

THE ENGINEERING AND MINING JOURNAL



Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. LVII. JUNE 2. No. 22.

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 THE SCIENTIFIC PUBLISHING CO., Publishers.

SUBSCRIPTIONS TO THE ENGINEERING AND MINING JOURNAL are PAYABLE IN ADVANCE. Price: For the United States, Mexico and Canada, \$3 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7.

The address slip on the paper will show date of expiration of subscription. Subscribers wishing their address changed will please give the name of the old post-office as well as the new one.

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ADVERTISING RATES furnished on application. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO.

THE SCIENTIFIC PUBLISHING COMPANY.

OFFICERS: R. P. ROTHWELL, Pres. & Gen'l Mang. | P. O. BOX 1833.
 SOPHIA BRAEUNLIQH, Sec'y & Treas. | 253 Broadway, New York.

Cable Address: "Rothwell, New York." Use A B C Code, Fourth Edition.

LONDON OFFICE:

20 Bucklersbury (Room 366), London, E. C., England.
 Edward Walker, Manager.

CHICAGO OFFICE: "The Rookery," Room 531.

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THE MINERAL INDUSTRY, VOL. II, 1893.

The "Mineral Industry," second annual volume, is being distributed as rapidly as possible, and in a few days more all who have ordered it should receive a copy. It is very gratifying that already a number of those who have received it have ordered additional copies—a very practical and satisfactory testimony to its value.

This is a volume of more than 1,000 pages, and contains such valuable articles on the latest practice in every department of the mineral industry that every one will find it an indispensable textbook.

Of the minor questions which arise to perplex the editorial mind, one of the most puzzling is the proper spelling of the name of the last developed iron range in the Lake Superior region. So far the weight of general custom seems to be in favor of "Mesaba," but there is almost equally good authority for "Mesabi." We have seen "Missaba" used also, and the prominent elevation which gave the range its name is frequently called "Missabe" Mountain. While the question is not of great importance, it seems as if it ought to be settled, and perhaps some of our correspondents may be able to help to a decision.

The two deep shafts of the Tamarack copper mine in Michigan have made steady progress since they were described in the "Engineering and Mining Journal" of March 24th. On March 1st No. 3 shaft had reached a depth of 3,824 ft.; on May 18th the bottom of the shaft was 4,020 ft. below the surface. In the same time No. 4 shaft had its depth increased from 3,698 ft. to 3,915 ft. The progress made in the two and a half months has thus been 196 ft. and 217 ft. respectively. The passage of No. 3 shaft beyond the 4,000 ft. level seems worthy a special note, and that point will soon be reached by No. 4 shaft, which is only 105 ft. behind its neighbor. The Tamarack mine has now, beyond all question, the deepest shaft of any mine in the world, and also the second in depth, so that it is entitled to a double distinction.

The Ontario Bureau of Mines is now making arrangements for courses of instruction in geology and the rudiments of mining engineering in the different mining districts of the province. An appropriation was made by the legislature at its last session to cover the necessary expenses, and the co-operation of the School of Practical Science at Toronto has been secured. The professors of that school will take an active part in the district courses of instruction. The purpose is to make these courses thoroughly practical and of service to miners who wish to improve themselves in their calling, to use their knowledge in prospecting or to qualify themselves for better positions. There is no doubt that these district schools may be of great benefit, as they have proved to be in New Zealand, where the system has been in use for years.

The retirement of Prof. James Dwight Dana from the position he has so long and so successfully filled in Yale College deserves more than a passing notice. Professor Dana retires at the age of 81 years, after spending 50 years in active service as a professor, holding for a large part of that time the charge of the department of physical science. During that time an army of young men have passed under his teaching, and few men have had greater opportunities for influence in this way. Most notable of all, however, is the advance in our knowledge of the physical sciences, in the methods of teaching them, and in the application of that knowledge to practical service, which has been made during the half century; an advance in which Professor Dana has rendered material help. His services as teacher and scientist have been extremely valuable, and we hope that he will long be able to enjoy the rest he has so well earned.

In addition to its regular diplomatic and consular service the Russian Government will shortly, it is announced, appoint several special commercial agents abroad. These men will be the representatives of the Ministry of Finance, and their mission will be to cultivate trade relations with foreign countries, to collect information and to watch for opportunities for trade. Seven appointments are to be made at first, one for Germany and the Scandinavian countries, one for England, two for southern Europe, and three for central and eastern Asia. The number may be increased later.

Russia's chief exports at present are raw materials, grain, oil and lumber. She is more of an importer than an exporter of manufactures. Competent men with due authority may do much good service in the proposed positions; and other countries which have a more varied list of exports and greater manufacturing interests to serve, might consider the Russian plan to their advantage.

The British iron trade shows a slight improvement. In Scotland the May statement shows 74 furnaces in blast, against 70 last year, and in other

districts the comparison of active furnaces is in very nearly the same ratio. The iron-makers continue to complain of the very low prices, but they do not seem to be quite justified by the market reports. On May 19th Scotch pig warrants were quoted at 41s. 7½d. (\$10) per ton. This shows a fall of 9d. (\$0.18) since the first of the year, but it is 17d. (\$0.34) above the quotation at the corresponding date last year. Middlesborough pig iron on the same date was 35s. 6d. (\$8.52) per ton, the same as in January, and 1s. 9d. (\$0.42) higher than in May last year. How our Birmingham, Ala., furnaces would like to get as much! Bessemer pig, on the other hand, is a little lower than last year; it was quoted May 19th at 45s. 6d. (\$10.92) per ton, which is 9d. (\$0.18) below the January price and 7½d. (\$0.15) below May, 1893. It is of interest to compare these prices with our own, which were, taking the Pittsburg quotations on the same date, \$11.50 to \$12 per ton for No. 1 foundry, \$9.50 for gray forge and \$11.75 to \$13 for Bessemer pig. These quotations, it may be added, are the highest for months.

SALE OF THE NICARAGUA CANAL.

The Nicaragua Canal Construction Company, which has been in the hands of a receiver for a short time, has been sold by him to Mr. John R. Bartlett, chairman of the Reorganization Committee, for \$297,525. This represents all liabilities of the old company and therefore gives the committee full legal title, and possession of the property and concessions. The plans which will be followed by the committee have not been made known, but it is stated by its chairman that arrangements are being made by which the company will be placed on a secure financial footing and work pushed forward, even though the bill now pending in Congress does not pass. Similar views have been held by those interested ever since the work was commenced, and we can only hope that in this instance they will be carried out. It will be several months before the organization of the new company is completed.

A REVIVAL OF PLACER MINING.

We have before referred to the considerable increase in the production of gold in the Australian colonies and especially in New South Wales. In that province the latest returns give the output for 1893 at 179,288 ounces, an increase of 22,418 ounces, or 13.6 per cent., over the previous year. Nearly all this increase came from the placer workings, indicating a revival in that kind of mining, which had been somewhat neglected in recent years, when the main production came from the quartz mines. This increase in placer working is the result of the policy adopted by the government at the time of the bank crisis in 1892, when there was a general panic and most of the factories were shut down, the result being the presence in all the towns and cities of a large number of unemployed and discontented men. To provide for these the government, in the face of some opposition, offered to provide the necessary outfit and to secure subsistence for all who would start out into the country "fossicking," as it is called in Australia—"prospecting" we would say here—for gold. A large number of men accepted the offer and the results have been generally good, most of them having found paying locations and earned at least fair wages, while only a very small number have failed to support themselves. A considerable proportion of the unemployed had been at some time engaged in mining, so that the work was not unfamiliar to them. The conditions, also, were not unfavorable, since there are many districts in New South Wales which were passed over or abandoned when placer mining was at its height, because they would not pay to work at the exorbitant wages and high cost of living which then prevailed. Times have changed, however, and the grounds then rejected will yield a return which is now considered sufficient to pay the workers. It is to the many "fossickers" thus sent out by the government that the increase in last year's production is chiefly due.

While the New South Wales experiment has so far proved successful, the policy there adopted is not applicable here except in a few localities, chiefly because there is very little government land on which gold is known to exist, and individual owners must be paid for the gold taken out.

The merchants, storekeepers and mineowners in nearly every mining district of this country send out men to prospect, giving them tools and subsistence and a share in whatever mines are discovered. This with us is called "grub staking." Naturally the storekeeper will furnish "grub" only to men he knows, and whom he believes to be honest, for he relies altogether on their honesty in turning in and reporting their "finds." The deserving miner can always get a "grub-stake"; but the "tramp," "Coxeyite," "Commonwealer," or by whatever other name the man who wants to live without working may be called, has a poor chance in the gold mines of this country. Fortunately there are not very many of this kind, and when a year ago many of the silver mines stopped work the miners scattered through the mountains "prospecting," and in consequence our gold output increased very largely last year. Our mining news columns show a remarkable increase this spring in placer workings, extending through all the mining States, though most marked in Idaho,

Montana and Colorado. Not only are new placers being discovered, but work has been resumed in some of the old "diggings" of 15 or 20 years ago, where many men who have been thrown out of work by the stoppage of silver mines are finding occupation and frequently profit. The effect is already apparent in the returns from those States, and will be still more so as the season advances and prospecting becomes more generally possible throughout the Rocky Mountain region.

THE INDIAN SILVER EXPERIMENT.

The fact which we noted last week, that the natives of India have begun to sell gold from their hoarded stores in considerable quantities, deserves careful consideration. It is well known that for many years India has absorbed gold, which has remained in the country, very largely in the form of jewelry and ornaments which are highly prized by all Eastern peoples. Figures of Indian trade collected and published some time ago by the London "Statist" showed that in 33 years prior to 1892 the gold imported into India, not accounted for, and presumably held in the country, amounted to £126,000,000, or no less than \$630,000,000. To this must be added previous accumulations, of which no accurate estimate can be formed.

Formerly the current price of gold in India was from 15 to 16 rupees the tola. The tola is the same weight as the silver rupee, so that the price corresponded nearly to the long-established coinage ratio of the metals. Recently, however, the price has gone up rapidly, until gold sells at nearly double the old price, a late quotation being 31 rupees the tola. This high price is tempting, and accordingly the golden hoards are beginning to see the light once more.

The theory of the Indian Currency Commission, on whose report the Indian mints were closed to silver coinage eleven months ago, was that when the government officially fixed the value of the silver rupee at 1s. 4d., and offered to exchange a sovereign for 15 rupees, the value of the coin would be fixed and remain stable; while at the same time the cessation of coinage would have the effect of drawing out the hoarded gold in the country and bringing it into the treasury in exchange for the silver coin. At the same time it was predicted that, as the white metal could no longer be coined, the imports of silver into India would practically cease, or at any rate be much diminished. Moreover, it was said, the value of the rupee being fixed, there would be an end of the fluctuations and depression of trade due to the decreasing value of silver, which would no longer be the standard of the country.

Events have proved that the prophecies of the advocates of the gold standard were based upon an entirely false view of the situation; and they have proved also how little the financiers of the Currency Commission understood the Indian people. No one of the predictions made has proved true. The rupee has continued to fall steadily until now its trade or exchange value is but little over 12d., or nearly 25 per cent. below the so-called "fixed" value of less than a year ago, with every prospect that by the time the year is completed it will be still lower. The gold hoards are beginning to come out, it is true, but not to the treasury, since the yellow metal is sold to speculators who are willing to pay an apparently high price for it in the silver coin which is still the currency of the country and is accepted as the standard by the natives. Imports of silver, stimulated doubtless by diligent effort to "unload" silver on the Indians before they find out its uncertain future, continued on a large scale and were hardly checked by the imposition of a duty of 5 per cent. The fluctuations of trade have been greater and more injurious than ever before. The large export trade from India to China and Japan and to other silver-using Eastern countries has suffered a very serious decrease. In this and other ways the purchasing power of the country has been diminished so that the effect has been very seriously felt by the English manufacturers who supply the Indian market.

In other words the stoppage of silver coinage and the attempt to force the single gold standard upon India have been a complete—it might almost be said a disastrous—failure, and the Indian Government is now seeking for a remedy for the results of its unwise action in all directions but the right one, which is clearly the adoption of bimetallism by international agreement.

There is a further danger which may be realized at any time. The Hindoo is slow to move, but is also very strongly attached to his own people, and is especially liable to be influenced by panic, and prone to act in a mass. Should the people generally begin to believe that silver is actually doomed, and that their hoards of the white metal are going to keep on decreasing in value, there may be a general panic and silver be sold to buy gold. The white metal would then go down far below its present price, and might even reach the level where the price is wholly determined by the demand for it in the arts; that is, it may stand on the same level as copper, zinc, tin, lead and iron. Such a panic may occur at any time; and it is not at all likely to be foreseen. Meantime the injury to Indian trade and to the interests of English manufacturers, whose Indian sales form a large part of their business, is a continuing one. Outside of the govern-

ment, many have correctly judged and weighed the facts, and it is this which in great part gave so much weight and importance to the recent Bimetallic Conference in London.

It is within the limits of possibility that the Indian gold movement referred to above may become of great importance. The sale of gold is very likely to increase, and if the estimate given above is nearly correct there is not far from \$300,000,000 in hoarded gold in the country. The estimate may be an exaggerated one; some of the gold has undoubtedly disappeared and still more will remain hoarded; but enough of it may be drawn out to make a material addition to the world's floating stock of the yellow metal. On the other hand, if the Indians should sell silver and buy gold, which is quite possible, not only would silver go down in price to figures never heard of, but gold would go up from the great demand thus created.

NEW PUBLICATIONS.

HOW TO RUN ENGINES AND BOILERS. By Egbert Pomeroy Watson. Second Edition. London, England; E. & F. N. Spon, and New York; Spon and Chamberlain. Pages, 128; illustrated. Price, \$1.

This little book professes to give practical instruction for young engineers and steam users. The author is a man of considerable experience, and he has given in the book a series of notes, some of which are of value, while others are not especially new. The notes are somewhat desultory and disconnected, and on some points rather defective. The important subject of governors is discussed in two brief pages, for instance, and about all the information given is that the old-style ball governors are going out of use; as to the types which have replaced them nothing is said. By far the larger part of the book is devoted to the slide-valve, and some of the author's ideas under this head are very good; but more might have been said of valve motions, a point on which most men in charge of stationary engines need instruction. The book, as we have said, contains some useful hints, and an engineer may read it with advantage; but he cannot depend upon it as a manual, nor can he get from it any connected idea of the steam engine nor of the work which he is called upon to do. Indeed it does not profess to be a complete handbook, and perhaps should not be criticised too severely.

L'ALUMINUM, LE MANGANESE, LE BARYUM, LE STRONTIUM, LE CALCIUM ET LE MAGNESIUM. Par Adolphe Lejeal. Introduction par U. le Verrier. Paris, France; J. B. Baillière & Fils. Pages 360; illustrated. Price (in Paris), 5 francs.

M. Lejeal has given in this compact little book an excellent compilation, which does not, in fact, profess to give anything new, but rather to present in condensed form the history and the present condition of our knowledge of the earthy and alkaline metals. As the best known and most important of these, aluminum naturally occupies the most space, and about two-thirds of the work is given up to its metallurgy and uses. The author has made free use of the work of his predecessors, generally acknowledging his obligations to them, and has sought to base the information given upon the latest authorities. He has not brought his statistics up to a very late date, and his figures are three years behind those given in the new volume of the "Mineral Industry." As a French book, it gives, naturally, the greater part of its space to European work, and especially to French work and experiments; but credit is given to the work done in the reduction of aluminum by Cowles and Hunt, and also to that of Professor Richards in this country.

While the book will not compare with that of Richards for completeness and originality, it is still a useful compendium of knowledge in relation to the curious group of metals of which it treats—metals which are so widely distributed in their chemical combinations, but so scarce and difficult to obtain in their pure metallic forms.

BOOKS RECEIVED.

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

Fourth Annual Report of the Utah Agricultural College Experiment Station. 1893. Salt Lake City, Utah; published for the College. Pages 280.

Jahrbuch der Kaiserlich-Königlich Geologischen Reichsanstalt Jahrgang 1893. XLIII Band; 3 und 4 Heft. Vienna, Austria; published by the Imperial-Royal Geological Survey. Pages 368; with plates.

Selected Papers of the Institution of Civil Engineers. London, England; published for the Institution. Pamphlets; illustrated.

The Mineral Industry, its Statistics, Technology and Trade in the United States and Other Countries from the Earliest Times to the End of 1893. Volume II. Edited by Richard P. Rothwell. New York; the Scientific Publishing Company. Pages 934, 112 advertising; with portraits and diagrams. Price \$5.

The Speed Secret. A short cut to rapid work in shorthand and typewriting. By "Official Reporter." New York. Excelsior Publishing House. Pages 58.

United States Geological Survey: Twelfth Annual Report, 1890-91. Part I. Geology. Part II. Irrigation. Major J. W. Powell, Director. Washington; Government Printing Office. Pages 672 and 376. With plates and maps.

CORRESPONDENCE.

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

All letters should be addressed to the MANAGING EDITOR.

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

The Mineral Industry Annual, Vol. II., 1893.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: We have to acknowledge, with thanks, receipt of a copy of "The Mineral Industry," Vol. II., which we, like many others, shall often have

occasion to refer to as an authority, knowing from what has preceded it that it will be found an interesting as well as invaluable record to have at one's command.

We must also congratulate you on its very neat appearance.

The American Metal Company, Limited,

NEW YORK, May 31, 1894.

B. HOCHSCHILD, Treas.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: From a hasty glance we think that Vol. II. of "The Mineral Industry" must be a great improvement over last year's edition, although the copy of that edition here was a favorite book with our mining friends when at our office.

The Metallic Cap Manufacturing Company,

NEW YORK, June 1, 1894.

F. K. BREWSTER, Secretary and Treasurer.

The Latest Armor-Plate Test.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I take exception to a remark, in your editorial of last week, on the test of the 18-in. plate at Indian Head, May 19th, that the test was "a complete victory for the projectile and a disastrous failure for the plate," and I maintain that the projectile, in order to have gained "a complete victory," should have pierced through the plate, whereas both shots, although breaking the plate, failed to get through.

This is, perhaps, a technical point in ballistics: the test certainly gave further evidence of the excellence of the Carpenter shells. It may be true, as Captain Sampson, Chief of the Naval Bureau of Ordnance, has recently said, that the trouble was with an original defect in the ingot, and that if the surface had not been hardened by the Harvey process, "the projectile would have gone through plate, backing and everything else." Further information will be awaited with much interest, but in the mean time, and with the recorded facts, I claim that it was not "a complete victory for the shell."

ENGINEER.

The Armor-Plate Test.

The following letter regarding the test of armor plate held at Indian Head on May 19th has been written by Capt. W. H. Jaques, Chief Engineer of the Bethlehem Iron Company, to the "Army and Navy Journal," and through the courtesy of the latter we are permitted to present it herewith:

"The Bethlehem's 18-in. nickel-steel, harveyized ballistic plate, representing the side armor of the battleship "Indiana," was hammer-forged, 16 ft. long, 90 in. wide and 18 in. thick for 4 ft. of its width from the top, tapering thence to 8 in. at the bottom edge.

It weighed 33 $\frac{3}{4}$ tons and was secured to 36 in. of oak backing by 26 3-in. bolts, as shown in the sketch.

Although 18 in. in thickness, it was tested with the 12-in. rifle under the clause of the specifications that "in no case shall the caliber of the gun exceed one-seventh the width of the plate at the point of impact." It was a Bethlehem gun against a Bethlehem plate, so Bethlehem was a sure winner.

During one of the operations of the "Harvey" process to which it was subjected loud reports indicated an internal fracture. Careful examination and drop tests failed, however, to locate the injury; but the 12,660-ft. ton striking energy of the first 12-in. shot easily discovered it. Propelled by 266 $\frac{1}{2}$ lbs. of Dupont brown prismatic powder, giving a striking energy of 1,465 foot-seconds, the shell cracked the plate into three pieces. Three cracks extended from the shot hole to the top, bottom and left edge, varying in width from $\frac{1}{4}$ in. to 8 in. The long longitudinal crack was caused by an internal crack nearly two-thirds the length of the plate, which had evidently been caused when the loud reports were heard, as the narrow crevice was filled with the oil that was used in a subsequent operation. Oil had found an entrance, although the most careful subsequent inspection failed to discover any surface or edge cracks.

While the results of the first shot would cause the rejection of the plate, as the requirement of this shot is that "There shall be no crack extending from the point of impact to an edge of the plate, or from one edge to another of the plate, and at the same time through the entire thickness of the plate at the edge," it was so evident that the reported suspected defect had so radical an influence upon the result that Commodore Sampson decided to fire the second shot to determine if the plate would meet the second condition, viz.: "The projectile, or any fragment thereof, shall not pass entirely through the plate and backing." Round 2 was therefore fired with 419 lbs. of Dupont powder, with a striking velocity of 1,926 ft.-sec., and an energy of 21,182 ft.-tons. Although the plate cracked badly again, no part of the projectile penetrated beyond 6 in. into the backing. Carpenter 850-lb. projectiles were used for both shots.

The first penetrated 20 in. and rebounded about 30 ft.

It was set up about 4 in. and developed a longitudinal crack 16 in. in length. The second penetrated the plate and 6 in. of the backing; the forward two-thirds was broken, twisted and partly welded into the plate and itself, the rear third being broken into several longitudinal fragments.

As diametrically opposite opinions regarding the value of the "Harvey" process have been reported as emanating from me, I shall be glad to tell you what I have said on the subject.

The views against Harveyizing thick plates accredited me were not based upon the results of the test of the Bethlehem 18-in. plate at Indian Head, May 19th. This was a mere incidental indorsement of the opinion I have often expressed in my lectures, writings and conversation.

While we have abundant and reliable data relating to the penetration and perforation of plain steel and nickel-steel plates of nearly all the thicknesses that are liable to enter naval construction, we have very little information regarding the cracking and shattering effects of the larger calibres attacking surface-hardened homogeneous plates at very high energies. The action of the few plates that have been tested led me some time ago to express the opinion that:

"The greater value of carbonization was with the thinner plates," and that, "Although the recent development has been chiefly in the direction of securing a harder face to the homogeneous steelplates, there still remains two types for comparison, that of a resistance which will keep out

a projectile of any caliber if thick enough, and that which will destroy the projectiles until a caliber is reached whose smashing and racking energy will demolish the protection, although perhaps at the risk of its own destruction."

I think there is a limit to the thickness of the plates that can be advantageously Harveyized; just what that limit is we have not yet had enough experience to determine.

There are reasons for doubting its usefulness for plates above 12 in.; and the best 12-in. plate that has ever been Harveyized cracked badly when struck with a 10-in. projectile having a striking energy of 13,564 foot-tons.

Not only is the thickness of the hardened surface less in proportion to the thickness of the plate, but the larger masses of steel, when subjected to the sudden shocks of water hardening, are more liable to initiate defects or develop minor ones that may occur in the ingot which, in the condition they exist after forming, might not sensibly decrease the ballistic resistance.

Further, any minor defect that may occur before carbonization is liable to be developed into an injurious one during the very long period the plates are undergoing the process of carburization. Furthermore, the withdrawal of 30 tons of steel from the blacksmith's forge and dipping into a bucket of water carry more risks than the dressing of an ordinary tool; these risks have their influence in determining the thickness of plates that are to be subjected to this unnatural treatment.

As to the value of carbonization of plates of certain thicknesses there appears to be no doubt, and I gave prominence to its employment as early as 1891; in a paper prepared for the British Iron and Steel Institute. Its value in destroying projectiles of calibers up to and sometimes including 10 in. caliber assuring a decrease in the weight of armor to be carried for protection against these calibres, cannot be overestimated, but we have not yet enough practical evidence to say if its application to the thicker plates will be finally adopted.

While the defect in the plate of the test of May 19th was suspected by the action of the plate during treatment, and was a prominent cause for its rejection, although there may have been a want of uniform chemical distribution in the ingot or some piping remaining after forging, all the opinions expressed agree that the final defect which was so prominent in causing the failure of the plate was the result of one of the operations of Harveyizing.

Other thick plates selected for ballistic test will, no doubt, perform better than the 18-in. plate in question, but I believe 13 in., 12-in. and even 10 in. armor-piercing shells, attacking at service energies, will crack the Harveyized plates; and although increasing the number of bolts may keep the cracked pieces in position, we find ourselves back again to the old discussion of which is the least objectionable, *considerable penetration or cracks*.

No matter what future tests may decide, one thing is certain: the calibers and energies of guns must be increased, not diminished.

BETHLEHEM, Pa., May 22, 1894.

W. H. JAQUES.

THE HARDWARE CLUB OF NEW YORK.

The Hardware Club of New York on May 31st opened its new club-rooms in the Postal Telegraph Building, at Broadway and Murray street, for inspection by its guests, who were most hospitably entertained by the reception committee and other members present.

The club's handsome and well appointed rooms are at the top of the building, on the fourteenth and fifteenth floors. The rooms are finished in mahogany, and furnished with solid mahogany furniture. Where not of mosaic tiling, the floors are carpeted with rich Wilton, in harmony with the ceiling and the wall decorations. In the front are the reception rooms and library, while adjoining these are the dining-rooms, with a capacity for seating 200 persons. Between the library and the main dining-room is the ladies' dining-room, on the Murray Street side; its windows command lower Broadway and the bay. Beyond the ladies' dining-room is the main dining-hall, 99 ft. long and 27 ft. wide. Two hundred and fifty guests can be accommodated in this room, which has a south and west view. An "air chamber," located above the ceiling, is expected to make the atmosphere of the dining-hall comfortable during the warmest weather. A passageway at the right end of the dining hall leads to the cafe, an eight-sided room, the greatest dimension of which is 32 ft. by 38 ft. Two private dining-rooms, 16 ft. long and 8 ft. wide, are entered from the cafe. The fifteenth floor contains the kitchen, store-rooms, refrigerators, steward's office, and quarters for the help. The balconies on the Broadway and Murray street sides of the building have an aggregate length of 156 ft. These will be provided with awnings. The furnishings of the rooms cost \$30,000 and could hardly be improved upon; at least such was the verdict of the visitors.

The Hardware Club owes its existence to Mr. Archibald P. Mitchell, the proprietor of "Hardware," that enterprising and able representative organ of the hardware trade—a paper which though young in years has already established itself as the chief paper in its field, and the Hardware Club is a further evidence of the ability and popularity of Mr. Mitchell and of Mr. James H. Kennedy, the editor of "Hardware." The club has now grown to represent a whole industry, but it is proper that those who were instrumental in its organization should be mentioned on this memorable occasion. The club was organized at a dinner at Sherry's in 1892; it is limited to 500 resident and 200 non-resident members, and now has a membership of 360, and about 40 names remain to be acted upon.

The House Committee, which had charge of the reception, consists of Brace Hayden, A. G. Sherman, J. L. Varick, E. C. Von Glahn, Eugene Bissell and Peter McCartee.

The officers of the club are: President, William H. Williams; vice-president, R. H. Swazze; treasurer, Thomas R. Keating; secretary, J. L. Varick. The board of governors consists of the above officers and Alfred D. Clinch, Webster R. Walkley, A. G. Sherman, Peter McCartee, Eugene Bissell, James H. Kennedy, Richard R. Williams, E. C. Von Glahn, M. C. Ogden, Brace Hayden and Charles Daly. These officers were elected at the formation of the club, and have since been annually re-elected.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

SUPREME COURT OF PENNSYLVANIA.

Construction of Oil Lease.

Where an oil lease required the lessee to drill a well within six months, or in default to pay a specified sum per annum for such delay within three months after the time for completing the well, failure to complete the well or to make any such payments within the time specified to avoid the lease, where no well was completed within six months, and the lessor, within a few days thereafter, leased the premises to others, all the rights of the parties to the first lease became extinguished, and no rent could be recovered from the lessee thereunder.—Wolf v. Guffey, 28 At. Rep., 1117.

SUPREME COURT OF CALIFORNIA.

Where a Mineowner is Not Liable.

A mineowner is not responsible for the death of miners caused by the negligence of the engineer of the hoist engine in mishoisting the cage in which they are ascending the shaft. The fact that the engineer had once before made a mis-hoist would not make the owner liable unless he had notice of it. The mine law of 1885, requiring a person employed at an engine to be sober and competent, does not change the common-law rule that notice of his insobriety or incompetence must have been brought home to the employer.—Mulhern v. Lehigh Valley Coal Co., 28 At. Rep., 1087.

Duties of Tenants in Common of Mining Claims.

One tenant in common of a mining claim is bound to contribute his proportion of the value of the yearly work required to be done to perfect title, and performed by his covenant, unless he abandons his interest in the unpatented claim, or offers to perform the work. Where, in partition by one tenant in common of such claim, on an accounting for money spent upon the land in excess of his share, no personal judgment is rendered against the other tenant, but the property is ordered to be sold, he should be allowed the full amount of the sums properly paid out, instead of only one-half, before the residue is divided. Where, in such an action, the amount allowed is less than he is entitled to, being for one-half the amount paid out, error in allowing improper credits is harmless.—Holbrooke v. Harrington, 36 Pac. Rep., 365.

