprised 1,594 wooden vessels and 82 iron vessels, making a total of 1,676. The life of the wooden vessels is reckoned at 17 to 18 years. In 1895 the age of them was ascertained, and it was found that 25 per cent. were between 1 and 5 years, 26.4 per cent. between 5 and 10 years, 26.7 per cent. between 10 and 15 years, 18.3 per cent. between 15 and 20 years, and 3 per cent. over 20 years. The maximum life of the iron tank vessels is put at 50 years, the minimum at 20 years, although 12 years are looked upon as the probable life of very shallow and thin vessels. There are no vessels which have seen 50 years service, the oldest being built in 1863. In the year 1895 the age of the iron vessels was as follows: From 1 to 5 years, 42 per cent.; from 5 to 10 years, 19 per cent.; from 10 to 15 years, 23 per cent.; from 15 to 19 years, 12 per cent.

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.)

161.—M. I. E.—Asbestos.—Your sample of asbestos is not of good quality. The value of asbestos depends almost wholly on the length and separability of the fibers. Your specimen does not yield long fibers, and unless you can mine the rock and put it on the market cheaply, the value of the deposit is slight.

162.—J. T.—Quartz—Phonolite.—Sample No. 1, the coarse-textured rock, contains quartz, also carbonate of lime, and possibly carbonate of iron. It is probably an impure limestone, part of the lime has probably been replaced by silica. Sample No. 2, a fine-grained greenish rock, is clearly of igneous origin, and may be a phonolite or possibly a trachyte. An exact determination requires study with the microscope.

163.—H. D. E.—Fullers Earth.—The chief use of fullers earth at present is for clarifying oils, and the chief consumers are the refiners of petroleum, cotton seed oil, etc. The samples you send are not of good color, and the clay is rather too plastic to be called fullers earth.

161.—The Origin of Quartz Deposits.—The mineral quartz—oxide of silicon—is an essential constituent of many igneous rocks, such as granite, quartz porphyry and rhyolite, filling the interstices between the crystals of feldspar in formless grains or masses as the last product of crystallization from the original magma. It also occurs abundantly in such metamorphic rocks as gneiss and quartzite and forms the mass of common sandstone. It is the principal mineral of gravel beds and sand banks everywhere.

Silica, or oxide of silicon, as quartz is known to the chemist, is soluble to a very small extent in pure water, and to a much greater extent in water containing various acids or solutions of alkaline carbonates. The water circulating through the rocks of the earth's crust contains various amounts of these solvents, and hence is able to dissolve silica in quantities bearing some relation to the percentage of these reagents it carries. Various acids resulting from the decay of vegetable matter dissolve silica, and surface waters penetrating the soil and the underlying rocks usually carry with them more or less of these solvents which, under the high temperature and heavy pressure existing at great depths, attack even the most insoluble silicates, removing their silica in solution.

This silica carried in solution either from near the surface or from regions of high temperature and pressure, is soon or late deposited when conditions favor its redeposition, and consequently its accumulation. This process may occur either upon the walls of open fissures and along planes or lines of lessened pressure, or else where chemical reactions occur such as to destroy the solvent power of the water carrying the silica.

Sea water, which holds a variety of substances capable of aiding in the solution of silica, contains much of it in addition to that which is carried into the sea by the streams and concentrated there by evaporation.

Silica is precipitated from the ocean water for the most part through the agency of minute organisms, as radiolari, diatomaceae, etc., which live in the water, and after death leave their silicious remains upon the sea bottom. These remains sometimes form accumulations of bedded silica of considerable thickness which, on subsequent elevation above the water, may form extensive areas of country rock.

In the solutions traversing the rocks of the earth's crust the silica is often accompanied by greater or smaller quantities of those elements which eventually form a large percentage of the important ores.

Ledges, veins and lenses of quartz are familiar to all working in a mineral-producing region. They generally consist of a sheet or a flattened body of quartz, usually approaching vertical in position, though sometimes almost horizontal. In shape these bodies may conform to the boundaries of the original places in which they were formed, as affected also by subsequent fractures and displacements. Successive deposits of quartz along the walls of a fissure or other space produce what is known as the "ribbon structure" in the vein. Perhaps the commonest type of quartz lodes, however, is that where the quartz instead of filling an original fissure has replaced other minerals. In such cases the original minerals may have gone off in solution as the quartz replaced them, and thus a body of quartz many feet thick and of great length may be formed where there was at first but a thin seam along which water flowed.

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.)

Asphalt in Kentucky.—Can you tell me how many producers of asphalt there are in Kentucky? And who they are?—A. F. L.

Answer.—The only company producing asphalt in Kentucky on any considerable scale is the Breckenridge Asphalt Company, which has its office in Louisville. Most of the so-called asphalt from Kentucky is only bituminous sandstone and not true asphalt.

Production of Slag Cement.—In your issue of June 9th you state the production of slag cement for 1899 at 244,000 barrels. There would appear to be an error in this statement for the following reasons, viz.:

First: The Illinois Steel Company gives its capacity as 2,000 barrels per day, or approximately twice the amount of the total reported.

Second: The other works have a capacity of about the amount reported.

Third: The Illinois Steel Company during the first six months of the year took all the cement the Brier Hill Company could give it to fill its orders, the latter company not yet having established its own market.

Fourth: During the last six months of the year, the Brier Hill Company had a market of its own in excess of its capacity.

Fifth: The theory is suggested by a note in the Geological Survey Reports for 1898, that the Illinois Steel Company's product has been classified as regular Portland cement.

—Will you kindly give me the solution of this apparent discrepancy?—J. P. S.

Answer.—The quantity of slag cement given in our issue of June 9th was made up from returns furnished by the producers. The Illinois Steel Company's product was not included in Portland cement. We cannot, of course, give the output of each company, as the figures were given to us only for use in making up the totals. The explanation which our correspondent wants is that the works were not run to their full capacity during the year.

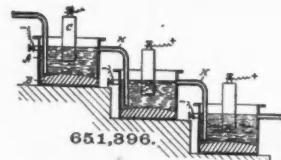
PATENTS RELATING TO MINING AND METALLURGY.

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.

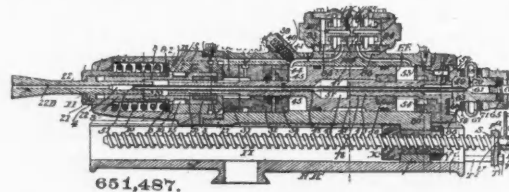
Week Ending June 12th, 1900.

- 651,333. COUNTERBALANCED CHUTE. Louis J. Anderson, Escanaba, Mich. The combination of a hopper bin or pocket provided with a discharge-opening, a discharge-chute pivotally secured to the hopper adjacent to the discharge-opening, a winding-drum provided with a cable secured to the discharge-chute to raise and lower the same.
- 651,346. PROCESS OF MAKING CYANIDES. August Dziuk, Hanover, Germany. The process of manufacturing cyanides and ferro-cyanides of the alkaline earth metals, which consists in subjecting carbides of the said metals in the nascent state to the action of a superheated current of pure elementary nitrogen.
- 651,358. ARTIFICIAL ASPHALT. John A. Just, Syracuse, N. Y. The process of making artificial asphalt from "acid tar," which consists in neutralizing the acid, heating the tar above the melting-point of sulphur and mixing sulphur therewith.
- 651,386. CUPOLA-FURNACE. Francis H. Richards, Hartford, Conn. The combination, with a furnace provided with an air-heating chamber, of a hot-blast chamber communicating with said air-heating chamber and with the furnace, and means for supplying liquid to the hot-blast chamber near the upper end thereof.
- 651,396. PRODUCTION OF CHROMIUM OXIDE. Ernest A. G. Street, Paris, France. The process of manufacturing chromium hydroxide from a solution of an alkali metal chromate or bichromate con-



sisting in passing an electric current from a suitable anode through said solution to a mercury cathode while the temperature of the solution is maintained at about 70° C.

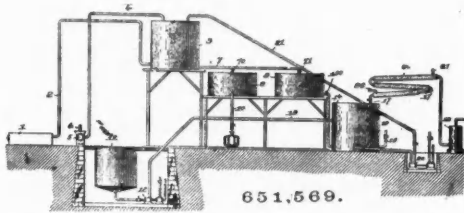
- 651,441. RELIEF DEVICE FOR ROLLS. Cornelius Kuhlewind, Knoxville, Pa., assignor to the Hydraulic Valve and Regulator Company, Limited, Pittsburg, Pa. A roll-breaker having coating wedges and springs mounted upon and movable therewith, and a stationary rigid abutment against which the system acts, the springs being arranged to hold the wedges in place until the pressure reaches a determined limit.
- 651,451. FURNACE-TILING. Henry G. Tidemann, St. Louis, Mo. A tile for boiler-furnaces, comprising a body portion for co-operating with a water-tube on one side, and a suitable support on the other side, and a lateral projection embracing said tube and forming a protecting-covering therefor.
- 651,461. ANNEALING AND BLUING FURNACE. John Jenkins, Allegheny, Pa. The combination with a furnace composed of refractory material divided by a central wall into a hot chamber and a cooling-chamber, of a series of pairs of rolls arranged in said furnace and in front of the hot chamber, a muffle extending through said horizontal opening in the wall and inclosing said rolls.
- 651,479. ABRASIVE BLOCK. Karl Essich and Richard Reuchlin, Stuttgart, Germany. A grinding-block composed of abrasive material and formed in the shape of a tube of oblong rectangular cross-section, and having an intermediate supporting-wall extending from one side to the other.
- 651,487. ROCK-DRILLING ENGINE. John G. Leyner, Denver, Colo. The combination with the cylinder and the piston, of a front cylinder-



head comprising an integral, cylindrical member adapted to be threaded to the end of said cylinder, an axial bore through said

head, a counterbore at its inner end, a chuck-bearing ring rotatably seated in said bore, and a drill-holding chuck rotatably mounted in said chuck-ring.

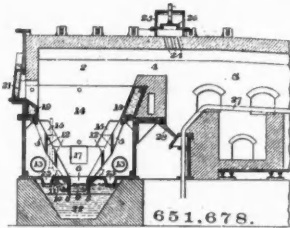
- 651,506. **BARREL AMALGAMATION OF PRECIOUS METALS.** Ernst Heiligendorfer, Canelas, Mexico. An improvement in the process of amalgamating silver and gold ores in vessels of such materials as will not decompose copper sulphate, consisting of the combination of metallic copper, quicksilver, salt, blue-stone and copper amalgam.
- 651,509. **PRECIPITATION OF PRECIOUS METALS FROM CYANIDE SOLUTIONS.** Frederick W. Martino and Frederic Stubbs, Sheffield, England. A process for the precipitation of the precious metals from aqueous cyanide solutions, consisting in treating such solutions with acetylene and precipitating the metals in a metallic state.
- 651,510. **TREATMENT OF ORES AND PRECIPITATION OF PRECIOUS METALS FROM THEIR CYANIDE SOLUTIONS.** Frederick W. Martino and Frederic Stubbs, Sheffield, England. A process for the precipitation of precious metals from aqueous cyanide solutions, consisting in treating such solutions with a hydrocarbon gas produced when a metallic carbide is decomposed by water and capable of precipitating the metals in a metallic state.
- 651,537. **PROCESS OF PURIFYING GRAPHITE.** Emil Teisler, Borsdorf, Germany. The process consists of first treating the graphite with dilute fluoric acid, then exposing it to the action of sulphuric acid, and finally washing it with water.
- 651,546. **PLATE FOR FILTER-PRESSES.** John H. Kinken, Louisville, Ky., and John T. Turney, Oak Park, Ill., assignors to the J. E. Turney Drying Machinery Company, Chicago, Ill. A filter-plate having up-and-down filter-grooves, a final drainage-channel into which they lead at their lower ends, and oblique drainage-channels crossing the grooves diverging downward from near the upper edge toward the opposite sides.
- 651,569. **COMMERCIAL PRODUCTION OF PURE CARBONIC DIOXIDE.** Henry Howard, Brookline, Mass. In the production of pure CO₂, transforming bisulphite of soda into neutral sulphite by the



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action of a sodium carbonate in the presence of H₂O, with the evolution of CO₂; withdrawing the latter, and converting the remaining neutral sulphite into bisulphite of soda by saturation with SO₂.

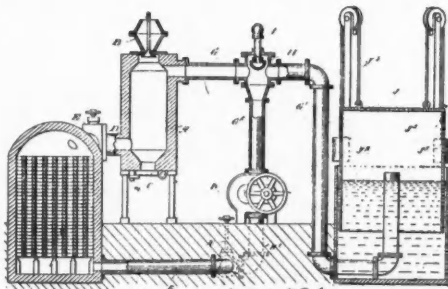
- 651,583. **FURNACE.** Winfred A. Stubblebine, Bethlehem, Pa. A furnace, comprising a regenerative chamber, air-blast pipes arranged in said regenerative chamber, a combustion-chamber communicating with said regenerative chamber near the bottom of the latter, and a supplemental roof-chamber having passages through its bottom communicating with said combustion-chamber.
- 651,597. **ELECTRIC WELDING.** Richard Eyre, Johnstown, Pa. The method consists in passing the heating-current through contacting surfaces of the two articles to be united, concentrating the heat at portions of said articles adjacent to said contacting surfaces between the points where the union is to be made and making the actual union between unexposed portions of the articles.
- 651,678. **GAS PRODUCER.** William Swinbank, Pittsburg, Pa. A gas-producer having opposite downwardly and inwardly inclined grates, a blast-pipe situate beneath each grate, a water seal, a discharge-



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opening between the low ends of the grates, a movable support or closure within said discharge-opening and below the level of the water in the water-seal, and means for opening and closing the removable support.

- 651,684. **PROCESS OF MANUFACTURING LIME AND CARBONIC ACID.** Gustaf M. Westman, New York, N. Y. The continuous process of treating limestone, which consists in heating a mixture of carbonic acid and steam, passing this mixture through limestone,



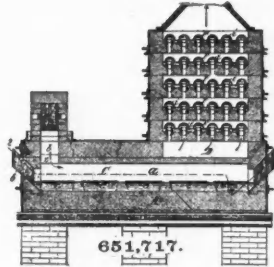
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drawing off the expelled carbonic acid and lime produced, bringing the expelled carbonic acid in contact with water, to convert the latter into steam to form a mixture of steam and carbonic acid, reheating a part of the mixture thus formed, and forcing the mixture back into and through the limestone.

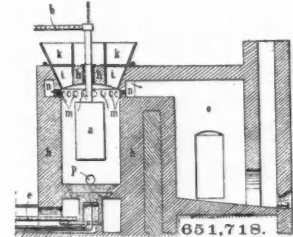
- 651,703. **CONSTRUCTION OF CUPOLAS.** Alexander Eadie, London, England, assignor to the James Simpson & Company, Limited, same place. The combination with the superstructure, the under struc-

ture, the tuyeres, air-supply pipes and air-belt therefor, of a cast-iron hollow brick lining composed of bricks having their hollow portions extended through two sides of each brick to form connecting passages through the tiers of brick, pipes leading from the air-belt to the lower course of the cast-iron lining, and air-outlets in the upper course of said lining.

- 651,717. **APPARATUS FOR CONCENTRATING SULPHURIC ACID.** Jacques L. Kessler, Clermont-Ferrand, France. An apparatus for concentrating sulphuric acid, comprising inlet-conduits for the gas, a chamber having dividing-partitions forming longitudinal channels communicating with each other under the dividing-partitions, and provided with outlets for the gas and removable plugs at the ends of each of the aforesaid channels.
- 651,718. **METHOD OF ELECTRICALLY TREATING ORES OF NICKEL, ETC.** Henri Leleux, Paris, France, assignor to La Compagnie Electrometallurgique des Procédes Gin et Leleux, same place. The method of electrically treating nickel, cobalt, silver, lead and copper ores, for obtaining the required metal without any pre-



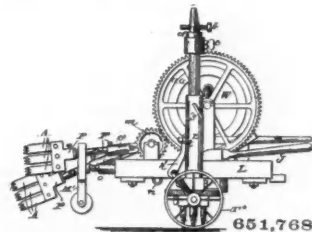
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liminary roasting or fusion, which consists in placing the ore to be treated into contact with electrodes of a metal whose heats of combination with the non-metallic constituents of the ore which contains the metal to be liberated are higher than the heats of the said metal to be liberated, and then passing through said electrodes and ores an electric current acting only as a source of heat for bringing the ore to such a temperature as to cause the suitably-chosen metal of one of the electrodes to unite, by exothermic reaction, with the metals that are associated with the particular metal to be liberated.

- 651,722. **FUEL-PRESS.** George W. Murphy, Northfield, Minn. A fuel-press, having a conical compression-chamber, a receiving-chamber communicating with the large end of the compression-chamber, a plunger working in the receiving-chamber, means for driving the plunger, a delivery-tube juxtaposed to the small or discharge end of the compression-chamber, a knife mounted to move between the mouth of the compression-chamber and the delivery-tube, a crank-shaft having connection with the knife, an internal mutilated gear, a gear on the crank-shaft working with the internal mutilated gear, and means for driving the internal mutilated gear.
- 651,725. **ELEVATOR AND SEPARATOR.** Schuyler C. Ruble and William N. Ruble, Golden, Ore. A separator provided with an inclined gathering-spout flaring toward its lower end, an inclined screening device extending upwardly from the upper narrow end of the spout and located in substantially the same plane therewith, said screening device consisting of a series of individually-supported transverse slats each of which has its lower edge at a lower level than the upper edge of the next slat below, a downward longitudinal flume or channel extending below said screening device, and a discharge-flume extending crosswise at the lower end of said channel.
- 651,740. **ROLLING-MILL.** Alphonse Allagnier, Alfortville, France. A metal-rolling machine, comprising a roll journaled in stationary bearings, a roll journaled in bearings movable vertically away from said stationary roll, an upright rack connected with each of the movable bearings, levers having two sector-gears, one meshing with the rack, a pinion meshing with each of the other sector-gears, a worm-gear on the shaft of the pinions, a worm for actuating the worm-gear, and means for moving the worm into and out of mesh with the worm-gear.
- 651,754. **DOUBLE STAMP-HAMMER.** Henri Guyot, La Souterraine, France. The combination with two hammers, of a standard common to both, two operating crank-shafts, one for each hammer, said shafts being in line with each other, a source of power adjacent to both shafts, and means for connecting it with either one of said shafts at will.
- 651,768. **MACHINE FOR UNDERMINING COAL.** Andi Ocktinsky, Rockvale, Colo. The combination, with the main frame, a vertically-adjustable frame mounted thereon and carrying a drift-roof spike at its upper end, and pick-bars adapted to operate horizontally, of



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a rotatable, horizontal bar provided with spokes and a ratchet-wheel, secured to said bar, the wheel and bar being arranged rotatably under and attached to the main frame, and a spring-pawl adapted to engage the ratchet-wheel.

- 651,781. **DREDGING APPARATUS.** George M. Esterly and George W. Esterly, Washington, D. C. The combination with a vehicle, and a track or way arranged on solid foundation along the shore of a body of water, of a platform carried by the vehicle and adapted to be rotated thereon, a suction-pump mounted on the platform, a suction-pipe connected with the suction-pump and carried by the platform, and means mounted on the platform for rotating the platform, and for propelling the vehicle, whereby the dredging operation may be carried on in strong currents or surf.
- 651,798. **PULVERIZING-MILL.** John H. Elspass, Pueblo, Colo., assignor of one-half to Robert Hughes, Denver, Colo. The combination of an outer and an inner series of posts, shafts journaled in these posts, pulverizing-rolls fast on the shafts, an annular revoluble mortar, a circular guide-track, a ring mounted on the mortar and engaging said guide-track, conical rollers located underneath the mortar and engaging a track of corresponding shape formed on the bottom of the mortar, a gear attached to the bottom of the mortar outside of the roller-track, and an operating-gear meshing with the gear on the mortar.

PERSONAL.

Mr. F. F. Sharpless of Dalton, Cal., has gone to West Chester and is going to southeastern Alaska.

Mr. John Hayes Hammond was on a visit to Mr. and Mrs. E. G. Stolber, of Silverton, Colo., last week.

Mr. J. W. Nell, manager of the Taylor-Brunton Company, at Salt Lake, spent last week visiting old friends at Leadville.

Mr. Martin J. Heller, of Capt. J. R. De La Mar's staff of experts, has returned to San Francisco from British Columbia.

Mr. E. M. Williams recently returned to Clifton, Ariz., to take charge of the mercantile interests of the Arizona Copper Company.

Mr. E. W. Crone, of Pittsburg, Pa., representing the Westinghouse Company, has gone to Orizaba, Mex., to install an electric plant.

Mr. Charles Crusoe has been elected a director in the Yellow Aster Mining Company, of Randsburg, Cal., vice F. M. Mooers, deceased.

Manager Ballou, of the Bimetallic Smelter, Leadville, has sailed for Paris. He is accompanied by his family and will remain abroad several months.

Mr. G. A. Burr, late chief engineer of the Compañia Minerva El Carmen, has been appointed mining engineer of the Avino Mines of Mexico, Limited, at Avino, Durango, Mexico.

Mr. Harry Burn, chief chemist at the Sloss-Sheffield Steel and Iron Company's furnaces at Birmingham, Ala., has started on a visit to Hartburn, Stockton-on-Tees, England, his old home.

Mr. T. C. Archer, late superintendent of the Mountain Copper Company's mines in Shasta County, Cal., sailed on June 25th for southeast Alaska to examine large copper deposits in that district.

Mr. Bertram Hunt, metallurgist, has returned to San Francisco, Cal., from Northern Territory, Australia, where he has been engaged in setting up mining machinery and in general metallurgical work.

Mr. L. C. Bonney, general manager Gold Dredge Mining Company, of Bannack, Mont., will go in August to Venezuela, where his company has concessions of placer ground to work by dredging.

Mr. Chas. F. Howe, mining engineer of Chicago, who has been examining manganese deposits in Tennessee and Virginia, has just returned to Chicago, having completed his investigations.

Mr. Norman M. Estey, of Leadville, Colo., is on a trip to New York and Boston on an important new mining enterprise. Mr. Estey is accompanied by his wife and will visit Paris before returning to Leadville.

Mr. John Mitchell, President of the national organization of the United Mine Workers of America, has been in the Birmingham District since June 21st, and has addressed the Alabama district convention, now in session.

Mr. Albert L. Waters has resigned his position as smelter superintendent with the Whipsaw Copper Mining Company, of Arizona, to accept a similar position with the Newton Copper Company, of Ranlett, Amador County, Cal.

Mr. George Kislinsky, of the De La Mar staff, after an absence of over half a year, was at Salt Lake City for several days last week. Until the middle of July he expects to be at Berkeley, Cal.

Mr. B. Kusakabe, a Japanese engineer in the service of the Japanese Department of the Interior, is visiting this country with two other Japanese engineers for the purpose of making a scientific study of bridges, levees and the protection of land from overflow.

Mr. F. C. Frey, who has been employed as assayer and surveyor by the Yellow Aster Gold Mining Company of Randsburg, Cal., is making preparations to return to Johannesburg, South Africa, to take his old position with the Simmer & Jack Mines, which are again under English control.

Mr. C. O. Baxter, of St. Louis, president of the Gibson Asphaltum Company, has just paid a visit to the mine near Fort Duchesne, Utah. He states that 1899 was the most prosperous year of the company, and they expect to ship even a larger tonnage of these unique hydrocarbons the present season.

M. A. F. Wuensch, mining engineer of Denver, Colo., has returned there from Mexico, where he examined and concluded negotiations for a newly-discovered gold lode for Messrs. T. H. McGraw, Sir Wm. Van Horne and Phelps, Dodge & Company, of New York City. The prop-

erty is situated near Arispe, Sonora, and was taken at \$150,000 gold, practically cash.

Mr. J. L. Knoepfer of Birmingham, Ala., has started on a tour of England, France, Germany, Austria, Russia, Holland, Italy and other foreign countries as the representative of the Republic Iron and Steel Company, Birmingham Machine and Foundry Company, and Tutweiler Coal and Coke Company. He goes to sell Alabama iron and machinery for the concerns named.

Mr. G. K. Brunberg, a mining engineer of the Grangberg iron mines, Sweden, has been on the Menominee Range for some time looking over the mines. During his stay in Iron Mountain, Mich., he was the guest of Chief Engineer Hellberg, of the Commonwealth Iron Company. Mr. Brunberg will make an extended sojourn in the iron districts, noting the various methods of mining and the most modern equipment.

OBITUARY.

Dr. Herman S. Lucas, formerly president of the Hampden Emery and Corundum Company of Chester, Mass., died on June 20th at Franklin, N. C., at the age of 83 years. He was born at Blandford, Mass., and taking up the study of medicine, was graduated as a physician in 1842. For two years Dr. Lucas practiced in Pittsfield, and subsequently removed to Chester, where he continued his medical work until 1873. In 1856 he discovered what for some time was supposed to be a large deposit of iron in the mountains around Chester. Some 1,200 tons of the mineral was taken out and shipped to the furnaces at Stockbridge and Lenox, and to Hudson, N. Y. A blast furnace and forge were erected at Chester, and the manufacture of iron was commenced, but the ore proved intractable. After making a more thorough examination of the mineral the doctor discovered that it contained a large percentage of emery. In 1868 Dr. Lucas, with Charles Alden and H. D. Wilcox, formed the company known as the Hampden Emery Company, and in the following year he purchased the interest of his partners and continued the business until 1874, when questions arose involving him in litigation, which caused the suspension of the manufacture of Chester emery by him. He continued in business, however, obtaining his material from Turkish mines, until 1878, when Nathan A. Harwood became associated with him. Mr. Harwood succeeded in devising a new process for the better division of the minerals and the improvement of the grading. He then began a systematic study of the mountains around Chester, opening up new mines and soon placed his company upon a solid basis. In the year 1888 a stock company was formed, Dr. Lucas being chosen president and Nathan A. Harwood treasurer and manager. Since 1878 Dr. Lucas spent most of his time in the South. A number of corundum mines have been opened by him in North and South Carolina, and have been purchased by the Hampden Emery and Corundum Company.

SOCIETIES AND TECHNICAL SCHOOLS.

Lehigh University.—Members of the graduating class this year presented 5 theses for the degree of analytical chemist, 11 theses for the degree of electrical engineer, 14 theses for the degree of bachelor of science, 17 theses for the degree of mechanical engineer and 23 for that of electrical engineer. The total number of theses presented was 80.

Cornell University.—At the graduating exercises in Ithaca about 100 degrees were given in mechanical and electrical engineering, while the number of degrees in arts, sciences, philosophy, law and civil engineering were about equal. The first professional student in forestry in this country to obtain a degree was Ralph C. Bryant of Princeton, Ill. After the presentation of diplomas President Schurman delivered the commencement address.

Ohio University.—This institution at Columbus has issued the catalogue of its College of Engineering for the academic year 1900-1901. This college now offers instruction in 9 fields of engineering work, architecture, ceramics, chemistry, civil engineering, electrical engineering, industrial arts, manual training, mechanical engineering, mining engineering; the period of study required for a degree being 4 years. In the year 1899-1900 there were 11 graduate students in the college and 337 students for a degree.

Pacific Coast Power Transmission Association.—This society held its fourth annual convention on Mount Tamalpais, Cal., June 18th, and the following officers were elected: Prince A. Poniatowski, president; H. H. St. Clair, vice-president; George P. Low, secretary; William Angus, treasurer.

The following papers were read and discussed: "Regulations on Long Distance Transmission

Plants," by F. A. C. Perine; "Arc Lighting for Interior and Street Service in Connection with Power Transmission Plants," by H. W. Hillman; "Transformers for Transmission Service," by H. C. Wirt; "Choice of Alternating Current Motors," by R. S. Masson; "The Application of Storage Batteries to Transmission Systems," by C. S. Poole; "The Factor Determining the Water Supply of California," by Marsden Manson; "Central Electric Polyphase Transmission System Regulation," by Prof. C. L. Cory; "Atmospheric Electricity," by Alex. G. McAdie; "Rate Indicators," by Howard Hendrickson. Quite a number of new members were elected, among others the McCloud River Electric Power Company, Mt. Whitney Electric Power Company and the Merced Falls Electric Power Company.

INDUSTRIAL NOTES.

The American Hoisting and Derrick Company of St. Paul, Minn., this week makes a shipment to Sweden of 2 carloads of hoisting machinery valued at nearly \$10,000, and consigned to Graham Brothers, of Stockholm.

At the annual meeting of the Bethlehem Iron Company recently the following directors were elected: R. H. Sayre, Joseph Wharton, E. P. Wilbur, R. P. Linderman, Beauveau Borie, J. P. Lippincott and R. W. Davenport.

President Brown, of the Brown Hoisting and Conveying Machinery Company, of New York, has gone to Europe for an extended tour. While on the other side Mr. Brown expects to secure some big contracts which are now pending.

The Pennsylvania Malleable Company, whose plant is located at McKees' Rocks, Pa., has placed an order with Somers, Fittler & Clarke, Pittsburg, for 4 additional 60-H. P. Otto gas engines, making a total of 10 gas engines in use at the plant.

The Stilwell-Bierce & Smith-Vaile Company of New York City is about to forward 6 large duplex pumps to Reuter, Brockelman & Company, of Shanghai. The pumps, which are intended for marine purposes, were obtained through C. Von Pustau & Company.

Mr. F. N. Sanborn, one of the mechanical engineers of the American Impulse Wheel Company, of New York City, sailed for Liverpool last week by the "Servia." Mr. Sanborn's trip abroad was suggested with the view to closing some important contracts for water-wheel plants. He will be absent nearly 3 months.

The Philadelphia Pneumatic Tool Company reports recent large orders from the Pennsylvania Steel Company, Baldwin Locomotive Works, Brown & Sharpe Manufacturing Company, Ingersoll Drill Company, the Bigelow Company and other representative concerns. The company has more than doubled the capacity of its shops since January 1st and has established agencies in all the leading cities of Europe and also in Japan.

The City Engineer of Chicago recently placed with the Bethlehem Steel Company an order for a hollow-forged shaft to replace a breakdown in the North Side pumping-station at that city. The new shaft, which measured 13 ft. 8½ in. in length, 19 in. in diameter and weighed close to 10,000 lbs., was booked on May 30th, and, under special emergency instructions, was hollow-forged, annealed and rough-machined in time to go forward June 9th. The remarkably short time required by the Bethlehem plant for the production of such a shaft is worthy of note.

The Park Steel Company will erect a large plant near Elizabeth, Pa., on the Monongahela River. This will include two blast furnaces, which will supply the iron for the open-hearth furnaces; and blooming and converting mills. Billets will be made at this plant for use at the works there and also for shipment to the company's Black Diamond Steel Works at Pittsburg. There will also be machine and blacksmith shops, a chemical laboratory and an elaborate loading and unloading wharf. A new fleet of barges to ply on the Monongahela, Allegheny and Ohio Rivers is to be built.

Messrs. Castner, Curran & Bullitt, selling agents of Pocahontas coal, will, it is stated, withdraw from the New York market July 1st. Messrs. H. C. Rogers and J. C. Curran, who have been associated with this concern since its inception and in charge of the New York office, will look after the Hoboken pockets as the lease on this plant has still a number of years to run, and will handle the celebrated Pocahontas coal in New York harbor. Ernest S. Green and Samuel Burrows, Jr., will retain the old offices of the company as export agents for Pocahontas coal, and will act as New York managers for the Lehigh Coal and Navigation Company's Eclipse coals, in which they have a considerable trade. Mr. H. I. Van Nostrand, formerly with this company, has associated himself with Peale, Peacock & Kerr.

It is officially stated by the promoters of the

Pittsburg Valve and Construction Company that the combination of 5 of the largest pipe bending concerns in the country, all located within the corporate limits of Pittsburg, Pa., will be consummated by July 1st. The prospectus of the new company states that the following plants are to be absorbed: Atwood & McCaffrey, Best Manufacturing Company, Pittsburg Valve and Machine Company, Shook-Anderson Manufacturing Company and the pipe fitting plant of the Wilson-Snyder Manufacturing Company. The new combination will carry on the business of pipe, valve and steam fitting, pipe bending and manipulation where high steam pressure is used. Among the peculiar advantages that will be possessed by the new corporation will be the use of a newly-invented machine for cold bending pipe to any desired shape. A charter will be asked for from the State of Pennsylvania giving power to issue \$4,000,000 worth of capital stock to be issued in shares of \$100 each, of which \$2,000,000 will be in preferred stock entitled to 7% yearly cumulative dividend in preference to the common stock, and \$2,000,000 in common stock. All will be issued full paid and non-assessable. The options on the plants which expired June 12th have been extended to July 2d.

TRADE CATALOGUES.

The Jackson Hand Power rock drill is described in a 16-page pamphlet sent out by the Jackson Drill and Manufacturing Company of Denver, Colo. This drill, which is driven by the rotary movement of a crank, has been on trial some time at many points in the west, and the pamphlet gives numerous testimonials from well-pleased users.

Engineers and architects interested in protective paints for steel structures can secure a handsome card illustrating several 18-story steel structures upon which Dixon's Silica-Graphite Paint has been used, by addressing the Joseph Dixon Crucible Company, Jersey City, N. J. The card also contains suggestions for specification of the paint.

Catalogue No. 28, published by the Trent Engineering and Machinery Company of Salt Lake, Utah, describes the stamp shoes and dies and roll shells the company carries in stock. These steel forgings are made of "armor plate" and "projectile" steel manufactured by the Midvale Steel Company of Philadelphia, and are stated to possess great durability.

The Prindle Engineering Company of Philadelphia, Pa., sends out printed matter calling attention to the centrifugal pumps it sells. Bulletin 101 describes an electric-driven Prindle pump for house service, filling tanks, etc. Bulletin 103 gives specifications of belt-driven pumps having a discharge from 1 to 60 in. in diameter and a capacity varying from 29 to 106,029 gals. per minute.

The Goodwin car, a dump car, which is stated to be especially adapted to the ore and coal trade, is described in a catalogue published by the Goodwin Car Company, of Chicago, Ill. The car is constructed of steel, dumps from either side and is operated by hand power or compressed air. Half-tone cuts show the car dumping while in motion. The company leases its cars which are made in several sizes.

The Caldwell perfected stop cock is described in folders sent out by W. E. Caldwell & Company of Louisville, Ky. This stop cock, it is stated, has a handle fitting freely around that part of the plug stem protruding above the body of the cock and provided with wedge-shaped cams which act as wedges when the handle is turned, lifting the plug just enough to ease it for turning. For high pressures the stop cock is longer and the handle has ball bearings.

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.

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GENERAL MINING NEWS.

ARIZONA.

Graham County.

Stanley Butte Copper Mining and Smelting Company.—This concern, organized under the laws of Arizona, is out with a prospectus which states that the company controls 20 claims in the Stanley Butte Mountains. The capital stock is 20,000 shares of \$100 par value. Among the incorporators are John Blake and his associate,

H. J. Harvey, C. J. Moore and W. D. French, all of Safford.

Mojava County.

(From Our Special Correspondent.)

Many other properties in this section are pushing development work and others are resuming operations after long idleness.

Lucky Boy.—This chloride mine is opened up in a systematic manner and is shipping a ton of very rich gold and silver ore every day. The ore comes from a 6-in. streak in a vein about 3 ft. wide. The ore is carefully sorted and packed to the railroad on burros.

Merrimac.—This mine, at Chloride, is about to resume operations. Recently a cave in the mine exposed a body of ore containing good quantities of ruby silver ore.

Tennessee.—The mine and concentrator at Chloride employ 75 men and ship 25 tons of silver lead concentrates to Pueblo every 24 hours.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

North Plymouth Mining Company.—This company has been incorporated with a capital stock of \$300,000, to operate gold properties at Plymouth. The directors are: F. W. Voogt, J. W. Keeney, R. L. Cheney, J. H. Spring, S. Rosenheim, James Toman, M. A. Frank and E. L. Wemple.

Calaveras County.

(From Our Special Correspondent.)

Big Horn.—Development work still progresses at this mine, 2½ miles north from Murphy, under the superintendency of W. B. Tucker. New machinery is being put in and sinking continues. The rock carries a good percentage of silver as well as gold.

Ford.—The mill at this mine, east from San Andreas, has started. The rock mined lately will probably yield handsome returns.

El Dorado County.

(From Our Special Correspondent.)

Little Gem.—A contract has been let for extensive development work on this property, east from Volcanoville, near the Josephine Mine. A drift is to be run from the 200-ft. level east. The mine has produced some very rich ore.

Nevada County.

(From Our Special Correspondent.)

Golden Treasure.—The shaft on this property in Grass Valley District, is down 200 feet, and a new pumping plant has been installed. Fifteen men are employed under H. Delmaine, Superintendent.

Riverside County.

(From Our Special Correspondent.)

Red Cloud Mining Company.—This company is developing a group of 16 claims in the Chuckawalla Mountains, which are said to be rich in gold, copper, lead and silver. A large milling and cyanide plant is in course of construction, and the main tunnel now in 200 ft. is to be continued 900 ft. further through the mountain. A wire rope tramway 7,500 ft. long connects the mouth of the tunnel with the mill. The machinery already installed consists of a 100-H. P. engine, 2 60-H. P. boilers, with a surface condenser. A large set of Cornish rolls is to be put in. E. H. Gould is Superintendent.

San Bernardino County.

(From Our Special Correspondent.)

Ludlow Station on the Santa Fe line is shipping carloads of extremely rich gold ore at frequent intervals from the Gentry and Buckeye properties. An average of 15 shipments in carload lots to the Pueblo smelters shows a value of about \$150 per ton in gold. Milling ore of about \$40 value in gold is shipped to the Barstow Mill.

Shasta County.

(From Our Special Correspondent.)

Bully Hill.—About 80 men are now employed. The new brick kiln will fire up about July 1st. Some machinery has been put in at the mine, a boiler, an air compressor and about 40 of the 60 roasters. Austin W. Brown is superintendent.

De Lamar Bridge.—The contract for this bridge across the Pit River has been awarded to E. Markwick at \$6,653, and work will begin at once.

Gladstone.—This mine, about 5 miles northeast from French Gulch, has been sold to J. H. Roberts, L. A. McIntosh, both of Harrison Gulch, and I. O. Jillson, of Hornbrook. The property has been developed to a depth of 900 ft. and has 7,000 ft. of track lines in its tunnels. It was formerly owned by a Cleveland, Ohio, company, but has been idle on account of litigation for some time. J. H. Wolkotte, who sold the property, got judgment against the Euclid Company, of Cleveland, and obtained possession by a Sheriff's deed on June 6th.

McCloud River Electric Power Company.—This company has been incorporated under the laws of the State of South Dakota, with a capital stock of \$1,500,000. The directors are: W. H. Carlson, H. C. Balcom and T. P. Estes, of Pierre, South Dakota, and A. Hochheimer, of Willows,

H. W. Heath, of Chicago, and R. M. Saeltzer, of Redding, Cal.

Sierra County.

(From Our Special Correspondent.)

Harper.—A steam pump is being put in at this mine, near Forest City. As soon as the shaft is pumped out development work will be pushed.

Osceola.—The Los Angeles Company, which is operating this property, near Alleghany, has ordered a new mill. It is reported that the Kenton Mine, in the same district, also owned by a Los Angeles company, is soon to resume operations.

Siskiyou County.

(From Our Special Correspondent.)

Hawkinsville Dredger.—This dredger has at last started up with a force of 18 men. The gravel already washed shows considerable gold, which came from the surface ground, but big pay is expected from the bedrock gravel in the Creek Basin. The machinery works very smoothly and as soon as the electric light dynamo is ready night and day work will start.

Trinity County.

(From Our Special Correspondent.)

Bully Chooop.—On Indian Creek, just below the base of Bully Chooop Mountains, a new ledge has been struck on this property. The ore is good milling and the claims will be thoroughly prospected.

Perham & Hobson.—From this claim, 4 miles up Coffee Creek from the Blue Jay Mine, a shipment of 5,500 lbs. of ore has been made to Keswick Smelter. Former shipments yielded an average of \$275 per ton.

Trinity Gold Mining Placer Company, Limited.—This company has been incorporated with a capital stock of \$50,000, all subscribed. The directors are: William Maitland, D. J. Noyes, G. W. Baker, F. G. Stewart and M. W. C. Wemyss, all of San Francisco, and F. Nettleford, of London, Eng. The hydraulic and placer claims to be worked by the company are located at the head waters of Coffee Creek.

Yellow Rose of Texas.—The large boilers have been sledged up the valley of Swift Creek, and across the snow on the summit to the mine. In a few days the mill will start. R. D. Lawrence has also brought in a boiler by the same route to his claim and his mill will start soon.

Tuolumne County.

(From Our Special Correspondent.)

Blue Bird.—At this mine, about 1 mile west from the Buchanan Mine, a 4-ft. ledge of good milling ore has been uncovered, about 10 ft. from the point where the Bodie Standard Company left off when they abandoned the property last fall. Glosser & Curtis are owners.

Longfellow.—Work at this mine, on the north side of Big Oak Flat, has been resumed with a good force of men.

COLORADO.

Gold King Consolidated Mines Company.—Incorporated in Maine on June 27th with \$6,000,000 capitalization to acquire 28 mining properties located in Southwestern Colorado, and consisting of the Gold King, Sampson, American and Anglo-Saxon Groups, and the Rocky Mountain Coal Company of Durango, La Platte County. The officers are: President, Mark Gallert; treasurer, Cyrus W. Davis; directors, Mark Gallert, Cyrus W. Davis, H. M. Soule, John D. Chipman, Julian T. Whitlock, St. Stephens, N. B.; G. Wetmore Gritt, R. C. Elkins, Charles L. Bailey, F. A. Jones, E. J. Lawrence, J. Walter Davis.

Clear Creek County.

(From Our Special Correspondent.)

Doric Gold Mines, Limited.—Drifting is under way on 2 of the veins cut by the tunnel at Georgetown. The mineral is an iron sulphide and runs about \$20 in gold. The streak is 2 to 3 ft. wide.

Edgar Union.—In drifting on this vein through the Wilcox tunnel a 3-ft. streak of lead ore running \$50 per ton has been opened. The level has carried the shoot for 50 ft. with constant improvement. There are 700 ft. of stopping ground to the surface. A level driven from the Edgar Union workings at the west end of the claim is within 200 ft. of the tunnel heading, but 300 ft. above it. It, too, is in ore.

Lamartine.—Himrod & Hudson, owners of this mine at Idaho Springs, have made arrangements for changing from steam to electricity. The compressor has closed down and the management has broke down the July supply of ore. It will take until August 15th to make all the changes necessary. Power is to be supplied by the power company of Georgetown, which is enlarging its electric plant.

Massachusetts Mining Company.—Work has been resumed in the Freeland Extension where drifting and stopping are under way. W. A. Haggott of Idaho Springs, is in charge. It is stated that no effort will be made to work a large force of men, although the showing in the property would justify it. The shaft has been sunk for about 300 ft. and must go to 900 ft. to connect all the adit level driven from the old Freeland property.

Seaton Mining and Milling Company.—This company has stopped drifting in the Newhouse Tunnel and will sink on the surface ore bodies to determine where the vein can be found, as it is not satisfied with the one in the tunnel, which is 2,000 ft. below the surface workings of the Seaton. The company has erected large ore bins and is starting to stope some of the ore recently opened.

Gunnison County.

(From Our Special Correspondent.)

Carbonate.—This mine in Carbonate District is to resume at once under company management.

Chloride.—J. H. Sinclair of Cripple Creek has assumed charge of the Chloride and is shipping rich ore regularly. Minnesota men now own this property.

Crested Butte Mines.—Superintendent W. A. Welch has started up the Ruby Chief for the season with a large force. Good ore has been encountered in the Iron Nos. 1 and 2 claims and occasional shipments are made. The following is the output from the Crested Butte coal mine for May: Coal, 24,285 tons; coke, 7,057 tons. The anthracite mine shipped 1,196 tons of coal during the last week in May.

Crystal District.—The Ladder lode on Sheep Mountain will shortly start up. A. T. Ferris has secured a lease on the Ida M. and will begin work at once.

Dale.—A crosscut has been started from the 100-ft. level north to catch the vein on a sudden turn from its usual course.

Good Hope.—A new hoist has been purchased and will be ready within a few days. Steady shipments are the rule.

Iola District.—The Vulcan Mine has received another carload of machinery. The Dale Mining Company has installed two new gold saving devices with good results. The Good Hope shipped another car of high grade ore June 15th.

Sacramento.—Denver men are negotiating for the purchase of this property.

Tomichi Valley Smelter.—Work has been suspended in order to increase the smelting capacity.

U. S. & 99.—A Mr. Rief of Cripple Creek has secured these claims and will put on men. Both claims have good ore in sight.

Pitkin District.—The Calumet has made another rich strike and will soon resume shipping. Wackerly et al have opened a body of galena carrying silver near grass roots on the Kimberly lode. T. S. Stanley has started up the Jessie and Gold Brick with small forces. A crosscut is being run on the Denver to cut the Pride of Denver vein, 275 ft. further on. This company owns a large group of claims and has a 1,012-ft. tunnel on the Denver.

Hinsdale County.

(From Our Special Correspondent.)

Henson Creek Lead Mines Company.—This company has elected officers as follows: Chas. E. Whiting, Franklin Mass., president; Wm. G. Titcomb, Boston, Mass., vice-president; Isaac S. Cole, Boston, Mass., treasurer; Henry F. Wells, Boston, Mass., secretary. The above, together with Chas. O. Brightman, New Bedford, Mass.; Arthur L. Young, Providence, R. I.; Chas. P. Sherman, Pawtucket, R. I., compose the board of directors. The company is operating the Pomeroy-Honee properties on Sheep Mountain. Frank Adams, of Capital City, Colo., is superintendent.

Hiawasee Mining Company.—A new hoist will be in operation July 1st.

Hidden Treasure.—This property, which recently changed hands, was taken in charge June 15th, by P. C. McCarthy, the new general manager.

Lake County—Leadville.

(From Our Special Correspondent.)

Leadville Daily Production.—The tonnage has fallen to about 2,400 tons per day, the fall in the price of lead having considerable to do with this. The iron tonnage is 900 tons a day at present, the Home Company leading the production with 400 tons.

Leadville Zinc Production.—This has risen from nothing to over 5,000 tons a month, while it is intimated that the formation in Missouri of a zinc-lead combination will have a tendency to bring Leadville into that market and greatly increase the tonnage of zinciferous ores from here.

A. M. W.—This is the greatest prospecting enterprise in the Leadville district. The base of the Wolfstone shaft will be sunk deeper than any shaft in that territory. The pumping plant, one of the finest in the west, is at 730 ft., the station being nearly 90 ft. long. The pump is a triple expansion, with a 36-in. stroke, throwing 1,200 gals. 1,200 ft. The old shaft has been re-timbered and sinking is under way. It will go down at least 1,300 ft. and probably 1,500 ft. Seven high-pressure boilers have been installed and a new engine has arrived.

Buena Vista Smelter.—A fire destroyed the power house and did other damage to the extent

of over \$5,000 this week. The plant is to be repaired at once.

Bug Mining Company.—Milwaukee men, headed by L. H. Cheeney, is at the head of this company, which resumed sinking a shaft in Lincoln Gulch. It took out some very good gold ore last year and will sink 200 ft. deeper.

Midas.—One of the largest ore bodies ever opened up in the camp is the iron body being developed in the Midas. The main drift at a depth of 515 ft. has been driven through 460 ft. through an iron mass. Cross cuts have been driven every 50 ft. for over 300 ft. and all show solid ore. In fact, while 5,000 tons a month have been shipped steadily since the first of the year, there is more ore than ever in sight to-day. Occasionally lead streaks are encountered, but have not developed into any ore body. This great iron deposit runs nothing under 8 ozs. silver, while much of it runs 14 to 18 ozs. There is enough ore in sight to continue the present heavy shipments for two years, while development and prospecting is opening up more on the ore body every day.

Morning & Evening Stars. There is but little demand for the low grade iron ore now and shipments are confined to manganese, about 100 tons per day coming from the Kitchen, Porter and Triangle shafts. It is shipped to Chicago.

New City Mining Company.—The syndicate is buying up mineral rights to hundreds of lots right in the heart of the city and has begun payments on some of the options at the rate of \$7,000 a block.

Rock Hill Mining Company.—Conditions are very favorable at the Nil Desperandum shaft. In following a large body of iron a streak of lead ore was found which is opening up nicely. It carries 15 to 20 ozs. silver and 30 to 40% lead. Manager Bulkley is of the belief that it will lead to a large body.

Sugar Loaf Section.—The Tiger, Dinero and Red Hook are all shipping, while the Black Iron will resume shipments July 1st, as also The Golden Curry.

Mineral County.

Creede Ore Shipments.—The shipments of ore from Creede for the week ending June 16th were 124 tons.

Montrose County.

The mill erected by Poulot & Voilleque, of Denver, for concentrating uranium ore is completed and claims owners nearby are taking out uranium ore for treatment.

McBride.—A strike of rich gold and silver ore is reported at this property in the Paradox Valley District on the east slope of the La Sal Mountains. Ore is shipped to Placerville, a wagon haul of 70 miles.

Park County.

Cincinnati Gold Placer Mining Company.—This company recently bought the Fairplay and Snowstorm placers and is arranging to put in 9,000 ft. of iron pipe to carry water from the ditch, and hydraulicking may begin early in July. Professor Loche, of Columbus, O., is consulting engineer of the company, John W. Flack is secretary and T. R. Miller superintendent.

Rout County.

(From Our Special Correspondent.)

Kansas City Copper Mining and Smelting Company.—This new company will own and operate the Bromide Mine on Douglas Mountain. Capitalization, \$250,000 in \$1 shares, with 50,000 shares in the treasury. Officers are J. K. Burnham, president; Rice R. Miner, secretary-treasurer; J. E. Lawrence, manager; all of Kansas City. Explorations consist of 1,000 ft. in shafts, drifts and inclines. Ore is red oxide and carbonates, with large excess of silica, which has given trouble in local smelting. The 30-ton furnace at the mine is not in commission. It is 100 miles to Rock Springs, on Union Pacific, and 90 miles to Rifle, on Denver & Rio Grande, and these long wagon hauls make coke too costly, and coke is essential for smelting bromide ore. Manager Lawrence is sanguine of shipping at a profit in spite of the long wagon haul.

San Miguel County.

(From Our Special Correspondent.)

Japan Mines Company.—After extensive repairs and a rearrangement of the machinery, the Japan Mill in Savage Basin is running full capacity, treating about 70 tons of mineral daily. The ore is concentrated on the basis of 4 and 5 tons into 1, and the product averages \$100 in gold, silver and lead to the ton. The high grade ore, several carloads per week, is shipped direct to smelters and returns from \$750 to \$1,000 per car. A new pump has been installed in the crosscut working tunnel, and the lower workings, where the ore is higher grade than in the upper, will be operated more this season. The mill tailings are treated in a plant with inclined canvas tables, which is reported to be profitable. The mine employs about 75 men. T. Walter Beam of Telluride is manager.

Teller County—Cripple Creek.

(From an Occasional Correspondent.)

Ajax Gold Mining Company.—It is reported that an offer of \$2,000,000 for this property, from an Eastern syndicate, has recently been refused. The company is a close corporation and the condition of the mine is not made public, but there is no doubt that the mine is a good one. It is on Battle Mountain, adjoining the Dead Pine of the Ophir Company. A new plant of heavy machinery is being installed.

Cripple Creek May Output.—The output for May amounted to 37,672 tons of ore of the total value of \$1,349,540. Of this 10,172, of the value of \$70 per ton, making \$712,040, were sent to the smelters, and 27,500 tons of the value of \$25 per ton, making \$687,500, were treated by the chemical mills. The milling capacity of the district has increased as now there are 4 local mills running, the Brodie, Arequa, Economic and Gillette. The balance of the mill ore was treated by the Valley Mills. A large new mill is in process of construction at Colorado City and another at Florence.

Eagle Ore Sampling Company.—This company is building the finest sampling works in the district near Goldfield, on the tracks of the Midland Terminal and the Florence & Cripple Creek Railroads, while that of the new short line will also be in the immediate vicinity. The capacity will be 350 tons daily, and the machinery is furnished by the F. M. Davis Iron Works of Denver. The cost will be \$35,000, and the business will be under the management of Mr. Nelson Franklin, who was for many years in a similar position with the State Ore Sampling Works, at Black Hawk. The company hopes to be ready for business about July 15th.

Independence Town and Mining Company.—Nothing new has transpired in the case of the Wilson Creek Company. It is generally thought that a suit to annul the patent to the Hull City placer will soon be commenced in the United States court, but even if the company should lose its patent it does not mean that the Wilson Creek people will get the ground, but simply that an immense amount of money will be spent in litigation. Meanwhile the physical condition of the mine is very good. About 20 tons of smelting ore per day is being sent out. It is understood that the company will discontinue dividends for the present on account of the expense attending the litigation.

Iron Mask.—The management has temporarily suspended operation, pending an examination of the workings by experts in connection with the pending litigation with the Center Star. The trial will, it is now said, be resumed in September.

Matoa Gold Mining Company.—It is rumored that a strike has been made in the Half Moon on the 1,000-ft. level. While this cannot be verified it is hoped to be a fact. This property has shipped a large amount of ore in the past, but has not shipped any of late, and the report, if true, will mean great things for Gold Hill.

Stratton's Independence Mines, Limited.—A contract between this company and Messrs. Tutt, Penrose & MacNeil, of the Colorado-Philadelphia Smelter at Colorado City, for the delivery of 200 tons of ore per day for a period of 5 years is closed. This is largest contract for ore ever let in this district. It is reported that the ore will probably average about \$60 per ton. It is also reported that the mine will close down for July, but T. A. Rickard, the general manager, states that it is an error. Hoisting will be interrupted 4 or 5 days to readjust the engine, but otherwise work will proceed as usual. The mine is reported in splendid condition. The office of the company has been moved from Colorado Springs to Denver, T. A. Rickard having become general manager as well as consulting engineer. H. A. Shipman is mine manager at Victor and R. T. Grant, assistant to the manager, while John Stark is mine superintendent.