CIRCUIT COURT, S. D. CALIFORNIA.

Notice and Record of Claim.

In speaking of the distinction that exists between the notice posted on a claim and the statutory requirement respecting the record of such notice, the Supreme Court of Nevada, in Gleason v. Mining Co., said: "There can be no question that the original paymaster notice was all that the law requires. The only objection to it is that it did not contain in itself a description of the claim by reference to some natural object or permanent monument. It was not necessary that it should. It is only the record of the claim that is required to contain such a description; and there are excellent reasons for making the distinction between the notice and record in this particular. A notice is generally, and for safety ought always to be, posted immediately upon the discovery of the vein, before there is any time to survey the ground and ascertain the bearings and distances of natural objects or permanent monuments in the neighborhood; and besides, the claim referred to by the notice is always sufficiently identified by the fact that it is posted on or in immediate proximity to the croppings. A notice claiming a location on 'this vein' has only one meaning. But the notice is exposed to the danger of removal by adverse claimants or destruction by the elements, and for permanent evidence of the location its record is provided for. The record, if it consisted of a mere copy of the notice, would not identify the claim, and there would be an opportunity, as well as a temptation, to the locators, upon the discovery of a more valuable mine in the vicinity, to prove, by perjured witnesses, that their notice was posted on that mine. The floating of claims was by no means an infrequent occurrence prior to the act of 1872, and if such attempts were seldom successful, they were always vexatious, and often the means of levying a heavy blackmail. It was on this account that the record (not the notice) was required to contain 'such a description of the claim or claims, located by reference to some natural object or permanent monument, as will identify the claim.' It is a sufficient compliance with this provision of the law if the description of the locus of the claim is appended to the notice when it is recorded."—Gird v. California Oil Co., 60 Fed. Rep., 536.

DIVIDENDS PAID BY MINING COMPANIES DURING MAY, 1894.

NAME OF COMPANY.	Paid in May.	Paid since Jan.	NAME OF COMPANY.	Paid in May.	Paid since Jan.
Alaska-Tred., Alaska	.....	\$75,000	Horn Silver, Mont.	.....	\$50,000
American, Mont.	.....	21,658	Iron Mountain, Mont.	.....	24,000
Bald Butte, Mont.	\$25,000	75,000	Kennedy, Cal.	\$18,000	24,000
Belden Mica, N. H.	5,000	25,000	Mayflower Gravel, Cal.	10,000	50,000
Boreel, Colo.	.....	500,000	Mercur, Utah.	25,000	125,000
Bullion, B. & C. Utah	25,000	25,000	Morning Star Drift, Cal.	9,600	38,400
Cent.-Eureka, Utah	15,000	15,000	Moulton, Mont.	.....	20,000
Cal. & Hecla, Mich.	500,000	500,000	Moose, Colo.	12,000	24,000
Champion, Cal.	3,400	17,000	Napa Con., L. Cal.	.....	20,000
Cop Queen Con., Ariz.	50,000	100,000	Omaha, Cal.	3,600	18,000
De Lamar, Idaho	.....	200,000	Quincy, Mich.	.....	200,000
Elkhorn	.....	32,813	Rico-Aspen, Colo.	25,000	125,000
Elkton, Colo.	6,000	30,000	Smuggler, Colo.	50,000	100,000
Franklin, Mich.	.....	80,000	Standard Con.	10,000	20,000
Golden Fleece, Colo.	12,000	60,000	Trinity River Hydraulic, Cal.	2,500	12,500
Golden Reward, S. D.	5,000	25,000	Union, Colo.	6,250	31,250
Harqua Hala, Ariz.	.....	36,000	Victor, Colo.	.....	30,000
Hel'na & Frisco, Mont.	.....	15,000	W. Y. O. D., Cal.	3,000	15,000
Homestake, S. Dak.	18,750	93,750			
Hope, Mont.	.....	25,000			
			Total	\$870,100	\$2,787,871

Readers of the "Engineering and Mining Journal" will confer a favor on the publishers if they will notify the "Journal" of any errors or omissions in the above table.

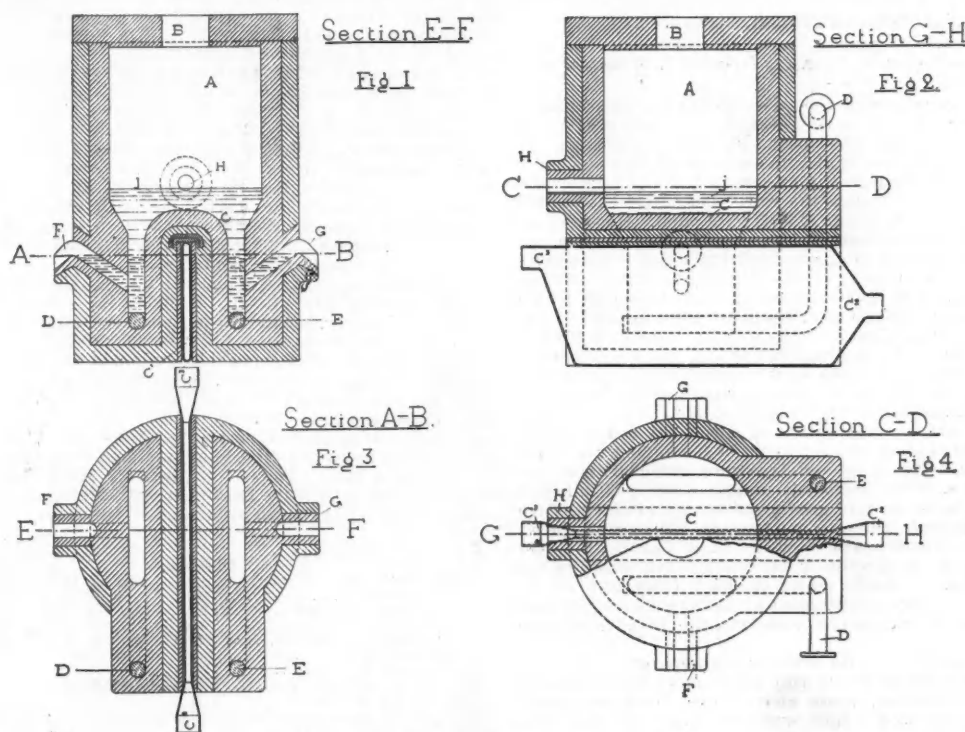
THE DIRECT PRODUCTION OF ZINC IN THE BLAST FURNACE.

In a paper recently published in the "Berg- und Hütten-männische Zeitung." Mr. W. Hempel, after reviewing the methods proposed at different times for the reduction of zinc ores without the use of retorts, describes a number of experiments made in this direction by himself at the Technical High School in Dresden. It was supposed that metallic zinc might be separated from furnace gases in a melted form by subjecting the current to the action of a centrifugal machine at a temperature below the boiling point of the metal; but a trial made at 470° Cent. proved a complete failure, only zinc dust and oxide being produced, and other experiments showed that the nature of the product of ordinary distillation depended not merely on the nature of the gaseous atmosphere in which the zinc vapor forms, but that the degree of dilution is also of importance. Thus, in the reduction of zinc oxide in the Silesian or Belgian furnace, large quantities of zinc dust are formed in the earlier stages of the distillation, liquid zinc being only obtained in a subsequent stage of the operation. This is due to the large quantity of indifferent gases given off by the charge at first, which carry away a considerable amount of zinc as vapor before it can coalesce into the liquid form. The received opinion that zinc oxide is only reduced at temperatures above the boiling point of the metal is considered by the author to be erroneous, and that it actually takes place at a strong red heat. The presence of uncondensable gases in large quantity being a necessary condition of blast furnace working, the non-production of liquid zinc by the method of direct reduction is sufficiently explained. If, however, the reduction is effected in an atmosphere containing a minimum of carbonic acid, and the gases when cooled to 60° Cent. are passed through a centrifugal machine, the zinc contained may be collected as dust containing from 72 to 90% of metallic zinc, silver, lead and copper in the ore being also volatilized as sulphides, but iron remains in the furnace. The author

DE LAVAL'S METHOD OF ELECTRIC SMELTING.

The accompanying illustrations show a method of electric smelting recently patented in Great Britain by Dr. C. P. G. de Laval, which is soon to be practically tested in Sweden, where the inventor resides. In his specification Dr. de Laval says that in the present method of smelting or heating iron or other materials by means of electricity the heat requisite for the smelting is produced by conducting an electric current through a layer of molten material of slight conductivity—an electrolyte—which, owing to the resistance offered by it to the electric current, is heated so greatly that the metal, which in the case of iron, is supplied from above, and owing to its greater specific weight, sinks through said layer, obtains the temperature required for the smelting during its passage through this layer. The two pole-pieces are inserted in the furnace at each side of a transverse bridge, made of some refractory material, and under the electrolyte so that the current must pass above or beneath this bridge and through the electrolyte, in order to go from one pole to the other. As these pole-pieces are situated under the molten layer of slight conductivity they will, during the process, become slightly fused so as to be transformed in the molten metal. As the pole is usually reckoned up to the point of contact between the metallic conductor and the electrolyte (in this case the layer of slight conductivity) the two poles will thus in the present method consist of molten metal. This is one of the characteristic features of the method in question. If it be desired to make the process continuous, the metal is supplied continuously, and the metal produced as well as the above situated layer of slight conductivity are maintained automatically at a constant or practically constant height.

The smelting is so carried out that the molten electrolyte is introduced into the furnace and heated still more by closing an electric current through the same. It may be convenient to use alternating currents for the purpose, in order that the electrolyte may not be decomposed. When



THE DE LAVAL ELECTRIC SMELTING FURNACE.

considers, therefore, that the ordinary process of zinc-smelting might be modified as follows:

1. The ore, whether calamine or blende, must be carefully roasted to convert it as nearly as possible into oxide.
2. The zinc oxide mixed with three times its weight of bituminous coal and 5% of lime is coked, giving a material with 22.7% zinc, partly in metallic form.
3. The zinc coke is burned by hot blast in a closed top furnace, with a flue at the top connected with a centrifugal machine. The zinc volatilized and carried off by the gases is collected in the flues and the drum of the centrifugal machine. The gases when cleaned are utilized as fuel.
4. The zinc dust is subjected to a pressure of about 1,500 lbs. per square inch, which reduces it to about 10% of its original bulk, making it perfectly compact.
5. The compressed zinc dust is distilled in retorts without the addition of carbon, when about two-thirds of its weight of metallic zinc of great purity is obtained. Lead and silver if present remain in the fixed residue. This operation requires much less fuel for heating than the ordinary method of reducing, as the material in the retort, being practically metallic zinc, is a good conductor of heat when compared with the mixture of zinc oxide and carbon, which is a very bad one.

Probably a more complete reduction might be obtained electrolytically, as a lower tension current would be required than for the reduction of salts, the material being already in the metallic state to a great extent.

Belgian Briquettes.—The exports of briquettes from Belgium in the first two months of this year amounted to 86,143 tons, as compared with 53,620 tons in the corresponding period of 1893, and 37,913 tons in the corresponding period of 1892. In these totals the exports to France figured for 31,486 tons, 25,080 tons and 28,289 tons respectively.

the temperature has been raised sufficiently the metal is added in some form either as free metal or as a metallic combination which latter in the furnace is reduced to free metal. If the metal or metal combination is of a greater specific weight than the electrolyte it is introduced at the top of the furnace and sinks down through the electrolyte, during which passage it smelts and gathers in a fused state at the bottom of the furnace, from which it is removed in some suitable manner. If, on the contrary, the metal or metal combination is of less specific weight than the electrolyte, it is introduced from below and ascends through the electrolyte so as to gather in a fused state at the top of the furnace, from which it is removed. The bridge which holds the poles separated one from another is in the first mentioned case placed in the lower part of the furnace. In the latter case it is situated in the upper part of the furnace, for instance, suspended from the roof.

In the accompanying drawings Figs. 1-4 show in vertical and horizontal sections as an example a furnace for carrying out this method of smelting. A is the furnace into which, when iron is to be melted, spongy iron, for instance, may be introduced through the hole B. In the lower part of the furnace there is located a bridge C of some refractory matter extending transversely across the furnace, on each side of which bridge the pole-pieces D and E, which are connected with a source of electricity, are secured. These pole-pieces consist, in this example, of iron bars which are inserted at the bottom of the furnace in the cavity between the bridge C and the wall of the furnace, as distinctly shown in the drawing. F and G are two outlets for the metal which are disposed as overflows, so that the metal flows out when it has risen to a certain height. H is a hole in the wall of the furnace designed to maintain the molten layer of slight conductivity—the electrolyte—at a constant height. As an electrolyte, in the present example, magnetic iron ore may be used. For smelting zinc or lead ores sulphide of iron is used as electrolyte. The bridge C is represented hollow and a flattened pipe C' passes through this cavity

in order to effect the requisite refrigeration of the bridge by conducting water or the like through the mouthpiece C³. C³ is the outlet of the water or the refrigerating liquid.

When the furnace is to be put in action the molten electrolyte I is poured in through the hole B, and the pole pieces D E are connected with the generator of electricity. The current then passes through the electrolyte and over the bridge C, thus heating the electrolyte still more. The metal is now added in some form, sinks down through the electrolyte while being heated by the latter to the temperature of smelting and gathers, when fused, on the bottom of the furnace. The pole pieces D and E smelt also a little so that the poles will consist of molten metal. As metal is constantly supplied, it sinks down through the layer I and gathers on the bottom of the furnace, this molten layer ascends at last so that metal flows out through the outlets F and G. Their height above the bottom of the furnace determines thus the distance between the two poles or the so-called pole level and consequently the way which the current must pass through the electrolyte from one pole to the other. In the same way the height of the electrolyte layer I is automatically regulated by the pole H.

If a metal is to be brought in fusion the specific weight of which is less than that of the electrolyte, a furnace similar to the one described may be employed, but reversed; that is, having the bridge suspended from the roof. The electric current must then pass beneath the bridge and through the electrolyte in order to arrive from one pole to another.

This method and furnace can also be employed to overheat a metal. The metal in this case introduced in fusion and it obtains the overheat when passing through the electrolyte layer which communicates its heat to the molten metal. Though only metals are mentioned here above which may be molten or heated in the described manner, the method may also be employed for other materials which are to smelted or heated.

THE MARYLAND-DELAWARE SHIP CANAL.

Specially prepared for the Engineering and Mining Journal by J. G. Ransom.

The opening of a ship canal across the Maryland-Delaware peninsula would have a far-reaching effect upon Baltimore as a commercial center by avoiding the long passage up Chesapeake Bay, and shortening the round trips of ocean steamers entering Baltimore by about 86 hours. The project has been discussed at intervals for nearly a century, and several companies have been formed to execute the work, aside from that which built and now operates the Chesapeake & Delaware canal. But the plan has acquired considerable momentum of late on account of Baltimore's rapidly growing foreign trade, the competition of rival cities at the mouth of the James River and the opening of the English ship canal between Liverpool and Manchester. The final success of that enterprise, which literally made a seaport of an inland city, has given great impulse to the construction of waterways in all parts of the world. Interest in the undertaking has finally crystallized into organized action, and a commission has been authorized by the Baltimore city council to secure the cooperation of Congress in an appropriation for preliminary surveys, with reference to the establishment of the most feasible route.

The problem presented in the construction of this canal is a peculiar one, whether it is considered from the standpoint of the engineer or from that of the business man. The Maryland-Delaware peninsula is of the latest geological formation, being composed almost entirely of alluvial drift in the form of clay banks, beds of gravel and sand, and an extensive deposit of marl which extends through portions of Talbot and Queen Anne counties, reaching a thickness of over 300 ft. at Centreville. On the Chesapeake side is found a bold water-front, where deep draught vessels can sail close to the shore, the banks being elevated from 10 to 50 ft. above the water. The coast line is penetrated by numerous estuaries and broad rivers, chief among which are the Sassafras, the Chester and the Wye.

On the Delaware side the shore has wide shoals separating it from deep water, and the little streams which run down from the watershed pass through extensive marshes, those above Cape Henlopen being several miles in width, overflowed at high water and not more than 4 ft. above the low water line. The tributary streams of the Delaware shore are unimportant, in consequence of which the debouché of a ship canal would necessarily be maintained at considerable expense.

From either coast line of the peninsula the land rises gradually to the watershed about 10 or 15 miles from the Delaware shore. At the lower end of the peninsula the highest elevation is not more than 50 ft., and in the upper end not more than 70. The soil is exceedingly porous, and it would be difficult either to fill or impound canal locks with a view to overcoming any part of the elevation. The engineering problems presented, therefore, are simple and to be overcome for the most part by dredging and digging.

Some 12 years ago preliminary surveys for a ship canal across the peninsula were made under the direction of Colonel Craighill, of Baltimore, whose reports upon the subject were presented to Congress in 1880. The proposition then worked out in detail contemplated a canal 178 ft. wide at low water level, 26 ft. deep below the mean water line, and 100 ft. wide at the bottom. The prism was designed with a berm 30 ft. above the bottom and 12 ft. wide, all slopes being 1½ to 1. In the several routes then surveyed it was proposed to construct from three to five locks with a view to controlling the current in times of freshet, and to command the ebb and flow of the tide so as to make navigation possible at all times. The locks were to be 60 ft. by 600 ft. in the chambers, and it was intended to pass vessels drawing less than 23 ft. of water. The necessity for locks arises from the peculiar character of the rivers which the canal would cross, they being without valleys and almost without banks, and subject to tides almost to their headwaters. When channels were to be dredged in connection with any of the proposed routes they were to be 300 ft. wide in all cases, and 24 ft. deep, with calculations made for a depth of 26 ft. if required at any time to provide against transverse washings by currents, as in the case of the Craighill channel of the Patapsco.

At different times no less than seven routes have been surveyed for this ship canal. They extend from the Choptank River on the south to the line of the present Chesapeake and Delaware Canal on the north. The following table designates these several surveys, gives the distance

in miles from Baltimore to a common point outside the Delaware Breakwater, the length of actual excavation, and the estimated cost of construction:

Route.	Distance, miles.	Excavation, miles.	Cost.
Choptank.....	149.81	37.67	\$16,500,000
Choptank (inland).....	139.	30.	18,250,000
Wye River.....	128.42	42.99	26,551,000
Queenstown.....	107.29	53.78	37,261,000
Centreville.....	106.38	50.95	41,558,000
Southeast Creek.....	115.78	38.33	25,000,000
Sassafras River.....	129.25	14.20	8,500,000

Each of these routes has certain advantages as to position, cost of construction or maintenance. The Choptank and Choptank inland lines are simply two surveys of the same canal; the Queenstown and Centreville surveys are also very close together, and the long approaches of the Wye River and Southeast Creek routes lie on the Delaware coast where they would be swept by adverse winds, making either of them impracticable. The question, therefore, is narrowed down practically to three courses, which may be briefly described as follows:

The Choptank route would necessitate the sailing of all vessels from Baltimore to the mouth of the Choptank River and up that stream 25 miles to its confluence with Ferry Creek, five miles above Cambridge, Dorchester County. The canal would then pass up Ferry Creek, through a marsh and over a flat country about 25 ft. above low water to the Nanticoke River at Walnut Landing. Proceeding up that stream and its drainage to the "divide," an easy descent to the ocean would be found through the Broadkill Creek and its marshes to a point three miles above Lewes, Delaware. In the Choptank River there would be no hindrance to free navigation, and in the Nanticoke River about 12 miles of the course proposed has a width of 500 to 700 ft. and about 20 ft. of water, and for four miles additional the width is from 50 to 100 ft., the stream carrying from 6 to 10 ft. of water. From this point to the summit the line would pass over a sandy and swampy country, heavily timbered, the highest elevation being 50 ft. This route would require only about 15 miles of actual canalization through solid ground, the rest of the work being accomplished simply by dredging natural streams.

What is known as the Queenstown route is almost a direct line across the peninsula, making practically a straight passage from the wharves in Baltimore to the open ocean. It leaves the Chesapeake at the mouth of Chester River, passes up that river and Queenstown Creek to the city of Queenstown, and thence over a flat country, from 50 to 70 ft. above low water, to Broadkill Creek, at Wiltbank's Landing, two and three-fourths miles from Delaware Bay. From this point the Queenstown line coincides with the Choptank route. What is known as the Centreville survey follows the same general directions, the two lines, in fact, crossing each other twice, but by utilizing one or two bends in the course a saving of eight miles of canal could be effected.

The Sassafras river route extends up the Chesapeake 40 miles to the mouth of the Sassafras River. Utilizing the course of this stream to the head of tidewater, 16½ miles, the canal would traverse a country rising 70 ft. above low water, over the "divide" and down to the drainage of Blackbird Creek. Following that stream to a high ridge which deflects the creek sharply to the north, the canal by a short cut would enter Delaware Bay near Liston's Point, 14½ miles from tidewater on Sassafras River, and 46 miles above Lewes.

On the assumption that steam vessels can sail 10 miles an hour in open water, seven miles in dredged channels and five miles in the canal proper, the following table exhibits the distance from Baltimore to a common point 12 miles outside the Delaware Breakwater, the time required in the passage, and the saving in distance and time over the route around the capes:

Route.	Distance, miles.	Time, hrs.	Distance saved, miles.	Time saved.
Choptank.....	149.81	19½	175	15½
Choptank (inland).....	139.	18	186	17
Wye River.....	128.42	18	196	17
Queenstown.....	107.29	17	218	18
Centreville.....	106.38	17½	219	18½
Southeast Creek.....	115.78	16	209	19
Sassafras River.....	129.25	15	193	20
Around the capes.....	350.	35	...	..

Looked at from a purely physical aspect, the Queenstown survey or the Centreville line would give the most direct course to the sea, and when completed would offer about equal difficulties with the other routes in the way of maintenance and operating expenses. But it is also the line of greatest resistance, requiring the maximum amount of digging and the largest number of locks to control the currents of the Choptank and Nanticoke rivers and their tributaries. The cost of the canal also by either of these routes would be at least \$11,000,000 greater than by the Choptank survey and \$28,000,000 more than by that of the Sassafras River. The choice, therefore, would appear to lie between the Choptank and Sassafras routes, when considered from the standpoint of the expert engineer.

Much has been written in favor of an enlargement of the existing Chesapeake & Delaware Canal, with a view to making it answer the requirements of an open passage to the sea. But the problem presented differs only in degree from the passage around the capes. The Elk River empties into the Chesapeake at the extreme head of navigation, and the outlet of the canal is correspondingly remote from the ocean on the Delaware side. To reach the sea 12 miles beyond Cape Henlopen less than 100 miles would be saved in the passage and not more than ten hours. The present canal affords excellent communication with Philadelphia, and would constitute an essential part of a direct line between Chesapeake Bay and New York by the improvement of the Raritan Canal, but as a relief to the port of Baltimore along the line of its foreign trade the route of the Chesapeake and Delaware Canal offers small inducements.

The utility of a ship canal across the Maryland-Delaware peninsula is apparent. In 1893 the value of exports from the port of Baltimore was \$73,153,482 and that of imports was \$14,858,621, making a total of \$88,012,103. The foreign tonnage movement for 1893 was 1,701 ships, carrying 2,389,677 tons; and in 1893 it was 1,403 ships, carrying 1,879,092 tons. If to this is added a fair percentage of the Chesapeake and coastwise traffic, say 5,000,000 tons, there is available for the ship canal at least 7,000,000 tons a year. Computing the revenue on the basis of 15 cents per ton, \$1,050,000 would result—6% on the estimated cost of the Choptank route or 12% on that of the Sassafras line.

VARIATIONS IN THE MILLING OF GOLD ORES—XI. GRASS VALLEY, CALIFORNIA.

Written for the Engineering and Mining Journal by T. A. Rickard.

(Continued from page 488.)

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Before concluding this description of the mills of Grass Valley it will be well to draw attention to one or two matters of detail.

DEPTH OF DISCHARGE.

At the North Star there is no serious effort made to maintain a uniformity in the depth of discharge. This is a mistake. A certain depth of dis-

charge will give the conditions most favorable to good work with a certain kind of ore; it should be the business of the millman to ascertain what this particular depth is, and it should then be his effort to prevent too wide a variation from it. At the Empire this is done in the two ways previously described, while at the W. Y. O. D. mill the dies are only used for six weeks and are then discarded.

The plan adopted in the latter case is a sensible one because, though there is a waste of iron in discarding dies that are not quite worn out, this loss is lessened by the sale of the scrap, and is offset by the prevention of

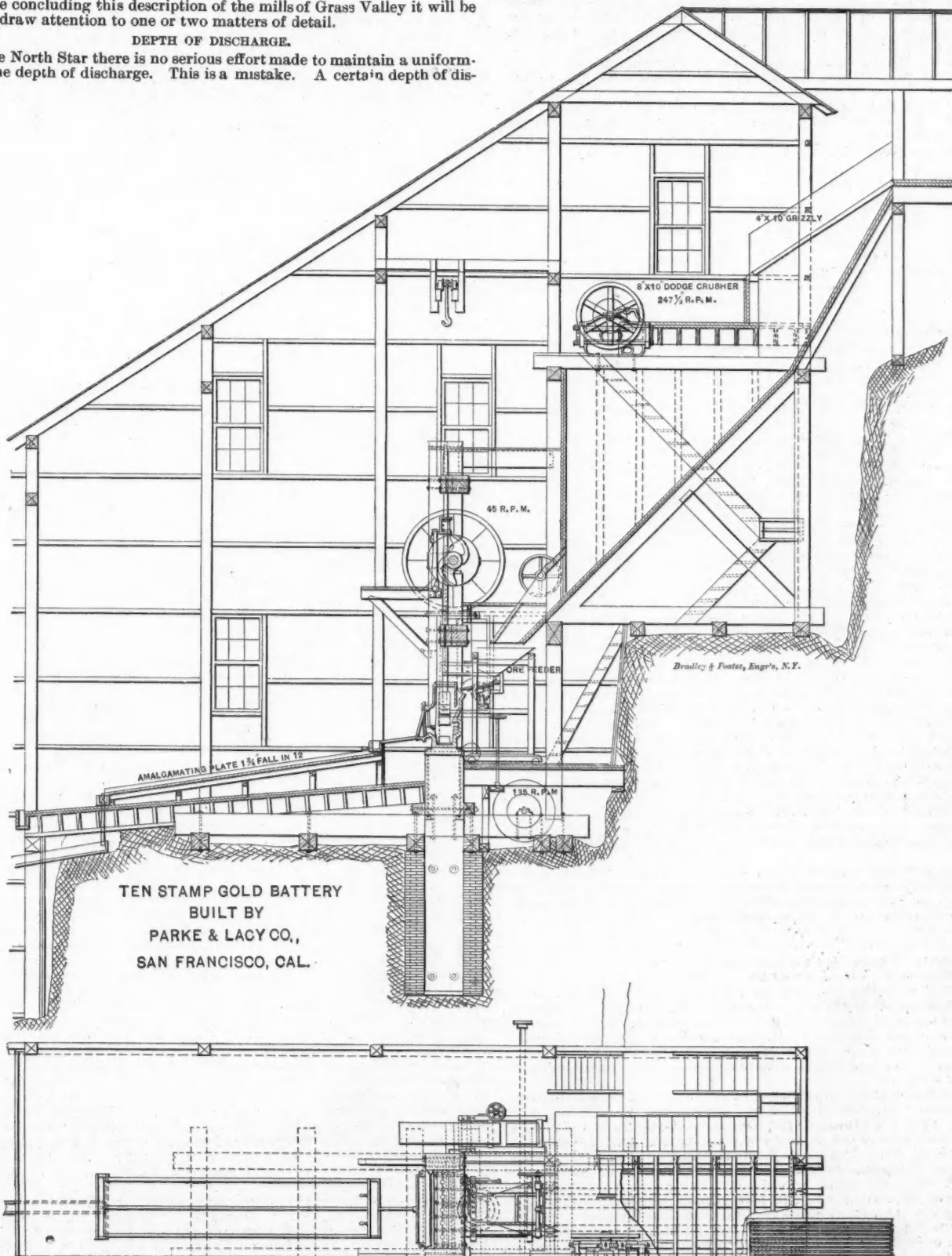
charge will give the conditions most favorable to good work with a certain kind of ore; it should be the business of the millman to ascertain what this particular depth is, and it should then be his effort to prevent too wide a variation from it. At the Empire this is done in the two ways previously described, while at the W. Y. O. D. mill the dies are only used for six weeks and are then discarded.

place of wire cloth does not appear to the writer to be any sort of an improvement. Many years ago the ordinary round-punched Russia iron gave place to angle-slot screens for the reason that it was found that the round-punched iron was constantly becoming clogged. The openings of the angle-slot screen kept themselves more clear.