GEORGIA.

White County.

White County Gold Mining Company.—This company just formed is capitalized at \$500,000, divided into 500,000 shares, par value \$1 per share, with principal office at Detroit, Mich. The directors are Frank D. Andrus, of Corliss, Andrus & Leete, Detroit; C. J. O'Flynn, Detroit; Hermann Dey, Detroit; E. C. Recor, St. Clair, Mich.; Capt. T. W. Hix, Nacoochee, Ga.; I. L. Oakes, Cleveland, Ga. The property is known as the Thomson lot, No. 102, 3d district, near Nacoochee Valley. It is said that the company expects to have machinery on the ground and in operation by September 1st.

IDAHO.

Idaho County.

It is stated that a 15-stamp mill will be erected at Rapid River by Denver men.

Dewey.—This company has decided to build a wagon road from their mines down the river to Harpster, a distance of 5 miles, connecting with the road that follows the river to Stites and to Stuart. The road will be constructed as soon as

possible, to enable the hauling of 100 tons of ore to the railroad. This ore is now being taken out and the force of men will be increased to 35. Similar ore was shipped to the Tacoma Smelter a few weeks ago and 14 tons yielded \$2,800.

New England.—This company has its dredge No. 2 mining night and day on Move Creek near Idaho City.

West Forks Gold and Copper Mining Company.—This Spokane company has 6 claims on Rapid River, nearly opposite the mouth of West Work. Two tunnels have been run, one 140 ft. long and one 260 ft. The ore is said to go over \$5 per ton in gold and copper.

Shoshone County.

Dobson Jim.—A good strike of galena is reported on this group of claims now bonded to O. G. Laberee of Spokane. The surface showing on the vein are of good size, but carry considerable zinc.

You Like.—J. S. Baker of Tacoma is the principal owner of this mine at Mullan. The working force is about 85 men and the company is shipping about 1,000 tons of concentrates per month. Recently shipments have been going to Pueblo, but they go to different smelters. The company recently completed a 2,700-ft. tunnel which taps the ore body between 600 and 700 ft. below the present workings.

KENTUCKY.

Crittenden County.

Fluor-spar Mines.—There is considerable activity in the region about Marion, and a number of companies are opening fluor-spar deposits which often carry lead and zinc in this and in Livingston County. The Fluor-spar Company, of Marion; Kentucky Fluor-spar Company of Pittsburg, operating near Marion; the Eagle Company of Wheeling, W. Va.; the Western Tube Company of Kewanee, Ill.; the Consolidated Oil and Gas Company of Canton, O., operating near Salem, are hurrying developments on their properties and securing suitable machinery for handling the ores. The Eagle Company, operating 12 miles from Marion, has its mill nearly completed, and will soon begin crushing and separating ore. A few days ago some Louisville parties acquired the Columbia lands, 5 miles from Marion, consisting of 1,000 acres, and have a large force of men working day and night opening up the ground.

MICHIGAN.

Copper—Houghton County.

(From Our Special Correspondent.)

Arcadian.—This company is still shipping rock from the new shaft on the Mesnard epidote for the impending mill test. Ten men are at work in the shaft. Although the rock contains much copper, some doubt is expressed as to the mill saving it, as it is very fine.

Atlantic.—The stamping of 1,100 tons of rock from the Michigan Mine has been completed. No. 1 and 2 heads are now stamping Baltic rock. The company, with the Baltic, has begun work on a new dam across Salmon Trout River at Redbridge. The Wisconsin Bridge and Iron Works, of Milwaukee, Wis., has the contract for the steel work, which will be 475 ft. long, while the maximum width of the cement foundation will be 64 ft. and its highest 24 ft. The dam will give an estimated storage capacity of 600,000,000 gals.

Baltic.—It is planned to set the stamp mill 25 ft. above the level of the lake thus eliminating the necessity of a sand wheel. The boiler house will be about 55 by 90 ft.

Calumet & Hecla.—This company has let a contract to the Rogers-Ruger Company of West Superior, Wis., for furnishing 500,000 ft. of lumber, to be dimension stuff, 12 by 12 in. on the end. An Acme 3-in. heading and forging machine, made by the Acme Machinery Company of Cleveland, O., has been installed in the Hecla blacksmith shop for making new drills. All the shafts have been opened, including No. 2 Hecla branch, in which the fire started, and the mine is shipping its normal supply of rock to the stamp mills. The foundation of the new engine house east of No. 15 shaft is completed. This engine house will be 70 by 110 ft. and will be constructed of red sandstone.

Copper Range Railroad Company.—At the annual meeting of the stockholders in Houghton, the following directors were elected: J. H. Seager, R. R. Goodell, J. H. Rice, F. McM. Stanton, S. L. Smith, Cameron Currie, F. A. Gilbert, Frederick Stanwood and W. A. Paine. The following officers were elected: W. A. Paine, president; J. H. Rice, vice-president, and Frederick Stanwood, secretary and treasurer.

Rhode Island.—Buildings for machine shop, etc., are being erected by Rashleigh Brothers of Houghton. No. 4 shaft on the conglomerate lode is being unwatered for the first time in about 30 years.

Trimountain.—The cross-cut from west of No. 2 shaft struck the lode at a distance of 176 ft. from the bottom of the drop shaft, and has penetrated it about 15 ft. The lode is said to be from 16 to 18 ft. wide and heavily charged with copper.

Copper—Keweenaw County.

(From Our Special Correspondent.)

Mohawk.—The fourth shaft on this property has been started about 133 ft. south of No. 3 shaft.

Iron—Gogebic Ranges.

Many changes in the old Puritan, new Ada, Ironton and Federal properties have been made in a few months. Where were a few deserted buildings and shafts hidden by a lusty growth of young trees and tangle of underbrush which had sprung up during the years the properties were idle, there is great activity. Ore is being hoisted from 4 shafts. At No. 1 shaft, near the west line of the old Puritan property, where the greater part of the ore was taken from when the property was worked in the early days of the range, the present operators have repaired the old buildings and shaft, and ore is shipped. No. 2 shaft is next on the property, and the only one which is not worked, the ore from that part of the property being shipped from No. 3 shaft, which is the old union shaft where ore was taken from both the Puritan and Ironton properties years ago.

Iron—Marquette Range.

Beaufort.—Ogleby, Norton & Company have taken this mine, west of Michigan. The ore is a limonite and the mine has been idle some years.

Imperial.—This old mine southwest of Michigamme on the Michigamme limonite formation, is being opened by the Cleveland Cliffs Company of Ishpeming. The ore runs about 50% iron and high in phosphorus, but is readily smelted. The ore body dips 40°, the hanging wall is lean ore and jasper, much broken, necessitating small rooms. Considerable development work has been done since the old open-pit workings were pumped out and drill holes show iron for a long distance. Ninety-seven men are employed.

Michigamme.—The railroad contractor's crew at this mine at Michigamme is making good headway with the extension of the Chicago & Northwestern line to the property.

Webster.—At this mine, west of Michigamme, the Cleveland Cliffs Company has the machinery in working order and a small quantity of ore has been hoisted. The survey of the railroad switch from the track leading to the Imperial has been finished and the grading will soon be under way. A new bridge was recently built over the river near there to carry the track. The Webster ore is a limonite very similar to the Imperial.

Iron—Menominee Range.

Chicagoan.—At this Iron River mine, in charge of Capt. J. P. Edwards for the Oliver Mining Company, a shaft is down 115 ft. and will be sunk to 180 ft. The shaft shows a body of ore that is to be explored. A fine plant of machinery is in place and a diamond drill is to explore the formation east of the shaft. A route for a spur track has been surveyed from Saunders.

Hilltop.—This new mine, near Crystal Falls, is now shipping ore over the Chicago, Milwaukee & St. Paul Railroad. A 10-drill compressor has been installed. Capt. Burke has charge.

Penn Mining Company.—This company has unwatered the East Vulcan Mine, near Quinnesee, which has been idle many years, and mining will be resumed. The foundations for a 30-drill compressor are being laid. The company is also mining at the West Vulcan, Norway and Curry mines, and employs about 400 men.

Sheridan.—It is stated that the Menominee Exploration Company will surrender its option on this Iron River property June 1st. The company has been working the property about a year and has shipped some ore. The ore bodies exposed are said to be small.

MINNESOTA.

The 200-ton blast furnace of the Thomas Furnace Company, at Duluth, is to blow out for an indefinite period. The Williams Mine, belonging to the company, is already closed.

(From Our Special Correspondent.)

The Duluth & Iron Range Road is now moving ore at the rate of about 4,500,000 gross tons for the season, less by 100,000 tons a month than was expected. The road is, however, ahead of the shipments to the same time a year ago by reason of the larger movement late in April and through May. Other roads are also doing less than they had intended the beginning of the year. Some of the mines of both the Mesabi and Vermilion Ranges have reduced their forces, and a reduction in wages is not unlikely later on. Of the 57 ships of the Rockefeller fleet only about 12, these being the 6,000 to 8,000-ton steamers of the fleet, are now running. These ships can carry ore at about 60 cents a ton this year, and are getting \$1.25, so their earnings are making up for much of the loss occasioned by the retirement of the remainder of the fleet.

The Great Northern Road has begun its new line to the Mesabi, running north parallel to the Duluth, Missabe & Northern from Stony Brook to Virginia. The line will reduce the haul from mines east of Hibbing to the Great Northern docks by about 40 miles.

Mesabi Range.

(From Our Special Correspondent.)

A village to be called Sharon has been started at the Sharon Mine, 10 miles west from Mountain Iron and 10 miles east from Hibbing. It is the only place between these two and will have several mines close by, the property of the Sharon Iron Company, the Lake Superior Consolidated, the Minnesota Iron Company, the Oliver Iron Mining Company, and others. The town is on the line of the Eastern Minnesota.

Explorations in section 3, near Mountain Iron, by Alexander Maitland, of the Republic Iron & Steel Company, are showing a large body of ore, much like Mountain in quality.

American Mining Company.—This company has one shovel working in stripping at its Alpena property, but is shipping no ore and probably will not be for some time. A very large area has been stripped.

Fay Mining Company.—This company has started the sinking of a working shaft and is drilling over its lands, as well as sinking pits to determine the extent of the ore deposit.

Lake Superior Consolidated Iron Mines.—This company has arranged to erect 2 steel shaft-houses at its Hibbing mines, Hull and Rust, to be 65 ft. high and 28 by 28 on the ground. The old shaft-houses at both mines were burned last year. The Hull is 217 ft. deep and has been opened north and south on 2 levels for 2,000 ft. There are 2 working shafts, 2 timber shafts, a ladder way and a pump shaft. The mine has a stockpile of about 60,000 tons, which will probably be mostly shipped this year. At the Rust there is a stockpile of 50,000 tons, and a small daily shipment is made to docks and to the Duluth furnace. The company's Pillsbury is shipping about 600 tons a day and has a stock of 50,000 tons, made during the winter. Its Sellers Mine is shipping 750 tons from pockets daily and has 70,000 tons in stock. Its Burt Mine has a large stockpile left, but most of this will be shipped this year. The company has increased its ore land holdings surrounding the Pillsbury Mine by taking a large tract under lease from the Pillsbury estate and Bennett & Longyear, where a large body of ore was shown up some years ago. This lease is at 25c. a ton royalty, all ore running above 57% to be classed as merchantable ore, and all ore to be cleaned up as mining progresses. The minimum output is 50,000 tons a year. This land will not be opened for some time.

Minnesota Iron Company.—This company's Genoa Mine has commenced shipments of stockpile, and is adding a large Prescott pump for No. 2 shaft. The mine will not increase its shipments of last year to any great extent. The company's Fayal is not pushing things underground so rapidly as the past few months, and may reduce forces slightly. Elba Mine is shipping very much better than ever before. Nothing will be done at the Canton Mine this year. Neither Iron Chief, the new Norman, formerly called the Moose, nor any of the company's numerous other ore bodies will be opened this year, and aside from the three mentioned the company is doing no shipping from the Mesabi this season. Probably very few people realize the enormous extent of the ore bearing territory on this range controlled by the Minnesota Company, either by fee or lease under its own name or that of some one of its numerous subsidiary concerns. Its land ownerships in T 58 R 17 alone include more than 5,000 acres, much of the land being well located on the formation. Vast tracts of this land in all towns have not yet been explored. Others have been found to contain ore, and several bodies of ore containing from 5,000,000 to 20,000,000 tons have been explored but not opened.

Sharon Ore Company.—This company is opening the Sharon Mine rapidly, and is both clearing off the timber and stripping the earth from over the ore. A large force is already at work about the mine and village.

Thomas Iron Company.—A diamond drill has now been set up at the Carlson 40, a mile north of Virginia, where test pits had shown favorable indications of iron. This land is joining the new Fay, to the north.

Virginia Townsite, recently burned, is the scene of another exploration for ore, and a diamond drill has been put in the center of the business part of the town, where Messrs. Myers, Hale, et al., who hold the mineral rights, think there is ore. A drill has been at work on the southern part of the village for the Cleveland Iron Company, the same interests, and has been taken off. Another drill working on the north 40 of the village has also been removed after showing ore to a depth of more than 100 feet.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The only encouraging feature about the ore market last week was the advance of \$1.25 per thousand in the price of lead, which sold at \$21.50 against \$20.25 the week previous. The price for top grade zinc ore was \$27 per ton or \$1 less than last week. As a result of the steadily falling price six mills on the

ground of the Boston-Little Circle Company, at Oronogo, closed last Saturday night indefinitely. All of these are producers of the very highest grade ore and their shutting down will materially affect the production of fancy grade zinc ore at Oronogo.

Following is the output by camps of the Joplin District for the week ending June 23, 1900:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,327,930	456,760	\$38,919
Galena	1,272,200	90,410	17,834
Cartersville	1,114,860	110,620	15,756
Webb City	225,570	40,770	3,357
Oronogo	419,240	4,780	5,345
Belleville	363,640	3,130	4,451
Central City	116,440	10,600	1,624
South Jackson	81,390	19,290	1,392
Cave Springs	175,710	5,710	2,407
Carthage	186,590	.....	2,287
Stotts City	115,950	.....	1,575
Aurora	805,160	31,410	7,960
Neck City	92,160	.....	1,290
Carl Junction	145,550	.....	1,747
Granby-Newton Co.	155,660	17,110	1,700
Springfield	100,500	.....	1,200

District total 7,699,650 790,590 \$108,824
Total 25 weeks..... 241,076,690 28,081,770 \$4,249,841

During the corresponding week last year top grade zinc ore sold at \$42.50 per ton and lead at \$26 per 1,000 lbs. The output was greater than the past week by 2,911,020 lbs. of zinc and 201,310 lbs. of lead and the value greater by \$106,045. As compared with the first 24 weeks of last year the zinc sales were less by 3,693,000 lbs., but the lead sales were greater by 4,084,520 lbs. and the value is less by \$1,319,433. Compared with the previous week the sales are less by 643,240 lbs. of zinc and 91,850 lbs. of lead, and the value is less by \$16,390.

MONTANA.

Park County.

Milwaukee—Montana Natural Bridge Gold and Copper Mining Company.—J. M. McNulty is in contact supervising the construction of the new tramway of this company, which is to carry ore from the mine to the mill. The wire cable has been received and other materials for the construction of the tramway are on the road.

Silver Bow County.

Anaconda Copper Company.—The old boiler plant at the Anaconda has been torn out to make room for 6 150-h.p. tubular boilers. Several months ago enough of the old ones were removed to install 6 200-H. P. marine boilers, which have proved a great success. The whole 12 will connect with the single steel stack recently completed. This gives the Anaconda the highest steam power of any mine in the district. The steam is carried to the hoist of the St. Lawrence No. 2 by an 8-in. main and from there to the air compressor just put in the Never Sweat a 12-in. main will carry the steam. This new compressor is the 3d in the Never Sweat air plant and has 1/3 greater capacity than the other 2, or 8,000 cu. ft. of air per minute, while the other 2 can only compress 6,000 each. This gives a total of 20,000 ft. for the mine. The new compressor has double stage and has steam cylinders 30 and 56 by 60 and air cylinders 30 1/2 and 50 1/2 by 60. The air is compressed in the low-pressure cylinder to 22 lbs. to the sq. in. At 250° it leaves the cylinder and passing an inter-cooler it is brought down to 80° temperature. Then goes to the high-pressure cylinder, where it is compressed to 80 lbs. to the sq. in., the temperature rising to 230°. After the second compressor the air before using is passed through a heater and raised to 450°. The work at the lower concentrator of the old smelter is progressing fast. The 36 sets of jigs in the west end of the mill are finished and a new engine has been put in to run them and the other new machinery. The engine is 500 H. P., of Frick make, with high-pressure cylinder 20 by 42 and the low pressure 36 by 42. The center wheel is 18 ft. in diameter, with a 3 1/4-ft. face, and the face has 12 grooves for transmission ropes.

NEVADA.

Elko County.

(From Our Special Correspondent.)

Dexter.—The deepest level is the 250-ft., but the 3-compartment shaft is down 100 ft. below 250-ft. level. Generous reserves are being blocked out on the 2 veins. There is a 40-stamp mill and the tails from the plates go to the cyaniding annex, which is quite a complete plant. A fair profit is said to be made on \$3.50 gold rock, while there is a large tonnage of high grade. The company has installed and owns 2 electrical water-power plants, ample for the air compressor and the stamp mill. Fuel is a costly commodity hereabouts. It is said the net yield for May was \$10,000.

Storey County—Comstock Lode.

Sierra Nevada Mining Company.—Superintendent A. C. Kyle made a sale of ore tailings for account of this company to Joseph Fisher, who is having them hauled to his mill in Six-Mile Canyon, where a plant has been installed for working them by the cyanide process, says the San Francisco "Bulletin." The tailings are at the base of the waste dump of the Sierra Nevada shaft, and the pile contains, it is estimated, be-

tween 15,000 and 18,000 tons. The pile is on the site of the dismantled Mariposa mill, which was removed from its original location in Seven-Mile Canyon and equipped with pans for working the tailings which proved too low grade to recover the bullion value through that process. Samples taken by Superintendent Kyle before the sale showed a average assay value of \$2.25 per ton in gold. The price paid for the tailings was \$1,000. An attempt to concentrate these tailings made by Mr. Fisher several years ago proved a failure.

NEW MEXICO.

Grant County.

Bayard Smelting and Mining Company.—This company owns and works the Texas mine and mill. The company has completed a new crushing plant. The shaft is to be sunk 1,200 ft. Over 50 men are employed.

Socorro County.

(From Our Special Correspondent.)

Ida Hill.—This group is worked by Byron & Fitch, lessees, who ship 200 to 400 tons per month of carbonate ores, bearing about an equal quantity of iron and silica, making it a neutral ore from a smelting estimate.

Kelly.—This mine at Kelly, which was a large producer from 1882 to 1888, is now leased to Connelly & Babcock, who are shipping some ore.

South Juanita.—This mine at Kelly, under lease to Courtney & Thorpe, is shipping 75 to 100 tons of silver-lead per month from 3 different levels in a 135-ft. shaft.

NEW YORK.

Essex County.

Witherbee, Sherman & Company.—This old iron firm, for many years owner of the Port Henry furnaces and mines, has been incorporated as a company to work the iron mines at Moriah and the railroad from these mines to Lake Champlain at Crown Point. The incorporators are: Frank S. Witherbee, Walter C. Witherbee and Wallace T. Foote, Jr., of Port Henry, and George D. Sherman, of Crown Point.

OHIO.

Columbiana County.

Marine Coal Company.—This new Pittsburg concern will incorporate under Pennsylvania law with \$200,000 capital. By recent purchases it is in possession of a large body of coal land near Wellsville. Mining will start as soon as the charter is granted and machinery can be set up. It is thought that the coal is of good coking quality, and if further trials bear out the belief, a block of coke ovens will be built. The incorporators are: A. L. Wallace, James H. McQuade and W. H. Brickell, of Pittsburg; J. H. Horner and John Warner, of Ohio.

OREGON.

Granite County.

Griffith.—Neil J. Sorenson of Boise, representing Idaho men, recently secured possession of these diggings in Canal Gulch, a tributary of Bull Run River, 8 miles northwest of Sumpter on the west slope of the Granite Divide. The diggings embrace 250 acres of pay dirt and the purchase included a 6-mile water ditch carrying a maximum of 600 in. The property will be equipped with suitable hydraulic machinery. The dirt is said to average 20c. per cu. yd. The ground is an old channel and its tributary gulches have been primitively worked for 30 years and have yielded large sums. The gold is coarse.

PENNSYLVANIA.

Anthracite Coal.

Judge John W. Simonton, at Harrisburg, June 26th, in the case of the Commonwealth against the Erie & Wyoming Valley Railroad Company, decided that the company has the right to construct a branch from its main line at Hawley, Wayne County, to the middle of the Delaware River at Lackawaxen village, in Pike County, a distance of sixteen miles.

This case originated in a writ issued by the suggestion of Attorney George Elkin, calling upon the Erie & Wyoming Valley to show by what warrant it claims to exercise the franchise of building a railroad between Hawley and Lackawaxen. The Erie & Wyoming Valley secured a continuous line from Port Griffith to Newburg, on the Hudson River. In 1886 the Erie and Wyoming leased the part of its road purchased from the Pennsylvania Coal Company from Hawley to Lackawaxen to the Erie Railroad Company, which is now operating the leased line in connection with its own road to Newburg. The lease has eleven years to run, with the right to terminate if all the coal of the Pennsylvania Coal Company for points east of Lackawaxen is not furnished by the Erie & Wyoming Valley to the Erie for transportation. The Erie Railroad Company, the actual plaintiff in the proceedings, took the ground that the Erie & Wyoming Valley had no right to construct such a branch as is proposed, as it would be a parallel line.

The building of the branch from Hawley to Lackawaxen will give the Erie & Wyoming Valley a connection with the projected Delaware Valley & Kingston from that point to Kingston on the Hudson River. After citing many authorities in support of its decision, the court concluded that "the question of necessity of the branch rests in the honest will and discretion of the directors of the company; that the definition of a branch does not depend either on direction or length; that a branch may be constructed from the terminus or from any other point on the main line is completed, or after the term has expired within which the main line must be built, and we are unable to decide that the defendant has no legal right to build the branch proposed in this case."

A fall of rock at the Hillman Vein colliery near Wilkes-Barre on June 25th, instantly killed 2 miners.

Fernwood.—At this colliery of the Butler Mine Company near Gatesville, on June 22d, a riot occurred in which over 100 shots were exchanged. The striking miners, mostly Italians, tried to prevent non-union men from going to work, with the result that 3 strikers were shot, none of them fatally.

Locust Gap.—At this new breaker of the Philadelphia & Reading Coal and Iron Company, near Shamokin, steam was turned on June 24th and the plant will soon be in operation, giving employment to 1,800 men and boys.

Otto.—The Philadelphia & Reading Coal and Iron Company is reported to have found a basin of coal north of this old colliery at Brandale and will erect a new breaker. The 4 seams of coal cut show a total thickness, it is said, of 40 ft.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Gladiator Mining Company.—Work has begun in one of the old tunnels of the Murray group, 1 mile west of Central City. The company was recently organized at Des Moines, Ia. The tunnel is to be extended 100 ft. to strike a phanolithic dike.

Homestake Mining Company.—The foundation for the mammoth cyanide plant is nearly completed. It is expected that 4 months more will see the plant running on the tailings from the mills, which contain about \$1.50 per ton gold. The company, it is stated, will start up the old Caledonia mill at Terraville and the Father DeSmet mill at Central City. Both have been shut down for several years, but are being repaired. The ditch from Spearfish creek to Lead will be completed about September 1st, giving plenty of water for the company's 6 mills. The company is employing 2,200 men, with a payroll of \$200,000 per month. Lead City, which was nearly destroyed last March by fire, is being rebuilt rapidly. Heavy rains recently have filled all the company's reservoirs and all the stamps are dropping. The assessed valuation of the real and personal property in Lead for this year is \$1,037,892, about \$400,000 greater than last year.

Shawmut Mining Company.—The Boston company which purchased the Esmeralda mine and mill in Blacktail Gulch, has added to this ground the Story Brothers' claim on the west, which shows a well-defined vertical of free-milling ore. The price paid was \$14,000. The new ground will be worked through the Esmeralda.

South Dakota Company.—This company is operating the old Wilson stamp mill, with cyanide annex at Central City. The ore comes from the Gunnison mines, at Portland. The mill is being enlarged.

Spearfish Mining Company.—This company, which purchased 365 acres of ground at Ragged Top, has commenced the erection of a 200-ton cyanide plant. Colorado Springs capital is interested.

Pennington County.

(From Our Special Correspondent.)

Big Hit Mining Company.—John Barth, president, has been out to examine the company's property at Keystone. The large concentrating plant is being remodeled into a stamp mill with cyanide annex.

Holy Terror Mining Company.—A cyanide plant, 30 tons daily capacity, has just been completed at the Keystone Mill and a test run is being made on tailings from Keystone ore. The ore in the Holy Terror and Keystone mines differs greatly in character. There is a large body of ore in the Keystone, only partly free-milling, which is stamped and cyanided wet. The Holy Terror ore is a good free-milling proposition, there being but a small amount of concentrates.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—During the week ending June 23d there were sent forward from the several smelters 19 cars, or 796,844 lbs. lead-silver bullion; 5 cars, or 266,174 lbs. copper bullion. In the same week there were shipped from different camps to smelteries out of the State for

treatment 96 cars, or 2,635,890 lbs. lead, silver and gold ores, and 2 cars, or 77,700 lbs. copper ore.

A New Old Smelter Site.—A week ago it was semi-officially let out that the new plant of the American Smelting & Refining Company would be built at Sandy. It would seem that this half-announcement was to obtain a better bonus from Murray—and Murray will probably capture the site.

Cyaniding Products Marketed at Salt Lake.—Mercur's consignments of product from cyaniding mills equals those from all other properties marketed at Salt Lake. Under the new regime all the Mercur products will be refined at home. While this is so it will not be many months before the loss of the Mercur on this market will be made up by the Horseshoe, Annie Laurie and other new cyaniding undertakings.

Juab County.

(From Our Special Correspondent.)

Eagle and Blue Bell.—A winze from 200-level has cut a cross-fissure in 300-level which shows 4 ft. of shipping ore. Here is a very large tonnage of second grade, silica, averaging 28 ozs. silver, \$2.40 gold and little copper, exactly the complement for the Bingham pyritic smelter. Superintendent J. C. McCrystal states that Eagle and Bell's forecast was never brighter.

Lower Mammoth.—Shipments are neither as large, nor of as good grade as anticipated. Fewer bonanza promises and some substantial realities would prove an agreeable change.

Mammoth.—For some moons it has been known that President-Manager McIntyre and Mr. Cunningham were at outs. The latter owns the New East Tintic Railroad, whose traffic is the carrying of Mammoth's ores and supplies. Mr. McIntyre announces that he proposes to build a tramway for this purpose and will have no further use for the railroad. It is probably true that Mr. McIntyre has offered to buy the railroad, and Mr. Cunningham's Mammoth stock—latter it is said at \$2.25—or put up a fight and it looks like a fight.