In time it was found, however, that the angle-slot screen was unsatisfactory because the sizing which it did was, to a marked degree, irregular. Brass wire cloth was introduced. The time of service of the angle-slot was nearly twice as long as that of the wire cloth, but this was offset by

SCREENS.

In the matter of screens the millmen of Grass Valley have taken a retrograde step. The adoption of round punched tin plate screens in



TEN STAMP GOLD BATTERY
BUILT BY
PARKE & LACY CO.,
SAN FRANCISCO, CAL.

their cost, which was also twice as much. The former cost \$3.90 per screen and the latter \$1.94. The brass wire was made of 29-30 and 30-31 wire. Steel wire cloth was also tried, but while it wore well, that is to say, it was not quickly abraded, yet its usefulness was much diminished by the fact that the horizontal wires shifted, presenting the appearance shown in the accompanying sketch, Fig. 4, where it is evident that at b b there will be scarcely any discharge, while at a a a coarse pulp can readily find an exit. Therefore they were discarded and brass wire cloth, which did not share this defect, was substituted.

The average life of a brass wire screen, 30 mesh, was found to be from 20 to 24 days, that is to say, it served to discharge about 200 tons of crushed ore. During a period of four years there were crushed at the North Star mill 70,000 tons of ore and the expense in screens during this period amounted to \$675. The screens were made to order in rolls 100 ft. long and of such a width, 45 in., as permitted of three strips being cut. Each strip was 15 by 52 in. One roll of brass wire cloth cost \$135, so that the screen cost \$1.94. The expenditure under this head was therefore slightly less than 1c. per ton of ore treated.

Recently, punched tin plate screens have been introduced; and as is so frequently the case in matters of this kind their adoption by one plant has led to their use at nearly all the Grass Valley mills. It is often the practice here, as it used to be at Angels Camp, Calaveras, to burn off the tin upon the blacksmith's forge, with the idea that in this way the iron plate became annealed and therefore toughened. Since the tin will amalgamate its removal also prevents the adhesion of mercury. When the tin is not removed as above described it is found that at the end of the first week's service the abrasion of the pulp has rubbed off the tinned surface. In this respect tin plate is no improvement on brass wire. It is true that the brass becomes partially amalgamated and the screen rots in consequence; but previous to the time when this action has become of any importance sharp bits of quartz have cut the wire, and it has become necessary to make a patch and to turn the screen frame upside down. Mr. Abadie informed me that he found that the brass wire had a shorter life when the stamps were crushing waste (that is, wall rock containing only a very small amount of gold), and very little amalgam was being discharged through the screens, than when good gold quartz was being treated and more mercury was being added to the mill-stuff.

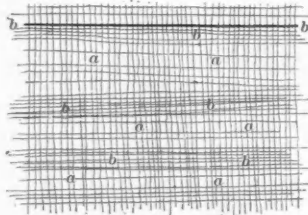


Fig. 4.

Brass wire screens now cost \$1.55 each, which is about three times as much as the tin plate, which costs only 55c. per screen: the former gives a service of 25 days, as against 14 to 15 days for the latter. But the relative expense is not worth notice since per ton of ore it is less than 1c. As compared to angle-slot or round-punched screens the wire cloth has the immense advantage that, with openings permitting of the passage of particles of equal size, it has a much larger area of discharge per square foot of screen. It therefore gives a more even product and produces less slime. A screen is a device for sizing the particles of pulp to be delivered to the amalgamating or concentrating apparatus placed below the stamps. Wire cloth most nearly gives the sizing medium required, while angle-slot or round-punched iron plate only very imperfectly fulfils this function.

All the Grass Valley mills have their screen frames at a forward inclination of about 10°. As compared to a vertical arrangement this helps to spread the pulp over the surface and to give the aid of gravity to the force of the splash in ejecting the crushed ore.

AMALGAMATING PLATES.

It will have been noted that the tendency at Grass Valley is to increase the amount of silver put into the electroplated copper amalgamating plates. At the North Star the plates carry 1 oz. of silver per square foot of copper; at the Empire, 2½ oz.; and at the W. Y. O. D., the newest mill, the quantity has been increased to 5 oz. per square foot.

The milling practice of this typical Californian mining district has undergone one important modification during recent years. I refer to the introduction of an inside amalgamating plate. This was done at the North Star mill in 1888. It was found that the shallow discharge brought the plate too near the stamp; therefore the chuck-block was inserted. The latter gives a sort of false lip to the mortar box and serves to heighten the discharge. It is a wooden block, extending the whole of the front of the inside of the battery, and to it the plate is attached. (See drawing, Fig. 1, of mortar at North Star mill.) At the North Star and W. Y. O. D. mills twice as much amalgam is saved inside the mortar as upon the tables outside, while at the Empire from 50 to 85% of the total amalgam obtained by the mill comes from the inside of the mortar. Of the saving thus effected in the battery about one-half comes from the plate itself and the other half is derived from the treatment, at the fortnightly clean-up, of the battery residues.* The tendency at Grass Valley is to increase the percentage of saving effected within the mortar.

This feature of the milling practice is of great interest since it indicates a tendency to make the mortar more of an amalgamating machine than has heretofore been the case in California. On the Pacific slope the stamp battery is primarily a crushing machine, hence the quick, short drop and the shallow discharge. The work of amalgamation has hitherto been left for the most part to other apparatus, and the introduction of an inside amalgamating plate tends to bridge over the wide divergence existing between the milling methods of Colorado and California. The

* In the Gilpin County mills all the amalgam saved inside is obtained from the two front and back inside plates.

modification is right in principle to the extent that the sooner you catch your gold the less likelihood there is of loss, and if you can extract it in the mortar do not allow it to pass out in order to arrest it on the tables. On the other hand, the cheap milling of California is largely dependent upon the rapid crushing of the ore by the fast dropping stamps; and the use of an inside plate, by demanding an increase in the depth of discharge, compels a diminution in the crushing capacity of the mill. It becomes a business proposition to be carefully weighed by the manager of the mill who has to decide whether the increased extraction in the mortar more than compensates for the less rapid reduction of the ore.

The little W. Y. O. D. mill sets a good example to its larger and more pretentious brethren in the matter of the arrangement of its amalgamating tables. These are 50 in. wide and 14 ft. long, giving a clear, wide, full amalgamating surface which shows much good sense and judgment compared to the short aprons and narrow sluices of the other plants. The narrow sluice plate of the Californian mill is a relic of the days when gravel mining apparatus was introduced into quartz crushing mills; it is indefensible and the sooner it is discarded the quicker will there be removed the only serious blemish of the typical American mill.

The accompanying drawing* will illustrate a representative well-designed Californian plant.

Grass Valley has been a school to many good millmen, and it has been the birthplace of many of the most important improvements introduced into gold milling practice. At another time the writer hopes to trace the gradual growth of the American stamp mill from the rough and clumsy machine of the early fifties to the magnificent and complete mechanism whose muffled thunder now echoes among the foothills of the Sierra Nevada.

COOKING PEAT IN SWEDEN.

The Royal Peat Coal Commission was appointed in Sweden in May, 1893, in consequence of a petition from Madame Gustava Augel, of Jonköping for a grant of 30,000 kr. (\$8,500) to carry out on a large scale the production of peat coal by a method patented by her. The commission consisted of Professors P. Klason and Lector O. E. Westin, of the High Institute, and Herr H. Palmberg, peat coal engineer to the Iron Office. The object of the commission was partly to study Madame Augel's method and to decide whether experiments on a larger scale were to be made, in order to turn the method to account, and partly also to inquire into and report upon Lieutenant H. Ekelund's peat coaling process. On September 29th-October 1st the commission witnessed two coaling experiments made in a furnace constructed by Herr C. Laurenius, engineer of the Ebbe Ironworks, at Jonköping, according to Madame Augel's method, and on October 2d and 3d experiments were conducted with a furnace erected by Lieutenant Ekelund. Some trials were also made with peat dust.

In the report recently rendered, the commission says of the Augel method: From the particulars set forth in the patent, it appears to be considered that the coaling might be effected by the heating of the peat in a perfectly closed chamber without escaping tubes. As, however, this is impossible on account of the enormous pressure caused by the steam developed from the water in the peat, together with carbonic acid gas, it became necessary to furnish the retort with escape tubes. In this respect the method has departed from that set forth in the patent, and has become almost identical with that followed in the manufacture of so-called "red coal," used in the manufacture of gunpowder. By experiment it was ascertained that the temperature in coaling with the Augel process lies between 180° and 210° Celsius. Under 180° the coaling progresses very slowly, and under 220° to 230° over-distilled peat tar is largely produced, whereby a current of inflammable gases is developed. In coaling large charges of peat this would cause considerable difficulty. An estimate of the probable cost of producing 900 tons of peat coal by Madame Augel's method shows that the cost of the same would be equal to that of mineral coal, taking the price of the latter in Sweden in round figures at 26 kr. per ton (29s. 3d.). However, in this estimate no profit is reckoned, neither on the preparation of the peat, nor on the coaling or the loading and freighting, reselling, storage, etc. On the other hand, the Augel peat coal is less in volume and weight than mineral coal, a hectoliter of the former weighing only 24 kilos., while a hectoliter of the latter weighs 76 kilos. If the peat is to be manufactured into a more concentrated fuel, the raw material must be cheaper than is the case with the dried peat. This is what Lieutenant Ekelund has attempted. His method consists in using, as raw material, peat containing from 40 to 60%, or quite twice the quantity commonly found in dressed peat. Lieutenant Ekelund is of opinion that he overcomes the difficulties of the large content of water of the raw material by constructing his coaling furnace in three sections, viz., a preliminary heating chamber, a coaling chamber and a cooling chamber, and by introducing the well-known method of utilizing the escaping gases in the process of coaling. But thereby no new principle has been introduced.

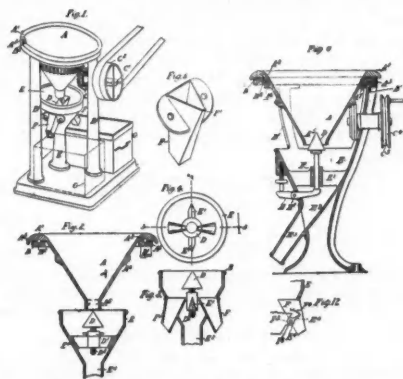
The first patented peat-drying furnace, invented in England in 1838, had also three sections with sliding valves between, and indeed, in the first peat furnace ever invented—Brocken, 1746—the same idea was fundamental. This experiment cost, in the course of four years, some £35,000. As regards the Ekelund furnace, the commission considers that, on the whole, it is identical with that suggested by Halliday for the drying of sawmill refuse, and the furnace employed in 1860 at Haspelmoor, in Bavaria, for making peat briquettes. The peat dust, too, the commission considers excessively dear if dressed, and dried peat is to be used as raw material. The commission has, however, witnessed with much interest the experiments in firing with peat coal-dust, and considers that Lieutenant Ekelund deserves great credit for having proved its utility as fuel. Experiments in the same direction are being carried on in Germany on a large scale, and it would be advisable to grant moneys for the same purpose in Sweden. If peat coal should prove too dear for the purpose of dust fuel, the peat itself might serve with advantage. Besides, the anthracite coal found in Sweden, being loose and easily freed from gases, should furnish an excellent material.

* Which I owe to the courtesy of the Park & Lacy Company, San Francisco.

CLARKSON'S SAMPLING MACHINE.

The accompanying illustration shows a perspective view and sections of a machine recently patented in England by Thomas Clarkson, of Fairholme, England, for taking samples from granular or pulverized materials, such as ores or minerals. In this machine a revolving hopper is carried upon a vertical spindle, the hopper having an annular opening at the bottom, the size of which may be controlled in any convenient manner, say by means of a circular and preferably conical cap or valve, the position of which may be adjusted by a screw and nut or other suitable means. From the hopper the material to be sampled falls in an annular stream into the receptacle provided for it, and it is from this stream that the sample is to be taken. This may be effected by means of one or more scoops or shoots projected into the path of the annular stream and, being preferably inclined downward, the material which they intercept falls down the shoots into sample boxes or receptacles.

Usually a known proportion of the material will be intercepted and the whole of the sampling may be effected at the one operation, the required quantity, say for example 10%, being taken at once: where, however, it is desired to take a sample of a sample this may be done by providing the apparatus in series placing two or more upon the same or separate shafts, but so arranged that the material sampled by the first apparatus is delivered to the second or subsequent apparatus, each of which again samples it. Thus in the first apparatus the sampling scoops or equivalent may be made of such size that they will take say one-half of the total amount of grain passing; this will be delivered to the next following apparatus, which will again halve or divide the stream by which perhaps 25% of the whole will be obtained, or this may be again divided, and so on



CLARKSON'S SAMPLING MACHINE.

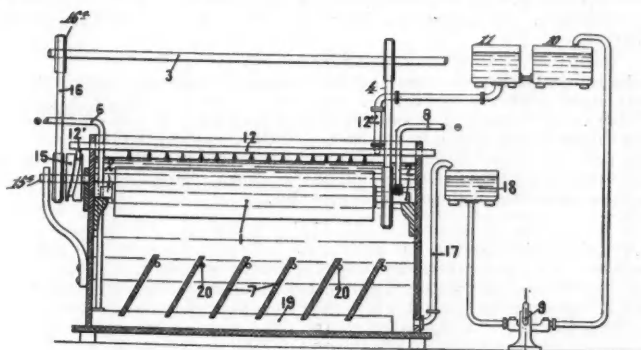
The sampling shoots should be made adjustable so that each shoot may be adjusted to intercept more or less of the stream as required, and, if preferred, a scale and index may be arranged in connection with each shoot or all the shoots, so that they can be accurately set to the required position. If desired, shoots of different capacities may be used in connection with the one apparatus.

The inventor says, in his specification: "My object in intercepting a 'true segment' of the falling stream is to secure a fair average sample, that is to say one representing in the same proportion all the particles or ingredients making up the bulk. This will be more readily understood when it is explained, that according to the nature of the material the stream may be denser or composed of smaller or heavier particles at, say, the inner side than at the outer side, and consequently, unless the mouth of the intercepting shoot be 'truly segmental' to the stream, the sample obtained therefrom will contain either too small or too large a proportion of the denser or larger particles, though the sample regarded generally might bear the desired proportion to the bulk."

The Iron Industry in Australia.—A substantial bonus is now available in New South Wales for the manufacturer who will turn out the first large consignment of locally made iron, says the "Australian Mining Standard." Recently we presented figures which showed that there was a very large falling off in the demand for almost every class of ironwork. We, therefore, asked the question whether it would not be wise for the government of the colony to pause before it committed itself to any large outlay in respect to ironwork with the view to taking advantage of the lower prices which must prevail. But such caution need not prohibit the development of our own resources. There are splendid deposits of iron ore in this colony awaiting the skill of the artisan, and why should that product remain unutilized if there are people who are willing, if offered the inducement, to start works necessary to convert the iron ore into a valuable commodity? Labor is now in a more settled condition. Fuel is very cheap, and can be counted on not to increase in value. Given these three conditions, all that remains is a local market, and there ought to be sufficient iron consumed in Australia to keep at least one large manufactory at work. The value of such works in times of war would be immense. In connection with the general question, it is of interest to note that a discovery of very valuable iron ore was made in Tasmania some little time back on the Blythe River. The Government geological surveyor, Mr. Montgomery, has just written a report on that ore body, which he estimates contains 30,000,000 tons of hematite ore of the finest quality. Mr. Montgomery has gone very carefully into the question of cost, and has come to the conclusion that even with fuel and freight at extremely high rates the ore could be converted into pig at \$13.27 per ton, as compared with a cost of \$10.80 in Great Britain. But to achieve this result he provides that the smelting shall be done at Newcastle, in New South Wales. This stipulation emphasizes the fact that care ought to be exercised by the Government of New South Wales how it binds itself in regard to the iron trade, and as the opening of iron manufactories at Newcastle would be a universal boon, no check should be placed in the way of their establishment.

THOFERN'S APPARATUS FOR THE ELECTRO-DEPOSITION OF METALS.

A new method for the electro-deposition of metals has recently been patented in the United States by Mr. Hermann Thofehn, of Paris, France. This invention has for its object to provide apparatus whereby electrolytic depositions of copper or other metal can be obtained, in such a way that the metal deposited possesses great fineness and homogeneity. To accomplish this object the invention consists essentially in the combination of an electrolytic bath, of an anode and cathode, and a reciprocating spraying pipe for showering the electrolyte upon the cathode. The accompanying drawing is a vertical sectional view of an electrolytic bath embodying the invention. This illustrates the working of the apparatus in connection with a cylinder which is to be plated with electrolytic metal. The cylinder is mounted on gudgeons 2 and is rotated by any suitable mechanism, such for example as a belt connection 4 with a shaft 3. The anodes 7 are arranged in an inclined position near the bottom of the tank in which the cylinder is mounted to rotate, and these anodes are coupled up and traverse the bath so as to deposit the metal upon the cathode 1 and leave at the point 8 to return to its source. The current enters at 6. The electrolyte is kept in constant circulation by a pump 9, so as to force the liquid received from the tank into a reservoir 10, placed at a higher level, wherein the liquid is purified, that is to say, freed from matters which are injurious to the quality of the deposit. From the reservoir 10 the liquid passes into a neighboring reservoir 11, wherein it is restored to its standard strength, and from which it falls so as to shower the cathode. Under a pressure regulated according to the elevation of the feed-tank 11. The showering is produced by a spraying pipe 12, receiving a reciprocating movement longitudinally, so that all parts of the cathode will be



THOFERN'S APPARATUS FOR ELECTRODEPOSITION.

equally showered. In the case of cylinders the discharge pipe is straight, but in the case of revolving surfaces the pipe may conform to such surfaces. The discharge pipe 12 is perforated with small holes arranged very close together, so that all parts of the metallic deposit will be acted upon by the liquid jets falling under a pressure which may be easily regulated. A longitudinal slot extending all along the discharge pipe would answer the purpose equally well. By the means described a homogeneous metallic deposit is obtained on the surface of the cathode, giving to the metal the qualities required by the trade.

The electrolyte is maintained at a uniform level, and above the point of submergence of the cathode, by means of the supply pipe 12' the level of the fluid being preserved by means of the overflow pipe 17, which discharges into the tank 18, the latter being connected by a suitable pipe with the pump 9 and the pump being connected with the tank 10.

The reciprocating movement of the spray-pipe 12 is effected as follows: The ends of the pipe are prolonged sufficiently to enable them to be carried through the sides or walls of the tank, which thus furnish a bearing or support for the same. The supply-pipe 12' is connected to the spray-pipe 12 by means of a flexible section of pipe. Upon one of the outwardly projecting ends of the spray-pipe 12 is mounted a finger 12', which lies in a cam-race formed in a disk 15, which is carried by a shaft 15a, driven by a belt 16, from a driving pulley 16a, carried by the power-shaft 3. It is evident that a number of spraying-pipes 12 may be simultaneously operated by the means described.

As illustrated, the anodes 7 are arranged above the conductor, and consist of a strip or plate 19 which is protected from the corrosion of the fluid, save at points of contact for the anodes, by an insulated coating of caoutchouc or gutta-percha. The rods 20, formed of insulating material, are used to support the anodes.

Iron-Making in Central Africa.—According to a recent account the Baluban tribe of Central Africa are famous for their skill in casting and forging iron. They construct tall cylindro-conical furnaces of clay with tuvers of clay and an ingeniously devised wooden bellows. They make arms for hunting and for war, and collars and bracelets of iron. The neighboring natives resort to them in great numbers to exchange their own products for the manufactures of the Balubans. These methods are somewhat similar to those of the Matabele, described by Mr. Bent in his interesting book on Mashonaland.

Underground Tin Mining in Perak.—Heretofore tin in Perak, as in all the districts of the Malay Peninsula, has been carried on by stripping and washing the surface deposits; but "Indian Engineering" says that underground mining has lately become common among the Chinese. It has been introduced by some Australian Chinamen. The workings are generally in the hillsides, where the miners sink pits and put in regular galleries. Unfortunately, the greater number of these workings are so dangerous, owing to the miners not using timber in their levels, that the inspectors of mines have had to stop their workings; but, under proper control, this kind of mining may become very useful, as it is much more economical in many cases than the present method of stripping the land.

Coal in Roumania.—New deposits of lignite are reported to have been discovered at Dorcesti, in the Dambovitza district of Roumania. Although the quality of the lignite is not yet known, arrangements are being made to open out the deposit.

Petroleum Operations in China.—A Szechuan syndicate of merchants has obtained authority from Li Taotai of Chungking, to open petroleum wells in the prefecture of Szechuan. Instructions have been given to a hong in Japan to buy the necessary machinery and plant for that purpose. The petroleum is said to be good.

Aluminum Bayonet Scabbards.—Experiments are being conducted at the armory in Springfield, Mass., in the use for aluminum for the bayonet scabbards for the new rifle. While the metal works well in bending and is about 50% lighter than the steel scabbards, no satisfactory method has been devised for soldering the edges together.

Cave Discoveries in New South Wales.—Two fresh caves, filled with beautiful stalactites, have been discovered at Jenolan. New chambers have also been found at the Abercrombie Caves. The first of these is said to be 120 ft. in length, and from 60 to 70 ft. in height. Another chamber was found, but not bottomed, on account of insufficiency of rope; but, to try the air, a lighted candle was lowered 35 ft. which burnt clearly.

Trial of the Engines of the "Texas."—The two triple-expansion engines built by the Richmond Locomotive Works, Richmond, Va., for the battleship "Texas" have had their dock trial at the Norfolk Navy Yard. This trial consists in running the engines continuously for four hours while the ship is at the dock, the object being to determine the smoothness of working, etc. The engine of the "Texas" passed the test very successfully.

American Oil Steamers on the Manchester Ship Canal.—Our English exchanges note the arrival on May 5th of the first cargo of oil from Philadelphia shipped to Manchester direct and not by way of Liverpool. The shipment was made by the Standard Oil Company in the "Ambrose," the first American steamer proceeding through the Manchester Canal. The announcement of the dispatch of the cargo was quickly followed by an immediate sale of the oil in Manchester.

Nickel in Silesia.—The Schlesiische Nickelwerke is now preparing to erect works for the extraction of nickel from the ores; it is expected that the construction and arrangement of the plant will take about 18 months. This company owns several mines near Frankenstein, and in 1891 began working the Benno and Martha shafts, from which 1,160 metric tons of nickel ore had been taken up to the end of 1893, carrying from 1.5% to 4% of nickel. The Benno shaft is now 52 metres (170.5 ft. deep) and so far the nickel contents of the ore have increased gradually with depth. The work of exploration is to be continued on an extended scale.

Population of Australasia.—New South Wales has the largest population of any of the Australasian colonies, the estimated figures at the end of 1893 being: New South Wales, 1,223,370; Victoria, 1,174,022; Queensland, 432,298; South Australia, 346,874; Western Australia, 65,064; Tasmania, 154,424; New Zealand, 672,265; total, 4,068,317. From those figures it will be seen that considerably more than one-fourth of the whole Australasian population is found in New South Wales. New Zealand, however, seems to have the largest population of any of them in proportion to its area. New Zealand has many natural advantages, and is, upon the whole, the most prosperous of the colonies.

Pennsylvania Railroad Traffic.—For the year 1893 the total tonnage of the Pennsylvania Railroad division of the Pennsylvania Railroad was 38,919,612 tons. This division includes the main line from Philadelphia to Pittsburg, with its branches. A large proportion of this tonnage was from the mines and iron works on the line, as shown by the detailed statement. The anthracite coal carried was 4,993,419 tons; bituminous coal, 13,384,727 tons; coke, 4,009,727 tons; making for coal and coke in all 22,387,735 tons, or 57.5% of the total. Iron furnished 10.7% of the total tonnage, made up as follows: Pig iron, blooms, billets, etc., 1,996,756 tons; rails, 325,131 tons; bar and sheet metal, 648,902 tons; castings and machinery, 1,776,847 tons; a total of 4,147,636 tons. Ores were 1,221,879 tons, or 3.1% of the total; petroleum, 423,101 tons, or 1.8%; stone, sand and other quarry products, 2,427,614 tons, or 6.2%; lime, brick, cement, etc., 797,640 tons, or 2.1%. Of the total tonnage carried 81.4% was thus of this class of freight.

A Peculiar Appearance in Gold.—In a paper read recently before the Royal Society of New South Wales, Prof. A. Liversidge says: "In experimenting upon the reduction of gold from solution, to test the theories of the formation of gold nuggets, I found that the pure gold plates and foil which I used in many cases presented a 'moire-metallique' appearance, such as is so familiar to us in tin plate and galvanized iron. The whole surface of the plate became dotted over with more or less regular crystals like those often seen on tin plate: they are, however, much more regular and rectangular in outline and very small, the majority being less than 1 mm. sq. Afterward I found that this crystallization could be brought about by merely boiling the pure gold foil or plate in hydrochloric acid. The acid, although free from nitric acid, dissolved traces of the gold, probably due to a little free chlorine. This 'moire-metallique' gold may have been observed before, but I have not come across any reference to it. Advantage might be taken of it for decorative purposes on jewelry and other articles made of gold plate."

Magnetization of Iron and Nickel Wire by Rapid Electrical Oscillations.—At a recent meeting of the Kaiserliche Akademie der Wissenschaften of Vienna, Professor Klemencic read a paper on this subject, "From the amount of heat developed in a wire of a magnetic

material traversed by electrical oscillations the author calculates, by means of the formula given by Lord Rayleigh and Stefan, the value of μ (the permeability). The heat developed in the wire under observation was determined by means of a thermo-electric couple, and was compared with the heat developed in a non-magnetic wire under similar circumstances. The following are some of the values obtained for: Soft iron, 118; steel wire, soft 106, hard 115; Bessemer steel, soft 77, hard 74; nickel, 27. These values agree very well with those obtained by Lord Rayleigh and Bauer for very feeble magnetizing forces. The results obtained by these observers show that for certain values of the magnetizing force the permeability is constant, and that it afterward rapidly increases."

Oil Fuel at the Columbian Exposition.—A report recently published shows that the total consumption of Ohio crude oil furnished by the Standard Oil Company, at the Columbian Exposition from March to November was 273,201 barrels. The daily average in March was 90 barrels; in October 1,860 barrels. The quantity of oil actually used as fuel in the main boiler plant for six months was 252,724 barrels. In the estimates given oil is taken at 7 lbs. per gallon, and 42 gallons per barrel (making 294 lbs. per barrel), the contract price for any quantity required having been fixed at 72.5c. per barrel, equivalent to 0.2466c. per lb. The evaporative values are summed up from the averages of the daily reports as follows:

Water evaporated from 212° F. at 125 lbs. pressure, 324,786 lbs. hourly; consumption of oil, 23,792 lbs. hourly; water evaporated for 1 lb. of oil burned, 14.25 lbs.; cost of oil burned per hour, \$56.20. The cost per horse-power hour was, for oil, 0.57c.; labor, 0.06c.; total, 0.63c.

The statement adds the following estimate for the cost of the work with coal as fuel: Estimated cost of coal, including receiving, storage, removal of ashes, etc., \$3 per ton of 2,000 lbs.; estimated evaporative value, 7 lbs. water to 1 lb. coal burned. On this basis coal would have cost \$69.60 per hour, or \$13.40 more than the oil. Per horse-power hour the cost would have been 0.81c., showing an advantage of 22.5% in favor of oil.

This advantage is estimated. It is to be regretted that there was no opportunity of making an actual comparative service test of the values of the two kinds of fuel.

PATENTS.

UNITED STATES.

The following is a list of the patents relating to mining, 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.

TUESDAY, MAY 22D, 1894.

- 520,032. Furnace. Richard Bow, McKeesport, Pa. Assignor of two-thirds to Richard Hampson and James M. Brown, same place. A furnace with air chamber above the grate-bars and a perforated removable plate between the air-chamber and combustion chamber.
- 520,035. Furnace. George M. Conway, Milwaukee, Wis. Combination of a series of combustion chambers into which air is admitted with the gases from the fuel.
- 520,056. Process of Manufacturing Steel Castings. Samuel P. Hutchinson, Philadelphia, Pa. Assignor to the Hutchinson Steel Company, New York, N. Y. The process consists in racking iron castings in a mixture of various ingredients, and exposing them to a high degree of heat.
- 520,060. Apparatus for Rolling Beams. Frederick H. Kindl, Pittsburg, Pa. Combination of a series of three or more vertical rolls.
- 520,076. Art of Molding Metal. William H. Pelkey and Antoine St. Louis, Fair Haven, Vt. Assignors of one-third to George M. Fuller, same place. A metal mold surface with a thin coating of an asphaltum compound.
- 520,133. Coal Conveyor. Hans L. Carstein, Cambridge, Mass. Combination of trestle, movable chute and means for giving the motion.
- 520,257. Electrolytic Cell. Thomas Craney, Bay City, Mich. Combination with an outer containing vessel forming the cathode department, of an inner porous vessel forming the anode department.
- 520,287. Plunger Worker for Concentrating Jigs. Otto Abeling, Burke, Idaho. Combination of a revolving cam, rod and piston.
- 520,296. Manufacture of Metal Tubes. Claud T. Cayley, London, England. In this process a punch and hollow die are used, and the punched blank is drawn down through annular reducing dies.
- 520,299. Apparatus for Heating Metal Electrically. Charles L. Coffin, Detroit, Mich. Combination of high resistance electrodes, means for insulating the same, with a movable contact to bring the electrodes into circuit with the metal.
- 520,306. Method of Heating, Welding or Working Metals Electrically. Charles L. Coffin, Detroit, Mich. Subjecting the metal to the influence of a moving voltaic arc while simultaneously heated by radiation from incandescent electrodes.
- 520,350. Apparatus for Electric Welding. Rudolph M. Hunter, Philadelphia, Pa. Assignor to the Johnson Company of Pennsylvania. Combination of holding clamps with a vessel containing a conducting fluid, in which the pieces to be welded are immersed.
- 520,377. Process of Winning Metals from Magnetic Iron Sand, Metallic Ore Dust and Metallic Residues. Ernest Nienstaedt, New York, N. Y. Assignor of one-half to Leo Goldmark, same place. The process consists in forming the dust or sand into blocks and then treating them in a blast furnace.
- 520,401. Process of and Apparatus for the Manufacture of Gas. Frank B. Johnson, Willard P. Hall, Walter Oakley and Charles F. Currey, Topeka, Kan. Assignors to the Johnson Syndicate Construction Company, same place. The process consists in passing steam and air into a receiver containing a chemical solution and iron filings and passing the resulting gases into a conveyor containing oil.
- Reissue. 111,420. Furnace. Joseph Hinstin, Paris, France. Combination of automatic feed, inclined grate and combustion chamber.

GREAT BRITAIN.

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

WEEK ENDING MAY 12TH, 1894.

- 10,054 of 1893. Miners' Safety Lamps. A. James, J. Hodgkin and H. Lucas, Pontypriid.
- 12,905 of 1893. Props and Framework for Mines. H. C. Barnes, Harrington.
- 11,804 of 1893. Phosphate Manures. C. Seynold and F. Heeder, Elberfeld, Germany.
- 12,264 of 1893. Detector and Estimator of Fire-Damp in Mines. G. Fletcher, Derby.
- 19,765 of 1893. Manufacture of Cement from Alkali Waste. B. K. Rigby, F. A. R. Neill and A. C. Carr, St. Helens.
- 1,377 of 1894. Crushing Mill. C. Morel and A. Hempel, Drome, France.
- 3,678 of 1894. Crushing and Concentrating Phosphates. A. F. and A. G. Beyer, Paris.
- 5,416 of 1894. Rock Drills. J. W. Larmuth and R. B. Howarth, Manchester.

PERSONALS.

Mr. E. C. Pechin has returned to Cleveland, O., from an extended stay in the Birmingham district in Alabama.

Mr. Gil S. Peyton has been elected superintendent of the Pan-American Mining and Milling Company, at Prietas, Mexico.

Mr. Roger Pendergrast, superintendent of the Sierra Nevada Mining company, is going to Carlsbad, Germany, for his health.

Mr. C. B. Holland, who represents the English stockholders of the Otis Steel Company, recently arrived in Cleveland, O., from England.

Mr. M. Nelson, formerly connected with the blast furnace at Fond du Lac, Wis., will have charge of the Excelsior Furnace at Ishpeming, Mich.

Mr. A. L. Dickerman, consulting engineer for the Colby-Hoyt syndicate, has been visiting mines in the neighborhood of Monte Cristo, Washington.

Mr. J. Parke Channing has resigned his position as assistant general manager of the Calumet & Hecla Mining Company, and the office has been abolished.

Mr. W. F. Mattes, of Pueblo, Colo., has organized a party to purchase the Grand View mine at Ouray, Colo. He will have the management of the mine and will build a mill there.

Dr. Francis Simonds, has opened a laboratory at 20 Platt street, New York, for experimental, analytical and assaying work. In addition he will offer facilities to students who wish to work or experiment, instructing and assisting them. He will make a specialty of original investigations in chemical and metallurgical processes.

The Senate has confirmed the nomination of Prof. Charles D. Walcott to be Director of the United States Geological Survey, in place of Major J. W. Powell, resigned. Professor Walcott has been for some time Chief Geologist of the Survey, and has practically had charge of the whole work for several months past, on account of Major Powell's illness. He is an accomplished geologist, and has done some excellent work both before and since his connection with the Survey. It is understood that he will make no important changes in the lines upon which it has been managed, but that his intention is to pay more attention to geological work.

Prof. James Dwight Dana has resigned his position in Yale College on account of his advanced age, which compels him to abandon regular work. He was the oldest professor connected with the university. Professor Dana is now 81 years old, and graduated from Yale in the class of 1833. He returned to college as tutor and studied under Silliman the elder, and succeeded to a full professorship 50 years ago. Since then he has had full charge of the department of natural science. He has been honored by Harvard and other colleges in America and by German Universities. The department has been placed in the hands of Prof. H. S. Williams, who has been associated with Professor Dana for a number of years.

OBITUARY.

John H. Dalzell, one of the prominent capitalists of Pittsburgh, Pa., died there on May 27th. He was president of the Pittsburgh, Allegheny & Manchester Traction Railroad Company, and was interested in many industrial enterprises of that locality.

SOCIETIES AND TECHNICAL SCHOOLS.

Technical Society of the Pacific Coast.—At the regular meeting in San Francisco on Friday, June 1st, Mr. Geo. W. Sherwood, civil engineer, of Riverside, will present a paper upon the "Nicaragua Canal," based upon personal experiences in connection with this work while an engineer in the employ of the company.

Western Foundrymen's Association.—At the annual meeting in Chicago, May 16th, the reports showed the society in good condition. The following officers were elected: President, Geo. M. Sargent; vice-president, C. A. Sercomb; secretary, B. M. Gardner; treasurer, H. S. Vrooman; executive committee, J. M. Sweeney, W. N. Moore, O. T. Stantial, E. C. Greenlee, H. L. Hollis. After some discussion on general topics, the secretary read a paper by Mr. H. L. Hollis, on "Chemical Differences of Some Russian, German and American Castings," which was briefly discussed.

Western Society of Engineers.—At the regular meeting in Chicago, May 2d, Jacob B. Rohver and Dion Geraldine were elected to membership. Mr. Charles J. Roney was chosen librarian in place of Thomas Appleton, resigned. After other routine business had been disposed of, Mr. Charles V. Weston read a paper on the "New Tunnel of the West Chicago Street Railway Company, near Van Buren Street." The paper was illustrated with numerous blue-prints showing the construction in detail. After the reading, discussion was participated in by Messrs. Casgrain, Hill, Artingstall, and Liljencrantz.

Engineers' Society of Western Pennsylvania.—The regular monthly meeting was held in Carnegie Lecture Hall, Pittsburgh, on the evening of May 17th. The discussion of Mr. Thos. H. Johnson's paper regarding the "Theory of Dynamic Work Applied to Static Forces" was continued with much animation, several members taking part, and Prof. Mansfield's views on the subject were presented in a paper prepared and forwarded by him. A very interesting paper on "Smoke Prevention by the Use of Producer Gas," by Mr. Blauvelt, of Philadelphia, was read by Mr. White, and elicited considerable discussion.

A paper on the "Determination of Arsenic in Lead Base Bullion" was presented by Mr. John E. Williams at the meeting of the Chemical Section which was held on May 18th.

Scandinavian Engineering Society of Chicago.—At the regular meeting, April 27th, the president, Mr. E. Lee Heidenreich, read a paper on "Monier Constructions." He fully described the system, showed the necessary calculations for it and explained the method of construction. As to the points commonly brought against the Monier system, he stated that numerous experiments undertaken with Monier plates have failed to prove the correctness of these charges. He said that this system has been applied not only to floors, walls, partitions, stairs and columns, but to entire buildings, particularly in tropical or volcanic regions; for instance, in Africa, where the German government has erected several buildings. In railroad construction this system has been used to a considerable extent, both in tunneling and in culverts, first on the Guaira Caracas and Caracas Antimano railroads in Venezuela, and later in Germany and Austria; in the latter country it has also been used for fortifications.

Columbia College, School of Mines.—On Friday, June 1st, the members of the Summer School of Mining of the Columbia College School of Mines left New York for Michigan. The class going to Buffalo by rail and thence by steamer to Haughton, Mich., which will be the headquarters while in that region. The class is under the supervision of Prof. Robert Peele, Jr., who has preceded them in order to make arrangements. The class, in all likelihood will live in tents, although at this date it has not been fully decided. They will stay altogether six weeks: five weeks of the time will be spent in practical work in the mines and at the expiration of that time the class will be joined by Professor Kemp for a week of practical field geology. The work will consist in taking the dips and strikes of the various strata, thereby giving practice with the compass and clinometer. A map of the district will be constructed with the data thus obtained. The men will then leave for New York, stopping over at Niagara Falls to take in the interesting geology of that district. The class numbers 30, of whom 23 seniors and 7 juniors.

Purdue University.—In January last the engineering laboratory of this institution, at Lafayette, Ind., was partially destroyed by fire. A circular from the university has now been issued, showing what progress has been made in repairing the damage then done. It is seen from the circular that, while the loss from the fire was very great, it will not, after September 15th, embarrass in any way the regular engineering work of the university. So far as the laboratories are concerned, not only is a complete restoration of all that was lost provided for, but many additions are to be made. The importance of the locomotive work that originated at Purdue has been especially recognized. Before the fire there was a single locomotive—now, by the addition of a working model of a Baldwin compound, there will be, in effect, two—then the locomotive was in the general laboratory—now it is to occupy an annex by itself; then it was an isolated plant, remote from railroads—now the annex is in track connection with the railroads of the country; then the plant was arranged to test the Purdue locomotive "Schenectady" only—now ample provision has been made for testing any locomotive that may be offered. It is to be noted also that the process of improvement is general; that while so much has been done for locomotive engineering the needs of other departments of laboratory work have not been overlooked.

Engineering Association of the South.—In compliance with invitations issued, a number of members and invited guests boarded the steamer "Colbert" at Decatur on the morning of May 12th to inspect the Mussel Shoals Canal as the guests of Uncle Sam. A canopied barge pushed in front of the steamer, well filled lunch baskets and a perfect day gave much pleasure. After passing through the Elk River Shoals Canal and inspecting the locks at that point, the boat passed on to the head of the Big Mussel Shoals Canal. Here the party disembarked, and were led to a train consisting of one small engine and an unique car ahead of it. The car had wooden truck frames, no springs, and was canopied with canvas. The track upon which this train ran is 48 in. gauge, and is used in towing the boats through the canal by locomotives. The ride was delightful, stops being made at all locks, bridges, aqueducts and other places of interest. At lock No. 7, the engineer headquarters, the party made a long halt, and ate lunch under the shade-trees in the grove surrounding the residences of the engineer officers. After lunch the quarters of the men and the shops were inspected. The party then proceeded to lock No. 9, the last lock of the middle

division. Returning, a stop was made at the aqueduct, the water having been withdrawn, affording a perfect view of its construction. Further on, another stop was made at the great dredge, which was in full operation, lifting the silt up with an endless chain of buckets and sluicing the same through a long pipe entirely over the wall of the canal. During all this time, Mr. W. A. McFarland, Assistant United States Engineer, in charge of maintenance of the canal, was guiding the party and explaining the various features with patience and skill. Before parting with them, the Association was called to order, and a vote of thanks to Capt. Geo. W. Goethals, who was unavoidably absent, and his able assistant, Mr. McFarland, was heartily given. On board the "Colbert," on the return trip to Decatur, the meeting was concluded, the routine business being disposed of.

Association of Engineers of Virginia.—The regular informal monthly meeting of the Association was held May 16th, in Roanoke, Va. The subject of "Photochromy," or the reproduction of colors by photography, was presented by Mr. Rene de Saussure. After giving a brief account of the photographic art and of the partially successful attempt to bring out colors by the use of colored screens, Mr. de Saussure gave a very interesting description, along with a demonstration of the scientific theories involved, of the latest and very successful effort of a French scientist, who has reproduced the exact colors of the object on the plate, but which colors, however, cannot be transferred by printing. The only difference between this process and that ordinarily used is the finer preparation of the plates, and the introduction of a mirror in the camera immediately behind the plate. The principles involved are the relative lengths of the waves of light for the different colors, and the interference produced by the reflected rays acting with the direct rays of light. The process is a very fine demonstration of the correctness of the wave theory of light, as the whole process is worked out on that theory as a basis. The one drawback to the colored photographs coming into common use is that the plates have to be extra fine and sensitive and have to be used within a day or two after they have been prepared, and so cannot be put on the market for sale. Improvement will more than likely overcome this difficulty before very long.

The board of directors have decided to hold the summer meeting on Saturday, July 14th, at Alleghany Springs, Va., and desire that all members who expect to attend should inform the secretary, by postal, of such intentions before June 10th, so that proper arrangements can be made. All members who expect to present papers at the meeting must send in the subject of such papers. Members are also urged to prepare papers on subjects that they are interested in, and that would lend interest and profit to the meeting. The entertainment and publication committee has charge of the arrangements.

National School of Electricity.—The prospectus of this school states that it is the outgrowth of the lectures delivered in the Electrical Building during the Columbian Exposition. It has been organized by Prof. J. F. Barrett, who was chief of the department of electricity at the Exposition, and the honorary faculty includes Messrs. T. A. Edison, Nicola Tesla, Drs. Elisha Gray, F. A. C. Perrine; Profs. H. J. Ryan, W. A. Anthony, G. I. Shepardson, Brown Ayres, M. T. O'Dea, D. C. Jackson and B. F. Thomas. The purposes of the school are thus explained: It is the intention to organize a class in electricity in every city and town where the population will justify it; to provide thorough instruction under a system that will make the study of electricity not only interesting but of great commercial value to students. Weekly meetings of each class will be held permanently at some centrally located point, agreeable to the students. At each meeting after the first there will be a short review with questions and answers. The course is intended to cover a period of 40 weeks, with one new lesson for each week. The course will occupy about one year, allowing for holiday seasons and intemperate weather. It must not be understood that students can be taught all there is to learn of electricity in this brief time, but there is no doubt that at the end of the course students will have a clear grasp of the subject, and will be familiar with every kind of electrical apparatus, and fully competent to complete their education along scientific lines at their leisure. The lessons will be short, and in language that students of most limited education can readily understand. For each week of the course a lesson-leaf will be issued, one at a time, that will contain all information necessary to a complete understanding of one subject. After the first lesson, the leaf will also contain questions upon the lesson of the previous week, calculated to fix the main points in the student's mind. The lessons will be accompanied by drawings sufficiently explanatory, and classes will be furnished with the simpler forms of apparatus for experimental work, and for class demonstration. Blackboard work by the instructor will also enter largely into the system of teaching. No technical phrases or electrical terms will be employed until they have been taken up in regular course and mastered. Nor will algebraic equations nor geometric symbols be used. The lessons are intended to be an epitome of accepted theories and of the latest and best practice. Mr. J. A. Hornsby, Monadnock Block, Chicago, is secretary.

INDUSTRIAL NOTES.

The Duquesne, Pa., Tube Works, employing 600 men, has closed down for lack of coke.

A new foundry is to be built shortly for the Harrison Safety Boiler Works, in Philadelphia.

The puddling department and rolling mill of the Norton Iron Works at Ashland, Ky., have been started up.

The Wellman Iron and Steel Company has started up its Bessemer steel plant at Thurlow, Pa., with a force of 125 men.

Monroe & Son, Pittsburg, have received orders for two 150 H. P. boilers for the Lincoln Foundry Company, of the same city.

The Connersville Ind. Blower Company is increasing the capacity of its works by an addition to the buildings and equipment.

The National Tube Works, at McKeesport, Pa., are closed down on account of a strike of the men against a reduction in wages.

The Pennsylvania Furnace and Casting Company has been organized in Pittsburg by Paul N. Devette, G. W. Flower and James Risley.

The Bertha Zinc Company is preparing to start up its furnaces at Pulaski, Va. Several of them have not been running since last fall.

The American Bridge and Iron Company at Roanoke, Va., has resumed work with a good force, having received a number of orders.

Messrs. A. Groetzing & Sons, Allegheny, Pa., report a large number of orders for their "dermatine" pinions, both from old and new customers.

The Philadelphia Engineering Company has the contract to build and equip the blast furnace plant of the Hamilton Iron and Steel Company at Hamilton, Ont.

Mackintosh, Hemphill & Co., Pittsburg, have just completed a new 38-in. blooming mill driven by a 42 by 60-in. engine, for the Duquesne Steel Works at Duquesne, Pa.

The Kittanning Iron and Steel Company has been organized, with \$350,000 capital stock. The directors are James Mosgrove and John A. Colwell, Kittanning, Pa.; C. T. Neale, Pittsburg.

The Acme Machinery Company, Cleveland, O. recently shipped two bolt cutters to the Hungarian State Railroad shops at Buda-Pesth, and has an order for a large bolt header to go to Chile.

Excelsior Furnace, at Ishpeming, Mich., is being put in order and will go into blast as soon as it can be made ready. It is a charcoal furnace, with a capacity of 40 to 50 tons of pig iron daily. The Cleveland-Cliffs company will furnish the ore for the furnace.

The sheet mill of the Reading Iron Company, at Reading, Pa., began operations on May 28th, having been idle owing to the damage done by the recent floods. The mill may not be run longer than a week, as the supply of soft coal is becoming very short. The rolling mill remains idle on that account.

The Amalgamated Association of Iron and Steel Workers concluded their convention at Cleveland, O., on May 26th, and elected the following officers: President, M. M. Garland; secretary, J. C. Kitgallon; assistant secretary, Steven Madden; treasurer, Roger Evans.

The Scoville Iron Works, Chicago, has resumed the manufacture of mining machinery, after a lapse of several years, in which it has been wholly engaged in other work. Their first new plant constructed for mining work is now ready for shipment to Colorado, and will be at the mine ready for work in about a month.

The Electrical Association, of Waterbury, Conn., has placed the contract for its new power station with the Berlin Iron Bridge Company, of East Berlin, Conn. The building will be 66 ft. in width and 183 ft. in length, the side walls of brick and the roof covered with the company's patent anti-condensation corrugated iron roof covering.

William Halpin, 44 Washington street, New York, manufacturer of the "Wells" light, recently received a letter from Mr. Wheeler, engineer of the Illinois-Mississippi canal, in which he says: "During the past year I have been using eight of your lights on the work here and have found them in every way satisfactory. For several months two shifts of men were worked, quarrying rock and handling earth into cars by their use, and I find the work at night as economical as that by day."

Last week the steel plant of the Pennsylvania Steel Company at Steelton, Pa., was compelled to shut down because of the flood. This week it remains shut down for the want of water. The break in the canal at Hecktown prevents the filling of the city level, and, as the ponds which supply the works are fed from it, the plant could not start up on May 23, as anticipated. No. 1 blast furnace, the only one of the four in blast, has been banked owing to a scarcity of water. None of the steelmaking departments or steel foundry is in operation. It is uncertain when they will start.

The Corliss Steam Engine Company, Providence, R. I., has been sold to a syndicate, and the company has been reorganized. The capital stock will be increased and the operations of the company extended. The new directors are; S. Holman, Worcester, Mass.; Gen. William F. Draper, Hopedale, Mass.; William H. Bent, Taunton, Mass.; Stephen A. Jenks, Central Falls, R. I.; Haven C. Perham, Lowell, Mass.; P. W. French, Boston; David M. Thompson, George R. Babbitt, Charles E. Giles, Providence, R. I. The works, when running full capacity, can employ more than 1,000 men.

The Baltimore Iron and Tin-Plate Company has moved its plant from Canton to Locust Point. It has secured a lease for three years on the property and plant of the old Coates Rolling Mills at Locust Point, with the option of purchase. The company was incorporated in January, 1894, with a capital stock of \$50,000. The incorporators are: E. Rice Daniel and Robert Girvin, of Swansea, Wales; James E. Ingram and Rufus W. Applegarth, Joseph F. Marthai and John M. Ingram, of Baltimore. The officers are; James E. Ingram, president; John M. Ingram, secretary, and Robert Girvin, treasurer and general manager.

After being out of blast about a year there is a good prospect for the Woodstock coke furnaces at Anniston, Ala., to be blown in shortly. A recent examination was made by an expert from Virginia to estimate the necessary cost of repairing not only the coke furnaces, but also the charcoal furnace now standing and to rebuild the one burned down in 1891. When the coke furnaces are in blast here, coke from the Coosa coalfield is used, the quality of which has been greatly improved during the past year both in its chemical and physical composition, so that it now compares very favorably in both these respects with other Alabama coke. Both the Anniston and Hercules pipe works at Anniston, Ala., are resuming on full time, having long contracts for pipe ahead. The iron ore banks of Calhoun County are all idle at present, but if the Woodstock blows in these banks will resume.

An interesting boiler test was recently made by the Citizens' Electric Railway and Power Company, at Mansfield, O., in which comparative results were secured from a "Cahall" boiler, made by the Aultman & Taylor Machinery Company, of that city, and a horizontal tubular boiler. The results were as follows:

	Cahall boiler.	Horizontal boiler.
Duration of test.....	7.5	7.250
Pounds of water evaporated per pound of coal, actual conditions.....	7.934	7.042
Pounds of water evaporated per pound of coal from and at 212°.....	8.453	7.88
Pounds of water evaporated per pound of combustible from and at 212°.....	9.931	9.071
Average steam pressure.....	111 lbs.	80 lbs.
Average temperature of escaping gases.....	311.2°	416°
Quality of steam.....	.65 super-heat	ure. 2.4°
Average percentage in favor of the "Cahall" boilers.....	13.2%	

MACHINERY AND SUPPLIES WANTED.

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

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GENERAL MINING NEWS.

ALABAMA.

(From our Special Correspondent.)

Clay County.

The old copper mines near the eastern base of the Blue Mountains are being prospected by a gang of miners under the superintendence of James Lovelless for the purpose of determining the extent and capacity of output of sulphurets. The work is being carried on by Mr. Chambers, of Talladega, with a view of ascertaining if a sufficiently large output can be assured to warrant building a spur track to connect with the Louisville & Nashville main line for shipping these sulphurets to a Charleston, South Carolina, acid plant.

Cleburne County.

Arbacochie Mining and Milling Company.—A crosscut has been driven through the ore body on the Lee property, and the company is taking out ore, which is hauled to the bin ready for crushing so soon as the arastra plant is complete. It is putting in six arastras, the daily capacity to be eight tons each. It is claimed that this unusual output for an arastra is to be secured by some newly invented devices, which are being added to the plant. The prospect work now going on consists in drifting along the strike of the ore body on the same level as it was crosscut. The thickness is between 4 and 5 ft. of pay ore. The arastras are being constructed so that an overflow will carry off the graphite in the

ore, thus preventing it from coming in contact with the mercury and interfering with amalgamation.

Bennifield and Sutherland.—These properties in the northern portion of the gold belt were sampled recently by J. H. Pratt, of Birmingham, in the interests of a syndicate who contemplate purchasing provided the grade of the ore is satisfactory.

Talladega County.

Clifton Iron Company.—One of the charcoal furnaces at Ironaton was recently blown in. Both have been out of blast for some months past. The ore on the lands of this company is well adapted for car wheel iron so far as low percentage of phosphorus is concerned, but the high percentage of manganese proves somewhat troublesome.

CALIFORNIA.

Texas Consolidated.—It is reported that a rich body of ore has been encountered in the Texas Consolidated mine at Old Diggings. Not long since the fifth lowest tunnel was commenced, which was expected to tap the main ledge at a distance of 1,700 ft. But already ore has been struck which assays very high.

Amador County.

Hector.—E. C. Voorhies has secured a bond on this property at Sutter Creek. He will develop it on an extensive scale.

Kern County.

In speaking of this county's mines the Bakersfield "Californian" says: "Miller & Co., at Havilah, are now working a force of miners day and night in their antimony mines. John Hayes has a force of men working the Canty gold mines near Havilah and intends soon to start up his mill. It is stated that a fine vein of pay rock is now being opened in this mine. At Keyville, one of the first and most prosperous mining camps in Kern county, there are now some 30 or more men at work, most of them taking out good pay. At Erskine creek, Stebbins & Potter are still developing the Heldman mines.

Mining locations, both quartz and placer, are constantly being made out on the desert, says the Bakersfield "Californian." Ex-Senator Del Valle has recently bought a one-eighth interest in the San Francisco, the rich gold mine which has lately been discovered between Jawbone and Kelson Canyons, about nine miles from Red Rock. It is said the Messrs. Valencia have refused \$30,000 for their three-quarter interest. The main shaft is only 21 ft. deep. The ledge is said to be from 18 to 24 in. wide and has been traced through two extensions, the San Domingo and the Philadelphia.

Sunrise.—A strong ledge has been struck in the new incline shaft being sunk on this mine on Osborn Hill, says the Grass Valley "Telegraph." A contract will be let to sink the shaft 100 ft.

Mono County.

Bodie Consolidated Mining Company.—The latest weekly official letter says: The north drift from west crosscut 1,300 level was extended 4 ft. We are carrying the drift 8 ft. wide; the face is in good ore, with occasional ribs of porphyry. Upraise from above north drift was extended 6 ft. Are stopping out ore from Burgess winze, 200 level. Have been repairing the Bodie mill and making preparations for starting up.

Bulwer Consolidated Mining Company.—The latest weekly official letter says: Commenced to crush ore in the Standard mill on May 15th. Have crushed 23 tons. Average battery sample \$17.15; tailings, \$5.70. South drift from No. 7 was extended 18 ft. It has shown an improvement for several days past as they advanced and are now getting some fair grade ore. They are stopping out some milling ore from the openings from No. 6 upraise. Cleaned out and fixed 200 ft. of main drift, 100 level.

Plumas County.

Quincy.—A gold bar, valued at \$2,080, was shipped last week from the Quincy hydraulic mine. It was a one-third clean-up of an 18 days' run, the total of which will be about \$6,000. The Quincy is said to be the largest hydraulic mine now working under the Camminetti law. It was enjoined from working about 11 years ago, and W. C. Ralston and others who are now running it took it up, according to the San Francisco "Report," solely on its past record.

Riverside County.

Within the past few weeks a great many new finds have been reported, says the Riverside "Enterprise." A very rich find is said to have been located a few miles from Yuma on the line of the Southern Pacific road. The new mill recently erected by the Ibis Mining Company, is now in operation; but owing to a short water supply the mill is not to run to its full capacity.

Santa Rosa.—This quartz mine, near Perris, has been sold by ex-Governor Blaisdell, of Nevada, to W. W. Brevoort and W. H. Griffith, of Denver, Colo. The new owners, it is said, will build large reduction works at once.

San Bernardino County.

Altuma Mining Company.—At this company's property in the Morongo district a tunnel 145 ft. long has been run, which tapped the vein 75 ft. below the surface. At this point a body of rich ore, said to run over \$100 per ton in gold, was found. A drift has been run on the vein about 26 ft., and about 6 tons of rich ore have been taken out and sacked for shipment. The ore body is about 2½ ft. wide and is continuous as far as the development work has been carried.

Boomerang.—The main shaft of this mine, says the Vanderbilt "Shaft," is now down nearly 350 ft. and it is being sunk at the rate of 20 ft. per week. A new drift has been started at the 300-ft. level. The shaft and all the drifts are in ore all the way.

Martin Bros. and Richard Cronin, of Pleasanton, are about to open up their quicksilver mine in San Antonio Valley says the Livermore "Herald."

Morongo King Mining Company.—This company's mill is all completed and ready to start up on a large amount of ore already mined as soon as the pipe-line is completed.

Vanderbilt District.—In the Vanderbilt mining district, says the Los Angeles "Herald," the mills have stopped running for lack of water, but as there is an abundance of water in the mines, which increases as the sinking progresses, and in a short time it is expected that there will be all the water required to run any number of stamps. The water in the shaft on the Bronze is now sufficient to run the mill on the ore taken from the Gold Bar, the adjoining claims. The Green-Campbell mine is opened to a depth of over 200 ft. and shows up a large amount of ore.

Shasta County.

Quartz Hill Gold Mining Company.—This company is actively engaged developing its mine at Quartz Hill.

COLORADO.

Mineral surveys approved by United States surveyor general for Colorado during the week ending May 19th were as follows: No. 8,720, Pueblo, Hale & Holmes; 8,800, Pueblo, Yankee Girl; 8,843, Pueblo, Fairview, Fairview No. 2, Fairview No. 3, Fairview No. 4, Fairview No. 5, Fairview No. 6, and Fairview No. 7; 8,880, Gunnison, Caro; 8,671, Pueblo, Grass 8,789, Pueblo, Tom Moore or World's Desire; 1,854, Pueblo, Chesapeake; 8,883, Denver, Gold Quartz; 8,822, Pueblo X, 10 U 8; 8,859, Pueblo, Little Caddy, Georgia, Belle and Seattle lodes; 2,373, Am., Durango, Veta; 7,527, Am., Pueblo, Bogart; 8,077, Am., Pueblo, Camilla.