May Day.—Shipments the current week were 4 cars of No. 1 ore. Conditions underground are holding up well and present production can readily be maintained.

Salt Lake County.

(From Our Special Correspondent.)

Alta.—Over 50 men are working in the old camp and new ore bodies are being cut. Annoyance from surface water is about at an end.

Columbia.—Manager F. B. Cook reports encountering water.

United States.—Announcement of Mr. Duncan McVichie accepting the general management has proven premature. He has positively declined to serve in this capacity, which is a great disappointment.

Utah Consolidated.—On June 19th ground was broken for the addition to the smeltery.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending June 9th the total smelter products sent from the camp was 2,702,320 lbs., made up as follows: Silver King, crude, 1,065,710 lbs.; concentrates, 482,830 lbs.; Daly-West, crude, 851,650 lbs.; Anchor, concentrates, 213,960 lbs.; Loring Bros., concentrates, 88,170 lbs. During May the shippers and the amount credited to each were: Silver King, crude, 4,465,175 lbs., concentrates, 1,109,060 lbs.; Daly-West crude, 2,692,610 lbs.; concentrates, 1,584,540 lbs.; Anchor, concentrates, 1,403,760 lbs.; Ontario, crude, 1,202,440 lbs.; Apex, concentrates, 236,280 lbs.; crude, 52,120 lbs.; Loring Bros., concentrates, 52,350 lbs.; Wright, concentrates 17,680 lbs.; total for the month, 12,968,135 lbs. Total shipments for May, 1899, 7,698,282 lbs.

WASHINGTON.

King County.

Renton Co-operative Coal Company.—This company's property, the Renton coal mine, is now owned by Jacob Furth of Seattle. The mine was opened 20 years or so ago and was long owned by Asa Simpson of California. Besides Mr. Furth, Boston men form the new company, and the mine is to be worked steadily. F. H. Whitworth is temporarily in charge.

FOREIGN MINING NEWS.

AUSTRALASIA.

Queensland.

The gold production of Queensland, Australia, in April was 72,125 oz. crude. For the four months ending April 30th the total was 277,667 oz., against 301,106 oz. last year, showing a decrease of 23,439 oz., or 7.8%, this year.

Victoria.

The gold production of Victoria, Australia, for April was 42,931 oz. crude. For the four months ending April 30th the total output was 216,744 oz., which compares with 249,876 oz. in 1899; showing a decrease of 33,132 oz., or 13.5%, this year.

CANADA.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Rossland Ore Shipments.—The output for the 5 months and 20 days ending June 20th amounted to 66,734 tons, valued at \$1,067,750 gross.

B. C. Exploration Syndicate.—This company recently purchased a 10-drill compressor plant from the Jencke's Manufacturing Company for use near Vancouver. The same firm has also supplied a 15 H. P. hoisting plant for use in the Evening Star Mine at Rossland, and a 25 H. P. hoist for use in the Arabella Mine at Grand Forks, B. C.

Le Roi.—The management is shipping about 550 tons daily to the Northport smelter. The War Eagle and Center Star have not yet resumed shipments.

Le Roi No. 2.—This company has been formed in England with a capital of 120,000 shares of the par value of £5 each. The sum of £50,000 has been reserved as working. This company owns the West Le Roi, Poorman, Annie, Annie Overton, Rockingham No. 1 and Shelka, all in Rossland Camp, and all of which are said to have either the War Eagle or Le Roi veins running through them. The properties were purchased from the British America corporation.

Paris Belle.—This company declared a dividend of \$4,000 on June 16th; the money, it is understood was derived from the sale of real estate.

Ontario—Lake of the Woods District.

(From Our Special Correspondent.)

Suttons.—A 5-ft. vein, showing much galena and carrying high values in gold, has been cut in prospecting on the second level.

Triggs.—Development work is going on at the rate of 4 ft. a day; over 300 ft. has been done already; the air-shaft will soon be down to the drift run to meet it on the first level.

Wendigo.—Two hundred and fifteen tons of ore has just been put through the Rat Portage Reduction Works, giving \$6 per ton in gold on the plates, whilst the concentrates were estimated to contain \$7.25 in gold. It has not transpired what values the tailings contained. The concentrates amount to almost 40% of the ore, which contains a notable amount of copper, viz., about 1.60%. Development work is being steadily prosecuted, comprising sinking and drifting.

MEXICO.

Durango.

El Carmen.—Three mines have passed into the possession of the Guggenheim Exploration Company on a lease for 10 years.

COAL TRADE REVIEW.

New York.

Anthracite.

There is little change in the regulation midsummer dullness that pervades the hard coal trade. At Philadelphia, New York and Boston buying is about down to the minimum and there is little sign of immediate improvement. At Western points also, trade is very slack, though the prospect of a 25c. advance on July 1st is reported to have brought out some orders and increased inquiries in Chicago territory. At the head of the Lakes the only thing of interest is the receipt of coal at the docks, movements by rail amounting to very little indeed. If the wheat crop is as short this year in the Northwest as reports indicate the market for hard coal in that territory is likely to be considerably curtailed.

The decision handed down by Judge Simonton at Harrisburg that the Erie & Wyoming Valley Company has the right to construct a branch from its main line at Hawley to Lackawaxen does not mean that work on a new coal road is to begin at once. There is plenty of litigation possible yet.

The sales agents at New York are still pretty firm on prices, though there are the usual concessions "made by independent operators." The steam sizes are in good demand, the other sizes are little wanted.

All the anthracite coal roads have given notice of an advance in the price of coal, 25c. per ton, east and west, beginning July 2d. The Reading Company took the initiative in the advance. The new circular prices will be as follows: Free on board, at tide water, stove and chestnut, \$4 per ton; egg, \$3.75. The western prices will be: Grate, \$4.25 per ton; stove and chestnut, \$4.50, on cars at Buffalo.

Notes of the Week.

The Philadelphia & Reading Coal and Iron Company makes the following statement for May and the 11 months of the fiscal year from July 1st to May 31st:

	May.	Year.
Earnings	\$1,817,801	\$25,573,891
Expenses	1,786,175	23,782,626
Net earnings	\$31,626	\$1,791,265

For the 11 months the gross earnings in-

creased \$4,165,365; the expenses \$3,353,978; and the net earnings, \$811,387.

Bituminous.

The Atlantic seaboard soft coal trade is in a little better condition than it was last week, through more inquiry. It is not active, however, and consumers can get all the coal they want for the asking. Consumers are scrutinizing the quality of the coal considerably, and we hear of some complaint in this direction.

Foreign trade is quiet, though some shipments are being made regularly each week, and at the end of the year it is thought that this business will foot up well.

Regarding the Georges' Creek strike there was a meeting of a committee of miners as individuals with one of the presidents during the week which, it is reported, was harmonious. There was a feeling that the men would go back early in July, but it is believed that this is by no means a certainty at this time. The operators do not seem to care one way or the other now that the strike has been hanging on as long as it has.

Trade in the far East is fairly good. Along the Sound it has looked up a little, while in New York harbor it is quiet.

All-rail trade is somewhat less. There are good stocks of coal at the shipping ports and rates have been reduced to get the cars unloaded. Transportation from mines to tide is good. The car supply is governed to a great extent by the individual unloading at shipping port.

In the coastwise vessel market rates are strong with vessels in fair supply.

We quote current rates of freight from Philadelphia as follows: Providence, New Bedford and the Sound, 65@70c.; Boston, Salem and Portland, 75@80c.; Portsmouth and Bath, 80c.; Lynn, 90c.; Newburyport, 95c.; Bangor, 90c.; Dover, \$1.15@1.25 and towages; Gardiner, 80@85c. and towages; Saco, \$1.15 and towages, with 10@15c. above these rates from Chesapeake Bay ports.

Birmingham, Ala.

June 25.

(From Our Special Correspondent.)

The convention of the miners of Alabama has been going on since last Wednesday and during this week the operators and the miners are to come to an understanding as to the wage scale for the ensuing year, commencing July 1st. A scale was presented to the operators to-day by the miners, but inasmuch as it calls for an advance on that now in effect, it is not believed the operators are going to grant the demands. Already a conference is on between miner and operator and it is likely that this week will be consumed in arguing differences. Both the operators and miners are well organized, and present indications are that a strike may occur after July 1st. The present schedule is based on pig iron at \$8 per ton and for every advance of 50c. per ton an advance of 2½c. on the ton on coal mining is allowed. The miners have a minimum price of 45c. and a maximum price of 55c. per ton. The miners now desire to increase the basis and also the maximum price, which the operators deny they are able to give.

At Belle Ellen, in Bibb County, the Southern Railway has let a contract for an extension so as to reach some new mines which will be opened in that vicinity. In Walker County a number of mines will be opened this year along the line of the new railroad known as the Ensley Southern, on which work began to-day.

The demand for coal is yet very active and the production of the mines in this State through the year can well be taken care of. The operators are receiving a pretty fair price for the product, many of the contracts now running having been made during the flush times. Not a few of the mines have contracts which are to last several months to come yet.

Chicago.

June 26.

(From Our Special Correspondent.)

Anthracite Coal.—There has been a somewhat better demand for anthracite coal during the past week, sales agents reporting that out of town inquiry has been good with a fair amount of business, and sales in the city have improved somewhat, all due possibly to the probability of an advance in price of 25c. per ton July 1st. Circular prices are yet \$5 for broken; \$5.25 for egg, stove and chestnut.

Bituminous coal has been sold a little heavier than last week, but inquiry is very slow of actual business. Manufacturing and railroads are taking fair quantities of soft coal, but the enormous production at mines necessitates shipping a great deal of coal here, and consequently demand cannot keep up with production, making prices very soft. Contracts are taken on figures much below circular prices.

Cleveland, O.

June 27.

(From Our Special Correspondent.)

This week has seen an united effort on the part of the Cleveland shippers to Duluth to break the carrying rate on coal, and it has also seen a compact formed among the Cleveland vessel owners to prevent such a break if possible. The shippers worked a shrewd scheme, but some of the owners discovered the trick and check-

mated the move. The shippers went into league with the Northern Steamship Company which is on both sides of the fence, being vesselmen and shippers as well, and as a result the "Northern Wave" and the "Northern Light," two of that company's line boats, were placed at 40c. to carry coal to Duluth, this being a reduction of 10c. Following these charters M. A. Bradley chartered his schooner "Sandusky" at the same rate thinking that the market had broken. Other vesselmen had given out orders to charter their boats at the same rate. Then one of the owners discovered the trick and called all of the others together and explained matters. The result was the formation of a compact into which all entered and agreed to charter no more boats for less than 50c., the present contract rate. Since that time all chartering has been done at 50c. Such an agreement among the vesselmen, which means a withdrawal of tonnage in case the rate is not paid, is the only thing that will save the rate. This superabundance of tonnage is due to the general weakness in the ore market and to the fact that the ore carriers are now looking for employment. Although coal is not any too plentiful and vessels have to wait for a chance at the docks the shippers are not suffering for tonnage.

Pittsburg. June 27.

(From Our Special Correspondent.)

Coal.—There are no special features in the coal trade this week. All the mines in the district are in operation and the full capacity is being produced and shipped. On the river, however, coal is being loaded for the next rise. A large number of coal boats and barges were returned on the recent high water. The Pittsburg Coal Company, the railroad coal combination, was this week granted a certificate to do business in the State of Ohio. A certificate is required under the law of the State for all foreign corporations; the delay in granting this certificate, it is explained, was due to a misunderstanding.

Connellsville Coke.—There was a decided drop in production last week and prices are lower. Furnace coke is quoted at \$2.50@2.75, and it is believed that a much lower rate could be secured. Of the 20,341 ovens in the region 17,458 were active, and 2,883 were idle. The production last week was 178,060 tons, a decrease of 5,907 tons compared with the previous week. The shipments aggregated 9,810 cars, distributed as follows: To Pittsburg and river tipples, 2,576 cars; to points west of Pittsburg, 4,896 cars; to points east of Connellsville, 2,338 cars. This was an increase of 341 cars compared with the shipments of the previous week.

SLATE TRADE REVIEW.

New York. June 29.

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

Size, inches	Monson or Br'n. Vile.	Bangor.	Bangor Ribbon.	Alb'n. or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unf'd g. Green.	Red.
24 x 14	7.00	3.50	3.00	3.25	3.10	5.10	3.15	.....	.....
24 x 12	7.00	3.50	4.00	3.25	3.10	5.25	3.15	3.75	.....
22 x 12	7.00	3.50	3.25	3.50	3.25	5.25	3.15	3.75	.....
22 x 11	7.00	3.75	3.25	3.50	3.25	5.25	3.15	4.00	.....
20 x 12	7.00	3.75	.....	3.50	3.25	5.25	3.15	3.75	.....
20 x 11	7.00	.....	.....	3.75	3.50	5.25	3.15	.....	.....
20 x 10	7.00	4.25	3.50	3.75	3.50	5.35	3.15	4.25	10.50
18 x 12	7.00	3.75	.....	3.50	3.25	5.25	3.15	3.50	.....
18 x 11	7.00	.....	.....	3.50	3.25	5.25	3.15	3.75	.....
18 x 10	7.00	4.25	3.50	3.75	3.50	5.35	3.15	4.00	10.50
18 x 9	7.00	4.50	3.50	3.75	3.50	5.35	3.15	4.25	10.50
16 x 12	7.00	3.75	.....	3.50	3.25	5.25	2.95	3.50	.....
16 x 10	7.00	4.25	3.50	3.75	3.50	5.25	2.95	4.00	10.50
16 x 9	7.00	4.25	.....	3.75	3.50	5.35	2.95	4.25	10.50
16 x 8	7.00	4.50	3.50	3.75	3.50	5.35	2.95	4.25	10.50
14 x 10	7.00	3.75	3.25	3.25	3.25	5.25	2.85	3.75	10.50
14 x 9	7.00	.....	.....	.....	.....	.....	2.85	3.75	10.50
14 x 8	7.00	3.75	3.25	3.25	3.10	5.10	2.85	4.25	10.50
14 x 7	7.00	3.75	3.25	3.25	3.10	5.10	2.60	4.25	10.50
12 x 10	5.75	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 9	5.75	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 8	5.75	3.50	.....	3.00	2.80	4.85	2.60	3.50	9.00
12 x 7	5.25	3.25	.....	3.00	2.80	4.85	2.50	3.50	9.00
12 x 6	5.25	3.25	.....	3.00	2.80	4.75	2.50	3.50	8.50

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

The trade is in a rather unsatisfactory condition according to the order books of dealers, and quarrymen state that there will be, in consequence, an over-production of slate as the year advances. Not only is the export trade decreasing, but the home demand is also less. Prices must suffer, although sellers claim they are getting the schedule as herewith.

The movement of slate from Slatington and Walnutport, Pa., for the first three weeks of June are as follows: Roofing, 12,999 squares; school slates, 1,831 cases; blackboards, 695 crates.

IRON MARKET REVIEW.

NEW YORK, June 29, 1900.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From Jan., '99.	From Jan., '00.
	June 30, 1899.	June 29, 1900.	June 30, 1899.	June 29, 1900.	Tons.	Tons.
An' racite & Coke.	204	252,225	269	291,425	6,167,261	7,411,723
Charecal.	16	5,225	23	6,025	129,318	180,116
Totals..	220	257,450	292	297,450	6,296,579	7,591,839

The iron market continues unsettled, with very little new business. Buyers are all waiting for bottom prices, and—as is usual in times like the present—it is hard to tell when the bottom has been reached. It is not impossible that a rush to buy will come unexpectedly, and some buyers may be caught. All depends on the turn of trade next month.

An exception is found in the structural market. The recent reduction is accepted as a basis, and a good deal of business is being placed with more in sight.

Export inquiries continue good, and it looks as if a large tonnage for fall delivery would be placed. Something depends on the freight question; and it is to be noted that the complications in the East are making tonnage scarce and rates higher.

We continue to hear of furnaces going out of blast and the reduction in tonnage will be considerable by the end of the month. Many of the stoppages are for repairs and the furnaces will blow in again before long, unless conditions are more discouraging than now seems probable.

The value of the iron and steel exports of Great Britain for the five months ending May 31st is given by the Board of Trade returns as below:

Iron and steel.....	£10,094,261	£14,375,934
Machinery	7,812,906	8,197,198
New ships	4,691,736	2,228,408

Totals

The increase this year was £2,203,637, or 9.7%, notwithstanding the large decrease in new ships. Imports of iron ore into Great Britain for the five months ending May 31st were 2,828,767 long tons, whereof 2,499,710 tons were from Spain. The total in 1899 was 3,059,939 tons, showing a decrease of 231,172 tons, or 7.6% this year.

Imports of pig iron into Great Britain for the five months ending May 31st were 39,092 long tons, against 84,018 tons last year; a decrease of 44,926 tons, or 53.4%. The imports from the United States were 16,268 tons, against 51,438 tons, or 68.4% this year.

Birmingham, Ala. June 25.

(From Our Special Correspondent.)

The pig iron market in Alabama has not improved, and its weakness has been admitted by the manufacturers. Prices are off between \$2 and \$3 a ton. The production in this State has been curtailed in the past two weeks, five furnaces at Bessemer belonging to the Tennessee Coal, Iron and Railroad Company, being out of blast, because of the strike of employees of the stock house. These decrease the production between 750 to 1,000 tons of iron a day.

There is but little demand in the domestic market at present for the product. The purchasing element is not buying. The manufacturers hereabouts are not very anxious to sell much ahead at the prices which are now prevailing.

The local market is also weak. July, however, will see some of the plants using large quantities of iron going out of blast. The Dimmick pipe plant at North Birmingham is now making pipe, but it will be July 15th before the entire plant will be in blast.

There is not much iron, if any, accumulating in the yards in this State, orders on hand for months still being worked on. The shut-down at Bessemer also prevents a surplus of iron. The export trade is yet very active.

The finished iron market is dull. The mills will close next week for an indefinite period and many of the employees will go northward for a vacation. Though the production of iron has been curtailed some, the production of coal, ore, limestone and other raw material for the furnaces has not been decreased at all.

The following quotations for iron are given: No. 1 Foundry, \$15.50@16; No. 2 Foundry, \$15@15.50; No. 3 Foundry, \$14.75@15; No. 4 Foundry, \$14.50; Gray Forge, \$14@14.50; No. 1 Soft, \$15.50@16; No. 2 Soft, \$15.

Chicago. June 26.

(From Our Special Correspondent.)

Pig Iron.—The situation is unchanged; the actual business doing here from week to week is on the basis of a sufficiency of pig iron for use from week to week. Altogether a fair tonnage is being placed each week. Consumers are not inclined to make inquiry for requirements ahead. Prices continue unsettled, particularly in Southern iron. Prices as near as possible are: Lake Superior Charcoal, \$23@24; Local Coke Foundry, No. 1, \$20@20.50; No. 2, \$19.50@20; No. 3, \$19@19.50; Local Scotch, No. 1, \$21@21.50; Ohio Strong Softeners, No. 1, \$22@23; Southern Sil-

very, \$22.50@24; Southern Coke, No. 1, \$20.85@21.85; No. 2, \$19.85@20.85; No. 3, \$18.85@19.85; Southern, No. 1 Soft, \$20.85@21.85; No. 2 Soft, \$19.85@20.85; Malleable Bessemer, \$20.50@21; Coke Bessemer, \$21@21.50.

Cleveland, O. June 27.

(From Our Special Correspondent.)

Iron Ore.—Just now at the high-tide of what appears to be the effort of the Bessemer Steamship Company to force carrying rates up on wild cargoes of ore every condition is favorable to the shippers. Boats that have been carrying contract ore all the summer now find that they are far ahead of their obligations. These boats are now on the market for wild cargoes, but find that the shippers are withholding them, fearing lest, by chartering freely now, they will send down ore which they will need later in the year with which to supply the demands of the contract boats. The boats which were chartered for the Escanaba trade for the season with the provision that they should go up light to assure better dispatch, have been carrying coal all the season and are doing the same now. The reason is that cargoes have been coming slowly. The carrying rates remain as they have been, \$1 from Duluth and the head of the lake, 90c. from Marquette and 70c. from Escanaba.

Pig Iron.—There is no business upon which a price on pig iron could be based that would adequately represent the market.

The market price varies as widely as do the circumstances under which the sales are made. There are no bids for iron for the latter part of the year. The drop in Bessemer iron has not afforded any scale upon which to base business transactions, and in fact the Bessemer price seems hardly to represent that market, although \$20 is still being quoted; but no business has been done.

Finished Materials.—The week has seen another drop in bars, from 1.60 and 1.65 to 1.5c., but even at that price the business is very light. Plates are being quoted at 1.45c. and 1.50c., but the understanding is that some of the larger sales were made on the basis of 1.40c. Beams and channels are still being quoted at 1.90 and angles at 1.80, with some considerable business in shapes. Billets are still quoted at \$28. Carnegies sold 100 tons early in the week and have inquiries now for between 600 and 700 tons more. The sales of the week have included plates for a steel steamer for Captain John Mitchell, of Cleveland, which was closed by the Carnegie Company; steel for a new building to be erected by M. A. Bradley; and 100 tons of bridge material. This week has seen more inquiries.

Philadelphia. June 28.

(From Our Special Correspondent.)

Pig Iron.—The drop in prices of at least 50c. a ton has done more to stop business than anything that has occurred for three months. The large producers have withdrawn quotations except to actual buyers and they are few. Brokers are given private quotations only. No. 1 Foundry is quoted \$18@18.75, though the more desirable brands cannot be had for these figures, in fact they are not being offered for sale. No. 24 is within reach at \$18. Gray Forge would not bring \$17, but just how much below \$16 it is impossible to say. Brokers do not know what to quote.

Billets.—The drop in billets to \$25 has not been followed by the expected business, though some correspondence with makers has resulted.

Bars.—Next week our repairing season begins and there is more than usual work to be done. Our millmen are reticent as to their intentions as to the summer and do not expect much difficulty in running their mills no matter which way the wages schedules go. Bars are plenty at 1.50c., common, 1.40c. There is no particular pressure to sell iron at present.

Skep.—A good deal of skep has been shipped during the past week or two and the mills have orders to fill that will run them to August.

Sheets.—The mills hereabouts will undergo a very thorough repairing. The supply is equal to the demand expected. Prices have been shaded even on small lots.

Plates.—The Eastern plate mills have a few big orders to engage their attention during the summer. The shadings that have occurred since March have started some contemplated dealings which will probably help the mills out nicely during the next two months. Plates are quoted on the basis of 1.50c.; tank boiler plates keep active.

Structural Material.—The drop in prices started negotiations on a big lot of work which has not been closed up.

Steel Rails.—One rumor was circulated this week that a reduction to \$30 had been privately agreed upon to be formally ratified at next meeting. Other authorities say there has been no action taken. It is understood, however, that a readjustment of prices is in contemplation.

Old Rails.—There is no business pending offers to take large lot at a drop of \$1 from current rates.

Pittsburg. June 27.
(From Our Special Correspondent.)

Buyers of iron and steel are evidently of the opinion that prices will soon come close to the cost of production and are holding off for lower rates as there is absolutely nothing doing of any consequence. From present indications there will be no decided movement until prices get down to bedrock. The mills are fairly active on old orders and but little new business may be expected before late in August. Preparations are now being made to close many of the mills in this district and the workers for the first time in several years seem anxious for a shut-down. They have had more steady employment in the year closing June 30th than for a long time. Many of the blast furnaces have closed and a number will go out of blast within the next 10 days. The product has been sold into July at the old rate of \$24, Valley, and but little business has been taken at the recently established rate of \$20, Pittsburg. The furnaces that have gone out are being repaired and it is expected that all will be in blast again before September 1st. The outlook for fall business is considered good, but no predictions are being made as to prices. A remarkable drop in prices of steel is noted this week. While the price of Bessemer billets has been fixed at \$28 they can be had at \$25 and only a few small sales are recorded at that figure. Open-hearth billets are down to \$25. Despite the nominal quotation of 1.75c. for steel bars, sales are reported as low as 1.45c., and iron bars which have been held at 1.90c. can be had this week at 1.40c. The only line in which there is no weakness is in structural material. The recent cut in prices has stimulated buying and all the mills are active. Another conference on the wage scale for the union iron and steel sheet mills was held during the week, but no agreement was reached. The representatives of the Amalgamated Association insisted that the scale be signed for all the mills owned by the American Sheet Steel Company, but the representatives of the combination claimed that this was impossible, as the wages for the men in the non-union mills have already been adjusted for the year. The wage committee of the Amalgamated Association went to Detroit on Monday, where a conference with representatives of the manufacturers on the bar iron scale began. A conference with the American Tin Plate Company on the scale was scheduled to be held in New York on Thursday.

Pig Iron.—No sales of Bessemer pig iron are recorded this week. There is nothing doing in foundry iron, but prices remain about the same as last week. No. 2 is quoted at \$18.50@18.75 and Gray Forge at \$17.50.

Steel.—Bessemer billets can be had as low as \$24, and open-hearth billets at \$25. Structural material is firm. There were no sales of sheet bars which are held at \$29.

Sheets.—There is no doubt now that all the union sheet mills will be shut down this week, as a settlement of the wage scale was found to be impossible at the second conference between the workers, and manufacturers' representatives held during the week. No change in prices is noted. No. 27 is still quoted at 3@3.05c., and No. 28 at 3.05@3.10c.

Ferro-manganese.—The demand has fallen off, but 80% domestic is still quoted at \$100.

New York. June 29.

The local market is still unsettled, and sales are confined to small lots for current events, except in the structural department, where a fair business has been done. Export trade continues good and new inquiries are constantly coming in.

It is stated that the negotiations for the consolidation of the Pratt & Whitney and the Niles-Bement-Pond interests are practically completed.

Pig Iron.—It is not easy to give accurate quotations, as there is a wide range and there are many matters which may cause variations. A large order might be placed below any price yet given. Prices are a shade easier on the whole. Northern iron. No. 1X Foundry, \$19.50@20.50; No. 2X, \$18@19; No. 2 plain, \$16.75@17.50. For Southern irons on dock, New York: No. 1 Foundry, \$20.50@21; No. 2, \$19.50@20; No. 3, \$18@18.50; No. 1 Soft, \$20.50@21; No. 2, \$19.50@20; Gray Forge, \$17@17.50.

Bar Iron.—Demand is still light and the market unsteady. Common bars are quoted as low as 1.45c. for large lots on dock; refined bars, 1.60@1.65c.

Plates.—Business is a shade better, but prices are unchanged. We quote for large lots at tide-water: Tank, 1/4-in. and heavier 1.60@1.70; tank, 3/16 in., 1.70@1.75c.; shell, 1.75c.; flange, 1.85c.; marine, 2.20c.; universals, 1.60@1.70c.

Steel Rails and Rail Fastenings.—There is talk of a reduction, but none has been made yet, and we continue to 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, 2.20c.; fish plates, 2.15c.; spikes, 2.20c.; bolts, 3.20c.