Boulder County.

Baxter.—About 13 men are employed on this mine, taking out ore and developing the property. The mineral is run through the Boston's 40-stamp mill with fair success. The Boston mine is owned by the same company and furnishes work for 12 men. Between these two mines the mill is kept running steadily.

Columbia.—This mine, which is owned by W. W. Huling, has been leased by Lummex, Taunton & Co., who have also leased the Madeline stamp mill. Twenty-five men are engaged in the mine and mill, and are taking out good ore.

Humboldt.—This mine employs 20 men. The ore for this mill is taken principally from the Peoria lode, a new discovery made in the bottom level of the Humboldt mine.

Morning Star.—This mine works 30 miners at present developing and opening up new ground for stoping. This property, it is said, has produced \$40,000 during the last four months and is in good ore.

Ward District.—According to the local papers Ward is now one of the most active camps in Boulder County. New shaft buildings and machinery are being put up at the several mines of the camp.

Clear Creek County.

During April there were shipped from Georgetown 68 cars containing 1,692,000 lbs. of ore, of which 45 cars went to Denver, 17 cars to Pueblo and 6 cars to Argo. During the same period in 1893 the shipments reached 94 cars, which contained 2,557,500 lbs., showing a falling off of 865,500 lbs.

Empire shipped six cars during April, of which two cars went to Denver, three to Idaho Springs and one to Argo, besides the shipments by wagon to Georgetown. This camp is coming to the front rapidly. Two mills were recently erected and will soon be in operation.

There were shipped from Silver Plume by rail during April 15 cars of ore, of which 12 cars went to Denver, 1 to Canyon City and 2 to Georgetown. Four cars of slag from the old Brown smelter at Brownville were shipped to Denver during the same time. The most of the ore produced at Silver Plume is hauled to Georgetown by wagon.

Seven-Thirty.—Lessees working on the 140 ft. level east on the Seven-Thirty mine have opened up a vein of solid galena ore 12 in. thick, which according to a mill run shows 344 oz. silver to the ton. This vein is now exposed for a distance of 100 ft. Some parties are driving the 80 ft. level east ahead with the view of encountering the above ore vein. They have 50 ft. further to go to reach the objective point.

Custer County.

Geyser Mining Company.—This company has secured a lease and bond from Messrs. Wolff Bros. on the Garnet claim, and also from Messrs. Klemchen, Hart, Bower and Menzel on the Aetna, both claims adjoining their property. The lease and bond runs for a period of three years. The terms are \$10,000 for each claim, and 25% royalty on the ore taken out. The Geyser company to secure patents on both claims without any expense to the owners. At the Geyser mine the station for the winze engine-room at the 1,350 level is almost completed, and it is expected to begin sinking there this week, says the

Silver Cliff "Rustler." Meanwhile some ore is being taken out of the prospecting drifts in the 2,000-ft. level. The orehouse will be enlarged. The force of men has been increased. The company is not at present shipping any ore, presumably waiting for a better market.

El Paso County.

A telegram from Cripple Creek says that the miners held a meeting on May 23rd and decided to stand for eight hours for a day's work, leaving the question of wages as between \$2.75 and \$3 to a board of arbitration. They further demand that the Union be recognized in the employment of miners. They are still keeping close watch of the hills, examining the stages for firearms, holding up all pedestrians and sending them out of the hills, and acting in general with all the tactics of an army in a strange country. The mine-owners have not yet agreed to appoint a committee to arbitrate, but it is understood that they will not agree to any proposition that involves the recognition of the union. The deputies are still at Divide and Colorado Springs.

Ella Helean Gold Mining Company.—This company has been incorporated and has already secured a municipal franchise to mine under the streets of Cripple Creek. The incorporators are C. H. Corliss, of New York, F. H. Pettingell, of Colorado Springs, and P. P. Stewart, William Wanner, Joseph Strong and D. H. Weyand, of Cripple Creek. The development shaft, has it is said, already encountered \$20 ore at a depth of 30 feet. The company has in addition to its franchise secured rights to mine under 200 lots in the center of the town.

(From our Special Correspondent.)

Gold Dollar.—A rich pocket of tellurium ore was found in this mine in Cripple Creek at the bottom, of 85 ft. level, last week, from which 50 lbs. of ore was taken of an average value of \$50 per pound. The pocket was found between two joints at right angles to the vein, the formation being granite. The tellurium in this mine is different from that found in other mines of the camp, in that it is without gold visible to the eye, or even under a microscope. The mine is being worked under a six-months lease. This is the only property in the camp that has a steam pump at work. The fort-wall is a very fine-grained diorite, locally known as porphyry, whereas the hanging wall is granite almost a gneiss, the vein itself being an altered granite, the mica being replaced by iron pyrites and tellurium.

New York Mining Company.—The Jack Gee, belonging to this company, which has been shipping about three cars of ore per month, is about to close on account of the action of the miners' union.

Portland Mining Company.—A grab sample taken from the Portland mine on Battle Mountain, from a new strike, assayed 110 oz. of gold per ton.

Hinsdale County.

Near Lake San Christoval a large body of tellurium ore has been uncovered. The vein is said to be the same as the Golden Fleece vein. It is on the opposite side of the creek from the Golden Fleece, in a direct line, and it is said to have the same dip and the same character of ore. Different assays have been made of the mineral and all run high in gold. Many claims have been staked.

Saguache County.

Alpha.—The force of men at this mine has been doubled. The shifts are at work on the Aluha tunnel, which will cut the Alpha ore chute, one shift on a new tunnel to cut the Diamond I vein, and one shift on the ore shaft on top the hill. From the latter workings the men are now sacking the 50th carload of ore taken out since last December. Returns from the last car show a profit of \$254.

Creede Quintette Mining Company.—At a meeting of this company the following officers were elected for the ensuing year: J. F. Benedict, president; F. M. Varney, vice-president; Curtis J. Smith, secretary; Thornton H. Thomas, treasurer. These, with C. D. Hayt, of Denver, constitute the board of directors. The company owns the Monon group at Sunnyside, and will do considerable work on the property this summer.

Kreutzer Sonata.—The men are working the crosscut to catch the rich sulphide vein encountered in the tunnel 100 ft. farther up the hill. This vein shows considerable wire silver, but at this point is but about a foot wide. Conditions in the crosscut indicate the vein will soon be reached.

New York and Last Chance Mining Company.—This company has shipped 50 tons of ore to the Ontario mill, Park City, Utah, to be treated by the amalgamation process. If the experiment results successfully the company will construct a plant at Creede, at the cost of \$100,000, says the Denver "News," capable of handling 50 tons per day.

Ridge.—Late smelter returns from ore from this mine show \$15 in gold to the ton and 70% lead.

San Miguel County.

Smuggler-Union Consolidated Mining Company.—At the annual meeting of this company, the following officers were elected: J. A. Porter, president; Richard Pearce, vice-president; N. N. Fowler, secretary and treasurer, and James R. Grant, A. Ellers and W. D. Bishop, directors. The company is not shipping to the smelters at present because of bad roads in the vicinity of the mine.

IDAHO.

Alturas County.

Whale Mine.—There are now some 50 tons of first-class ore on the dump of this mine at Bullion, says the Hailey "Times," which were taken out by leasers during the winter.

Yellow Jacket.—Superintendent Sheldon has gone to Denver to purchase a new mill to replace the one recently destroyed by fire.

Owyhee County.

Oro Fino.—This mine was recently sold by the sheriff to satisfy a mortgage held by T. Regan, of Boise. The property was bought in by Mr. Regan for \$159,363, the amount of his claim. The only other bidder was J. C. Kemp van Ee. The Oro Fino, says the Silver City "Avalanche," is one of the large properties of War Eagle mountain and the last on the Chariot vein to be worked. We attribute the cause of the company's failure to the large amount of water which it had to contend with in working the mine. To raise the water from the Oro Fino it was necessary to drain all the adjoining properties, as the vein is open and accumulates water rapidly.

Shoshone County.

Bunker Hill & Sullivan Mining Company.—As noted briefly last week, the report of a strike of the miners telegraphed East was not correct, and no strike took place.

There are now, says the "Coeur d'Alene Miner," about 350 men employed and the mill is running full blast night and day. There is a considerable amount of development work in progress in different parts of the mine. Drifting is in progress both ways from the bottom of the winze which has been sunk from the Reed tunnel level—the main level of the mine—to a depth of 114 ft. This is now the lowest level in the mine. It has been opened each way from the shaft a distance of several hundred feet, the work being done under contract by W. S. Harris, who employs about 15 men. The new electric hoist which was introduced into the mine about two months ago has proven a very efficient piece of machinery and is an active argument in favor of its general use instead of steam power for underground hoists and other machinery in mines. The new hoist at the Bunker Hill occupies a floor space but 8 x 10 ft. in size. It is operated by an Edison motor of 30 H. P., and the ease and celerity with which it can be manipulated is remarkable. It has an efficiency of 89%, the loss of power in transmission being very small. The winze on which the hoist has recently commenced is now but 30 ft. deep, but will be carried to a total depth of 365 ft. to connect with the Reed tunnel level. This is west of the gulch, on what is known as the Bunker Hill mine on level No. 3. It is about 800 ft. from the mouth of the drift on which it is located. The work here in progress is a very important feature of the development of the mine, as the character of the ground which it opens up will determine whether or not it can be operated under present prices of the metals. There are now about 70 men on the Bunker Hill who are engaged solely on development work. The company has just received two carloads of 30-lb. steel rails, to be used on the Reed tunnel level. These are being put in preparatory to the use of a locomotive on the Reed tunnel level at some time in the future, as the haul is now getting to be too long for horses. This plan will be adopted provided that there is sufficient ore in the new ground which they are opening up west of the gulch to justify the change.

MICHIGAN.

Copper.

Franklin Mining Company.—A special meeting was held in Boston, May 26th, at which the stock holders ratified the action of the directors in extending the corporate existence of the company for a period of 30 years from April 3d, 1887. There were 36,801 shares of stock voted on. This action confirms that taken at the annual meeting, the special meeting having been called to fulfill the technical requirements of the Michigan law.

Quincy Mining Company.—Among the interesting features of the season's work at this mine, says the Hancock "Copper Journal," the new adit, just started in the hillside above the smelting works, will be a valuable improvement. This drift has a width of 4 ft. in the clear at the top, and 6 ft. at the bottom, with a height of about 7 ft. The portion of the adit now in progress of construction has not yet reached the solid rock, and the timbering through the earth consists of 3-in. pine plank supported by legs and caps of cedar logs about 1 ft. in diameter. This adit, which will be driven into the hill for a distance of about 2,300 ft., will cut No. 5 shaft at the seventh level. As most of the water in the Quincy comes from the upper levels of the mine, the greater part of the present cost of pumping will be saved by the new drift, which will pipe out all the water to this depth.

Tamarack Mining Company.—This company has declared a dividend of \$4 per share, payable June 20th. The last dividend (of the same amount) was paid in December, 1893.

On May 13th No. 3 shaft, to which we have several times referred (Engineering and Mining Journal, December 30th, 1893, and March 17th, 1894), reached a depth of 4,020 ft., while at the same time No. 4 shaft was 3,915 ft. below the surface. No. 3 shaft, it is expected, will have to go about 100 ft. deeper to reach the Calumet conglomerate lode, if calculations are correct. On the surface the rockhouse at No. 3 shaft is completed with the exception of the placing

of the machinery. The hoisting engine is now being built and is similar to that in use at No. 2 shaft. The drum, however, will be 36 ft. in diameter at center, with conical ends, and hold 7,000 ft. of rope. The drum at No. 2 shaft is 30 ft. in diameter and straight faced. The hoisting engine-house will stand 30 ft. north of the shaft and will probably be built of stone, but will not be erected until after the lode is cut. The distance between Nos. 3 and 4 shafts is 650 ft. Nothing in the way of a hoisting plant for No. 4 shaft will be done until the lode is cut. No. 2 shaft is 3,280 ft. deep, or to the 19th level, a start having just been made to sink to the 20th. The 19th level is opening up very well.

Iron.

The coal strike and other causes have made ore boats a little more scarce than shippers like to see, and competition is not as sharp as had been expected. The latest rates noted to Lake Erie ports are 45c. per ton from Escanaba, 65c. from Marquette, and 80c. from Ashland.

Iron—Gogetic Range.

Colby Mine.—In this mine at Bessemer 280 men have been put at work, 200 being employed underground and 80 on the surface. The mine has been idle for an entire year.

Sunday Lake Mine.—This mine now is making regular shipments of iron ore.

Iron—Marquette Range.

Jackson Mining Company.—The big air compressor delivered here some two or three months ago for the North Jackson is at last being set up and put in readiness for use, says the Norway "Current." This is considered as assuring a continuance of work at the mine, in view of the fact that the machinery was held for weeks in anticipation of an order to close down.

Lake Superior Iron Company.—The new shaft at Section 16 mine of this company has reached a depth of 70 ft. It is being sunk upon an incline, and has had much hard ground to cut, which has made the work slow at times. The stripping of the lean ore body to an extent to permit of the mining of 20,000 tons of ore has been completed, and they only await the completion of the skipway to begin raising ore. This will require two weeks, probably.

Marquette County.

James Ames and Peter J. Lundquist will explore for gold in the hills north of Ishpeming during the coming summer, says the Marquette "Mining Journal." They have taken an option on the 40 acres of land adjoining the 40 on which the Peninsula gold mine is located on the north. It is their intention to thoroughly explore every foot of land on the 40. In view of the work done on the Peninsula property some few years ago, when a vein 32 ft. in width was discovered in two shafts that were then sunk, they are confident that they will have no difficulty in striking the same vein. The shafts on the Peninsula property were sunk to a depth of 69 and 80 ft., respectively, when the work was abandoned. In one of these the vein was tested by drifting for a distance of 80 ft., and good results were obtained. It is known that the vein carries good milling rock for at least 600 ft., it having been followed that distance, but it was never thoroughly explored. Good milling rock was also found at other places, aside from this vein on the Peninsula property. Free gold has also been found on the property. The milling rock, such as has been discovered there, will yield about \$3 to the ton.

Several Ishpeming men contemplate exploring for gold this summer, but Messrs. Ames and Lundquist are the first to make a start. To those who

MINNESOTA.

Duluth.

(From our Special Correspondent.)

Iron ore shipments for the season to date are as follows: Vermilion range, Chandler, 77,331 tons; Minnesota, 59,950; Mesaba range, Canton, 54,841; Oliver, 35,030; Mountain Iron, 27,000; Franklin, 23,240. Total, 277,382. The Minnesota Iron Company has shipped 192,122; the Lake Superior Consolidated, 62,000, and the Franklin Mining Company 23,240 tons. It is expected that the Pioneer, Hale, Lake Superior, and possibly the Biwabik will be added to the shipping list shortly.

Iron.

The shipments of iron ore from the docks at Two Harbors from the opening of navigation up to May 15th were 148,954 tons, of which 45,948 tons were from the Minnesota Iron Company, 55,711 tons from the Chandler, while 47,295 tons came from the Mesaba range.

Iron—Mesaba Range.

(From our Special Correspondent.)

Lackawanna.—Operations with drills have been resumed here.

Lake Superior Consolidated.—Captain Cohoe, of Mountain Iron, is arranging to work the mine on an elastic wage system, paying the men extra wages proportionately for anything above an average day's work.

Mahoning Ore Company.—Surveys of the Duluth, Mississippi River & Northern railroad are being made to the mines of this company.

Oliver.—Test-drillings here were sunk in the ore body a depth of over 400 ft., at which point the drill broke off. The bottom of the deposit is not yet reached. This ore body is half a mile long and 700 ft. wide. The Consolidated now holds the first lease.

The Oliver mining company will probably take out this season 400,000 tons.

Iron—Vermilion Range.

(From our Special Correspondent.)

Considerable excitement has been caused in the iron region by the action of a gathering of homesteaders in Tower, who threatened to lynch and did drive out of town a party of claim contestors. As a result homesteaders are organizing as vigilance committees all along the Vermilion and Mesaba ranges to keep contestors and claim jumpers out of the woods altogether.

Minnesota.—This company has put into operation a steam yard loader that will fill 100 cars every 10 hours. It does away with the hand labor of 100 men. The machine will handle about 250,000 tons of crushed ore during the shipping season. The company is hoisting about 3,000 tons daily.

MONTANA.

Cascade County.

Castner Coal and Coke Company.—This company, at Belt, says the Anaconda "Standard," has just received another large shipment of mining cars which will be used in increasing the daily output at once. Officers of the company have just entered into a contract with Mike Foley, of Barker, to drive 50,000 mine props down Belt Creek and its different tributaries. The new mode of transporting timbers and logs is considered feasible and will be a saving to the company in freight alone of more than one-half the cost of securing these timbers by freight trains. The company's lands lie along the river, which, during the month of June is very high, and the stream can be easily utilized to secure props and timbers at a saving over the present freight rates. Foley is now securing men for the work. The coal company is also erecting a large store building which will be ready for occupancy by June 1st. The present output of the mine is about 500 tons daily, and it will be increased. A coke oven is being built and a practical test will be made of the coal for coking purposes within a short time.

Jefferson County.

The Massachusetts & Montana Gold Mining Company.—This company has been incorporated for the purpose of working the rich placers in the Lowlands, says the Basin "Times." About 220 acres of land have been acquired, besides three quartz lodes. The officers of the company are: President, Chief Justice W. Y. Pemberton; vice-president, E. A. Nichols; treasurer, Thomas M. Hodgins, Butte; secretary, Howard Mountain. Most of the property owned by the company was located last year by E. T. Ewing and Reuben Geery. It comprises the Lone Star and Palona, the Ruby placer and the easterly, westerly and southerly extensions of the Ruby, and is situated in Ruby mining district, about 10 miles from Basin. The company also owns a water right on Ruby Creek and 40 in. on both Spring Gulch and Buffalo creeks. A force of men is now at work getting the ground ready, and Mr. Ewing, the superintendent, says he will begin hydraulic mining immediately.

Eva May.—At this mine, in the Upper Cataract district, near Basin, a strike was made recently in a drift from the foot of the shaft, which is down 350 ft.

People's Party.—On this mine, owned by James Thompson, a tunnel has been run into the mountain 75 ft. on the lead in 2 ft. of ore which carries gold, with silver and lead. This mine also contains much pyritic iron. The vein is strong and lies between two well-defined walls of granite.

Saturday Night.—A small force is at work on this mine, near Basin. The shaft is now down 70 ft. and the tunnel is in 175 ft. A winze is being sunk half way between the face and the mouth; the lead is said to be 9 ft. in the winze. Sinking will continue 75 ft. farther, when cross-cuts will be run and drifts extended on the lead. The ore is an iron pyrites containing some lead and carrying gold.

Silver Bow County.

Jenny Dell.—This mine, on which W. R. Young and J. M. Montgomery are leasing, is turning out some rich ore. They are paying \$500 a month for the use of the Eveline shaft 12 hours a day. A winze is being sunk in the west drift of the 300 and in the slope there is ore all across the face. The lead is about 21 in. wide.

Standard Firebrick Company.—This company, says the Anaconda "Standard," confines its business principally to the manufacture of fire and silica brick, used in furnaces and smelter. Of these 180,000 are turned out every month, the proportion of firebrick being a little larger than that of the silica product, the latter being used in furnaces where the heat is most intense. The material for both kinds of brick is nearly all obtained in Montana, the fireclay coming from the town of Norris, in Madison County, and the silica from the company's mine a few miles from Dillon. However, there also enters into the composition of the product a slate-like fireclay that is shipped from Colorado. It is only within the last few months that the company has placed its product on the outside market, as it has had all it could do in filling a contract with the Anaconda company for 100,000 fire and silica brick per month. The company has seven ovens, each with a capacity of 30,000 brick per month.

NEVADA.

Storey County—Comstock Lode.

Comstock Tunnel Company.—A special meeting of the stockholders is to be held at the company's office in New York, June 7th, to consider the financial condition of the company and take such action as may be deemed proper.

Consolidated California & Virginia Mining Company.—The directors of this company held an important meeting on May 25th. James G. Rule was present and asked for an extension of time on his contract, which would expire June 1st. After listening to Mr. Rule the directors decided not to grant him any extension, as the ground where he claimed to know the existence of a valuable body of ore had been most thoroughly explored, and the ore body had failed to materialize. Accordingly, the Rule contract expires June 1st.

Following are extracts from the latest weekly official letters from the superintendents of Comstock mining companies:

Alta.—The south drift from the north raise has been extended 27 ft. in ore of fair grade, varying in width, from which 18 tons of ore of the average value of \$29 per ton has been saved. We broke through into old workings in the intermediate winze at a depth of 46 ft. and have put in a platform 20 ft. above the bottom preparatory to stopping at that point. Shipped a bar of bullion, the proceeds of the milling of 20 tons of ore; value \$2,577.75.

Belcher.—On the 850 level from the main north lateral drift, the northeast drift, jointly with the Crown Point Company, is in 10 ft. north of the north line, and will be continued until it meets the southwest drift now being run by the Crown Point Company. The face of this north drift shows quartz giving low assays. From the main north lateral drift an east crosscut was started during the week, which is now in 5 ft. The face of this crosscut is also in quartz giving low assays. Owing to bad air we were obliged to suspend operations at these points until we got a better circulation of pure air. This has now been accomplished, and from this time on work will proceed uninterrupted. Twenty-six tons of fair-grade ore were hoisted during the week.

Consolidated California & Virginia.—From the sill floor of the 1,650 level, at a point 110 ft. south from the shaft station, an upraise has been carried up during the week 25 ft., and from the top a south drift has been advanced 18 ft. in porphyry and quartz carrying a low assay value. In the south lateral drift, which encountered the ore body at a point 120 ft. south from the winze, 14 ft. below the sill floor of the 1,650 level, we have been timbering and cutting out for that purpose and have extracted a few tons of high-grade ore. The south lateral drift, No. 3, started from the west crosscut 28 ft. below the sill floor of this level and 14 ft. under south drift 2, has been extended 21 ft. The first 2 ft. is in ore of low grade, and the remaining 19 ft. in solid ore of a steadily improving quality, the average assay value of which (per car sample) was about \$60 per ton. The face of this south drift is in ore of a high grade which will average over \$100 per ton. It is evident the ore in this drift is a continuation and extension of the ore developed in the two south drifts run above. The ore extracted during the week amounted to 130 carloads—about 137 tons—the average assay value of which, per car samples, was \$89.54 per ton, and the largest portion of which came from the two south drifts, Nos. 2 and 3, above mentioned, and the remainder of a lower grade from our workings in the vicinity of the winze, down 20 ft. In the 1,000 level—the Rule drift—the upraise on the east side of the main drift, at a point 585 ft. south from the shaft station, has been carried up 3 ft., total height 80 ft., in porphyry, clay and quartz, carrying some value. The winze 353 ft. south from the shaft station has been sunk to a total depth of 22 ft., and from the bottom of this winze a north drift has been advanced 20 ft. in vein matter of very low assay value.

Crown Point.—The south drift on the 600 ft. level from the top of the 700 ft. level raise is in 151 ft. The material encountered is somewhat softer and shows bunches of low-grade quartz. The south drift on the 500 ft. level from the shaft station is out 158 ft. The face is in porphyry and quartz of low value. We are still engaged in repairing and cleaning out the south drift on the 800 ft. level, and have completed 23 ft.

Hale & Norcross.—No changes are reported in the workings on the 900 and 1,100 levels. The average battery assay of the ore milled at the Brunswick mill during the week (749 tons 760 lbs.) was \$15.15; percentage obtained of the average battery, 89.24. The standard value of the bullion yield of this ore is: Gold, \$4,077.80; silver, \$8,059.46; total, \$12,137.26, the net value of which (minting charges deducted) is: Gold, \$3,916.91; silver, 633.49 fine oz.

Justice Mining Company.—The bullion yield of 200 tons of ore from the Justice mine, worked at the Taylor mill, was \$2,183.82, of which \$1,788.73 was gold and \$395.09 was silver, giving a coin return of \$1,961.18. The average battery sample was \$15.33, of which 70% was obtained in milling.

Kentuck Consolidated.—The south drift from the east crosscut on the 1,335 level is in 36 ft., the face in quartz, with bunches of pay ore. In the 1,200 level the south drift from the Jacket incline is in a total distance of 84 ft.; the face in low-grade gold ore.

Occidental.—From the west ledge above the 400 level we continue to extract about eight tons of ore per week of the average value of \$11 per ton.

Savage.—In the stope, on the 1,050 level, the east crosscut, No. 1, started from the north drift at a point 45 ft. from the station, was advanced to a total length of 60 ft.; face is in ledge formation. We are repairing and retimbering the main south drift on this level. The upraise from the north drift is advanced 43 ft., top in quartz giving some fair assays. On the 1,100 level, east crosscut 2, started from the face of the north drift, was advanced to a total length of 65 ft. This drift, having reached the east clay of the vein, was discontinued. Opposite east crosscut 2 from the face of the north drift we have started west crosscut 2 and advanced 14 ft.; face in quartz and porphyry.

Segregated Belcher.—The east crosscut from the north lateral drift on the 1,150 level has been extended to a total length of 35 ft. The face is in soft porphyry. There is no change to note of the stope from the south raise on this level. We have shipped to the Mexican mill for reduction 89 tons of ore, the average battery sample of which was \$20.47.

NEW MEXICO.
Bernillo County.

Cochiti District.—Advices from Santa Fe state that new strikes of ore running from \$30 to \$100 per ton are so frequent in the Cochiti district that they excite very little comment. Returns from Furlingame show \$700 ore in a new prospect in Cella Canon. In the Lone Star tunnel a rich vein of \$470 ore has been struck. That the principal mines run in tellurium is now settled. A fine body of mineral, similar to that in the Crown Point, has been uncovered in the Miners' Union claim in the west fork of Pino Canon, over a mile from the Crown Point. In Cochiti Canon the Little Colorado claim, owned by La Junta parties, reports a new strike, assay returns from which show \$41 in gold and \$85 in silver. Near Bear Canon, 10 miles south of Pino Canon, some fine ore is being extracted, and the ledges are similar to those in the Lone Star. One claim, which shows 12 ft. of quartz, gives an assay return of 1 oz. in gold and 33 1/2 oz. in silver. The same croppings are found near Borrego springs.

Colfax County.

Baldy Queen Mining, Milling and Smelting Company.—This company has been incorporated with a capital stock of \$700,000. The incorporators are James Gillen, C. Ferguson, J. V. Dailey, J. G. Northcutt, J. W. Rayne.

Dona Ana County.

Texas & New Mexico Smelting and Mining Company.—This company, of Las Cruces, has been incorporated with a capital stock of \$800,000. The incorporators are: Max H. Voight, of Austin, Tex.; J. E. Carpenter, of New York, and Geo. W. Ellis, of Dona Ana County.

Lincoln County.

Old Abe.—While development has not been pushed extensively at this property of late, it has been running constantly on good ore. During the present year it has produced and milled 5,433 tons of ore as follows: January, 1,232 tons; February, 1,150 tons; March, 1,311 tons; April, 1,050 tons; May (3 weeks), 740 tons. This ore averages \$15 to \$18 per ton, says the White Oaks "Eagle." The exact amount has not been figured out.

OREGON.

Baker County.

French Gulch.—Miles Stephenson and others who recently discovered a quartz outcropping in this gulch in the Auburn District, are sinking a 50-ft. shaft and running crosscuts. From present appearances the discovery will develop into a large body of low-grade gold ore.

Jay Gould.—This claim, on Ruan Gulch, has been turning out some excellent ore, says the Baker City "Democrat." The ore carries free gold.

Marion County.

Robbins-Elkhorn.—On this mine, at Elkhorn Mountain, a considerable force is to be put at work. The mill is being put in order, and will be started up as soon as some ore is taken out.

Union County.

Eagle Creek Placers.—A Duluth, Minn. company, represented by Joseph McAfee and Frank Merritt, have located eight miles of Eagle Creek, commencing at a point known as Shanghai Falls, a few miles from Sparta, and running up stream, says the Baker City "Democrat." It is the intention to commence mining operations at an early date. The enterprise is one of large proportions and will require the outlay of considerable money. Mr. McAfee estimates that upward of \$75,000 will be expended in machinery and in putting in a bedrock flume to work the mines. It has been known for many years that the bed of Eagle Creek contained gold in large quantity, but owing to the huge boulders to be encountered the undertaking was too great for people possessed of limited capital. However, the bars of the stream have been worked at intervals with good success.