Structural Material.—Quite a business has been done, and more is in sight. We quote in large lots at tide-water: Beams, 2.10c.; channels, 2.10c.; angles, 2c.; tees, 2.15c.; zebs, 2.10c.

METAL MARKET.

NEW YORK. June 29.

Gold and Silver.

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

Metal.	May.		Year.	
	1899.	1900.	1899.	1900.
GOLD.				
Exports	\$2,049,255	\$12,209,596	\$6,644,997	\$22,330,474
Imports	3,070,265	3,706,161	20,281,961	12,869,812
Excess E.	\$1,021,010	E. \$8,501,435	E. \$13,636,964	E. \$9,460,662
SILVER.				
Exports	4,436,549	6,056,058	23,276,649	25,184,366
Imports	3,010,353	2,461,493	12,541,322	13,793,352
Excess E.	\$1,426,196	E. \$3,604,565	E. \$10,735,327	E. \$11,391,014

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 June 28th, 1900, and for years from January 1st, 1900, 1899, 1898, 1897.

Pe-ri-od.	Gold.		Silver.		Total Ex-cess, Exp- or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$40,500	\$72,681	\$967,670	\$153,528	E. \$781,961
1900..	20,521,377	1,519,396	20,260,167	2,146,120	E. 37,116,023
1899..	11,141,612	7,145,671	13,889,536	1,655,874	E. 16,232,603
1898..	4,495,054	68,990,935	16,904,043	1,798,609	E. 49,360,297
1897..	14,147,361	1,850,425	20,507,258	1,370,790	E. 31,444,004

Exports of gold were in small lots, to various points; imports were from the West Indies. Exports of silver went chiefly to London; imports were from the West Indies and Mexico.

The United States Assay Office in New York reports the total receipts of silver at 85,000 oz. for the week. Total since January 1st, 2,508,000 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	25.29	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	59.95	27.65	60.10	25.95	56.02
May.....	27.56	59.96	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.....			27.15	58.89	28.05	60.68
October.....			26.70	57.98	27.90	60.42
November.....			27.02	58.67	27.93	60.60
December.....			27.21	58.99	27.45	59.42
Year.....			27.44	59.58	2.76	58.29

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	4.69	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	24.98	4.675	4.31	4.71	6.67
May.....	16.34	17.20	29.37	25.76	4.181	4.44	4.53	6.88
June.....	16.89	17.10		25.85		4.43		5.98
July.....	17.12			25.63		4.52		5.92
August.....	17.42			31.53		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 16.33c.; for February, 16.08c.; for March, 16.55c.; for April, 16.94c.; for May, 16.55c.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$.48	\$.49 1/2
Peruvian soles and Chilean pesos.....	.45	.46 1/2
Victoria sovereigns.....	4.86 1/2	4.88
Twenty francs.....	3.86 1/2	3.90
Twenty marks.....	4.77	4.88
Spanish 25 pesetas.....	4.78	4.82

Financial Notes of the Week.

Midsummer is approaching with the usual quiet incident to that season in trade. There is an effort being made to get up some excitement of the November election, but people are thinking very little of that yet. Trade is without incident. The money market continues easy. No gold exports are reported thus far this week.

Silver has had a sharp advance. There has been much speculation and also legitimate buying, with the expectation that owing to the Chinese difficulties larger supplies of the metal would be required for that quarter. The market closed at 28 9/16 in London.

The statement of the United States Treasury on Wednesday, June 20th, shows balances in ex-

Imports and Exports of Metals.

Port.	Week, June 27.		Year 1900.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum.....long tons			72	44
Antimony ore.....	**300			1,640
regulus.....	**20			625
Chrome ore.....				1,501
Copper, fine.....	1,883	370	51,688	10,851
" matte.....	331		1,890	40
" ore.....				4,254
" ash.....				61
Ferro-Chrome.....	**21			34
Ferro-mangan'se.....	**20			342
Iron ore.....				17,447
" pig, bar, rod.....	432	**693	5,601	3,493
" pipe.....	185	**33	7,580	157
" plates, sheets.....			880	13
Lead.....	1,662	1,025	38,976	36,906
" ore.....				7,600
" dross.....				24
Manganese, ore.....				5,414
Metals, old, scrap.....			1,904	4,352
Composition.....			1,015	185
Nails.....	659		12,105	
Nickel.....	28	**4	1,028	65
" ore, matte.....		**35		146
" Rail'd material.....	197		602	518
" Rails, old.....			1,037	
" Spiegeleisen.....				1,300
" Steel bars, plates.....	2,255	**873	13,187	10,414
" rails.....	650		21,201	18
" wire.....	1,455		13,365	
" not speci'd.....	966	**21	4,557	1,585
Tin.....			160	5
" and black plates.....		1321		16,852
Zinc.....			322	144
" dross.....			412	50
" ashes, skim.....			563	20
" ore.....			8,073	
†Baltimore.				
Chrome ore.....long tons			2,930	
Copper, fine.....	798	356	22,364	2,556
" matte.....				155
Ferro-mangan'se.....	422	492	2,388	18,126
Iron pig, bar, etc.....		3,543		234,375
" ore.....				18,489
" pyrites.....				89,590
Manganese ore.....				384
Metals, old & Ralls.....				1,171
Nails.....				2,816
Pipe, iron & steel.....	150			85
Silicon.....				659
Spiegeleisen.....				1,388
Steel, bars, etc.....	2,388		13,465	663
" wire.....				79
" rails.....	3,652		48,884	
Tin.....				111
" and blackplates.....		100		1,599
*Philadelphia.				
Antimony.....long tons			14	
Chrome ore.....				3,650
Copper, fine.....			2,402	
" ore.....				18,273
Iron, pig.....	**462			1,187
" ore.....	**6,845			98,943
" pyrites.....				87,455
Manganese ore.....				50,738
Spiegeleisen.....				3,953
Tin.....				218
" and black plates.....		199		1,970
Zinc.....				67
" ore.....				1,500
Total United States. \$§				
Articles.	April, 1900.		Year, 1900.	
	Expts.	Impts.	Expts.	Impts.
Antimony.....long tons		291		822
Chrome ore.....		344		1,074
Copper, fine, in all forms.....	112,764	\$83,492	59,648	17,648
Iron, pig & bar.....	11,427	6,950	40,401	29,595
" ore.....		21,726	120	297,962
Iron & steel plates.....	2,369	357	9,883	4,360
Iron & steel rails.....	31,494	181	98,823	469
" wire.....	7,993	146	27,729	599
Lead, pigs, bars & old.....	44	83	324	686
Lead in ore, etc.....	7,325	9,169	28,908	29,324
Manganese ore and oxide.....		23,378		158,720
Nickel & matte.....	229		804	
Nails, cut.....	1,238		3,529	
" wire.....	2,367		14,689	
Quicksilver.....	41		185	
Steel, billets, rods, etc.....	2,737	3,156	23,969	13,708
Tin.....	73	3,404	127	11,521
" black plates.....	42	7,475	82	22,407
Zinc.....	2,771	75	7,941	433
" ore.....	1,522		11,930	

*New York Metal Exchange returns. †By our Special Correspondent. §Not specified. ¶Monthly returns, Treasury Department. †Report of Mr. John Stanton. †Week June 21st. **Week ending June 19th. Exports include domestic and foreign metals.

Import Duties on Metals.

The duties on metals under the present tariff law are as follows: Antimony, metal or regulus, 3/4c. a lb. Lead, 1 1/2c. a lb. on lead in ores;

cess of outstanding certificates as below, comparison being made with the statement of the corresponding day last week:

	June 20.	June 27.	Changes.
Gold.....	\$63,956,519	\$69,413,691	I. \$ 457,172
Silver.....	13,671,876	15,001,112	I. 1,329,256
Legal tenders.....	22,851,673	25,045,356	I. 2,190,683
Treas. notes, etc....	513,238	681,741	I. 163,503
Totals.....	\$106,001,286	\$110,141,900	I. \$4,140,614

Treasury deposits with national banks amounted to \$104,066,957, showing a decrease of \$3,404,122 for the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending June 23d, gives the following totals, comparisons being made with the corresponding weeks in 1899 and 1898:

	1898.	1899.	1900.
Loans and discounts.....	\$612,599,100	\$778,868,400	\$810,025,000
Deposits.....	737,517,800	969,004,800	890,982,600
Circulation.....	14,666,400	13,586,600	23,033,100
Reserve:			
Specie.....	184,106,900	194,003,400	166,224,200
Legal tenders.....	62,486,300	58,945,600	72,048,300
Total reserve.....	\$246,593,200	\$252,949,000	\$238,272,500
Legal requirements.....	184,386,950	227,251,200	222,745,650
Balance, surplus....	\$62,206,250	\$25,697,800	\$15,526,850

Changes for the week this year were increases of \$25,100 in loans and discounts, and \$66,500 in circulation; decreases of \$4,787,600 in deposits, \$1,991,900 in specie, \$1,176,900 in legal tenders, and \$1,971,900 in surplus reserve.

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

Banks.	1899.		1900.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n.....	\$194,003,400	.....	\$166,224,200	.....
England.....	157,442,905	168,725,505	.....	.....
France.....	374,413,585	\$244,468,040	419,360,845	\$229,584,865
Germany.....	152,895,000	78,765,000	142,980,000	73,665,000
Spain.....	61,340,000	66,360,000	68,445,000	84,145,000
Aus.-Hun.....	150,775,000	53,075,000	188,010,000	47,835,000
Neth'lds.....	19,025,000	31,715,000	24,365,000	30,190,000
Belgium.....	15,095,000	7,550,000	14,215,000	7,105,000
Italy.....	76,945,000	10,910,000	77,180,000	8,325,000
Russia.....	477,160,000	25,675,000	411,000,000	39,480,000

The returns of the Associated Banks of New York are of date June 23d and the others are of date June 22d, 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 June 14th, 1900, are reported by Messrs. Pixley & Abell's circular as follows:

	1899.	1900.	Changes.
India.....	£2,060,400	£2,534,660	I. £474,260
China.....	617,761	140,960	D. 476,801
The Straits.....	21,907	165,080	I. 143,173
Totals.....	£2,700,068	£2,840,700	I. £137,632

Arrivals for the week this year, were £185,000 in bar silver from New York. Shipments were £280,000 in bar silver to Bombay, and £15,000 to Calcutta; total, £295,000.

Indian exchange is a little easier and Council bills were taken at an average of 15.97d. per rupee in London. It is understood that more silver is to be bought for the Indian Government.

Imports of specie at San Francisco in May were \$2,702,736; they included \$973,300 gold from Australia, the first received this year. For the five months ending May 31st the receipts were:

	Gold.	Silver.	Totals.
Coin.....	\$4,831,237	\$135,892	\$4,967,129
Bullion.....	108,600	867,216	975,816
Totals.....	\$4,939,837	\$1,003,108	\$5,942,945

The imports were from the following countries: British Columbia, \$30,005; Mexico, \$1,076,727; Central America, \$22,741; South America, \$1,280; Australia, \$978,930; China, \$4,348; Japan, \$3,542,391; Hawaii, \$286,613. The large receipts from Japan—which were all in gold yen—are noticeable.

The foreign merchandise trade of Great Britain for the five months ending May 31st is given by the Board of Trade returns as follows:

	1899.	1900.
Imports.....	£198,403,349	£213,569,770
Exports.....	132,497,918	147,460,556
Excess, imports.....	£65,905,431	£66,109,214

The increase in imports was £15,166,421, or 7.6%; that in exports £14,962,638, or 11.3%. The movement of gold and silver was as follows:

	Imports.	Exports.	Excess.
Gold:			
1900.....	£10,820,993	£5,502,127	Imp. £5,318,866
1899.....	11,926,407	8,746,229	Imp. 2,180,178
Silver:			
1900.....	5,178,041	5,561,728	Exp. 383,685
1899.....	6,108,363	6,477,754	Exp. 369,391

The United States furnished this year £4,467,327, or 88.2%, of the silver imported.

Other Metals.

Daily Prices of Metals in New York.

June.	Sterling Exchange.	Silver.		Copper.				Spelter.		
		Fine oz. Cls.	London. Pence.	Lake. cts. # lb.	Electro-lytic # lb.	London, # ton.	Tin, cts. # lb.	Lead cts. # lb.	N. Y. cts. # lb.	St. L. cts. # lb.
23	4.86 1/2	60 3/4	27 1/2	16	15 3/4	.....	31 3/4	3 87 1/2 @ 4	4.20	4.05
25	4.86 1/2	60 3/4	28	16	15 3/4	71	32	4.10 @ 4.15	4.20	4.05
26	4.86	61 3/4	28 1/2	16	15 3/4	71 3/4	31 3/4	4.20 @ 4.25	4.25	4.10
27	4.86 1/2	61 3/4	28 3/4	16	15 3/4	71 3/4	31	4.20 @ 4.25	4.30	4.15
28	4.86 1/2	61 3/4	28 3/4	16	15 3/4	71 3/4	31 3/4	4.20 @ 4.25	4.25	4.10
29	4.86 1/4	61 1/4	28 3/4	16	15 3/4	71 3/4	31 3/4	4.20 @ 4.25	4.30	4.15

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 is firm. Consumption both here and abroad continues to be good. Consumers generally are but poorly supplied and are buying more freely. Europe has this week also come forward with somewhat larger orders. However, the buying has as yet not been of sufficient volume to affect prices, and we quote Lake at 16c., electrolytic copper in cakes, wirebars and ingots at 15 3/4 @ 15 1/2 c., in cathodes at 15 1/2 @ 15 1/4 c., and casting copper at 15 1/2 c.

The London market for speculative sorts, which closed last week at £70 12s. 6d. for spot, £70 10s. for three months, opened at £71 for both deliveries. It improved 15s. on Tuesday and fluctuated but little during the middle of the week. At the close we quote £71 12s. 6d. for spot, and £71 15s. for three months.

Refined and manufactured sorts we quote: English tough, £75 10s. @ £76 10s.; best selected, £76 10s. @ £77 10s.; strong sheets, £84; India sheets, £82; yellow metal, 6 3/4 d.

Imports of copper into Great Britain for the five months ending May 31st were, in long tons: Ore..... 1899. 1900. Matte and precipitate..... 29,021 51,445 Fine copper..... 26,094 32,832

The total was equivalent to 56,962 long tons of fine copper this year, as compared with 45,046 tons in 1899; an increase of 11,916 tons, or 26.5%. Of the total this year the United States supplied 704 tons of ore, 3,112 tons of matte and 13,867 tons fine copper. The large increase in ore was chiefly from Spain and Chile.

Tin.—In spite of the violent fluctuations in the London market, and the great scarcity of spot tin there, our market has remained quiet. While the metal has sold as high as 32c. for spot, at the close we quote spot tin at 31 3/4 c., futures at 29c.

The London market, which closed last week at £145 for spot, £131 10s. for three months, opened at £148 for spot, £132 for three months. It fluctuated violently, spot tin declining on Monday £2 10s., three months' tin remaining unchanged. On Tuesday spot declined further £2, and on Wednesday another £4 10s. to £139 for spot; three months went to £130 10s. On Thursday spot was cabled at £140, three months at £132 5s., and at the close the quotations are £147 for spot, £133 for futures.

It will be seen that the corner collapsed very quickly, and our reports lead us to believe that the market will soon again be in a more normal condition. Our cables to-day report that delivery next Tuesday is quoted at a considerable discount, indicating that, while the corner has again become acute, an early change may be looked for.

Imports of tin into Great Britain for the five months ending May 31st were: Straits Settlements, 8,178 long tons; Australasia, 1,211; other countries, 2,264; total, 11,653 tons, against 11,590 tons last year; an increase of 63 tons, or 0.5%. Exports of foreign tin were 2,176 long tons, against 1,758 tons in 1899.

Lead.—The market this week has experienced a sudden and large advance of 1/2 c. per lb. On Monday prices were raised 3/4 c., and on Tuesday a further 1/2 c. We now quote New York at 4.20 @ 4.25c.; St. Louis, 4.15 @ 4.20c. Consumers throughout the country are very poorly supplied, and as consumption is good the demand for lead is very heavy. In some quarters it is believed that the volume of demand will be so great that a further advance in prices will take place.

The European market has also been firmer this week, Spanish lead being quoted at £17 7s. 6d., English lead 2s. 6d. higher.

Imports of lead into Great Britain for the five months ending May 31st were, in long tons: Spain..... 1899. 1900. Australasia..... 43,780 35,962 United States..... 30,064 21,644 Other countries..... 12,434 14,812

Totals..... 91,314 79,671 This shows a decrease of 11,643 tons, or 12.8%

this year. The lead credited to the United States is chiefly Mexican lead, refined here in bond.

Spelter.—There has been a decided improvement in the market. On the one hand, larger orders have presented themselves, and on the other, producers generally find that they are well sold ahead. In consequence, prices have advanced and we quote 4.15c. St. Louis, 4.30c. New York.

The European market is very quiet. Our cables report the quotation as £19 for good ordinaries, £19 5s. for specials.

Antimony.—There is no change. We quote Cookson's at 10 1/2; Hallett's at 9%, and U. S. Star at 9 1/2 @ 9 3/4 c.

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

Platinum.—Consumption is increasing and prices are strong and likely to go 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 72c. per gram, showing an increase of 1 1/2 c.

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 @ \$52 for local deliveries, and \$46.50 @ \$47 for export.

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

Imports of quicksilver into Great Britain for the five months ending May 31st were 284,814 lbs., against 2,458,594 lbs. in 1899. Exports were 868,028 lbs., against 939,620 lbs. in 1899. The exports exceeded the imports by 583,214 lbs. this year, while in 1899 the exports were 1,518,974 lbs. less than the imports.

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

Aluminum.	Per lb.	Ferro-Titanium (20%).	Per lb.
No. 1, 99% ingots.....	33 @ 37c.	Ferro-Tungsten (37%).	35c.
No. 2, 90% ingots.....	31 @ 34c.	Magnesium.....	\$2.75 @ \$5
Rolled sheets.....	42c. up	Manganese (over 99%).	\$1.05
Alum.-bronzes.....	20 @ 23c.	Manganese Cop. (2% Mn)	32c.
Nickel-alum.....	33 @ 39c.	Manganese Cop. (30% Mn)	38c.
Bismuth.....	1.61	Molybdenum (Best).	\$1.45
Chromium (over 99%).	1.00	Molybdenum.....	45 @ 47 1/2 c.
Copper, red oxide.....	60c.	Tungsten (Best).....	95c.
Ferro-Molyb'dum (50%).	\$1.05		
Ferro-Titanium (10%).	90c.		

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

LATE NEWS.

(From Our Special Correspondent.)

Birmingham, Ala., June 28th.—The Tennessee Coal, Iron and Railroad Company started one of its idle furnaces at Bessemer last night, and two more to-day. The furnaces have been closed down because of a strike of the laborers for an advance in wages. The plants were started up with labor brought from other places. No trouble occurred.

The coal miners and operators met to-day in joint session and discussed the wage scales proposed by both sides. On each class of the scale proposed by the miners the miners' committee voted aye and the operators no. The miners then took up the proposition of the operators for a renewal of last year's wage scale and voted it down. This put both miners and operators in a position they occupied before the matter came up at all and left nothing before the joint conference. To-morrow joint scale committees from the miners and operators will meet and attempt to agree on a scale.

(From Our Special Correspondent.)

Pittsburg, Pa., June 28th.—At a meeting of representatives of the Carnegie Company, the Federal Steel Company, the National Steel Company and the American Steel and Wire Company held in New York on Tuesday, the condition of the market was discussed and it was decided to maintain the price of \$28 for Bessemer steel billets. This action does not seem to have had any effect, as billets can be had as low as \$24, but there is no demand even at the low figure.

A message was received at headquarters of the Amalgamated Association this morning from Secretary John Williams, who has been in Detroit since Monday attending the conference on the iron wage scale. He announced that an agreement was not reached and that propositions of manufacturers had to be submitted to all the sub-branches of the association for action before the matter can be closed up. This will require some time, and arrangements were made for another conference to be held in three weeks. As a result all the union rolling mills in the country will close for an indefinite period on Saturday night. All the Amalgamated Association wage scales expire on Saturday, June 30th, and all mills under its jurisdiction will be shut down on that date, as there are no prospects of an adjustment of the sheet and tin plate scales this week. Another conference on the sheet scale cannot be held for a week or two, and there is no probability of the tin plate scale being settled at the conference which began this morning in New York.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 790.)

New York. June 29.

Heavy Chemicals.—Continued quiet characterizes the market and prices are nominally unchanged, excepting domestic chlorate of potash. The Columbia Chemical Company, in which Pittsburg glass people are largely interested, is rushing work on its Barber-ton, O. alkali plant. This will doubtless be completed by January 1st next, and will have a daily capacity, it is said, of 250 to 300 tons soda ash and caustic soda. About 85% of next year's production is understood to have been contracted for.

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 1.02½@1.05
Caustic Soda, high test.... powd., 60% 70@74½, 98%.	\$1.90@2.00	2.25@2.30 3.00@3.25 3.25@3.50 3.50@4.00	\$2.50@2.55 3.75@4.00 67½@70
Sai Soda "conc." Bicarb Soda.... "extra	70@80. 1.45@1.75 1.25@1.37½ 3.25@3.50	..... ..... ..... .....	..... 1.75 2.25
Bleach Pdr., Eng. prime.... other brands Chl. Pot cryst powd.	..... ..... ..... .....	..... ..... 9.00@9.25 9.00@9.25	1.75@2.00 1.45@1.60 10.25@10.50 10.50@10.75

Acids.—The Paris green makers are buying acetic acid and blue vitriol in a good way, and the soda-water people have also increased their contract deliveries of sulphuric acid. On export account blue vitriol shows a lighter movement.

Quotations as below are for large lots delivered in New York and vicinity, per 100 lbs. unless otherwise specified.

Acetic, No 8 in lbs....	\$1.62½	Nitric, 38°	\$3.87½
Blue Vitriol.....	4.57½@5.00	Nitric, 38°	4.12½
Aqua Fortis, 36° ..	3.62½	Nitric, 40°	4.37
Aqua Fortis, 38° ..	3.87½	Nitric, 42°	4.75
Aqua Fortis, 40° ..	4.12½	Oxalic	5.75@6.00
Aqua Fortis, 42° ..	4.50	Sulphuric, 66°	1.20
Muriatic, 15°	1.20	Sulphuric, 60° ..	1.05
Muriatic, 20°	1.35	bulk 50° ton	14.00
Muriatic, 22°	1.50		

Brimstone.—New York imports this week were 850 tons. Sales of best unmixed seconds on spot have been made at \$21, and shipments at \$20.50 @ \$20.75 per ton, while best thirds brought \$18.50 @ \$18.75. The situation in Sicily is somewhat unsettled, as it is rumored that the Anglo-Sicilian Sulphur Company (the trust) is experiencing some difficulty in renewing the contracts with the miners. These contracts expire next year. The melting season is approaching, and as the product is expected to exceed in quantity that of former years, the present large stocks in Sicily will be added to materially. This also tends to affect prices. Concerning the statistical position in Sicily, Mr. Solon J. Vlasto advises us that the exports in May, to all countries, amounted to 59,154 long tons, against 42,608 long tons last year. For the first five months of 1900 the exports aggregated 285,084 tons. The exports to the United States from January 1st to June 1st, 1900, amounted to 65,335 tons, against 55,040 tons in 1899, showing an increase of 10,295 tons. Stocks in Sicily on May 31st amounted to 186,290 tons, against 178,923 tons in 1899, showing an increase of 7,367 tons. The imports into Great Britain in the five months ending May 31st amounted to 9,741 tons, against 8,647 tons last year.

Pyrites.—More inquiry from acid makers. Prices are nominally unchanged. Imports into Great Britain in the five months ending May 31st were 327,450 long tons, against 284,248 last year.

Fertilizing Chemicals.—Easy prices for the leading ammoniates have brought out many orders. Word is received that the Virginia-Carolina Chemical Company is disposing of some of the "hold-over" help of constituent concerns, thus reducing its expenses. It is claimed these people were only employed for a year.

Sulphate of ammonia, gas liquor, for shipment is quoted at \$2.80 per 100 lbs., while for spot 5c. more is asked. In May Great Britain shipped to this country only 51 long tons sulphate of ammonia, making a total for the five months of 1,697 tons, as against 3,348 tons in 1899, showing a decrease of 1,651 tons. Other quotations are: High grade tankage, \$1.65 and 10 per unit f. o. b. Chicago; and \$2 and 10, New York; high grade blood, \$1.75@1.80 per unit f. o. b. Chicago, and \$2.05@2.07½, New York; azotine, \$1.90@2 per unit; fish scrap, dried, \$23@23½ per ton, f. o. b. factory, and wet, \$1.85 and 35 per unit; ground bone, domestic steamed, \$20@21.50 per ton; Calcutta bonemeal, \$25@28 per ton; bone black, spent, \$15@16 per ton.

Nitrate of Soda.—Market is firmer owing to higher freights and increased cost of production, resulting from a scarcity of labor and dearer coal. Sales on spot have been made at \$1.67½

per 100 lbs., and for shipment at \$1.70. The Chinese troubles react unfavorably on the freight market, and it is expected that rates will go still higher.

Concerning the coast market Messrs. Jackson Brothers, of Valparaiso, Chile, advise us under date of May 19th, that business is almost at a standstill, and buyers generally look forward to lower prices. The April production is calculated at 2,519,000 qtls. (114,208 long tons), making a total for the first four months of this year of 10,039,000 qtls. (454,444 tons), as against 9,324,000 qtls. (422,077 tons), showing an increase of 715,000 qtls. (32,367 tons). The total deliveries in Europe and elsewhere up to April 30th have been only 15,904,000 qtls. (719,940 long tons), as against 16,204,000 qtls. (734,967 tons) last year, recording a decrease of 15,027 tons. Sales for the fortnight ending May 19th were 140,500 qtls. (6,360 tons). We quote 95% for May, 4s. 11d.; June, 4s. 11½d. per qtl.; July, 5s. 1d.; August, 5s. 2d.; September-November, 5s. 2½d., and 96%, for near deliveries, 5s. 1½d., all ordinary terms, sellers. The price of 4s. 11d. with 3s. 9d. all round freight stands in 7s. 1½d. (\$1.71) per cwt. net cost and freight without purchasing commission.

Phosphates.—In Florida many of the large miners have closed down or curtailed production, among the idle plants being that of the Bradley Phosphate Company, at Fitzgerald. Of the 81 hard-rock plants, about 30 have ceased operation, while in the land-pebble region only 5 are working. This condition has resulted from decreased shipments for both home and foreign consumption. Two charters are noted of 1,082 tons from Fernandina to London at 20s. 3d. (\$5.40), June sailings, and 1,804 tons from Savannah to Hamburg at 20s. (\$4.80). In Tennessee regions operators report a somewhat better demand, and for the five months ending May 31st, shipments show an increase of over 65,000 tons as compared with last year. Of this increase fully 18,000 tons is credited to export business. South Carolina phosphates are moving quietly, but there is a slight increase in the home shipments as compared with last week.

The shipments of phosphates in the five months ending May 31st are compiled by us, as follows, in tons, comparison being made with the corresponding period last year:

	1899.	1900.	Changes.
Florida.....	316,951	240,042	D. 76,919
Tennessee.....	160,321	225,381	I. 65,060
South Carolina.....	149,537	122,941	D. 26,596
Total, tons	626,819	588,364	D. 38,455

The shipments were distributed about as follows:

	1899.	1900.		
Domestic Foreign.	Domestic Foreign.			
Florida.....	47,718	269,213	35,440	204,632
Tennessee.....	119,079	41,242	166,073	59,308
South Carolina.....	105,000	44,537	108,694	14,247
Total, tons	271,797	355,022	310,207	278,157

It is noted that the domestic shipments show an increase of 38,410 tons, while the exports record a falling off of 76,865 tons, or double the gain made in our home consumption.

Concerning foreign phosphates we note an importation of 3,000 bags from Antwerp, Belgium. The shipments from Tunis, Algiers, in the first two weeks of April amounted to 11,400 tons. New Zealand, to encourage the exploitation of the phosphate deposits, offers from £250 to £500 in two prizes. The conditions are: The deposit should be easy of access and not too far removed from a railroad or a seaport; it must be sufficiently rich to be able to supply the wants of the colony for five years, at a price for the fertilizer that would allow its profitable use in agriculture, and an expert specially chosen for this purpose shall decide this point; finally, it must contain, in the crude state, at least 40% of phosphate. Should the phosphate content be below this amount the prize will be reduced in proportion. We quote as follows:

Phosphates.	Per Ton F. o. b.	C. i. f. Un'd Kingdom or No Sea Ports.	
		Unit.	Long ton.
* Fla. hard rock (77 @ 80%)	\$7.50@8.00	7½@8d	\$12.09@12.49
* Fla. land pebble (68 @ 73%)	4.35	6½d	9.45
* Fla. Peace River (58 @ 63%)	3.00@3.50	6½d	7.80
† Tenn. rock 78% export.	4.00@4.25	7d@7½d	10.92@11.31
† Tenn. 78% domestic.	3.50	.....	.....
† Tenn. 75% "	2.75@3.00	.....	.....
† Tenn. 72% "	2.50@2.65	.....	.....
† So. Car. rock, crude.	3.00	6½d	7.80
† So. Car. rock, ground.	5.00	.....	.....
Algerian, rock... (63 @ 70%)	.....	6½d	9.05
Algerian, rock... (58 @ 63%)	.....	6½d	7.80
Christmas Isle... (80 @ 85%)	.....	8½d	14.03

* Fernandina. † Mt. Pleasant. ‡ Fetteressa.

Nashville, Tenn. June 26.
(From Our Special Correspondent.)

There is no mining being done in the Tennessee phosphate fields compared with last year, and a survey of the conditions shows there are less than 700 miners at work, all told. The rainfall for June has been excessive, as the weather bureau reports 5.09 in. for the month so far, with 23 days of rain since May 28th. Last year

the rain for the entire month of June was only 0.05 in.

Stocks at Mt. Pleasant and other points are very much decreased, and with continued rain there is every indication of better prices and increased demand. Quotations are: Tennessee phosphate rock f. o. b. Mt. Pleasant, Tenn., 78% bone phosphate of lime 3%@4% iron and aluminum, \$4.25 per ton, 2,240 lbs.; 78% and 4%@5%, \$3.50; 75%, 5@5½%, \$3; 72%, 5½@6½%, \$2.65. Acid phosphate in bulk f. o. b. Nashville, Tenn.: 16%, phosphoric acid, \$9.50@10 per ton; 14%, phosphoric acid, \$9@9.50.

Liverpool. June 12.

(Special Report of Joseph P. Brunner & Co.) There is no feature of special interest to report respecting chemicals, soda ash and caustic soda being still in a strong position, while chlorine products remain dull and lifeless.

The following are the exports of alkali and bleach for the month ending May 31st last, as per Board of Trade returns just issued: Total exports to all quarters, including United States, 355,060 cwts. alkali, 112,604 cwts. bleaching powder; exports to United States alone, 63,909 cwts. alkali, 73,545 cwts. bleaching powder.

As compared with May, 1899, there is a slight decrease in the shipments of alkali, which is offset by almost a similar increase in bleach exports.

Soda ash is firmly held by makers at usual range, according to market. For tierces values may be called 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 prices for tierces. Soda crystals are in request and steady 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 is strong and buyers are paying full prices, there being little offering in second hands. We quote spot range as follows: 60%, £9 5s.; 70%, £10 5s.; 74%, £10 15s.@£10 17s. 6d.; 76%, £11 5s.@£11 10s. per ton, net cash.

Bleaching powder is moving off fairly well as regards deliveries against contracts, but there is little fresh business coming in, and the market is dull at nominally about £6 10s.@£6 15s. per ton, net cash for hardwood packages.

Chlorate of potash is neglected and quotations are nominal at about ¼d.@½d. per lb., net cash, but practically nothing doing to test the market.

Bicarb. soda is still quoted at £6 15s. per ton, less 2½% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages and also special quotations for certain export markets.

Sulphate of ammonia is slow of sale and still dropping, £11 7s. 6d.@£11 10s. per ton, less 2½% being about spot range for good grey; 24@25% in double bags f. o. b. here.

Nitrate of soda is quiet at £8 2s. 6d.@£8 10s. per ton, less 2½% for double bags f. o. b. here; as to quality.

MINING STOCKS.

Complete quotations will be found on pages 787 and 788 of mining stocks listed and dealt in at:

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

New York. June 29.

Trading is almost lifeless, while speculators have fluctuated prices to suit the few buyers that are in the market.

In the copper group Amalgamated sold at \$85 to \$85½ on declaration of the regular 1½% quarterly and ½% extra dividend, being \$2 per share. Anaconda recovered to \$40. British Columbia was unsteady, selling first at \$10, then dropping to \$9.50, and later recovering to \$10.25. Union of North Carolina is uninteresting, sales being made at \$2¼@2½, but at the close \$2½@2½ is bid. Tennessee made a few sales at \$12@10, the first in many weeks.

American Smelting and Refining is up to \$36¼, while the preferred at one time dropped 4½ points to \$85, but later recovered to \$86½.

Ontario of Utah sold at \$7 to \$7½, and Kingstons & Pembroke of Ontario, Canada, at 20c. Quicksilver preferred, of California, changed hands at \$8½.

In the Colorado section sales of Elkton were made at \$1.25, of Isabella at \$1.27 to \$1.25; Mollie Gibson, 25c.; Zenobia, 17c.; Little Chief, 16c.; Pharmacist, 12½c.; Alamo, 14½c.; Anaconda, 37c.; Creede & Cripple Creek, 13c.; Cripple Creek Consolidated, 14c., and Work, 31c.

Consolidated California & Virginia, of Nevada, brought \$1.60; Sierra Nevada, 30c.; Savage, 30c.; Yellow Jacket, 13c., and Justice, 9c.

Boston. June 27.

(From Our Special Correspondent.)

The market has continued dull with little to excite it. The only excitement is in watching the attempts made to force down certain stocks, which are from time to time picked out for a raid. It is not a healthy nor a fair market, but it is the best we have.

This week the victim selected was Cochiti,

which was not a difficult stock to depress. It sold down to \$7½ without any rally. The other gold stocks were neglected.

Business in the coppers was small. Calumet & Hecla was quoted at \$716; Boston & Montana, \$284; Wolverine, \$35½@36; Baltic, \$18. There was nothing done in Amalgamated; Butte & Boston sold at \$61. The trading was inside altogether, the public paying little or no attention.

Dominion Coal was quoted at \$37; New England Gas and Coke, \$15. The Legislature has apparently determined to do nothing further to aid the gang which is trying to use the State House to depress these stocks. It is to be hoped that this decision will be adhered to. Boston would be better off if less attention was paid to depressing good industrial enterprises and inflating worthless coppers; or if the process were reversed.

There was a little inquiry to-day for Franklin, which was quoted about \$12½. It is hardly possible that anyone is trying to secure control of this property, which has received little consideration for some time past. Nobody seems to know anything new about the company; but we shall probably hear something in time.

Colorado Springs. June 23.

(From Our Special Correspondent.)

The week has showed considerable activity with prices (outside a class of favorites) registering, in the main, a slight loss. This special class which comprised half a dozen Gold Hill propositions was the object of one of an aggressive bull movement. The prices of the several securities were forced to a higher register and on the whole have maintained their gain. Trading has been quite professional and little Eastern money has been received by the large brokerage houses of the city.

Independence Town and Mining and National divided honors this week in point of heavy trading. Elkton remains firm with a lessened demand. Isabella witnessed a series of fluctuations which have become characteristic of these shares for a period covering the past 18 months. All are awaiting the announcement as to when this mine will resume shipments.

Gold Coin is quoted at \$5.50 bid and \$7.50 asked. Such a margin between the traders in this stock is fictitious, the latter price not standing for the market value. Vindicator remains fairly strong at \$1.45 bid and \$1.49½ asked. The outcome of the monthly meeting of the directors on July 5th, when it is believed the quarterly dividend will be temporarily reduced, is being awaited with interest. The cut is inaugurated as the result of installing an expense-saving plant on the company's main workings.

The trading in National was the feature of the week. Last week over 1,000,000 shares were traded in. This week the sales reached a total of 634,500 shares. The price oscillated between 13% and 15%, closing to-day weaker at 14%@14½. Outside of this special class of stocks which were handled quite professionally, the market has presented little worthy of noting. The sales on the old Exchange this week were 3,446,300 shares, representing a total cash value of \$449,991.

Portland, Ore. June 23.

(From Our Special Correspondent.)

The Oregon Mining Exchange of Portland, opened its doors to the public this week. The new exchange has fine quarters in the auditorium of the Chamber of Commerce. Lieutenant-Governor J. H. Hutch of Idaho officiated at the opening. R. F. Peabody has been engaged as the regular caller. The other officers of the new exchange are as follows: J. E. Haseltine, president; P. J. Jennings, first vice-president; I. G. Davidson, second vice-president; F. J. Hard, secretary; David Goodsell, treasurer; directors, L. G. Clarke, J. E. Haseltine, David Goodsell, P. J. Jennings, I. G. Davidson, F. V. Drake, E. A. Clem. The membership committee, which passes upon the eligibility of members and brokers, is composed as follows: L. G. Clarke, H. M. Cake, Sigmund Frank, H. L. Atkinson, G. B. Hengen and J. W. Helsner. A number of Idaho and Washington mining stocks are already on the list.

Salt Lake City. June 22.

(From Our Special Correspondent.)

Sultry weather, the first of the summer, has had a softening influence on a soft market. Uncertainty of the lead market not only depresses the best lead-silvers, but influences the favorites.

Ajax did some business at slightly lower figures. Bullion-Beck maintains the recent advance. Daisy is played with under \$5 per 1,000 shares, with offerings in excess of demand. Daly-West reflects the low lead market more than any other stock. Geyser-Marion bobs up and down a little above the pending assessment. Joe Bower's Extension has levied another 1-cent assessment. Mammoth will pay a \$20,000 dividend on July 2d. Mercer again disappoints its friends. The consolidation will be perfected next week and there is great interest to learn what pro-

gramme will be announced by the new officers. Star Consolidated is fairly firm, but slight regard is paid to the option out on the control at 75. Swansea's annual report made a splendid showing, so far as production is concerned. After paying \$70,000 in dividends there remains \$78,000 in the treasury. Valeo shares are softer in spite of the attempt of the inside to hold them up.

San Francisco. June 23.

(From Our Special Correspondent.)

We have had the usual sort of a market with small transactions and taking of profits on small changes in quotations. There has been nothing special except a statement from Consolidated California & Virginia of results obtained from low grade ore; and that was carefully mixed up so that nobody could find out the actual results.

Some quotations noted are: Consolidated California & Virginia, \$1.50@1.55; Ophir, 71@72c.; Confidence, 65c.; Silver Hill, 36@37c.; Sierra Nevada, 28@29c.; Hale & Norcross, 27c.; Mexican, 21c. There were offers for Standard Consolidated, which was held at \$3.90, with no sales.

Business on the Oil Exchange has been dull, though prices were steady. Some quotations noted are: Oil City, \$16.50; Home, \$4.25; San Joaquin, \$3@3.10.

London. June 9.

(From Our Special Correspondent.)

The South African mining market has shown signs of professional operations this week. Some realizations were effected at a profit on the strength of the occupation of Pretoria and afterward the quotations relapsed slightly. The public are still holding aloof, so that very little real business is being done. In some quarters it was expected that after the capture of Johannesburg there would be a great increase of business in all classes of South African shares, but the expectation has not been realized. The fact is that Lord Roberts' reason for advancing so rapidly on Johannesburg and Pretoria was to deprive the Boers at the earliest opportunity of their financial resources and incidentally also to capture the arsenals and factories. It is evident that there will be a further long delay before the mines are again in working order, and even before their condition is correctly ascertained. It is not surprising, therefore, that the public still keep out of the mining market.

Another reason for people keeping out of speculation is the condition of things in China. The rebellion against foreigners is considered to be a genuine one and the future in that part of the world is viewed with distrust. In many quarters there has been a disposition shown lately to look into Chinese industrial and mining possibilities, so that the present crises has caused much disappointment.

The public have had the opportunity this week of subscribing to another Whitaker Wright company. This is the Le Roi No. 2, Limited, which has been formed to acquire the Josie, Poorman, Annie, Rockingham and Number One claims, which adjoin the Le Roi, War Eagle and Center Star claims at Rossland. The two Whitaker Wright companies, the London & Globe Finance Corporation and the British America Corporation are, of course, the real vendors, though as a matter of form a different name appears as the actual vendor. The purchase price is £550,000, payable in cash or shares at the option of the vendors, but the larger the amount of cash received from the public the larger will be the proportion of cash taken as purchase consideration. The total capital is £600,000, so that £50,000 should be available as working capital. Mr. Carlyle and Mr. Macdonald, the late and present managers, estimate the production at 300 tons a day of average value of \$16, consisting of gold, silver and copper, while the total expenses are estimated at not more than \$8 per ton. No estimate is given of the ore ready for stoping, but figures are given of the amount of feet driven and sunk. Hitherto when companies have been floated by the Whitaker Wright group the shares have been usually offered exclusively or preferentially to shareholders in other companies belonging to the same group. But in this case there is no such reservation. I do not think there will be a large application, for no one nowadays cares much about mining speculation. Besides, the group have not been very fortunate recently. The companies belonging to the group, besides the two issuing houses already mentioned, are the Standard Exploration Company, the Caledonia Copper Company, the Nickel Corporation, Lake View Consols, Ivanhoe and the Le Roi. The London & Globe pays dividends and the British America Corporation a small one, but in both cases the profits arise out of the sale of the shares of the subsidiary companies. The Le Roi, though it has been in the present hands for 18 months, has not paid a dividend yet. We hear nothing of the Standard, and it is too early yet to expect anything of the other two. It is, therefore, not a very propitious time for floating another. I should have expected this flotation to have been made shortly after the payment of a Le Roi dividend. Such a time would surely have been more politic.

Paris. June 17.

(From Our Special Correspondent.)

The stock market is uneasy, chiefly because of the break in Berlin, and speculators are limiting their operations. The chief reaction is in the metallurgical shares, which are generally weak. Copper stocks have been rather quiet, though Rio Tintos are stronger. The South African gold stocks are generally passive, with few sales. The news from the Transvaal is still somewhat indefinite, and people are not disposed to commit themselves.

The foreign merchandise trade of France for the five months ending May 31st is reported by the Ministry of Commerce as below:

	1899.	1900.
	Francs.	Francs.
Imports.....	1,933,199,000	1,964,926,000
Exports.....	1,601,157,000	1,703,380,000
Excess imports.....	352,042,000	261,546,000

This shows an increase of \$13,727,000 fr., or 0.7% in imports; an increase of 102,223,000 fr., or 6.4% in exports, and a decrease of 88,496,000 fr., or 25.4% in the balance of imports over exports. The statement is, on the whole, an encouraging one.

Azote.

ANNUAL MEETINGS.

Name of Co.	Locat'n.	Date.	Place of Meeting.
Banker.....	Colo....	July 2.	Leadville, Colo.
Best & Belcher.....	Nev....	July 12.	San Francisco, Cal.
Centennial.....	Mich....	July 13.	60 State st., Boston.
*Columbia Cop.....	Utah....	July 6.	Salt Lake City, Utah
Copper Hill.....	N. Mex....	July 5.	20 Broad St., N. Y.
Elkton Con.....	Colo....	July 9.	Colorado Springs.
Golden Fleece.....	Colo....	July 20.	Council Bluffs, Iowa.
Homestake.....	S. Dak....	July 18.	San Francisco Cal.
Internal Phos.....	Tenn....	July 6.	149 Broadway N. Y.
Union Con.....	Nev....	July 12.	San Francisco, Cal.

*Special meeting.

DIVIDENDS.

NAME OF COMPANY.	Latest Dividend.		Total to date.
	Date	Per share.	
\$Ala. Steel & S'p B., pf	July 2	3.00	
Amalgamated.....	July 30	2.00	1,500,000
Am. Cement.....	July 16	3.00	
" " extra.....	July 16	1.00	
Am. Coal, pf., Md.....	July 16	1.00	
Am. Sm. & Ref. pf.....	July 10	1.75	568,725
Am Steel & Wire, com	July 2	1.75	875,000
Am. Steel & Wire, pf	July 2	1.75	700,000
Dominion Coal pf.....	July 2	4.00	
Empire Steel & I., pf	July 21	3.00	
Federal Steel, pf.....	July 20	1.50	932,067
General Chemical, pf	July 3	1.50	
Last Dollar, Colo.....	July 5	.02	30,000
Mammoth, Utah.....	July 2	.05	20,000
Napa, q., Cal.....	July 2	.10	1,700,000
National Salt, com.....	Aug. 1	1.50	10,000
Nat'l Tube, com.....	Aug. 15	1.50	
Nat'l Tube, pf.....	July 2	1.75	
New Idria, q., Cal.....	July 2	.20	20,000
Parrot, Mont.....	July 31	1.50	344,775
Penna. Steel, pf.....	July 16	1.75	26,250
Quicksilver, pf., Cal	July 16	.50	21,500
Republic Iron & S., pf	July 2	1.75	371,997
Sloss Shef'ld., & I., pf	July 3	1.75	1,866,911
Susq. Iron & Steel.....	July 16	3.00	1,587,989
Tomboy, Colo.....	June 28	.24	72,000

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

NAME OF COMPANY.	Loca tion.	No	Delinq.	Sale.	Am't.
Alta.....	Nev....	5	July 10		.05
Ararstraville.....	Cal....	5	June 11	July 11	.10
Ben Butler.....	Utah 4	4	June 14	July 2	1.00
Bullion.....	Nev....	56	June 20	July 10	.03
Cadmus.....	Cal....	3	July 25		.10
California Borax.....	Cal....	3	July 5	July 30	2.10
Crown Point.....	Nev....	70	July 18	Aug 8	.05
Eureka Con. Drift.....	Cal....	25	June 30	July 21	.01
Kutoma.....	Utah 1	1	July 8	July 17	1.00
Father de Smet.....	S D k	3	July 9	Aug. 6	.25
Garibaldi.....	Cal....	2	July 9	July 31	.04
Geyser-Marion.....	Utah	1	June 27	July 30	.43
Goleta Con.....	Cal....	1	June 30	July 0	.06
Gould & Curry.....	Nev....	90	July 0	July 31	.15
Hercules.....	Utah	1	June 18		.01
Joe Bowers, Ext.....	Utah 8	8	July 20	Aug 7	.01
Mammoth G. & I. field	Cal....	1	Aug 4	Oct. 2	1.17
Marmaduke.....	S. D k	1	June 1	July 1	1.00
May Day.....	Cal....	4	June 6	July 25	.10
Meicher.....	Utah	2	June 29	July 16	.01
Meier.....	Utah	1	July 10	Aug. 14	.00
National Con.....	Cal....	12	July 9	Aug. 1	.15
Pacific.....	Utah 3	3	July 10	July 31	.00
Ruby Hill.....	Utah 1	1	July 10	Aug. 10	.00
Sailor Con.....	Cal....	4	June 22	July 6	.01
Seg. Belcher & Mides.	Nev....	25	June 20	July 10	.03
Silver State.....	Utah	1	July 2	July 20	.00
Spanish Con.....	Cal....	1	July 16		.00
Star.....	Utah	1	June 26	July 16	.01
Tesora.....	Utah	1	July 12	July 28	.02
Tetro.....	Utah 13	13	June 30	July 21	.01
Texas.....	Cal....	1	July 11		.10

STOCK QUOTATIONS.

NEW YORK

Table of stock quotations for New York, listing companies like Alamo, Anaconda, and others with columns for location, par value, and daily price movements.

BOSTON, MASS.

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 daily price movements.

COAL AND INDUSTRIAL STOCKS

Table of coal and industrial stock quotations, listing companies like Am. Sm. & Ref., Am. S. & W. Con, and others.

Official quotations Boston Stock Exchange. Total sales, \$1,747.

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

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah, listing companies like Ajax, Alice, and others.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Am. Alkali, Bethlehem Iron, and others.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Golden Star, and others.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, Cal., listing companies like Belcher, Best & Belcher, and others.

SPOKANE, WASH.

Table of stock quotations for Spokane, Wash., listing companies like Butte & Boston, Conjecture, and others.

CALIFORNIA OIL STOCKS.

Table of California oil stock quotations, listing companies like Anaconda, Blue Goose, and others.

*California and Producers Oil Exchanges. Total sales, 2,490 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing various companies like Acacia, Am. Con., Anaconda, etc., with columns for share price and sales.

Colorado Springs Mining Stock Exchange. Total sales, 1,851,100 shares.

MONTREAL CANADA.

Table of stock quotations for Montreal, Canada, listing companies like Big Three, California, Can. Gold Fields, etc., with columns for share price and sales.

* Montreal Stock Exchange. Total sales, 157,300 shares.

MEXICO.

Table of stock quotations for Mexico, listing companies like Durango, Barrador y Cab., Candelaria de Pan., etc., with columns for share price and sales.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing various companies like Alamo, Anaconda, Arg. J., etc., with columns for share price and sales.

Official Quotations Denver Stock Exchange. Total sales, 109,430 shares.

PARIS.

June 14.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Boleo, Briansk, etc., with columns for country, product, capital stock, and prices.

LONDON.

June 15.

Table of stock quotations for London, listing companies like Alaska Goldfields, Anaconda, Broken Hill Prop., etc., with columns for country, capital, and quotations.

* Ex-dividend.

DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest Date, Amt.), Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest Date, Amt.).

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. Q., Quicksilver. I., Iron. This table is corrected up to June 21. Correspondents are requested to forward changes or additions.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT PRICES.

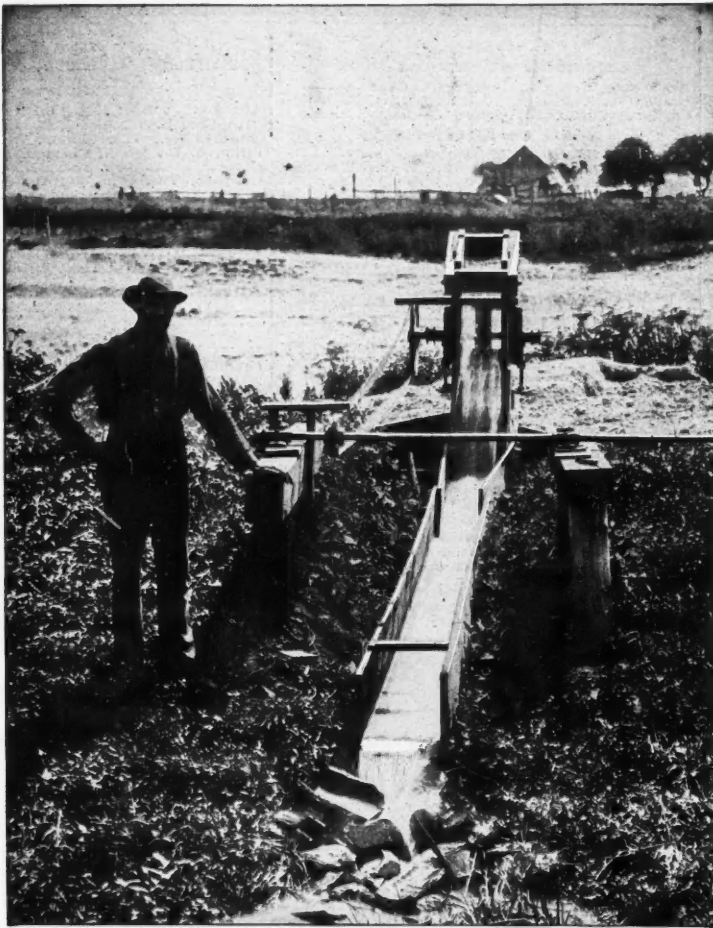
Table with multiple columns listing various chemicals and minerals such as Abrasives, Acids, Alcohols, Alums, Ammonia, Antimony, Arsenic, Asphalts, Barium, Barytes, Borax, Bromine, Cadmium, Calcium, Cement, Chromes, Clays, Cobalt, Coal Tar, Copper, Cream of Tartar, Cryolite, Explosives, Feldspar, Fluorspar, Fuller's Earth, Graphite, Gypsum, Kaolin, Lead, Lime, Magnesite, Magnesium, Marble, Mercury, Mica, Naphtha, Nickel, Oils, Oxides, Potash, Potassium, Quartz, Rosin, Salts, Silica, Sodium, Sulphur, Talc, Zinc, and Zirconium. Each entry includes a description, unit of measure, and price.

THE RARE ELEMENTS.

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

Table listing rare elements including Barium, Beryllium, Boron, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Germanium, Glucium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Niobium, Osmium, Palladium, Potassium, Radium, Rubidium, Ruthenium, Rutilium, Selenium, Strontium, Tellurium, Thallium, Thorium, Uranium, Vanadium, Wolfram, Yttrium, and Zirconium. Each entry includes a description, unit of measure, and price.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to June 9. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.