Mabel.—This claim, in Sparta district, has been banded by C. Wells and T. Sheaver, who intend to go to work at once on the development. The claim, so far as work has gone, is a well defined quartz lode, carrying free gold.

PENNSYLVANIA.
Anthracite Coal.

It is learned that the heirs of the late Valentine Brobst, of Reading city, who are scattered throughout this and neighboring States, are preparing to bring suit for the recovery of valuable coal lands in Schuylkill, Northumberland, Columbia and other counties. It is claimed that these coal lands belonged to Mr. Brobst, and later to his daughter Magdalena, who died in 1874, and the heirs allege that no settlement has ever been made. Some of the lands in dispute are now in possession of the Girard estate.

The figures for the production of several collieries in the neighborhood of Wilkes-Barre for the year to date are as follows: New Hollenbeck, 20,626 tons; Empire, 41,979; South Wilkes-Barre, 63,789; Stanton, 61,600; New Jersey, 17,657; Suzar North, 34,178; Lance, 35,702; Nottingham, 81,840; Reynolds, 27,478; Wanamie, 39,244; Parish Coal Company, Plymouth, 23,681; Maffer, 21,118; Bennet, 23,887; Alden, 28; Red A-h 5,145; Newport, 13,629; Kidder Coal Company, 14,736; Pennsylvania Coal Company, 1,455; Delaware & Hudson Canal Company, Plymouth, 1,161; Boston, 658—total, 585,638 tons.

Mount Lookout.—An explosion of gas occurred in the Mount Lookout Colliery, near Pittston, on May 28th. As soon as the air current can be rearranged the mine will resume operation.

Philadelphia & Reading Coal and Iron Company.—Of the 52 collieries of this company in the Schuylkill region 30 are now working full time, and it is expected that the others will be free from the waters of the last week's floods within a few days. General Superintendent Luther, in an interview with a United Press reporter, said that the collieries would not work full after they were all in operation, but that they would work about four days a week. At present the shipments of coal are only half what they were before the recent floods.

Susquehanna Coal Company.—Work was begun on a large addition to No. 5 breaker of this company at Nanticoke. In the new addition there will be 6 large screens and 10 "jigs," the latter used for cleaning coal by the water process. The work will be completed within three months and will increase the colliery's output.

Bituminous Coal.

Governor Pattison had a conference with the coal operators of central Pennsylvania in Harrisburg on May 28th. At the close the Governor made public a telegram that he had written to James White, one of the strike leaders in the Clearfield region, and which he said embodied the result of the conference. It is as follows: To James White, Houtzdale: After a conference with the operators of central Pennsylvania, I find they are willing and offer to pay the highest wages paid in competitive districts in the United States, and to conduct their business with the miners of Pennsylvania on that basis. The Governor considers this a concession, because it really is all the operators can pay and compete with those in the same business who ship to the same points.

Graphite.

A company composed of Reading capitalists has leased the farm and mills of Morgan Thomas at Pughtown, in Chester County, and has commenced operating the graphite mines on the property. Several new shafts have been sunk, and new machinery is being placed in the mills. These mines were worked satisfactorily many years ago.

SOUTH DAKOTA.

Lawrence County.

New York capitalists have bought ex-Gov. Larabee's (of Iowa) 1,100-acre coal tract in the Black Hills for \$150,000, his negotiations with A. L. Sweet, of Chicago, having failed. They will build a railroad to Minnesela, 18 miles east.

Emma.—A large body of ore has recently been opened up in this mine, which is situated in the Bare Butte district and in the town of Galena, says the Deadwood "Times." The principal opening on the property is a tunnel some 400 ft. long. During the progress of the work several seams of ore were found. Some time ago the owners decided to make an upraise at the face of the tunnel. Ore was almost immediately struck, and the upraise has now been extended into it 23 ft., and the contact not yet reached. The property has been under development for several years.

Golden Reward.—A gold brick valued at \$16,500, the result of an eight-days run at the Golden Reward chlorination works, was shipped from Deadwood on May 25.

J. R. Mine.—It is reported that this mine, situated on Spring Creek, in the southern hills, has been sold to a party of New York capitalists for \$90,000, says the Deadwood "Times." There is also a 20-stamp mill which has been operated successfully on ore from this mine. The workings consist of an incline shaft 185 ft. deep, several drifts and crosscuts, all driven on the vein, which varies from a few inches to 4 ft., between walls of quartzite and talc slate. At the bottom of the shaft the vein is about 3 1/2 ft. wide. At one point on the ledge it widened out to several feet, and a small slope about 12 ft. square was made, the ore taken out of which yielded \$4.500.

Keystone.—An upraise of 100 ft. from the low to the upper workings of this property has been completed, says the Deadwood "Times," the enti-

distance being in a good grade of free-milling gold ore. The stope on the lower level, 30 x 50 ft., is now being carried up; the third floor is nearly finished and timbers for the fourth are being placed in position. All the ore taken from this stope is pay ore, and is being treated in the mill with satisfactory results.

Pennington County.

Omega Mining and Milling Company.—This company, composed principally of residents of New York City, owns a group of claims on Rapid Creek, a few miles southwest of Pactola, which are showing up a large body of low grade, free milling ore, says the Rapid City "Journal." There is a 15-stamp mill on the property with which several satisfactory test runs have been made during the past few months. The company will now make a full month's run on the ore. The ore found in the vein is of a slaty quartz and very easily mined. The vein is between 80 and 90 ft. wide, with some seams of high grade ore running through it. If the 30 days run proves satisfactory the company will mine and mill the ore on a more extensive scale.

TENNESSEE.
Grundy County.

Tennessee Coal, Iron and Railroad Company.—Work at the Tracy City mines of this company is being pushed so as to meet the unusually heavy demand for coal because of the strike.

UTAH.

Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending May 19th were as follows: Bullion, 893,481 lbs.; copper bullion, 42,751 lbs.; silver and lead ores, 935,600 lbs. The receipts of ore and bullion at Salt Lake City for the week ending May 23d were to the aggregate value of \$1,806,600, of which \$123,916 was in bullion and \$74,150 was in ore. The receipts of Pennsylvania bullion amounted to \$30,733; Hanauer bullion, \$5,950; base bullion, \$21,900; Daly bullion, \$46,417; Ontario bullion, \$12,356; gold bars, \$3,200, cyanides, \$3,300.

West Mountain Placer Mining Company.—This company has filed articles of incorporation. The incorporators are: John Butter, Bingham Canyon, Utah; John Dern, D. A. Lombard, R. S. Somers, W. S. Brown, Fremont, Neb.; John Heimrich, E. H. Airis, Hooper, Neb.; A. M. Spooner, Salt Lake City. The place of business will be in Salt Lake City. The amount of capital stock is \$200,000, divided into 200,000 shares of \$1 each. The officers are: John Dern, president; John Butter, vice president; D. A. Lombard, treasurer, and A. M. Spooner, secretary. These officers with John Heimrich are the directors. The property consists of a portion of the Ireland and Watson placer mining claim in Bingham. Several of the incorporators are heavy stockholders in the Mercur Gold Mining and Milling Company.

San Pete County.

Sterling Coal and Coke Company.—This company has filed articles of incorporation. The incorporators intend to develop certain coal mines located in San Pete County; the principal office is Salt Lake City. The officers named are: Theodore Bruback, president; Jacob B. Blair, vice-president; Robert L. Scannell, secretary and treasurer; Halbert S. Kerr, director; George Cullins, director. The mines are to be operated in connection with the San Pete Valley Railway. O. R. Young has been placed in charge of a corps of engineers and will proceed at once to locate the line for the extension of the railroad south from Mautl. The capital stock of the company is fixed at \$30,000, divided into 3,000 shares of the par value of \$10, which are all taken.

Summit County.

Following were the ore shipments from the Mackintosh sampling mill at Park City last week: Anchor concentrates, 354,160 lbs.; anchor, first class, 123,500 lbs.; Silver King, 245,893 lbs.; Varcoe & Co., 25,470 lbs.; Alliance, 14,500 lbs. On May 15th the Marsac mill shipped 11 bars of bullion, containing 13,261.83 oz. of fine silver.

Ontario Silver Mining Company.—In the case of this company against the Home Coal Company, judgment has been entered up against the defendant in the sum of \$247,953.87. The action was upon an open account, in which plaintiff, during the past ten years, had advanced moneys to the defendant.

Tooele County.

Mercur Mining and Milling Company.—At a meeting of the directors of this company on May 26th, it was decided to overhaul and repair the present milling plant and increase the capacity to 240 tons of ore per day; and further, to put in new crushing machinery. The company will also build a tramway, to be operated by steam power, from the mill to their mines.

WASHINGTON.

Okanogen County.

Hidden Treasure.—This mine is the eastern extension of the Highland Light claim, and shows a somewhat larger body of ore of the same general character as the main lead and equally rich. This claim is owned by a Mr. West, of Seattle.

Highland Light.—At this mine, in the Squaw Creek district, the owners have sunk a shaft 90 ft., and tunneled about 40 ft. along the vein. This was a free gold property to a depth of 12 ft.; it then became a sulphide vein, carrying black sulphides with free gold. At a depth of 60 ft. they now have a 6-ft. vein, with a 30-in. pay-streak. A spur has

been struck lately, running nearly at a right angle with the main ledge, that is rich. The owners are now at work on an arrastra, and propose to crush such of their ore as is free milling, and thus save the expense of shipping. This claim is owned by John Gilpatrick and partners.

Hunter.—On this claim, in the Squaw Creek district, a tunnel is now in 112 ft., and the claim is making a very good showing.

Lookout.—On this claim a shaft is down about 50 ft., and the owners claim a vein 12 ft. wide, carrying free gold. It belongs to Devers & Somers, of Ruby.

Snohomish County.

Emma Lode.—The interest of Henry White in this claim, in the Silver Creek district, has been transferred to J. G. Smith.

Rainy Mining Company.—This company has transferred the Senate mill site in the Monte Cristo district to the United Concentration Company.

United Concentration Company.—This company has filed a trust deed of its concentrating works, tramway and other property at Monte Cristo. The deed is to George D. Rogers as trustee, and is made to secure an issue of \$75,000 in bonds. The proceeds are to be used in extending the operations of the company.

WISCONSIN.

Florence County.

A report is current that nickel ore has been discovered on the Ronan property in the neighborhood of Spread Eagle Lake. The discovery is said to show a vein 12 in. wide, carrying an unusually high percentage of nickel. The reports need confirmation.

FOREIGN MINING NEWS.

ONTARIO.

(Special Monthly Letter.)

Important legislation affecting the mining industry of Ontario was passed at the recent meeting of the legislature. The abolition of government royalties, which was at one time proposed, was not indeed carried into effect, but some changes were made in the rate of royalties and the method of levying them which will probably go a long way toward removing any feeling of hostility felt against this provision of the mining laws by those engaged in the industry. The royalty levied on silver, nickel or nickel and copper ores was reduced from 3% to 2%, and a like rate was fixed for all other ores, including iron. The basis upon which the charge is calculated is the value of the ore less the actual cost of raising it to the surface and its subsequent treatment for the market. It must be remembered that no royalty can, under any circumstances, be levied on lands sold prior to May 4th, 1891, and that in all cases seven years is allowed from time of purchase or lease from the Crown during which development may take place without imposition of royalty. As a matter of fact, no royalty has yet been collected by the government, and none can be collected on any lands whatever for a period of nearly four years. A more important step was setting apart the sum of \$125,000 out of the surplus funds of the Province, to be called the "Iron Mining Fund," for the purpose of encouraging miners to open up and work the iron ore deposits of the Province. For a period of five years from July 1st next there will be paid upon all iron ores which shall be raised or mined and smelted in the Province the equivalent of \$1 per ton (2,000 lbs.) of the pig metal product of such ores; but not more than \$25,000 may be so paid out in any one year. It is well known that there is abundance of good iron ore, both magnetite and hematite, in Ontario, and in a growing country like ours, large quantities of iron are yearly required for construction and manufacturing purposes, yet we import every pound of the metal we use. The lack of coal has probably had something to do with our backwardness in this respect, but we have had, and still have, a plentiful supply of wood for charcoal, and every opportunity for the establishment of charcoal blast furnaces. Even for the manufacture of coke iron we are not less favorably situated than are many seats of the industry in the United States, where sometimes the fuel, sometimes the ore, and occasionally both, have to be hauled long distances by rail or water. It will be seen that the bounty is payable upon ores actually converted into pig iron, not merely upon those mined. The object of this is, of course, to promote the establishment of a smelting industry. The aid which miners will receive will be at the rate of 50c. or 60c. per ton of ore, depending on the richness of the ore raised. It is in every way likely that claimants for a share of the bounty thus provided will soon appear. The furnaces of the Hamilton Iron and Steel Company, at Hamilton, Ont., are under contract to be completed by January 1st next, and the promoters of the Desert Lake Mining and Railway Company express their confidence in being able to produce pig iron from their property in Coffin township before long. The government also made an appropriation of \$15,000 for the purchase of two diamond drills, to be used in exploring for ores and minerals throughout the Province. These drills will be placed at the service of owners of mining lands, who may wish to test their properties, and it is probable that the charge made for their use will not exceed working expenses. A number of applications have already been received by the Director of Mines for the use of the drills from persons interested in iron and copper lands.

A good find of gold-bearing quartz has been made in the township of Snider, in the vicinity of White-water Lake, a few miles west of Sudbury. The vein is exposed on a perpendicular cliff 35 or 40 ft. high, and widens from about 8 ft. at the summit to 20 ft. at the base, both hanging and foot walls being well defined. Developments on the surface show that the quartz carries pyrites rich in gold, and streaks of free gold are found along the entire face of the lode. An assay by Professor Heys, of Toronto, gave \$53.42 worth of gold per ton. Messrs. Noel & Dixon, of Sudbury, and H. A. West and Charles E. Tilley, of Chapleau, are interested parties. The Bonanza Nickel Mining Company is developing a gold location near Lake Wahnapiatae, on which is a vein said to be of considerable width. It has sunk to a depth of 45 ft. and is in good ore. In general the veins in the Wahnapiatae district are not wide, but many carry gold in considerable quantity. Placer gold is said to be found along some of the streams in this part of Ontario, but no workings have yet been done to prove the richness of the ground. Late news from the Rainy Lake gold region say that many prospectors are now in the field, and that their numbers are being constantly recruited, principally from the American side. The route from Duluth to Port Arthur by steamer, thence via the Canadian Pacific Railroad to Rat Portage, and thence by steamer to Fort Frances, is the pleasantest way of making the trip, but many prefer the overland journey by way of Tower. Mr. H. Wylie, of Port Arthur, has just returned from Rainy Lake with rich specimens showing free gold found on the Canadian side.

The Grand Trunk Railway, which a short time ago announced that it was short of coal on account of the miners' strike in the United States, and consequently dismissed thousands of its men and notified its agents to refuse heavy freight, is now running trains and doing business as usual. The Canadian Pacific Railway Company derives its coal supply from four sources, British Columbia, at the western end of the line; Lethbridge, east of the Rocky Mountains; the United States in the central portions, and Nova Scotia at the East. It has therefore been little, if at all, inconvenienced by the strike so far. A cargo of 500 tons of Nova Scotia bituminous coal was shipped to Hamilton, Ont., recently, where one or two manufacturing concerns had shut down for want of fuel. Under ordinary circumstances the distance from the mines is too great to permit of competition with United States coal at points so far west. It is said that coal has been found in the Rainy River district, western Ontario, but samples received here indicate that the deposit is lignite.

A second gas well was recently struck by John Reeb, near Port Colborne, at a depth of 675 ft. The yield is about half a million cubic feet a day. An unsuccessful attempt was made at the late session of the legislature to prohibit the use of gas-compressors or pumps, which the people in the Welland County gasfield believe are exhausting the gas supply of that district more rapidly than by the natural flow. This is the principal gas field yet developed in the Province, and the gas is piped across the river Niagara to the city of Buffalo and consumed there, very little being used in Ontario. A gradual decline in the rock pressure has taken place, until now the yield of the wells is only about two-thirds of what it was two years ago. The field in the county of Essex is of small area, but has maintained its original rock pressure of 400 lbs. since the beginning of operations there five years ago. The consumption of gas in this field has hitherto been confined to a few small towns, but it is now proposed to pipe the gas to Windsor and Waikarville, opposite Detroit, a distance of 35 miles.

LATE NEWS.

The Belmont Brick and Tile Co., Wheeling, W. Va., resumed operations on the 29th inst.

The plate mill of the Wheeling, W. Va., Steel and Iron Co., at Benwood, is in full operation.

J. F. Lockwood, chief draughtsman for Otis Bros & Company, New York, is in Roanoke, Va.

Placer mining has been started for the season in Choteau County, Mont., and a number of claims will be worked.

On the Alpine mine, on Florida Mountain, in Owyhee County, Idaho, Messrs. Nichols & Lewis have begun work for the season.

No. 2 mine at Blocton, Ala., is again on fire. About three months ago a fire took place in this mine, but, it was thought, was subdued.

The Weber Mining and Milling Company, in Kootenai County, Idaho, has just received the machinery for a 20-stamp mill, which will be set up and put in operation as soon as possible.

The great gold find reported in press dispatches recently at Alexander City, on Rock Creek, Mont., is pronounced by local papers a delusion. A little gold was found at the surface, but nothing below.

On the Home mine in Owyhee County, Idaho, the shaft has recently been sunk 21 ft. deeper and a drift run north 90 ft. on the vein, showing a good vein, with a pay-streak 4 in. to 18 in. wide, assaying well in gold.

The Mammoth Gold Mining Company, in Lewis and Clarke County, Montana, recently ran crosscuts 75 ft. north and 106 ft. south from the main shaft. The north crosscut has found a vein from 1 ft. to 3 ft. wide, while on the south end a vein 3 ft. wide has been struck.

In the B. F. & H. mine on the Blacktail Mountain in Kootenai County, Idaho, a rich strike was lately made in the tunnel which the owners are running on the vein. The ore carries a large amount of silver and some gold. It is thought to be a pocket, but its extent has not yet been ascertained.

The recent trials of oil fuel in place of coal, which were made on the Chicago, Burlington & Quincy Railroad, proved a disastrous failure. The engine on the fast mail was equipped with oil burning devices, but at Kewanee the oil tank exploded, seriously injuring the engineer and fireman.

The property of the Southern Cross Gold Mining Company, in Silver Bow County, Mont., was sold last week to satisfy a judgment for \$10,503, and was bought in by Alexander J. Johnson for \$7,500. A new company is to be organized, into which the old stockholders will come by paying an assessment.

Work has been started for the season on the Rocky Bar placer claims in Elmore County, Idaho. These claims were located originally by Henry Thoupson, who recently sold the property to James L. Stewart, of Glasgow, Scotland, and associates, who will work on a large scale. The company's ground is five miles long and about 200 ft. wide.

A press dispatch says that in Jay County, Indiana, May 29th, three big oil wells were struck in the Jackson township field. Two on the Christian Farm are flowing 125 and 300 barrels each daily, and the one on the Wheat Farm is good for at least 250 barrels. All three are owned by Black Brothers.

It is reported that the Chesapeake & Ohio Railroad will parallel the Norfolk & Western through southern West Virginia so as to secure a share of the extensive coal business. The new line will be about 100 miles in length, running from the mouth of Piney Creek to Guyandotte Mountains, connecting with the main line at Barboursville. Work will begin this summer.

Advices from Anthony, Fla., state that there is a noticeable improvement in the phosphate industry. The Lindner Company has largely increased its output by the addition of a tramway derrick; and the French company, while employing less men than heretofore, is still running out about 100 tons per day. Two carloads of rock were recently shipped to New York by the Deacon company.

Maj. T. J. Peters has been appointed receiver for the Alabama Iron and Steel Company, at Brierfield, Ala. The application was made by E. T. Peter, secretary of the company. The bill filed states that the company owes large sums, and judgments will be taken against it at the ensuing term of the Bibb County Circuit Court. The action taken is for the protection both of stockholders and creditors.

In the Nine-mile mining district in Missoula County, Montana, the Chickamaik Company has its additional stamps and new vanners in place and ready to operate.

The San Martina Mining Company in the same district reports ore enough in sight to warrant the erection of a five-stamp mill. Some 600 ft. of tunnels and crosscuts have been run, and a large body of ore shown. The company has levied an assessment of 1/2c. per share to pay for running 1,300 ft. of tunnel and to prepare for the mill.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 1.
PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending May 26th and year from January 1st:

	1894.		1893.
	Week.	Year.	Year.
Shipped East and North:			
Phila. & Erie R. R.	1,328	74,882	47,049
Cumberland, Md.	11,199	1,257,954	1,592,604
Barclay, Pa.	217	9,378	26,896
Broad Top, Pa.	173	122,371	304,924
Clearfield, Pa.	773	1,121,692	1,767,742
Allegheny, Pa.	415	473,205	543,688
Beech Creek, Pa.	633	835,474	700,526
Pocahontas Flat Top	73,738	1,280,381	1,206,499
Kanawha, W. Va.	23,721	938,945	1,301,947
Totals	120,197	6,064,353	7,491,874
Shipped West:			
Pittsburg, Pa.	20,775	510,249	536,289
Westmoreland, Pa.	18,830	575,954	853,604
Monongahela, Pa.	63	163,539	277,819
Totals	39,668	1,199,792	1,667,712
Grand totals	159,865	7,264,145	9,159,586

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending May 26th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 15,836 tons; year, 1,132,611 tons; to corresponding date in 1892, 2,272,154 tons.

Anthracite.

The sales agents held a meeting in this city on May 29th. The prices for June were advanced 15c. on egg and grate and 25c. on stove and chestnut. Net prices to-day are therefore \$3.50 for egg and grate and \$3.85 for stove and chestnut. Last year's net June prices were \$3.75 for grate, \$3.85 for egg and \$4.25 for stove and chestnut.

There was considerable difference of opinion at the meeting in reference to the advance. Some of the agents present, and among them were some of the most conservative and experienced men in the trade, opposed the advance on the ground that conditions did not justify it. Those consumers who are, financially, in a position to do so, have bought all the coal that they can. The others are buying from hand-to-mouth, and in all probability will continue to do so, advance or no advance.

It was recommended that the output for June be restricted to 60% of the maximum capacity. Enough orders have been booked to keep the operators fairly busy until July 1st. Most of the business done this month will, of course, be simply deliveries on these orders, which were placed at May prices, and the present "raise" amounts to a last appeal to dilatory buyers, a sort of kind-hearted warning that they had better buy now if they want to get low prices.

In the mean time the anthracite coal market remains unchanged. The same features characterize it to-day that we have reported in our last two issues. There is no frantic rush on the part of dealers to lay in their supplies, and there is no fear of any scarcity. There is the usual demand and no more. Last year a heavy business was done in June and prices were from 25c. to 40c. higher. But the business depression had not reached the coal market at that time. The anthracite trade may not be in as flourishing a condition as producers would wish, but it compares more than favorably with any other industry. And the time is come for all operators to act wisely and conservatively, in the matter of prices as well as of output. It would not take much to bring about cutting. Operators realize the folly of selling at lower prices than they are positively obliged to, but they always think that the obligation to do so exists when they find that somebody else is "shading."

The Reading Railroad reports that its coal shipment (estimated) for last week, ending May 26th, was 121,000 tons, of which 16,000 tons were sent to Port Richmond and 18,000 tons were sent to New York waters.

NOTES OF THE WEEK.

The statement of the Philadelphia & Reading Coal and Iron Company for April shows gross receipts of \$1,428,055; expenses, \$1,478,894; loss from mining, \$50,839; fixed charges, \$122,209; total deficit, \$173,043. For the five months of the fiscal year, from December 1st to April 30th, the statement shows: Gross earnings, \$8,019,326; expenses, \$8,157,657; loss from mining, \$138,331; fixed charges, \$509,380; total deficit, \$707,711. As compared with last year the April statement shows a decrease of \$5,726, or 0.4% in gross receipts, and an increase of \$131,179 in the total deficit. For the five months the gross earnings decreased \$896,087, or 10.1%, while the deficit shows an increase of \$240,798.

Bituminous.

So far as the market itself is concerned there is no change from last week—that is, there is no market to speak of. There is quite a quantity of foreign coal on the way and loading for account of producers here, but such coal does not come on the market at all; it is supplied to those consumers whose contracts contain no strike clause.

Consumers generally understand the situation, and are making no demands upon producers for supplies. The reports as to the number of concerns hereabout which have been obliged to close down on account of the scarcity of fuel are greatly exaggerated. They have resorted to other kinds of fuel to keep them going temporarily.

In a number of cases consumers have filed orders with the producers, to be shipped after the strike has ended.

The strike situation is practically unchanged although the miners in various regions are growing restive at the duration of the strike. In one or two of the regions the strike will probably collapse within a week. Meetings of non-union miners have been held during the past few days looking toward their return to work notwithstanding the threats of the agitators and of the unions. Thus far, these meetings have resulted in nothing, but they show the drift of opinion.

The Pocahontas region is still mining great quantities of coal. In the New River and also in some of the mines along the West Virginia Central a few men are at work. In the George's Creek region the Consolidation is putting out from 2,000 to 2,500 tons daily, and most of the other companies have ordered the men to take their tools out of the mines, which is tantamount to a discharge. Four or five of the agitators were arrested this week on complaint of the Consolidation Coal Company, and with one exception were convicted of contempt in disobeying the orders of the court about interfering with the men going to work. The chief man, however, escaped.

In Pennsylvania the Governor has issued a proclamation warning the miners against unlawful acts of violence and will call out the militia if necessary. One of the most prominent of the Clearfield opera-

tors stated to a representative of the "Engineering and Mining Journal" that they intended to get new men and would work the mines if they had to have one deputy for each miner.

The railroads are not in want of coal for the present and, from all that can be learned, can run for a month longer without fresh supplies. Some are using anthracite.

The Baltimore & Ohio is releasing most of the coal seized at the time the strike went into effect, showing that no fear is entertained as to a dangerous scarcity of fuel. The Pennsylvania Railroad has not released so great a quantity as the Baltimore & Ohio, but we hear of several small lots which have been turned over to the original consignees.

Prices all depend on the buyer. Some steamers have had to pay \$5@6 per ton alongside.

Ocean freight rates are unchanged. We quote as follows from Philadelphia: To Boston, Salem, Portland, Portsmouth, Bath, Gardiner and Bangor, 60c.; Providence, New Bedford, New Haven, Bridgeport and Allyn's Point, 55c.; Wareham, 75c.; Lynn and Newburyport, 65@70c.; Dover, \$1 and towages; Saco, 75c. and towages.

NOTES OF THE WEEK.

The conference of the coal operators of Illinois held in Springfield on May 31st, to arrange prices and come to an agreement whereby the competition of the northern, the southern and the central Illinois fields could be adjusted, to the end of settling the great coal strike, was without result. The miners declare the strike will continue.

The Chesapeake & Ohio Railroad Company has, it is said, decided to parallel the Norfolk & Western through southern West Virginia, and tap the coal seams and timber lands there. The new line will be about 100 miles in length, running from the mouth of Piney Creek through the valley to the Guyandotte Mountains, and will reconnect with the main line of the Chesapeake & Ohio at Barboursville.

Assistant Secretary of the Treasury Hamlin has issued instructions to the Collector of the Port of New York that protests might be allowed and entries made in the case of bituminous coal withdrawn for use as fuel by steamers, subject to the decision of the Supreme Court whether the coal was entitled to benefit of drawback. Messrs. Kennedy & Moon, the New York Custom House brokers, represented to the department that the Government would lose nothing, in case the final decision was against the allowance of drawback, by permitting the verification of weights and the record of the coal withdrawn for fuel. On the contrary, if such withdrawals were permitted on condition of entry and verification, the Government would be in a position to determine the amount of drawback actually due in case the decision was in favor of the allowance. Such a system would obviate the interminable controversies which arose when the Supreme Court decided that drawbacks were due on bagging and every claim became a subject of contest because of the absence of any check on the part of the Government on the amount claimed to be due.

Buffalo. May 31.

(From our Special Correspondent.)

The prices of anthracite coal will be advanced on June 1st 25c. on all sizes per ton in this city, according to one dispatch; but another says 25@15c. per ton. Must await further news to see which statement is correct.

Anthracite coal has been selling quite freely for some time for family and manufacturing use. The short supply of soft coal has materially benefited trade in anthracite, as well as the feeling manifested that prices would be higher.

Lake shipments of anthracite were very light last week, and thus far this week the engagements have been far from numerous; 45c. is the going rate to Chicago per net ton free on and off.

Coal dealers incline to the belief that the strike in the soft coal districts will soon be ended as concessions will be offered and accepted. The tenor of newspaper dispatches indicate the same trend of sentiment.

Changeable weather has ruled since our last letter in the lake regions. The warm weather followed by a heavy northwest gale with snow on Lakes Superior, Michigan and Huron on Sunday and Monday. Fortunately vessels ran for and obtained shelter at various points, so that the accident list was light and no loss of life reported thus far.

The shipments of coal from Buffalo by lake for the week ending May 26th aggregated only 40,072 net tons, distributed thus: 23,900 tons to Chicago, 7,722 to Milwaukee, 2,400 to Duluth, 2,000 to Toledo, 1,000 to Saginaw, 400 to Gladstone, 650 to Green Bay; 400 to Sault Ste. Marie, 250 to St. Clair, 700 to Detroit, and 650 to Owen Sound. The rates of freight were 40c.@45c. to Chicago, 40c. to Milwaukee, Green Bay and Sault Ste. Marie, 35c. to Saginaw and Owen Sound, 30c. to St. Clair, 25c. to Detroit and Toledo, and 15c. to Duluth and Gladstone, closing dull.

News items are scarce. The Lehigh Valley Company has not lifted the injunction obtained by it restraining the Delaware & Hudson Company from blasting rock in Buffalo River for the purpose of enlarging their coal docks and trestle "around the horn."

The experiments on some of the propellers of using hard for soft coal have not been successful as a rule, but the scarcity situation has been modified somewhat, nevertheless.

Delegates from the Clearfield striking miners

have been in Buffalo and have earned good credit marks for fairly stating their case in detail, and as a rule received the sympathy of dealers and the public generally.

An experiment is to be tried in Chicago River in a few days. A tug has been fitted up with tanks to be filled with high-test petroleum oil to be used as fuel, by the use of which the city authorities hope to demonstrate how the smoke nuisance created by the tugs can be abated.

Chicago. May 30.

(From our Special Correspondent.)

Anthracite coal has been in very good demand during the past week. Shipments to Chicago for the week have been about equal to the sales, but should the soft coal strike not cease inside of a week or 10 days hard coal will undoubtedly have a big increase in sales. The tug companies will soon be compelled to buy hard coal for their numerous tugs on the Chicago River. Prices continue to be cut, the circular prices being \$5.25 for grate and \$5.50 for egg, stove and chestnut.

Bituminous coal grows scarce here with each day. Dealers are hustling in all directions to find coal for their patrons, but it is discouraging, work as there is mighty little to be had. Cincinnati is now sending soft coal here in limited quantities. This coal is being floated down the Ohio River in barges and represents a supply that has been accumulating for months past and which has been stored at various places along the river. The railroads are beginning to feel the want of soft coal, and 10 days more will bring a number of their trains to a stop. The prevailing prices on soft coal are now \$4.25@4.50 per ton, sales at the latter figure having been numerous during the week.

Coke is much sought after, but the supply is very much below the demand. The West Virginia article is selling at \$5 per ton.

Pittsburg. May 31.

(From our Special Correspondent.)

Coal.—The strike is still on, but unless all signs fail it will soon be settled. The coal operators say unless a settlement is arrived at the present week they will put new men to work next week, and will see that they are protected. Gov. Pattison has been visiting certain mining districts; on Wednesday a proclamation was issued, calling on "all miners in the Commonwealth to disperse their armed bands and cease rioting, or troops will be called out; and I do hereby command all persons engaged in the said riotous demonstrations to forthwith disperse and retire peaceably to their respective places of abode, warning them that a persistence in violence will compel resort to such military force as may be necessary to enforce obedience to the laws."

There was a good stage of water in the Ohio, but no coal was sent out, the stock in hand is small and commands good prices. Coal is being shipped by river from the Kanawha to Cincinnati.

Connellsville Coke.—There is still a good deal of mystery connected with the coke trade; the coke producers manage to keep their own counsel remarkably well. They have certainly succeeded in firing up a much larger number of ovens. The closing down of so many furnaces has caused a falling off in the demand. The Big Edgar Thompson works and the Duquesne plant having closed adds an army of over 20,000 to the unemployed. The Tube works at McKeesport are still closed, with both sides firm. Within a short time the increases in the ovens are known to be over 1,000. Increases have been made daily. The operators are making untiring efforts and are meeting with considerable success, increasing their working force. The general impression in the region is that the strike is fast going to pieces and will end in a short time. Fully one-half the men at work are new men brought into the region; in fact new men are arriving daily, which is influencing the old men greatly and causing many of them to return to work. What effect the governor's proclamation will have remains to be seen, but it seems to be generally good.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 1, 1894.
Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From		From	
	June 2, 1893.	June 1, 1894.	Jan., '93.	Jan., '94.	Tons.	Tons.
Anthracite.	69	33,450	34	17,430	732,167	353,839
Coke.	147	142,290	71	85,670	2,981,997	2,063,216
Charcoal.	37	8,580	19	4,235	202,245	88,168
Totals.	253	184,260	124	107,335	3,916,409	2,445,223

Pig Iron.—We are unable to find any improvement in the pig iron market here. There has been some disposition on the part of certain furnace agents to advance prices, but wherever this has been done it has resulted simply in stopping sales.

There is no appreciable increase in the demand. Some consumers have just used up iron which they should have finished three or four months ago and have been ordering more supplies, but always in small quantities.

Owing to the coal strike and the reports which reach us from elsewhere of advancing prices, there was a slight speculative movement in pig iron this week, but it has been unimportant as to volume. There is no scarcity of iron in this market, with the exception of some soft irons which have not been

tain large concerns are preparing to come into the market. Tank and heavy plates are quoted at 1'30c.

Structural Material.—Bridge work and some railway work for terminals and stations is now promised for this month and manufacturers expect to know more about it in a few days. Beams and channels, 1'40; angles, 1'30.

Steel Rails.—Standards, \$24. Girder rail demand is fair and more work is promised for July and August.

Cartagena, Spain. May 16.

(Special Report of Barrington & Holt.)

Late quotations on iron ores in this market are as follows: Ordinary 50% Portman ore, 5s. 2d. @ 5s. 8d. per ton; special low phosphorus 50% ore, 5s. 8d. @ 6s. 2d.; extra quality low phosphorus ore, 6s. 7d. Manganiferous ores are quoted as follows: No. 1, 20% manganese, 12s. 3d.; B., 17% manganese, 8s. 9d. @ 9s. 3d.; No. II., 15% manganese, 8s. 3d.; low grade, 6% manganese, 5s. 9d. Manganese ores, 35%, are quoted at 10d. per unit. Non-pyrites, 40% iron and 45% sulphur, 11s. per ton. These prices are all f. o. b. shipping port.

Trade has been dull so far in May, the slight improvement noted our last report not having been maintained to any great extent. Prices show no change, although stocks of manganiferous ores have been considerably decreased.

Freights continue high. Some recent charters are: Portman to Middlesborough, 9s.; Benisaf to Stockton, 8s. 10 1/2 d.; Cartagena to Rotterdam, 8s. 7 1/2 d. per ton.

METAL MARKET.

NEW YORK, Friday Evening, May 25, 1894.

Prices of Silver per Ounce Troy.

[The rule for finding the equivalent of the London price of bar silver per standard ounce, .925 fine, in American value of a fine ounce, is as follows: Multiply the rate at New York, of sight sterling exchange on London, by the London price of bar silver, and divide the product by 22.]

Table with columns: May, St. Ex., London, N. Y. Cls., Value of sil. in \$. Rows for dates 26, 28, 29.

The silver market has been without animation. The demand from China has been moderately active, and current supplies have been absorbed, at a declining price, however. The market closes quiet at figures quoted. The probabilities are that, although the production will not be much greater during the summer months, the supplies for sale will be larger, owing to the completion of a large number of contracts and the absence of fresh time-sales to any considerable extent.

The United States Assay Office at New York reports the total deposits of silver for the week to be 61,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending May 26th, 1894, and for Years from January 1st, 1894, 1893, 1892.

Table with columns: Gold (Exports, Imports), Silver (Exports, Imports), Excess of Ex. or Imp. Rows for Week, 1894, 1893, 1892.

Of the gold exported for the week \$2,100,000 went to London, \$2,000,000 to Germany, \$250,000 to France and the rest to the West Indies; the silver nearly all went to London. Of the gold imported \$59,830 came from France and the balance from Havana. The silver came from Central America.

During the five days ending May 31st the exports and imports of gold and silver at the port of New York were as follows: Exports, gold, \$4,190,895; silver, \$464,451. Imports, gold, \$562,307; silver, \$36,258. Of the gold exported, \$3,525,031 was in American coin, \$3,000,000 of which went to Germany, \$500,000 to France, \$22,034 to London. Of the remainder, \$32,811 was Spanish coin, which went to the West Indies, and \$33,050 was French coin. \$5,800 of which went to South America and \$633,050 to the West Indies. Of the silver exported \$16,540 was Mexican coin, \$1,040 of which went to South America and \$15,500 to the West Indies. All the rest was American coin and bullion, \$38,000 of which went to Germany, \$67,711 to South America, and \$342,200 to London.

NOTES OF THE WEEK.

A slight improvement in business is apparent this week in spite of the drawbacks, which continue very much as we noted them last week. The tariff discussion still drags along, and some bitterness has been injected into the debate on several occasions; there are signs of an end approaching, however, and business men begin to feel some encouragement.

The great strike of the coal miners also shows some signs of an approaching end, and it is not impossible that another week may see the breaking up of this trouble.

The "Coxey" or "industrial army" movement, which has caused many worthy people much anxiety, is gradually drawing to its legitimate end in general ridicule. The people generally are beginning to see the real objects of the movement and the composition of the "armies," which have been brought into undue prominence.

Gold shipments still continue, and \$3,000,000 went out on Tuesday's and Thursday's steamers. These shipments were all to Germany, none going to London. From present appearances some \$2,250,000 more will go on Saturday's steamers, bringing the total for the week up to about \$2,250,000.

A gold movement in the opposite direction has been going on for some time, and this week reached considerable dimensions, about \$1,200,000 having been received in French and Spanish coin in New York for transmission to Cuba. Such large shipments of coin are not usual.

Imports of specie reported at the San Francisco Custom House for April and the four months to April 30th are reported as follows, both gold and silver being included:

Table with columns: Location, April, Four months. Rows for Mexico, British Columbia, Australia, Central America, South America, Japan, Total.

Of the April imports \$50,690 were gold and \$96,168 silver. In addition, considerable specie has been received from Mexico by rail, mostly in the form of dollars, which shipments are not included in above because not entered at the Custom House.

The bill for the repeal of the tax on State bank circulation is now before the House of Representatives, and the debate upon it began last week, and has been continued at intervals during the present week. The prospect for its passage appears somewhat doubtful.

The statement of the New York banks for the week ending May 26th shows decreases of \$1,397,425 in reserve, \$233,200 in loans, \$883,000 in specie, \$1,514,200 in legal tenders, \$3,087,100 in deposits and \$7,600 in circulation. The total reserve was \$221,151,400, being \$77,601,700 in excess of the legal requirement.

The statement of the United States Treasury on Thursday, May 31st, showed balances in excess of outstanding certificates amounting to \$121,911,087, made up as follows: Gold, \$79,280,015; silver, \$13,024,203; legal tenders, \$17,150,549; treasury notes, etc., \$12,456,320. The changes during the week were an increase of \$326,379 in the total balance, and a decrease of \$3,182,063 in the gold balance.

The Treasury receipts from internal revenue for the ten months of the present fiscal year, to April 30th, aggregate \$119,140,347, a decrease of \$13,341,775, as compared with the corresponding ten months of 1893. The principal items show: Spirits, \$68,935,192, a decrease of \$9,591,252; tobacco, \$23,585,242, a decrease of \$3,157,944; fermented liquors, \$24,943,627, a decrease of \$702,763; oleomargarine, \$1,550,051, an increase of \$135,707, and miscellaneous, \$125,660, a decrease of \$25,522. The receipts for April, 1894, were \$876,631 less than for April, 1893.

The Bank of England continues to increase its reserve and to accumulate gold. The amount reported this week is the largest since 1879 and was increased during the week by £1,786,000. The total gold reported in the bank on Thursday, May 31st, was £36,042,880, an increase of £9,941,132, as compared with the corresponding date last year.

The Bank of France on Thursday, May 31st, reported its specie holdings (reduced to sterling, at £79,974,376 gold and £51,163,738 silver; an increase of £2,423,536 gold and a decrease of £85,662 silver as compared with the corresponding date last year. Changes during the week were increases of £43,000 gold and £65,000 silver.

The French trade returns for April and the four months to April 30th are not favorable, the imports showing a considerable increase and the exports a decrease. For the four months the values were as follows:

Table with columns: Imports 1893, 1894, Exports 1893, 1894. Rows for Food, Raw materials, Manufactures, Total.

The large increases in food and raw materials bring the total increase in imports this year up to \$66,414,000, or 26 1/2%, while the decrease in exports was \$8,712,000, or 3 1/2%. The excess of imports over

exports was \$105,600,000 this year, against \$30,483,000 last year.

The abundance of money seeking employment is shown by the success of the Russian conversion loan. Finance Minister Witte proposed to convert the outstanding old bank bonds and Orient loans, the total amount of which is 1,014,750,000 roubles, into new 4% bonds. He proposed to begin the operation by issuing 750,000,000 roubles of the new 4% bonds at 92 1/2%, leaving the rest for the future. The applications for the issue were so large, however, that it was decided to issue the whole amount required to convert all the bonds at once, thus making the total new issue 1,100,000,000 roubles.

In the Argentine Republic a renewal of commercial disturbance is reported, and the premium on gold has gone up to 305; that is, the paper dollar is worth a fraction under 25 cents in gold. There seems to be no prospect of a fall in the premium, since the government has taken no measures to reduce the amount of paper outstanding or to appreciate its value, and the commercial condition of the country does not afford much hope of relief.

The British Mint report for 1893 gives an interesting table, which, besides giving the annual rate of seigniorage, records the average price of silver in the London market, and the average price paid by the mint in each year:

Table with columns: Year, Average price per standard oz., London market, Average price per standard oz., paid by the mint, Rate of seigniorage, Per cent. Rows for years 1870-1893.

The average market price for these 24 years was thus 50'695d., and, omitting 1876, during which no bullion was purchased by the mint, it appears that the average market price during the remaining 23 years was 50'595d., while the corresponding price paid by the mint was 50'739d.

Although in former years trifling amounts of old coin have generally been received from Australia by the Bank of England, the importations may without question be regarded as consisting chiefly of new coins struck at the branch mints of Sydney and Melbourne. The transactions of 1893, however, were of an abnormal character, owing to the necessity which arose in the spring of the year of forwarding from this country gold coin to relieve the pressure caused by the financial crisis in Australia. A sum of £1,878,501 was taken from the Bank on this account early in May, but no less than £1,126,965 of this coin was returned to it during the months of September and October. These circumstances, and the general depression of trade in the Australian colonies throughout the year, serve to explain the reduction in the amount of new gold coin received in 1893 as compared with 1892.

While the average price of silver in the London market fell to 35 1/4d., or 4 1/4d. less than in 1892, the average price paid for silver by the Mint fell to 36 1/4d., or 3 1/4d. lower than the average of the preceding year. The amount of bullion purchased, 2,212,303 standard oz., was, however, less than the corresponding amount—2,647,518 oz.—in the preceding year, so that the seigniorage which accrued was £274,483 17s. 11d., as against £288,920 16s. 5d. in 1892. As the coining value of the metal is 66d. per oz., it follows that seigniorage accrued at the average rate of 29 1/2d. per oz., corresponding to no less than 81 7/8%, as against 65'69% in 1892. In estimating the amount of profit which accrues on the coining of silver in any one year, however, it must be borne in mind that a large sum is annually expended in the purchase of worn silver at its nominal value, and therefore at a considerable loss to the state. Taking account of this fact, it appears that silver purchased in 1893 for £628,699 9s. 4d. produced coin of the nominal value of £71,594 3s. 8d., so that the average rate of profit on the whole silver coining was only 38'63%.

The profit from the operation of the mint in 1893 was £206,605; the average yearly profit for 22 years has been £111,581.

Domestic and Foreign Coins.

The following are the latest market quotations for the leading foreign coins:

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

Other Metals.

Copper.—Although in our last issue we could not well do otherwise than to indicate lower values as likely to rule ere long, in spite of the fact that we were then able to report a better demand for manufactured articles and a consequent better demand for raw materials, we did not anticipate that before the time of our next issue the expected lower prices should have materialized. Rumors to the effect that a large sale of Lake copper was about to be made to the manufacturers, deliveries to be spread over several months, have been current for several days, and, at the time of writing it is said that such a sale has been made at 9c., the price that has been talked of in connection with the rumors. As the manufacturers have been confident that they would be able to buy at such a price business has naturally been restricted, everybody awaiting the outcome of the negotiations. Statistics for the second half of the month, as cabled from abroad, show an increase in supplies of 1,300 tons.

Electrolytic copper we have to quote at 9c. and Arizona big copper at 8 1/2 to 8 3/4 the market for all being more or less nominal.

Abroad, there has been a relapse to former conditions of dulness and low prices, G. M. B's having now declined to a lower point than was reached a short time ago, and which was the lowest on record. The close is at £38 12s. 6d. for spot and £39 for three months, while the figures of a week ago were £39 5s. for spot and £39 12s. 6d. for three months. We quote English Tough, £41 to £41 5s.; Best Selected, £42 to £42 5s.; Strong Sheets, £50 10s. to £50 15s.; India Sheets, £47 to £47 5s.; Yellow Metal, 4 1/2 d.

Recent sales of furnace material in England are noted by James Lewis & Son's latest circular as follows: 230 tons Mexican ore, 25% at 7s. 3d. per unit; 1,250 tons Copiapo ore, 15% at 7s. per unit; 50 tons Chilean carbonate ore, 25% at 7s. 3d. per unit; 200 tons Portuguese sulphuret ore, 5% at 7s. per unit; 30 tons Cueva precipitate, 50% at 7s. 9d per unit. A sale is reported of 2,000 tons American matte, 70% for delivery over the year, at 7s. 10 1/2 d. per unit, but this requires confirmation.

Our special correspondents from Cartagena, Spain, write: A few good finds of copper ore have been made during the past few months in this Sierra. One mine has sold several large parcels of ore testing as high as 25% copper and 20 oz. silver per ton.

The exports of copper from the port of New York during the week ending June 1, 1894, as reported by the New York Metal Exchange were as follows:

Table with 2 columns: Location and Quantity. Includes Rotterdam-Obdam (Figs 42 tons), St. Petersburg-Hindoo (Ingots 103 tons), Swansea-Massasoit (Plates 124), Liverpool-Tauric (Ingots 100), etc.

Matte: Hamburg-Sorrento.....112 Tons

Exports of copper from Baltimore for the week ending June 1st are reported by our special correspondent as follows:

Table with 2 columns: Date and Location, and Quantity. Includes May 18, Hamburg-Polynesia (180 bars, 24,223 lbs.), etc.

Other metals exported during the week were: 31 barrels, 5 bundles, 10 hogsheds and 1 box, 13,137 lbs., zinc, to Liverpool.

Tin.—The market has been steady and quiet throughout the week, prices having fluctuated but comparatively little, and being 20% for spot and June deliveries.

The closing quotations in London are £71 5s. and £71 15s. respectively for spot and futures.

Lead.—The action taken by the Senate on the lead ore and pig lead duty question has not been without some effect on the market, but as the foreign markets are sure to be advanced by any inquiry there may be from this side, there seems to be no good reason for anticipating any serious decline, even though foreign lead can to-day be laid down here at about 2'10 C. I. F., equal to 3'10 on the basis of one cent a pound duty. We have to quote 3'30.

Prices abroad are already strengthening, as Spanish lead is now quoted at £9 2s. 6d. @ £9 3s. 9d. and English lead at 2s. 6d. per ton more.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead dull and prices declining slowly; latest sales are on a basis of 3'10c. and 3'12 1/2 c. East St. Louis offerings from various channels are quite liberal, with the demand exceedingly light.

Spanish Lead Market.—Our special correspondents at Cartagena, Spain, write: Lead is quoted rather lower than last month. The basis for settlement in this Sierra has been had at 45 reales per quintal; silver at 14 reales per oz. Liner ore, basis 78% lead, has been liquidated at 29.50 reales on cars at Cartagena.

Exports of lead ore from Spain in the first three months of 1894 were 3,493 tons.

Spelter is, if anything, a little firmer, not so much on account of an improved demand as in consequence of the coal strike, which for the time being seriously interferes with the production of the metal. The moment the strike is settled it is to be assumed that things will again resume their natural course, and we fear that the market for this metal will then become as unsatisfactory as it is for all others, unless there is a marked improvement in the demand.

Antimony remains dull, with the quotations practically unchanged from what we reported them to be last week: 9 1/2 c. for L. X.; 8 3/4 for Hallett's; 10c. for U. S. French Star.

Aluminum.—The Pittsburg Reduction Company furnishes the following quotations: No. 1 (guaranteed over 98% pure) in rolling ingots, 75c. per lb. in small lots; 73c. per lb. in 100-lb. lots; 70c. per lb. in ton lots. No. 1 aluminum in ingots for remelting; 65c. per lb. in small lots; 60c. per lb. in 100 lb. lots; 55c. per lb. in ton lots and over. No. 2 grade (guaranteed to be over 94% pure aluminum, with no injurious impurities, for alloying with iron and steel) cast in ingots for remelting; 60c. per lb. in small lots; 55c. per lb. in 100-lb. lots; 50c. per lb. for ton lots and over. Aluminum castings, from 90c. per lb. upward, in accordance with the number of castings, their weights, etc. Sheets are quoted 80c. @ \$4.40 per lb., according to thickness and size. Wire, \$1 @ \$2.50 per lb., according to gauge.

Abroad, the Neuhaus Company continues to quote 5 fr. per kilogram for ingots in large lots. The price given is at works in Switzerland. In Paris 99% pure metal is quoted at 7 fr. per kilo. for ingots; 8 fr. for sheets; 11 fr. for wire, and 19 fr. per kilo. for tubes.

Bismuth.—Quotations on the New York Metal Exchange are \$2 per lb. for lots of 500 lbs. or over; \$2.25 @ \$2.50 per lb. for smaller lots

Magnesium.—The only concern at present manufacturing this metal in commercial quantities (the Aluminum and Magnesium Fabrik, Hemelingen, Germany), quotes prices as follows: Ingots and cubes, \$6.48 per kilogram; bars, \$6.24; powder, \$3.64, ribbon and wire, \$9.12 per kilo. These prices are at the works and for orders of over 10 kilos.; for less than 10 kilos. 24c. per kilo. must be added for ingots and bars, and 48c. for powder or wire.

Nickel.—Quotations in this market are steady at 44 @ 50c. per lb., according to grade.

Platinum.—Prices abroad have gone up 50 fr. per kilo. For chemical ware, however, there is no change. Messrs. Eimer & Amend, New York, quote platinum crucibles and dishes, hammered ware, French make, at 45c. per gram for smaller quantities, 43c. per gram for lots of not less than 100 grams, and 41c. for lots of not less than 250 grams. Wire and foil at 42c., 41c. and 40c. respectively for the quantities named. Current retail price for crucibles is 50c. per gram.

Sodium.—There are no local quotations. In Germany and England the metal is quoted at 90c. @ \$1 per lb. at factory.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, June 1.

Heavy Chemicals.—There has been no change of importance in this market since our last report. It continues quiet. Domestic makers of heavy chemicals have been suffering from a scarcity of fuel owing to the bituminous coal strike and that has tended to keep prices where they were. For caustic soda an improved spot demand is reported. Alkali and carbonated soda ash continue quiet. There is not much doing in bleaching powder just now. Prices are unchanged from last week. We quote: Caustic soda, 60% 2'82 1/2 @ 2'97 1/2 c.; 70% 2'60 @ 2'70 c.; 74% 2'62 1/2 @ 2'72 1/2 c.; 76% 2'70 @ 2'80 c. Carbonated soda ash, 48% 1'05 @ 1'25 c.; 58% 1'05 @ 1'15 c. Alkali, 48% 1'05 @ 1'15 c.; 58% 1 @ 1'10 c.; according package. Sal soda, '80 @ '90c. Bleaching powder, 2'05 @ 2'50c.

Acids.—There is only a small hand-to-mouth demand for acids and the market is without features of interest. There is no change in prices. We quote: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.62 1/2 @ \$1.75; muriatic, 18", 80c. @ \$1; 20", 90c. @ \$1.10; 22", \$1 @ \$1.25; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 75c. @ \$1; chamber acid, \$7.50 @ \$8 per ton. Mixed acids according to mixture, oxalic, \$6.40 @ \$7.25 per 100 lbs. Blue vitriol is quoted at \$3.75; glycerine for nitro-glycerine, 11 1/2 @ 12 1/2 c., according to quality and quantity.

Brimstone.—The brimstone market continues dull. Quotations are as follows: Best unmixed seconds, on the spot, \$16.75; shipments, \$16.25. Best thirds are \$1 less.

Fertilizing Chemicals.—Dullness prevails in this market. There is little or no demand for fertilizers as is usually the case at this time of the year. Prices show but little change. We quote sulphate of ammonia \$3.55 for gas liquor and \$3.25 for bone. Dried blood, \$2.35 per unit for high grade and \$2.20 for low grade. Azotine, \$2.35. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P2O5, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18%, P2

O5, 95c. per unit. Acidulated fish scrap, \$15 @ \$16, and dried scrap nominally \$25 f. o. b. fish factory; wet scrap \$15 f. o. b. fish factory. Tankage, high grade, \$22.50 @ \$23; low grade, \$21 @ \$21.50. Bone tankage, \$23 @ \$24; bone meal, \$24 @ \$25.50.

In lots of 50 tons on contracts we quote: Double manure salts, 48.53% (basis of 48%); New York and Boston, \$1.12; Philadelphia, \$1.14 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.17. High grade manure salts, 90-95% and 96-99% (basis 90%), respectively: New York and Boston, \$2.07 @ \$2.11; Philadelphia, \$2.09 1/2 @ \$2.13 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.12 @ \$2.16.

Phosphates.—Charleston, S. C. quotations are as follows: Acid phosphate, \$6.25 @ \$6.50 cash f. o. b. in bulk; phosphate rock, standard land, kiln dried, \$4.50 @ \$4.75 f. o. b. mines; ground rock, \$6 f. o. b.

Muriate of Potash.—In lots of 50 tons, quotations are as follows: 80.85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.78 @ \$1.91; Philadelphia, \$1.80 1/2 @ \$1.83 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.83 1/2 @ \$1.86.

Kainit.—Prices for kainit (minimum 23%) in cargo lots for 1894 delivery are as follows for invoice and actual weights respectively: New York, Boston and Philadelphia, \$9 @ \$9.25; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.75 @ \$10. For sylvinite, 27-35%, prices are as follows per cent. per gross ton, invoice weight: New York, Boston and Philadelphia, 37 1/2 c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 41c. Actual weight, 1c. more per cent.

Nitrate of Soda.—We quote this week: On the spot, \$2.25 @ \$2.27 1/2; near-by, \$2.07 1/2 @ \$2.15, according to position; summer shipments, \$2.

The Government of Chile will sell at public auction in the city of Santiago, Chile, on October 15th next, and following days, 31 nitrate works and 12 nitrate beds situated in the province of Tarapaca, the total value of the properties being nearly \$1,000,000. Parties interested may apply for further information to the Consul-General of Chile in New York and the consuls of Chile in Philadelphia and Boston.

Liverpool.

May 22.

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

The past week has been quite a holiday time here and most of the Lancashire chemical works are shut down for repairs, while trade is so dull that there is no necessity for any hurry in reopening, and it is expected that work will hardly be properly resumed before the early part of next month. Soda ash drags and for Leblanc makes prices are quite nominal, varying according to export market, the spot range being about as follows: Caustic ash, 48%, £3 15s. @ £4 per ton; 57% and 58%, £4 10s. @ £4 15s. per ton. Carbonate ash, 48%, £3 5s. @ £3 15s. per ton; 58%, £3 15s. @ £1 per ton, net cash. Ammonia ash, 58%, in moderate request and quoted at £3 10s. @ £3 15s. per ton, net cash, for tierces, according to make; bags, 5s. per ton less.

Soda crystals are very dull at £2 12s. 6d. @ £2 15s. per ton, less 5%. Caustic soda is flat, owing to the absence of orders. Quotations vary according to export market, the nominal spot range being about as follows: 60% £7 10s. @ £8 5s. per ton; 70%, £8 10s. @ £9 5s. per ton; 74%, £9 10s. @ £10 5s. per ton; 76%, £10 10s. @ £11 5s. per ton, net cash. For parcels under 10 tons 5s. per ton extra is charged. The tendency seems to be toward lower prices.

Bleaching powder is not active, but there is a fair demand, and quotations are unchanged at £7 10s. @ £8 5s. per ton, net cash, for hardwood packages, according to export market. Chlorate of potash is not wanted, and, in the absence of business, quotations are quite nominal at about 6 1/2 @ 7d. per lb. for prompt delivery, while the lower figure could no doubt be shaded with an order in hand, but the difficulty is to find any buyers.