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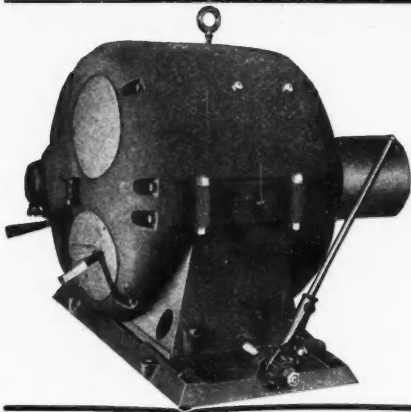
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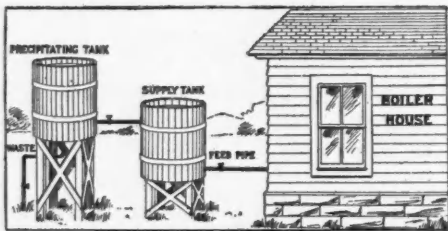
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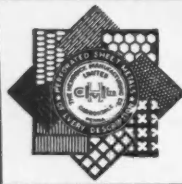
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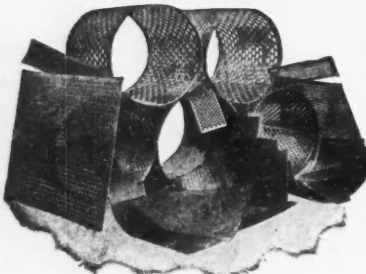
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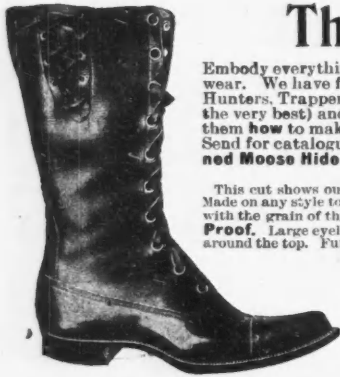
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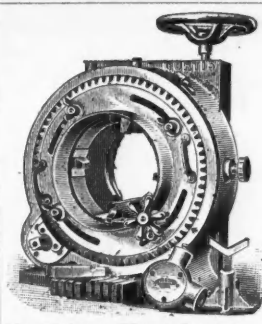
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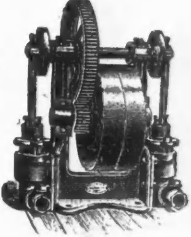
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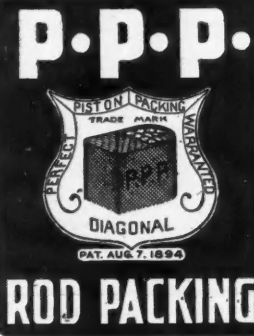
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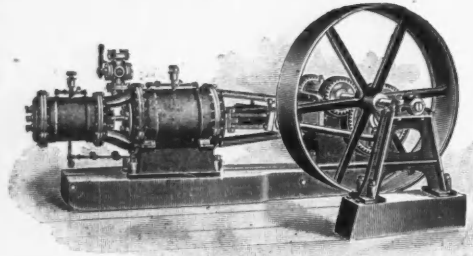
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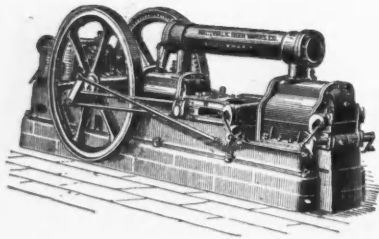
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See Page 23.

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CHEMIST (31), COLLEGE AND UNIVERSITY graduate, broad and excellent training, capable of taking charge of analytical or technical work, desires position in mine, smelting works or commercial laboratory. Address ASH, ENGINEERING AND MINING JOURNAL, No. 18,729, July 21.

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METALLURGIST DESIRES POSITION as under manager or assayer; has had considerable experience in assaying and surveying. An Associate of the Royal School of Mines, London, and has also studied in Germany. Address "C. D. H.," ENGINEERING AND MINING JOURNAL, No. 18,736, June 30.

MINING ENGINEER, TECHNICAL graduate, desire position as superintendent or assistant. Six years' experience in treatment of gold and silver ores. Experienced in construction and operation of large cyanide plants. Thoroughly practical. Age 27. Speaks Spanish. Can refer to present employers. Address "TRIFUNFO," ENGINEERING AND MINING JOURNAL, No. 18,735, July 7.

PROPOSALS.

Space under this head is sold at the uniform rate of \$1.15 an inch, each insertion; minimum charge, \$1.15 a week.

TUNNEL AND SHAFTS.-Sealed proposals will be received at the office of the Board of Trustees, "Commissioners of Waterworks," of the City of Cincinnati, Ohio, until 12 o'clock noon of Tuesday, July 3, 1900, for the construction of a tunnel and shafts for supplying water to the Western Pumping Station in the City of Cincinnati, in Hamilton County, Ohio, in accordance with plans and profiles, specifications and detail drawings on file in the office of the Chief Engineer of the Board of Trustees, "Commissioners of Waterworks." The same to be paid for as stipulated in the form of contract for the performance of the above work, and which form of contract is on file in the office of the Board of Trustees, "Commissioners of Waterworks." Plans, profiles, and detail drawings of the work, and copies of the specifications, estimated quantities of the work to be done, form of proposal, forms of bonds, and form of contract can be secured at the office of the Chief Engineer of the Board of Trustees, "Commissioners of Water-

works." Bidders must enclose their bids in sealed envelopes, and deposit the same with the Clerk of the Board of Trustees, "Commissioners of Waterworks," before Tuesday, the 3rd day of July, 1900, at 12 o'clock M., and such sealed envelopes must have endorsed thereon the nature of the bid and the name and address of the bidder. Bids will be opened on Tuesday, the 3rd day of July, 1900, at 12 o'clock M., at the office of the Board of Trustees, "Commissioners of Waterworks." Each bid shall be accompanied with a bond in the sum of \$10,000, properly stamped, and signed by two sureties, for the acceptance of the contract, if awarded by the Board of Trustees, "Commissioners of Waterworks"; or the bidder may deposit with the Board of Trustees, "Commissioners of Waterworks," in lieu of such bond, a certified check or bank certificate of deposit, payable to the order of the Board of Trustees, "Commissioners of Waterworks," or cash equal in amount to the bond as above required. Bidders must furnish satisfactory evidence of their ability to do the class of work required. Bidders must use the printed forms, as none other will be received. The Board of Trustees, "Commissioners of Waterworks," reserve the right to reject any or all bids.

PUMPING MACHINERY.-Sealed proposals for building and erecting one or two pumping engines at the Water-Works Pumping Station in the City of Detroit, addressed to the Board of Water Commissioners of the City of Detroit, and endorsed "Proposals for Pumping Engines," will be received at the office of the Board, 232 Jefferson Avenue, Detroit, until 12 o'clock noon, of Wednesday, the 11th day of July, 1900. Each engine shall be of twenty-five (25,000,000) million U. S. gallons capacity in twenty-four hours, and in accordance with the specifications and requirements on file in the office of the Board, copies of which can be procured on application. Each bid shall be accompanied with a certified or cashier's check in the sum of two thousand dollars, as surety for the acceptance of the contract. The Board reserves the right to reject any and all bids. By order of the Board of Water Commissioners of the City of Detroit.

DIVIDENDS.

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AMALGAMATED COPPER COMPANY, 52 Broadway, New York, June 21, 1900. At a meeting of the Directors of the Amalgamated Copper Company a quarterly dividend of ONE AND ONE-HALF PER CENT, and an extra dividend of ONE-HALF PER CENT, were declared payable July 30, 1900, to stockholders of record at 3 o'clock, P. M., July 2, 1900. Transfer books close at 3 P. M., July 2, 1900, and reopen July 31st, 1900. WM. G. ROCKEFELLER, Sec. and Treas.

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New York, June 19th, 1900.

Notice is hereby given that an Assessment of Three (3) Dollars has been called on each share of the Capital Stock of the Adventure Consolidated Copper Company, payable at the Company's office, 45 Broadway, New York City, as follows:

One (\$1) Dollar per Share August 20th next; One (\$1) Dollar per Share December 20th next; One (\$1) Dollar per Share April 20th, 1901.

Transfer books are ordered closed twenty days before each instalment is made payable, and no stock can be thereafter transferred until the instalment due thereon is paid.

The Transfer books for the instalment, payable August 20th next, will be closed July 31st, in the afternoon, and opened August 21st, in the morning.

Upon payment of each instalment a receipt will be issued to attach to stock certificate, or upon return of certificate, instalment when paid, will be stamped thereon.

On all instalments remaining unpaid for thirty days after the time due, and payable, interest at rate of six per cent. per annum will be charged, and all stock on which the instalment remains unpaid for ninety days, after due and payable, is declared forfeited, and will be sold in accordance with the Laws of the State of Michigan.

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SITUATION AS SUPERINTENDENT, master mechanic or mill man, by one thoroughly competent and of long experience in such positions—sober and energetic. Up to date in methods of handling work and labor. Mining and milling plants broken in health, skillfully treated and restored to usefulness. Address SEGURO, ENGINEERING AND MINING JOURNAL, No. 18,711, June 30.

WANTED.—POSITION AS MANAGER, Mill Man or Engineer. Twenty years experience in mining and milling gold. Would like Alaska. Address M. D., care of Miles Byrne, No. 71 Richmond Terrace, West New Brighton, Staten Island, N. Y. No. 18,717, June 30.

CHEMIST, GRADUATE, THOROUGH analyst, organic and inorganic. Experienced in engineering, chemistry and research for improving manufacturing processes. 10 years' experience. All references. Address C. M. P., ENGINEERING AND MINING JOURNAL, No. 18,718, June 30.

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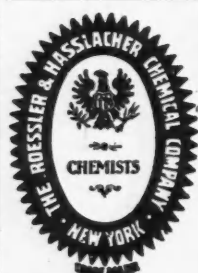
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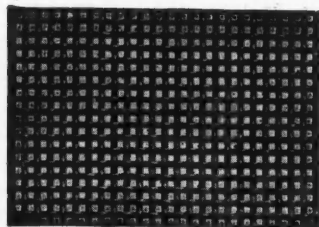
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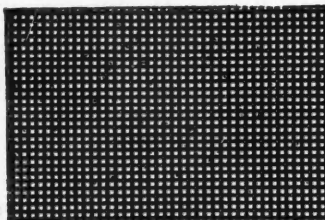
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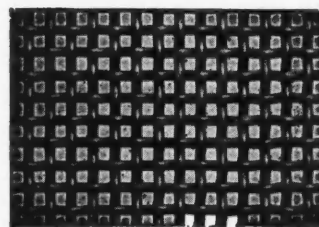
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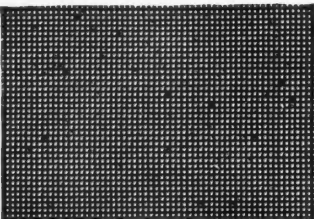
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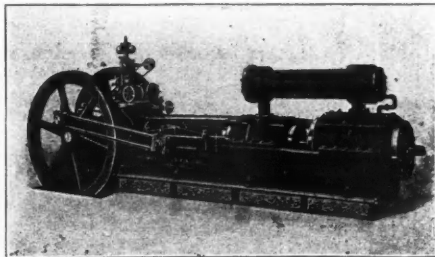
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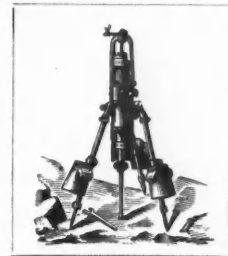
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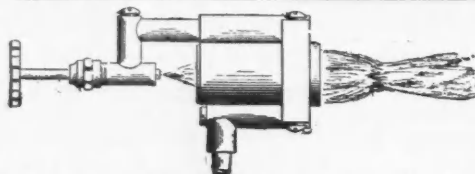
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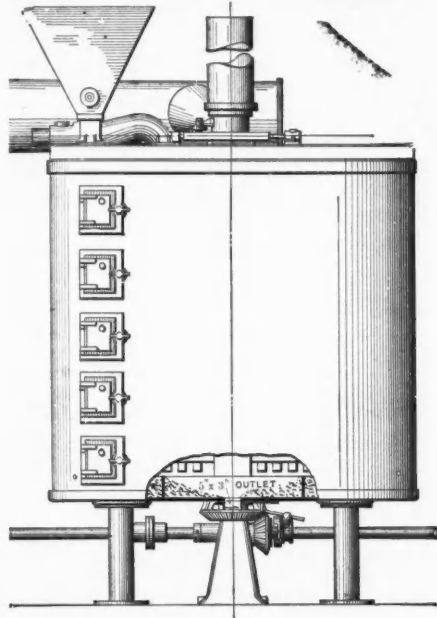
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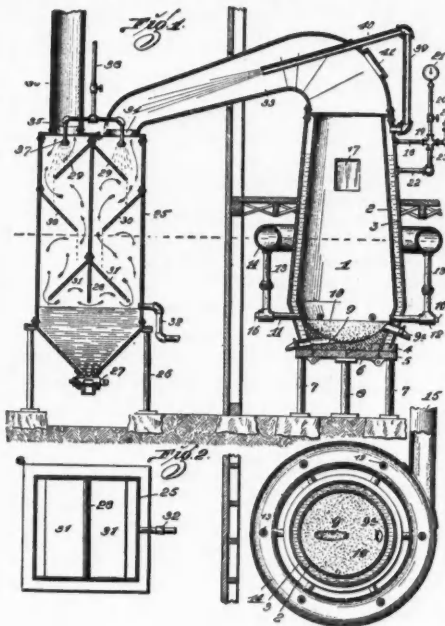
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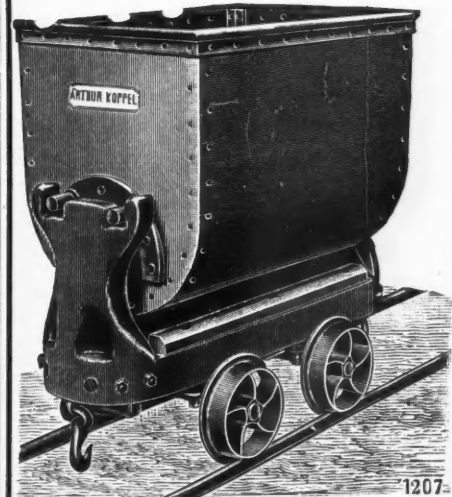
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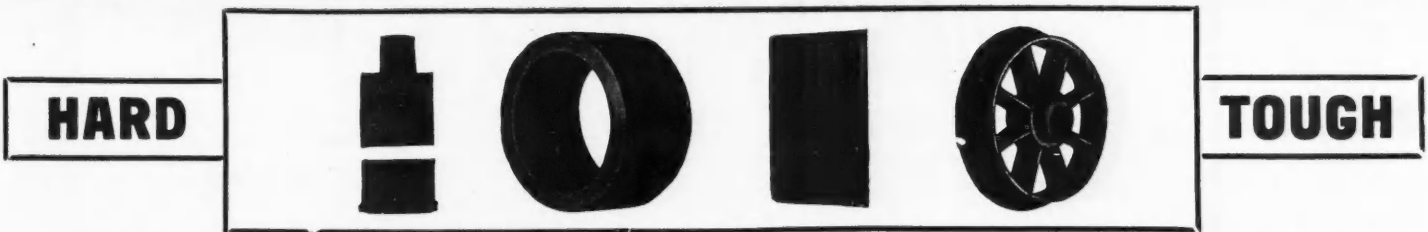
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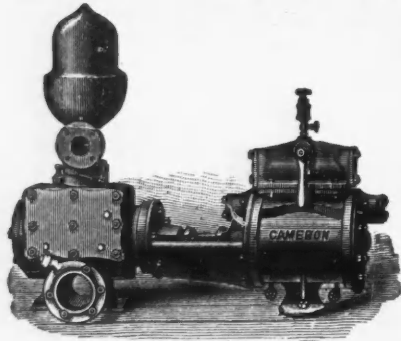
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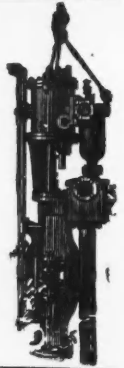


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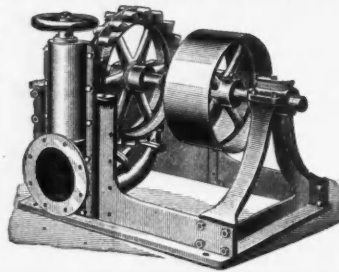


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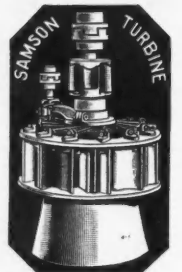


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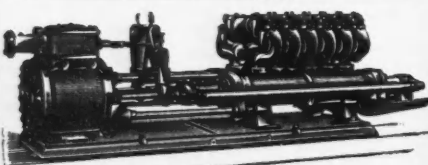
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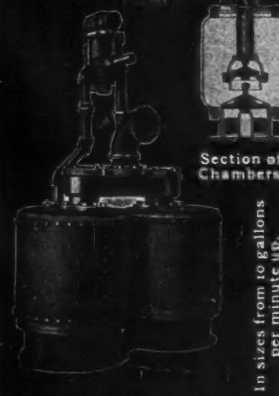
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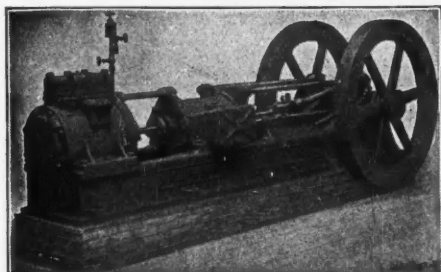
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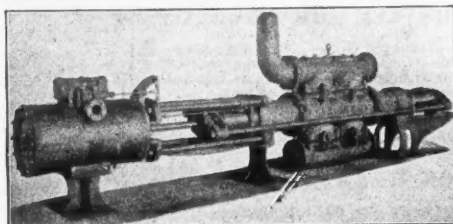
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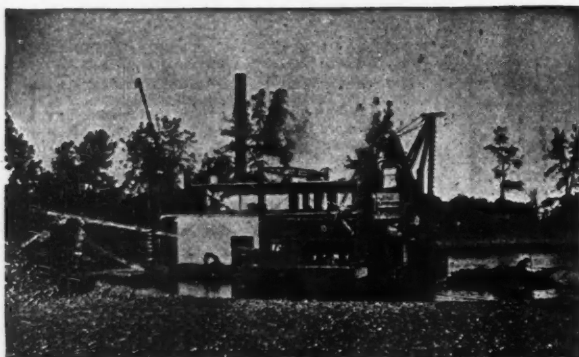
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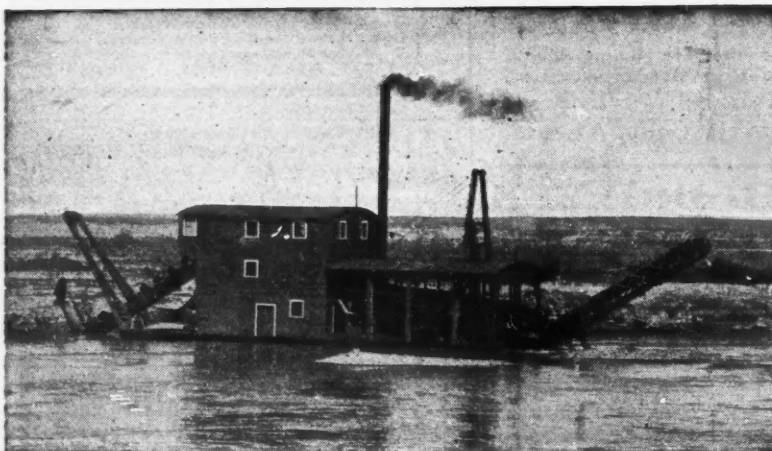
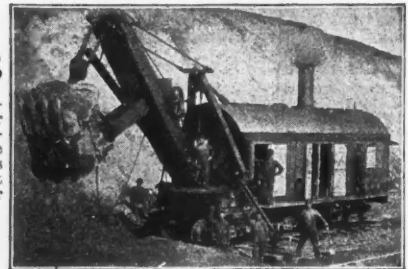
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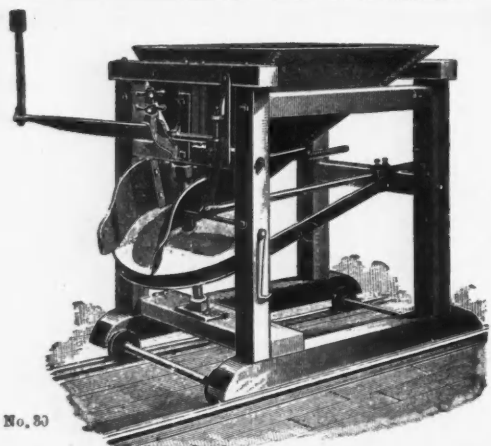
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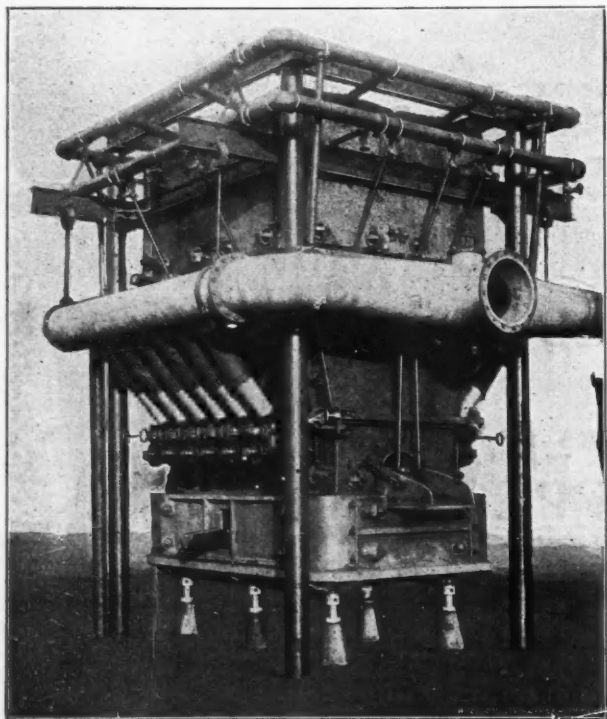
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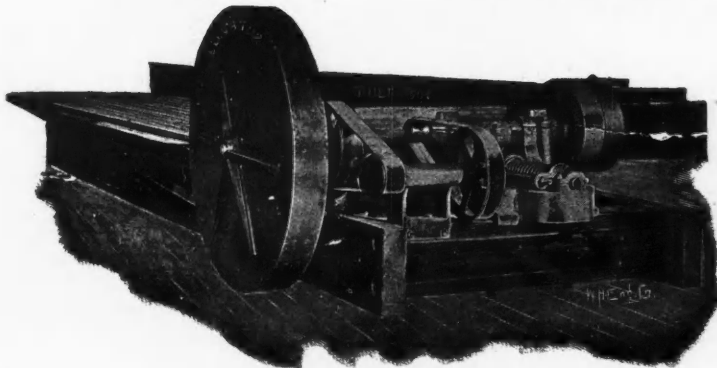
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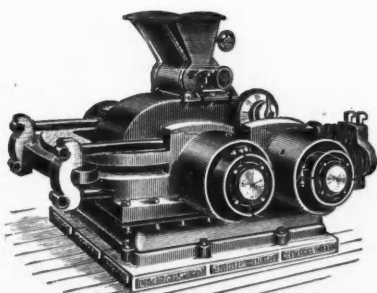
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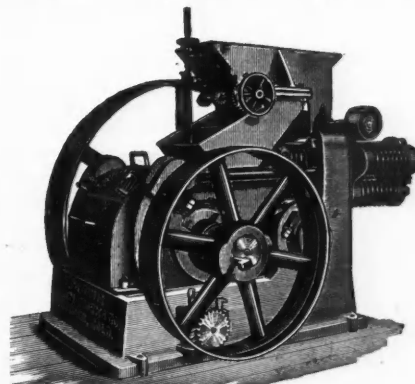
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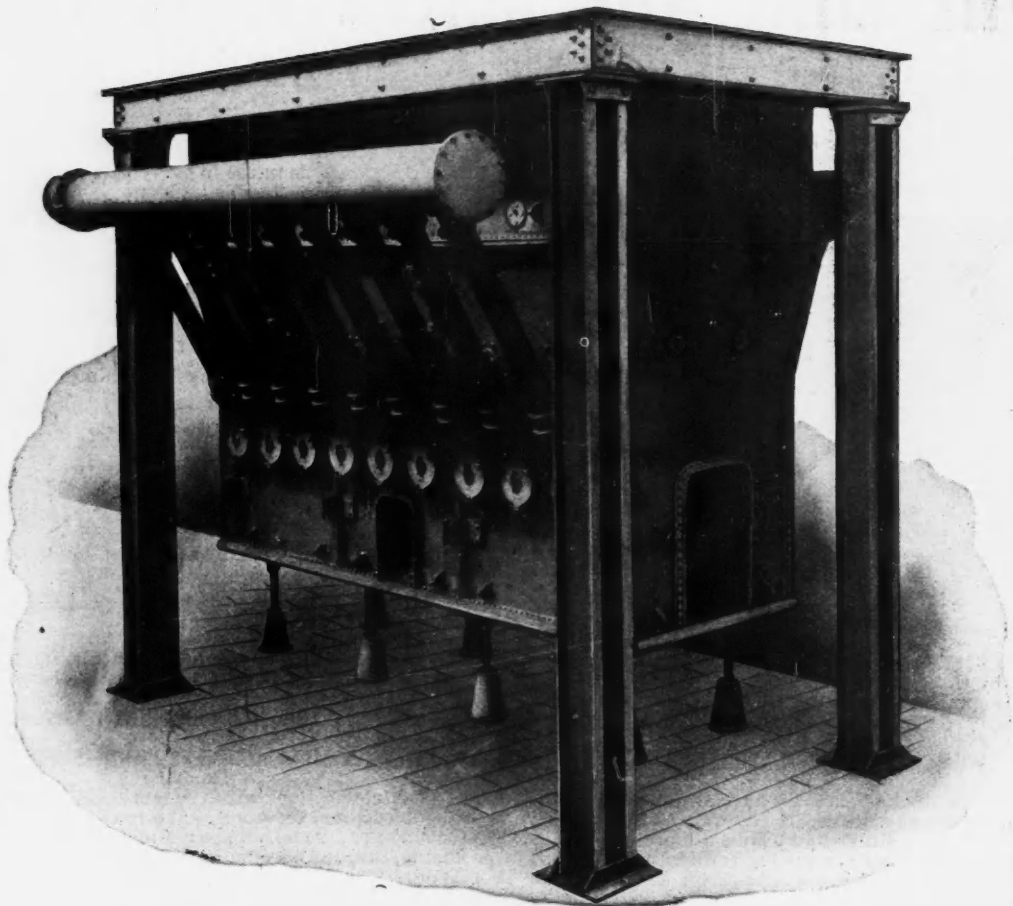
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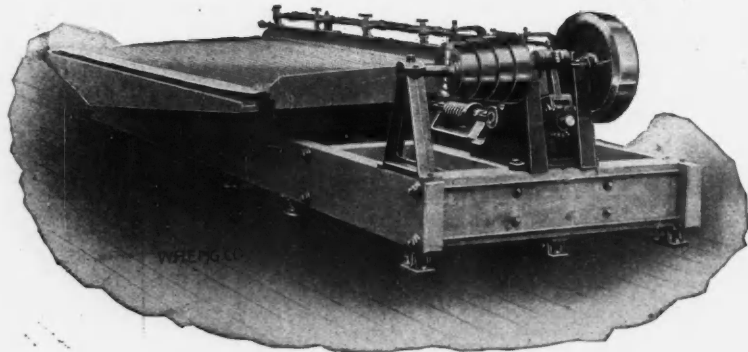
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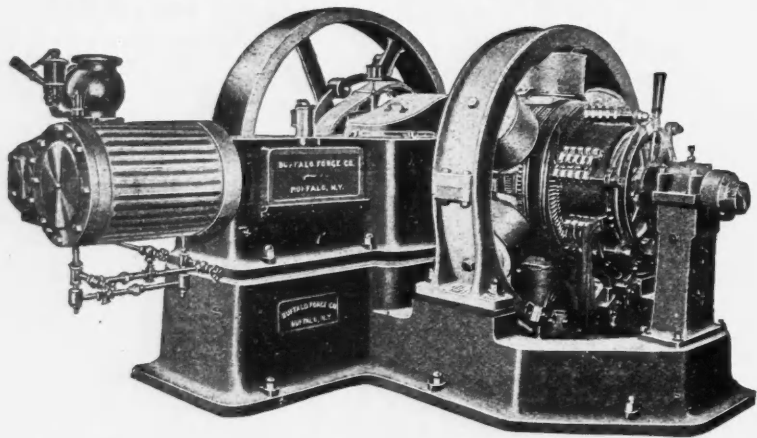
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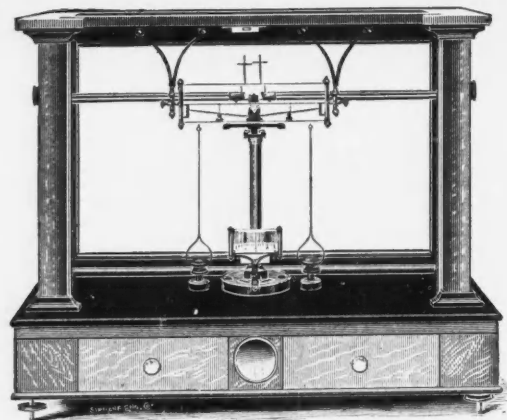
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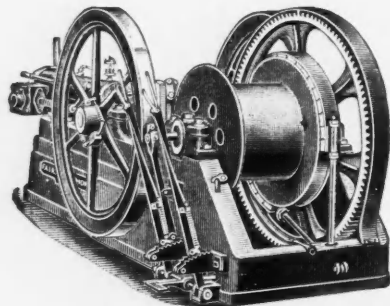
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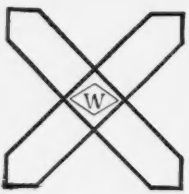
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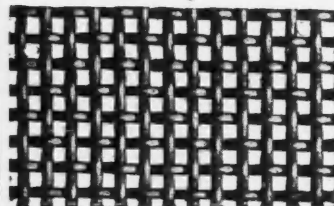
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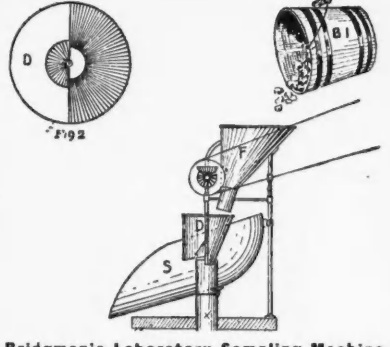
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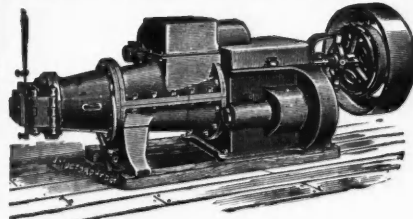
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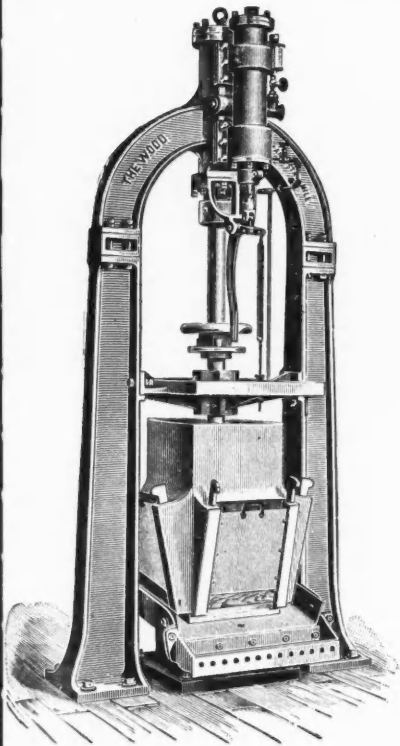
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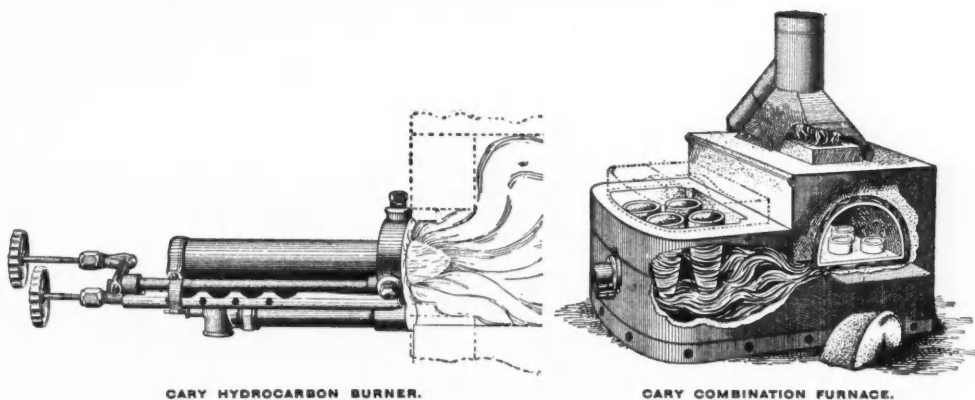
Portland has 4 National and 10 private banks. The deposits of the latter are about equal to the former, which amount to about \$12,000,000, and a capital of \$1,100,000.

The imports for 1899 amount to - - - - -	\$1,646,819
Exports 1900, estimated - - - - -	12,000,000
Our Jobbing trade amounted to, in 1899 - - - - -	100,000,000

The water supply is from the summit of Mt. Hood, at an elevation of 3,500 feet above the sea level. It flows through 30 miles of pipe directly into the distributing mains of the city at the rate of 24,000,000 gallons per day, and is the purest water to be found in the country.

Portland's Commercial strength, 1,079 firms - - - - -	\$21,233,500
Seattle, Spokane and Tacoma, 1,706 firms - - - - -	14,378,250

These figures tell where the capital of the Northwest is centered. Gold output of Oregon for 1899 amounted to \$5,100,000



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CONTENTS.

CHAPTER

- I. Introductory—Mistakes in Mining.
- II. What Constitutes a Mine.
- III. Rock-forming Minerals and Rocks.
- IV. Physical Character of Mineral Deposits.
- V. Origin of Veins.
- VI. Filling of Mineral Veins.
- VII. Influence of Rocks on Vein Filling.
- VIII. Mineral Deposits Other than Veins.
- IX. Prospecting.
- X. Making Locations.

CHAPTER

- XI. Patents to Mining Ground.
- XII. Early Development of Mines.
- XIII. Ores.
- XIV. Useful Earthy Minerals, etc.
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is kept of every transaction made upon the exchange, and is always open to the inspection of brokers' clients.

	1898. CASH VALUE OF SHARES SOLD.	1899. CASH VALUE OF SHARES SOLD.
January.....	\$492,451.48	\$3,886,512.68
February.. ...	381,736.82	3,620,226.78
March.....	496,249.67	2,147,437.81
April.....	513,401.56	2,082,928.17
May.....	496,200.98	2,234,034.45
June.....	644,221.76	2,332,403.66
July.....	477,154.04	1,523,779.67
August.....	975,593.04	3,123,200.90
September....	1,298,930.47	3,637,118.50
October.....	1,307,713.67	3,740,449.63
November....	1,647,682.89	4,138,864.29
December....	1,556,209.98	2,396,468.53
Total cash val.	\$10,287,546.36	\$34,863,425.07

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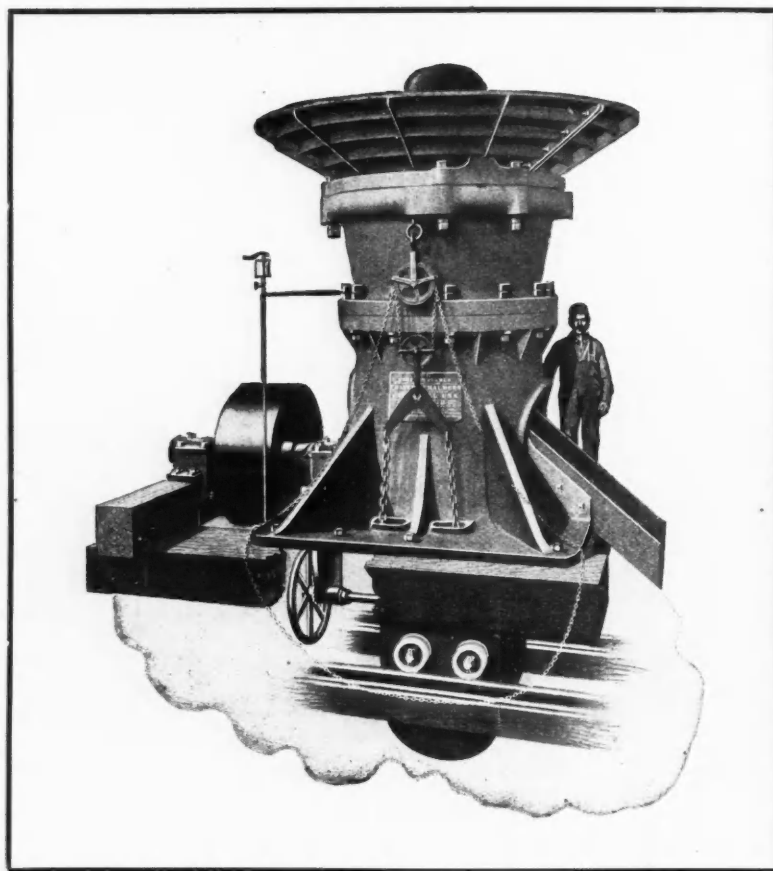
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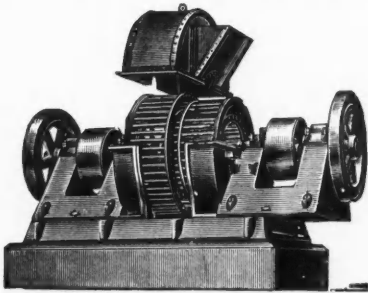
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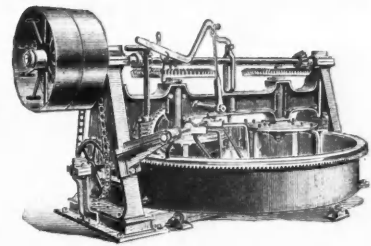
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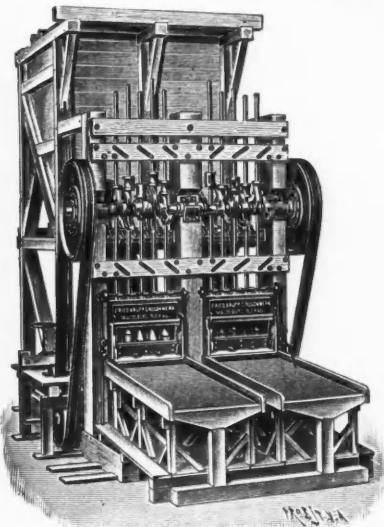
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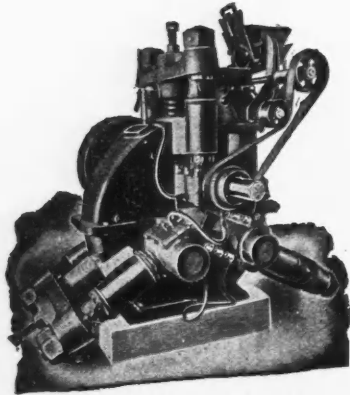
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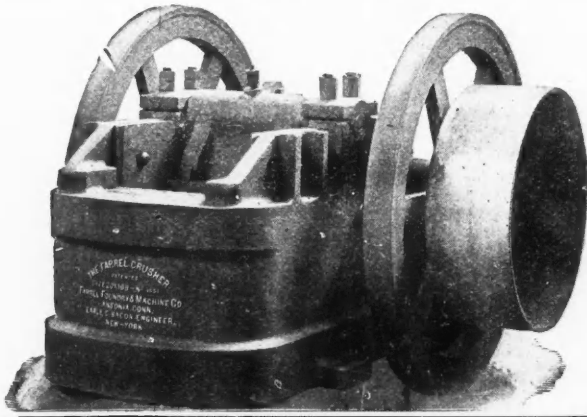
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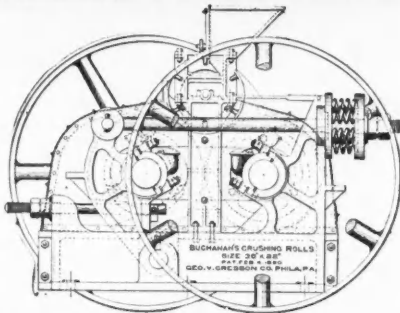
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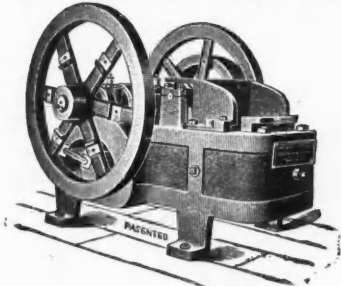
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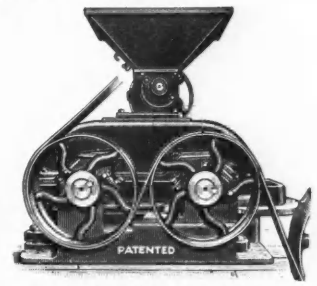


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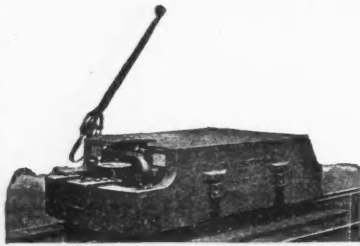
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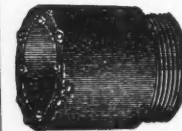
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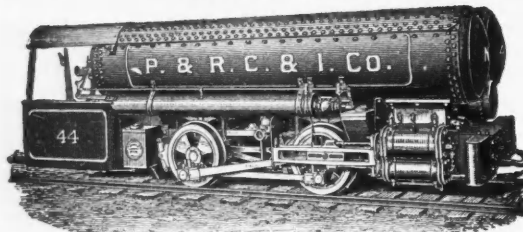
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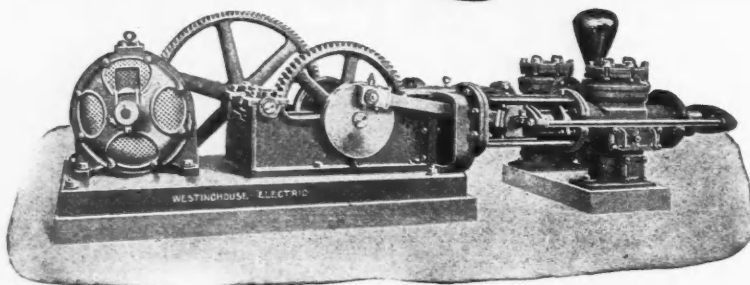
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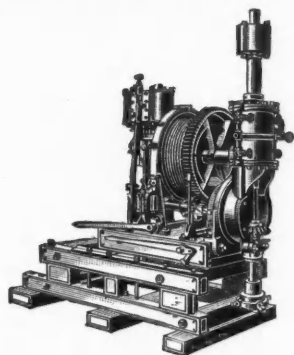
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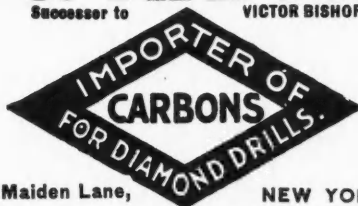
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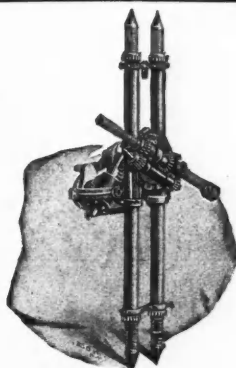
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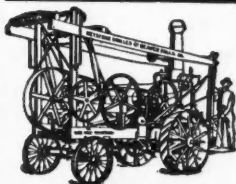
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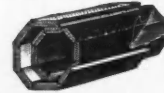
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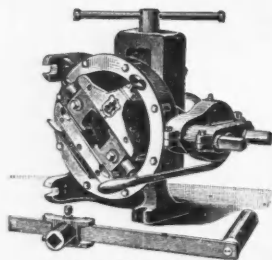
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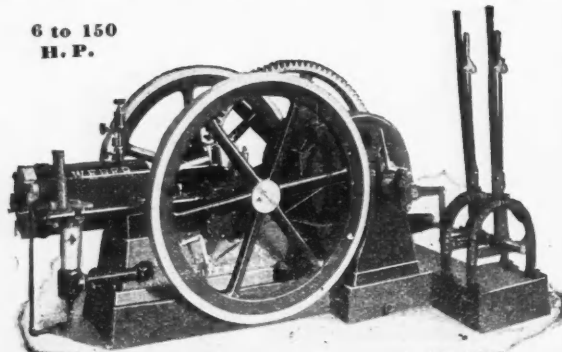
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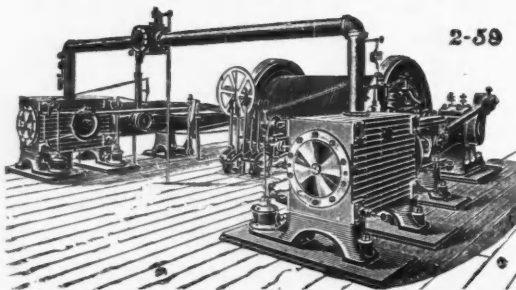
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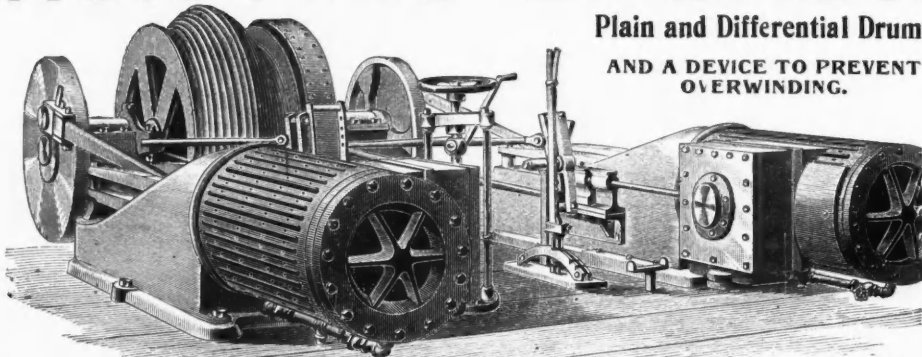
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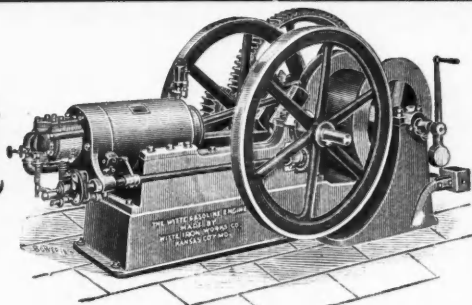
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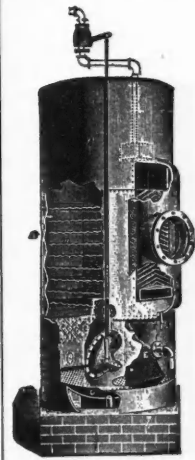
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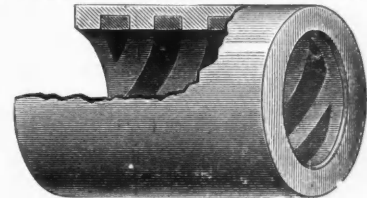
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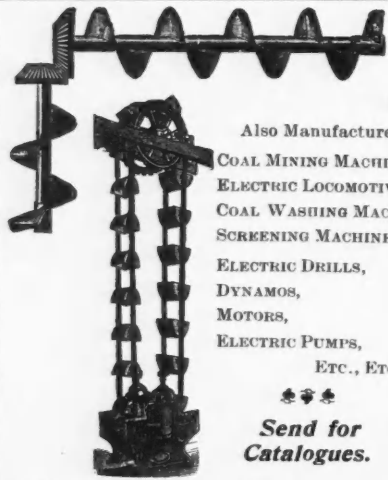
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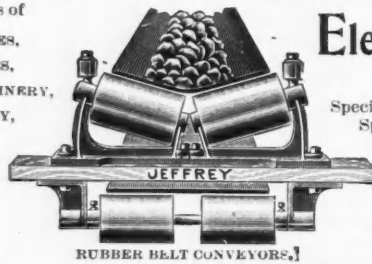


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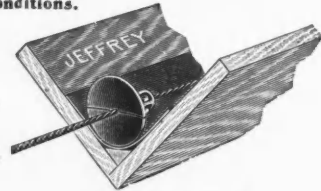


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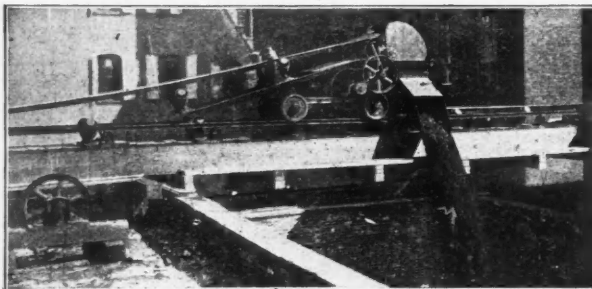
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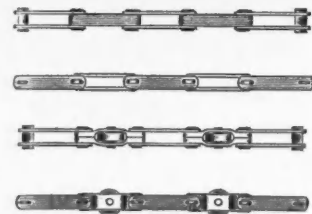
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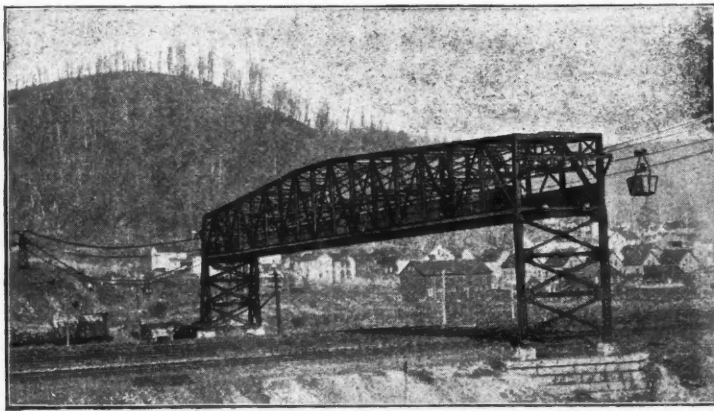
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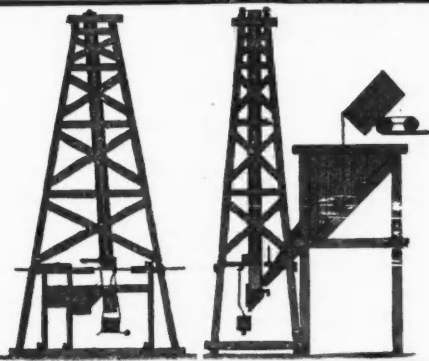
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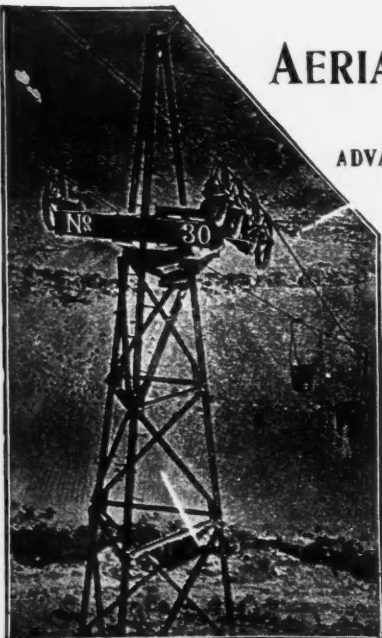
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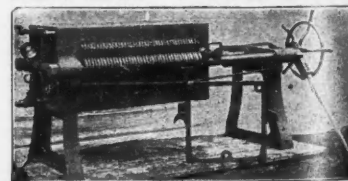
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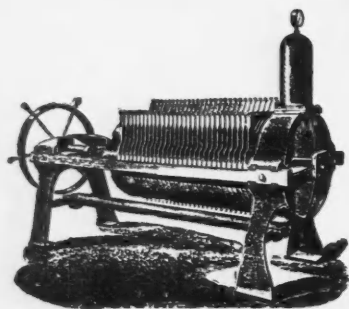
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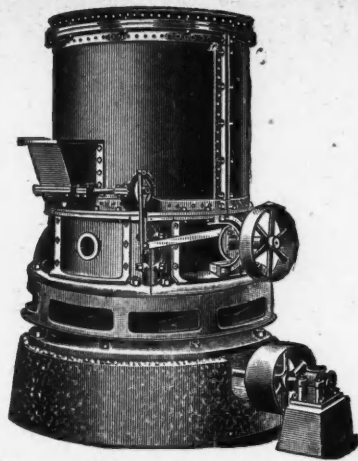
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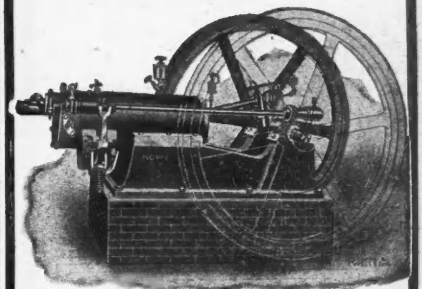


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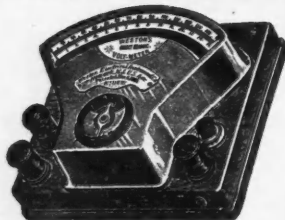
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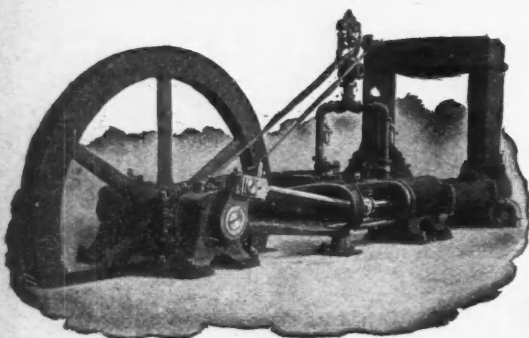
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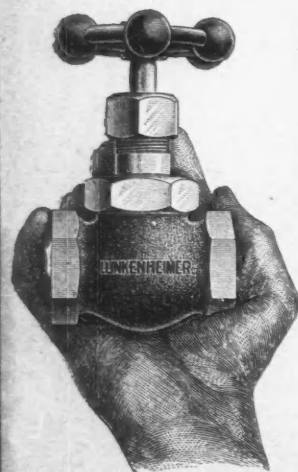
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