Bicarb. soda finds a ready sale at £6 15s. per ton less 2 1/2% for one cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia has been run up considerably, holders now quoting from £14 5s. to £14 10s. per ton for good gray 24 and 25% in double bags f. o. b. here, according to quality. The advance has caused buyers to hold aloof, but with limited supplies it almost looks as if the "bulls" would be able to keep prices up for the present. Nitrate of soda has declined to £9 17s. 6d. @ £10 per ton, less 2 1/2% for double bags f. o. b. here, according to quality. Carb. Ammonia.—Lump, 3 1/4 d. per lb.; powdered, 4d. per lb. less 2 1/2%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 502 and 504.]

NEW YORK, Friday Evening, June 1.

The past week has been more than usually quiet in the mining stock market. To some extent this is due to the demoralizing effects of a holiday in the middle of the week, and also to the fact that the San Francisco market has been "off."

Dull as the mining stock market here has been for many months past, it is, nevertheless, an unusual thing for only one non-dividend stock to be traded in during an entire week. Comstock Tunnel was the only stock included under the heading of non-dividend paying companies which shows any transactions this week.

The total sales for the week of the various companies' stocks amounted to but 7,100 shares. On

these the total brokers' buying commissions amounted to less than \$25.

The Comstocks have been neglected during the week. If we are to be treated to any more "booms" it is to be hoped that they will prove longer lived than the last one. We warned our readers at the time that the high prices which certain Comstock shares were then bringing would not last long because there was nothing more substantial behind the rise than mere stock manipulation. The faith of a large proportion of the mining-stock-buying public in the Comstock lode is almost as great and as remarkable as the lode itself. It would be well for them if their faith in the management of the mines themselves were exactly the reverse of that.

Consolidated California & Virginia declined from \$5.60 to \$4.50; only 200 shares were sold this week. Comstock Tunnel shows sales of 5,000 shares; the price declined from 7c. to 5c. Other sales were: 100 shares of Ophir at \$1.65, an equal number of shares of Sierra Nevada at the same price, and 200 shares of Yellow Jacket at 85c. @ \$1.

Of the Bodie stocks there was a sale of 100 shares of Bodie Consolidated at \$1.40, and another of 100 shares of Standard Consolidated at \$1.75.

The Colorado stocks continue in but small demand. There was a sale of 100 shares of Leadville Consolidated at 9c., and 600 shares of Little Chief at 14c. @ 15c.

Of Deadwood Terra 200 shares were sold at 50c.

NOTES OF THE WEEK.

Judges Ryan and Hallet, in the United States Circuit Court in Denver, Colo., on May 31st, denied an application from the Raven Gold Mining Company, of Cripple Creek, for an injunction to restrain the miners' union from interfering with its property. The Court held that it had no jurisdiction.

The Choctaw Coal and Railway Association creditors and bond and share holders have formed a new reorganization committee, consisting of Messrs. Earle (chairman), Tyler, Gowen, Kirkbride and Thouron, the latter being secretary. It is the intention of the committee to promptly submit a plan for terminating the receivership.

James L. Flood is reported to have said that he favored the closing down of the upper portion of the Consolidated California & Virginia mine this month, for the purpose, as he said, of saving money for the company. The region on and above the 1,100 ft. level, which the Rule contract controlled, had been well explored without any important discoveries of ore, such as Rule originally claimed that he would make.

Boston.

May 31.

(From our Special Correspondent.)

The market the past week has been fairly active, and prices well sustained. Boston & Montana sold up to \$24 $\frac{3}{4}$, ex-dividend, and held the quotation with sales of above 2,000 shares. Butte & Boston advanced to \$9 $\frac{1}{2}$ @ \$9 $\frac{3}{4}$, a gain of the fraction, on light transactions.

Calumet & Hecla in the early dealings sold up to \$275, but later lost the advance, closing at \$270.

Tamarack improved \$4. to \$162, declined to \$158, and recovered the loss, closing at \$162. Quincy lost $\frac{1}{2}$ on sale of five shares only at \$86 $\frac{1}{2}$, and the scrip declined from \$30 to \$29. Osceola has been very quiet this week, selling at \$20 $\frac{1}{2}$. Franklin sold at \$8, same as last week, and Kearsarge at \$6. Atlantic sold at \$8, an advance of \$ $\frac{1}{2}$.

Centennial has been in better demand, probably to cover short sales, and advanced from 80c. to \$1 $\frac{1}{2}$, losing the fraction in the later sales. About 2,000 shares of Allouez were marketed this week at 9c. @ 1c. Wolverine sold at \$11 $\frac{1}{2}$, same as last week.

Quite a lot of Napa Quicksilver was put on the market this week, and found ready sale at \$4 $\frac{1}{2}$ @ \$5 $\frac{1}{2}$.

The following were the closing prices to-day, the market being a little off: Calumet, \$270 bid, \$275 asked; Boston & Montana, \$24 bid, \$24 $\frac{3}{4}$ asked; Butte, \$9 bid, \$9 $\frac{1}{2}$ asked; Osceola, \$20 $\frac{1}{2}$ bid, \$21 asked; Quincy, \$85 bid, \$88 asked; Tamarack, \$158 bid, \$162 asked. Centennial, 75c. @ \$1.

San Francisco.

May 25.

(From our Special Correspondent.)

The market has been quiet during the past week and prices have had a downward tendency. The inactivity that has prevailed now for several weeks is, apparently, the lull before the storm, but whether it indicates renewed activity in the near future and a rapid inflation of values, or a big break along the entire line of Comstock shares, it would be at present rash to say. Inasmuch as Consolidated California & Virginia has been carrying the entire market, the closing of the "Rule" contract without the mythical ore body having been uncovered, would seem to indicate that the mainstay of the stock market had weakened, to say the least.

Consolidated California & Virginia opened the week at \$6, but during the intervening days it steadily declined, until this morning it sold for \$5.70. Ophir has displayed more strength, selling to-day for \$3.80, practically the ruling rate of a week ago. Mexican at \$1.80, Sierra Nevada at \$1.10 and Union Consolidated at 85c. show from 5c. to 10c. decline on the week's trading.

In the middle group of Comstocks attention has been paid more particularly to Best & Belcher, which sold to-day for \$1.55. This is a 30c. decline

during one week. Chollar ruled at 60c.; Gould & Curry at 90c.; Hale & Norcross at 65c.; Potosi at \$1.05, and Savage at 75c. All these prices show a 1c. decline save in the case of Potosi, which fell off 35c. during the week.

The volume of trade done in the Gold Hill stocks has been very small. Prices have not declined much, however, in the case of the leaders. Belcher ruled to-day for \$1.35; Bullion for 30c.; Challenge for 50c.; Crown Point for 33c.; Overman for 26c., and Yellow Jacket for 80c. These prices are in no instance more than 5c. below the ruling rate of last week.

Small lots of Bodie Consolidated have sold for \$1.40; Bulwer for 15c., and Mono for 25c. Why the first-named stock should sell at any such price is a mystery, particularly when Bulwer is not wanted, even at 15c.

At the close of the market this afternoon prices were a trifle in advance of ruling rates.

BY TELEGRAPH.

SAN FRANCISCO, June 1.—The opening quotations to-day are as follows: Best & Belcher, \$1.70; Bodie, \$1.20; Belle Isle, 10c.; Bulwer, 10c.; Chollar, 55c.; Consolidated California & Virginia, \$5; Eureka Consolidated, 35c.; Gould & Curry, \$1.15; Hale & Norcross, 80c.; Mexican, \$1.35; Mono, 25c.; Navajo, 10c.; Ophir, \$2.95; Savage, 77c.; Sierra Nevada, 91c.; Union Consolidated, 78c.; Yellow Jacket, 85c.

London.

May 22

(From our Special Correspondent.)

During the past fortnight business in the mining market has been interfered with by the Whitsuntide holidays and things have been dull and lifeless all round. There does not appear to be much prospect of briskness springing up again just yet and in all probability a period of inaction is at hand. The operators, to whom the recent revival is due, have not been at all satisfied with the results of their endeavors to galvanize the mining market; and seeing that so little response has come from the general public they have relaxed their strenuous efforts. I think that a quiet market may be expected all summer.

During the past few days inside sellers of De Lamars have appeared again, but sales have not been pressed for fear that there should be a recurrence of the slump of three weeks ago. The rumors floated about by various parties explaining the inside selling have made the shares very touchy, and the operation of getting rid of a few more shares has to be conducted with great caution. These shares will probably continue weak for some time, and any outside holder will find it a very inopportune period for selling out. It is sought in some quarters to explain the recent slump by the occurrence of the miners' strike which lasted from the 1st to the 7th of May, consequent on the reduction of wages of 50 cents a day; but such an explanation is quite insufficient. In fact the stoppage was beneficial as it allowed the company time to effect some necessary repairs to the plant, without having to pay idle men's wages.

New Gustons have improved considerably in tone during the past month on account of the encouraging reports sent home by Mr. F. P. Crowther, one of the directors, who is now visiting the mine. The shares are being inquired for, and their quotation has advanced to 12s. buyers. Mr. Crowther reports that the ore is improving in contents as developed, and that the reserves are being increased. Considerable quantities of argentiferous copper ore is found in the lower levels assaying 20 to 40% copper and 200 oz. silver, and copper ore is also being found carrying \$10 to \$20 in gold as well as silver.

Among low priced shares, Holcomb Valleys attract most speculation, though the continued delay in getting the machinery in order causes many skeptical inquiries and comments. They do not seem to get much further than test runs. The latest news is that since the breaking up of the frost, a test run of 170 cubic yards has been made, and that the result was 42c. of gold per cubic yard. It is also stated that the assays of the tailings show a loss of 2c. per cubic yard, or about 3%, but that this can be remedied by a slight alteration in the plant.

The Palmarejo company's internal quarrel continues unabated. The present directors, who a month ago expressed their willingness to resign, are endeavoring to get back again, and are now trying to defeat the resolution that three of the five members of the new board of directors shall be nominated by the advisory committee. Mr. Applegarth of course continues to refuse to resign his seat on the board. During the next few days further meetings of the shareholders will take place and strenuous efforts are being made on both sides.

After a period of repose the Elmore copper companies are making a reappearance on the market. It is surprising that, after the notorious fiasco, these stocks should ever hold their heads up again. Such, however, is the case. Within the last few days the Elmore Copper Depositing Company's shares have been moved up 2s. 6d. to £1, and those of the Wire Manufacturing Company up 10s. to £1 2s. 6d. Glowing reports are being issued as to the solid business being done by these companies, but they are of course being sent out by holders who are desirous of selling out.

Paris.

May 23.

(From our Special Correspondent.)

Our market here has suffered less from political disturbances than might have been expected. Last week a general unsteadiness was apparent, but this

has now disappeared and the market has been fairly strong. In the metallurgical department Acieries de France are firm at 810 fr.; Ateliers et Chantiers de la Loire have gone up a little, to 497 fr., and the rest of the list is unchanged.

Of the general mining shares Malfidano (zinc) now stands at 2,081 fr. for shares, and 1,511 for rights. The company has declared a dividend of 105 fr. on the shares and 80 fr. on the rights. This is somewhat below the last dividend, chiefly on account of the low price of zinc. The stockholders have voted to divide the shares; hereafter the capital stock of 12,500,000 fr. will consist of 50,000 shares of 250 fr. each, instead of 25,000 shares of 500 fr.

Of the other shares Vielle Montagne (zinc) has been steady at 415 fr. and Laurium at 560 fr.; Aguilas is a little lower, Huanchaca (silver) has recovered to 113 @ 114 fr. Nickel has ceased to fall, the recent low prices having called out buyers and steadied the market.

The coal shares show little change. Dombrowsa is again in favor, Aguas-Tenidas (iron) has declared a dividend of 40 fr., somewhat more than had been expected.

The weak spot in the market has been the copper stocks. Not only is the price of the metal already low, but there have been rumors of increased production, competition, stocks forced on the market at any price and others too numerous to mention. All these have had their effect; Rio Tinto, Jerez-Lanteira and Cape Copper have all fallen, and Tharsis is the only stock which has held its own.

De Beers has fallen a little, but recovered part of the fall. It is reported that for a time only the Kimberley mines will be worked.

Some interesting statistics lately gathered in Paris and in Berlin seem to show that the situation now is entirely reversed from that which formerly prevailed. In our day it is the country population, the agricultural element, which is fixed, and the town furnishes the unstable, nomadic element. The townpeople do not seek the country, but within their limits they are uneasy and continually changing. Where the modern tendency to concentration of men and capital is going to end it is hard to tell.

We have had some curious bankruptcies here in Paris, but I find one financial genius in London who has devoted his time to developing gold mines in New South Wales, and who now presents a statement showing liabilities of £145,530 and assets amounting to an even £300. This financier does not make any proposal to his creditors, a fact which does not cause one much astonishment, since if all his assets are realized they will pay his creditors something less than $\frac{1}{2}$ d. to the pound, or, to be exact, 0.002% of their claims. But doubtless Messieurs the officers of the court will want all the £300 for themselves, if they resemble their brethren in France.

AZOTE.

DIVIDENDS.

Aspen Mining and Smelting Company, dividend No. 35 of 10 cents per share, \$20,000, payable June 4th, at the office of the company, No. 54 Wall street, New York.

Calumet, Hocking Valley & Toledo Railway Company, dividend of 2 $\frac{1}{2}$ % on preferred stock, payable July 2d.

Elkton Mining Company paid dividend of 1 cent per share, \$6,000, May 15th, at the office of the company in Colorado Springs, Colo.

Golden Fleece Mining Company paid a dividend of \$12,000 May 15th at the office of the company in Lake City, Colo.

Mercur Mining Company, dividend of \$25,000, payable June 15th, at the office of the company, in Salt Lake City, Utah.

Moose Mining Company paid dividend of 2 cents per share, \$12,000, May 5th, at the office of the company in Colorado Springs, Colo.

National Lead Company, dividend of 1 $\frac{1}{4}$ % on preferred stock, payable June 15th to stockholders of record May 25th, also a dividend of 1% on common stock, payable July 2d to stockholders of record June 11th, at the office of the company, No. 1 Broadway, New York City.

Rico-Aspen Consolidated Mining Company, dividend of 2 $\frac{1}{2}$ cents per share, \$25,000, payable June 10th, at office of the company in Denver, Colo., and at the office of W. M. Tuttle, No. 22 William street, New York City; also at the office of Messrs. Elliot, Johnson & Co., in Philadelphia, Pa. Transfer books close June 5th and reopen June 12th.

Union Mining Company paid dividend No. 1, of $\frac{1}{2}$ c. per share, \$6,250, May 20th, at the office of the company in Colorado Springs, Colo.

MEETINGS.

Comstock Tunnel Company, special meeting to consider the financial condition of the company, to be held at the office, No. 115 Broadway, New York, June 7th, at 1 p. m.

Lake Superior Smelting Company, annual meeting, at the office, Sears Building, Boston, June 9th, at 11 a. m.

Quicksilver Mining Company at the office of the company, No. 20 Nassau street, New York City, June 20th, at 1 p. m.

Quincy Mining Company, annual meeting, at the office, No. 52 Broadway, New York, June 6th, at 11 a. m.

NEW YORK MINING STOCK QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, dates from May 25 to June 1, and Sales. It lists various mining companies like Belcher, Nevada, and others.

* Dividend. † Dealt in at New York Stock Ex. Unlisted securities. ‡ Assessment paid. § Assessment unpaid. Dividend shares sold 2,100. non-dividend shares sold 5,000. * Holiday. Total shares sold, 7,100.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, dates from May 25 to May 31, and Sales. It lists mining companies like Atlantic, Michigan, and others.

Dividend shares sold, 3,821. Non-dividend shares sold, 3,000. Total shares sold, 6,821.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Names of Stocks, dates from May 26 to June 1, and Sales. It lists coal and railroad stocks like Am. Coal, Balt. & Ohio, etc.

Total shares sold, 36,663.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Name of Stocks, dates from May 26 to June 1, and Sales. It lists industrial and trust stocks like Adams Express, Am. Cotton Oil, etc.

Total shares sold, 27,838.

PENNSYLVANIA.

Table with columns for Philadelphia, Bid, Asked, and various stock names like Edson E. Light Co., Northern Liberties Gas, etc.

UTAH.

Table with columns for Salt Lake City, Bid, Asked, and various stock names like Alliance, Anchor, Centennial, etc.

FOREIGN.

Table with columns for London Quotations, May 22, 1894, Buyer, Seller, and various stock names like Alaska Treadwell, Alameda & Tiritto, etc.

CALIFORNIA.

Table with columns for San Francisco, Closing Quotations, and various stock names like Alpha, Belcher, Belle Isle, etc.

COLORADO.

Table with columns for Denver, Prices and sales for six days ending May 28th, 1894, and various stock names like Aola, Argentinum, Anaconda, etc.

MARYLAND.

Table with columns for Baltimore, May 30, Bid, Asked, and various stock names like Atlantic Coal, Balt. & N. C., etc.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Par, Assessments (Total Levied, Date and amount of last), Dividends (Total paid, Date and amount of last), and Name and Location of Company, Capital Stock, Shares, Par, Assessments (Total levied, Date and amount of last).

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † The Deadwood previously paid \$375,000 in eleven dividends and the Terra \$75,000. ‡ Previous to the consolidation in August, 1888, the California had paid \$31,320,000 in dividends, and the Coma. Virginia \$42,300,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,320,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid \$1,400,000 in dividends against \$485,000 in assessments.

COLORADO. Aspen. May 21 Price. Argentum-Juniata... \$0.52 Aspen Contact... .38 Aspen Deep Mining... .04 1/2

PENNSYLVANIA. Pittsburgh. May 31. Allegheny County Light... 80 Bridgewater Gas... 48

MINNESOTA. Duluth. May 29. LISTED STOCKS. Par. Bid. Asked. Biwabik M. Iron Co... 100 \$20.00 \$21.00

Paris, France. May 18. Acieries de France... \$10.00 de la Merine... \$22.50

CURRENT PRICES. These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, chem. pure... .17 @ .19 Commercial, in bbls. and cys... .01 1/2 @ .02

Cadmium Iodide - lb... \$5.50 Chalk - ton... \$1.50 @ \$2.25 Precipitated, lb... .04 @ .06

Mineral Wool - Ordinary slag... .01 1/2 Ordinary rock... .02 1/2 Ground, ton... .50

Tin - Crystals, in kegs or bbls... 14 @ 15 feathered or flossed... .30 Muriate, single... .07 @ .12

THE RARER METALS. The prices given below are the prices in Germany, and are per gramme except where otherwise stated:

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
 Borelmann, Louis F.
 Fullrock, M. & Co.
 Furligh, J. & Co.
 Galt, J. H. Compressor Works.
 Hase 19th, W.
 Ingersoll Steam Rock Drill Co.
 McKleran, S. G. & Co.
 Newalls Iron Works Co.
 Pann Diamond Drill & Mfg. Co.
 Rand Drill Co. (See Diamond Drills.)

Amalgamators
 Bowers Steam Shovel & Dredge Co.
 Gates Iron Works

Anti-Friction Metals
 Hertz, T. & Son.

Architects and Builders
 Berlin Iron Bridge Co.
 Fennell Bridge & Construct. Co.

Assayers and Chemists' Supplies
 Alsworth, Wm.
 Baker & Adamson.
 Baker & Co.
 Bate, J. & H.
 Bittick & Crenshaw
 Denver Fire Clay Co.
 Henry Hill Chem. Co.
 Haskins Wm.
 Miners' Assay Office.
 Overton, S. J. Chem. Co.

Attorney, Corporation
 McIndoe, H.

Babbit's Metal
 Epping, Carpenter & Co.

Band Wheels
 Poole, R., & Son Co.

Bankers and Brokers
 Sandell, E.
 Biehler & Sohne
 Billings, Robt. & Co.
 Grant, R. & H.
 Hinds & Hartman
 Hicks & Sprague.
 New Mexico M. Ex. Co.

Belting
 Grotzinger & Sons.
 Hanan & Johnson
 Jaffery Mfg. Co.

Blasting Caps and Fuse
 Lau, J. H. & Co.
 M. Smith, J. & Co.
 Blowers
 Garden City Sand Co.

Boiler Compound
 American Fluoride Co.

Bolters
 Babcock & Wilcox Co.
 Pollock, Wm. B. & Co.
 Scalfie, Wm. B. & Sons
 (See Machinery.)

Brass Castings
 Epping, Carpenter & Co.

Brass Rolling Machinery
 Poole, R., & Son Co.

Brattice Cloth
 Mineralized Rubber Co.

Brick Machinery
 Fletcher, S. K.
 Freese, E. M., & Co.

Bridges
 Berlin Iron Bridge Co.
 Peacock Br. & Co.
 Pittsburgh Bridge Co.

Bucets
 Galt, Wm. B. & Sons. (See Machinery.)
 Gaunter-Griffin, Sus. Ry. Bridge Co.
 Poole, R., & Son Co.

Carbon
 Bishop, Victor, & Co.
 Bostelmann, Louis F.
 Car Wheels
 Whitney & Co.

Cement
 Atlas Cement Co.

Chain and Link Belting (See Belting.)

Chemicals
 Baker & Adamson.
 Bullock & Crenshaw.
 Henry Hill Chem. Co.
 Overton Chem. Co.
 Charles Liquid
 Pickhardt, Wm. & Kattroff.

Clasques, Friction
 Poole, R., & Son Co.

Coal
 Newland White Coal
 Mg. Co.
 Casner & Curran
 Consolidation Coal Co.
 Co. Bros. & Co.
 Haddock, Snook & Co.
 Coal Cutters
 Ingersoll-Sergeant Drill Co.
 Jaffery Mfg. Co. (See Machinery.)

Coal Tipples
 Youngstown Bridge Co.

Cokeovens
 Sheffield Car Co.

Concentrators, Crushers, Pulverizers, Separators, Etc.
 Allis, Ed. P. & Co.
 American Mining & Milling Machinery Co.
 Beckett Foundry & Machine Co.
 Blake, Theo. A.
 Boston Ore Machinery Co.
 Colorado Iron Works
 Fraser & Chalmers.
 Free Vanner Concentrator.
 Gates Iron Works.
 Hendrie & Boltzoff Mfg. Co.
 Krom, S. B.
 Mechanical Gold Extractor Co.
 Stedman Foundry & Mach. Co.
 Totten & H. G.
 Waltham-Watson Mfg. Co. (See Machinery.)

Conduits, Fibres
 Fibre Conduit Co.

Copper Dealers and Producers
 Abbott, Wheelock & Co.
 American Metal Co.
 Atlantic Mining Co.
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Boston & Mont. M. Co.
 Butte & Boston M. Co.
 Canadian Copper Co.
 Central Mining Co.
 Copper Queen Mfg. Co.
 Detroit Cop. & M. Co.

Copper Rolling Machinery
 Poole, R., & Son Co.

Centrifugals and Miners' Supplies
 Bucyrus Steam Shovel and Dredge Co.
 Pollock, Wm. B. & Co.
 Pratt & Whitney Co. (See Machinery.)

Corrugated Iron
 Berlin Iron Bridge Co.
 Scalfie, W. B. & Sons

Crucibles, Graphite, Etc.
 Denver Fire Clay Co.
 Garden City Sand Co.
 Obermayer Co.

Crucible Steel Castings
 King & Andrews Co.

Crushed Quartz
 Garden City Sand Co.
 Galt, J. H. City Sand Co. | Obermayer Co.

Diamond Drills
 Grotzinger & Sons.
 Bishop, Victor, & Co.
 Letow, Theodore.
 Diamond Drills
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Bullock Mfg. Co., M.C.
 Fessenden, Wm.
 Letow, Theodore.
 (See Air Compressors and Rock Drills.)

Drawing Materials
 Albers, Theo. & Son.
 Queen & Co.

Dredges
 Bucyrus Steam Shovel & Dredge Co.
 Southern & Co.

Dredging Machines
 Poole, R., & Son Co.

Dump Cars
 Hunt Co., C. W. | Wright & Adams Co.

Educational Institutions
 Columbian University,
 Correspondence School of Mines.
 Harvard University.
 Mass. Inst. of Technology.
 Michigan Mining School.
 Missouri School of Mines.
 Pennsylvania Military College.
 R. S. Polytechnic Institute.
 Woodville Seminary.

Electrical Machinery and Supplies
 General Electric Co.
 D. K. Co. Limited.
 Jeffrey Mfg. Co.
 King & Andrews Co.
 International Co.

Elevators, Conveyors and Hoisting Machines
 Brown Hoisting and Convey. Mach. Co.
 California Wire Works.
 Cooper, Hewitt & Co.
 Hunt, C. W. Co.
 Jeffrey Manufacturing Co.
 Scalfie, Wm. B. & Sons.
 Union Wire Rope Tramway Co.
 Vulcan Iron Works.
 (See Wire Rope Tramway and Machinery.)

Elevator, Grain, Machinery
 Poole, R., & Son Co.

Emery Wheels
 New York Belting & Packing Co., Ltd.

Employment Bureaus
 Engineering Employment B. Bureau.

Engineers, Chemists, Metallurgists
 Adams, W. H.
 Askew & Russell.
 Baker & Co.
 Blaney, John F.
 Blauvelt, Harrington.
 Boggs, Wm. H.
 Boss, Clarence M.
 Boss, M. P. J.
 Brodie, Walker M.
 Burfield, J. H.
 Burlingame, E. B.
 Butters, Charles.
 Campbell-Phison H.C.
 Carnahan, F. W.
 Carpenter & Franklin B.
 Cary, & More.
 Case, Wm. H.
 Cazin, Franz.
 Chandler, W. H.
 Channing, J. Parke.
 Clement, Victor M.
 Collins, J. H. & Sons.
 Courtis, Wm. H.
 Crawford, J. S.
 Darling, L. H.
 Davis, Floy A.
 Davis, Lewis K.
 De la Soudaine, Geo.
 Dewey, Frederic F.
 Dickerson, Alton L.
 Dickinson, H. P.
 Donald, J. T.
 Drysdale, Dr. W. A.
 Ede & Burwell
 Emmens, Stephen H.
 Engelhardt, E. O.
 Everette, Dr. W. E.
 Fearn, Percy L.
 Fink, W. W.
 Forbes, George.
 Freedland, Francis T.
 Froehling, Dr. Henry.
 Furlonge, W. H.
 Gooding, P. W.
 Hann, O. H.
 Halse, E.
 Hammond, John Hays
 Hampton, W. Huntley
 Hardman, John B.
 Hastings, John B.
 Hoffman, Ottokar.
 Hollibaugh, J. R.
 Hooker & Lawrence.
 Hunt & Robertson.
 Ihne, F. W.
 Jennings, E. P.
 Jones & Jones.
 Kennedy, Julian

Engineers' Instruments
 Alexander, T. & Son.
 Brandt's Sons.
 Bullock & Crenshaw
 Gurley, W. L. & S.
 Engines
 Armstrong Brothers.
 Buckeye Engine Co.
 Bullock, M.C. Mfg. Co.
 Racine Hardware Co.
 Silwell-Bierce & Co.
 Smith-Vallo Co.
 Union Iron Works
 (See Machinery.)

Excavators
 Bucyrus Steam Shovel & Dredge Co.
 Southern & Co.

Fans, Steam
 Cole, Wm. E.

Fertilizer Machinery
 Poole, R., & Son Co.

Fibre Conduits
 Fibre Conduit Co.

Fire-Brick and Clay
 Denver Fire Clay Co.
 Klone Hill Machinery
 Poole, R., & Son Co.

Flue-gas
 Obermayer Co.
 Poole, R., & Son Co.

Foundries
 Poole, R., & Son Co.
 Obermayer Co.

Foundry Supplies
 Obermayer Co.

Friction Clutches
 Poole, R., & Son Co.

Foundries
 Hoskins, Wm.
 Moore, S. J. & Co.
 (See Machinery.)

Fuses, Powder
 Climax Fuse Co.

Gas Engines
 Young & Gasoline Engine Co.
 White & Middleton Gas Engine Co.

Gas Works
 Pollock, Wm. B. & Co. W. R. D. & Co.
 Allis, Ed. P. & Co.
 Bristol Mfg. Co.

Gearing
 Poole, R., & Son Co.

Grate Elevators
 Poole, R., & Son Co.

Grasses, Graphite, Etc.
 Dixon, Jos. Crucible Co.

Hangers
 Poole, R., & Son Co.

Heavy Machinery
 Poole, R., & Son Co.

Hopper Scales
 Mueller Mfg. Co.

Hoses, Rubber, Etc.
 Allen, Chas. A.
 Mineral and Rubber Co.
 New York Belting & Packing Co., Ltd.

Injectors
 Young Lock Nut Co.

Inspection and Tests
 Hunt, The Robert W. Co.
 Okonite Co. Ltd.

Insurance Companies
 Hartford Steam Boiler Inspect'n and Ins. Co.
 Mutual Life Insurance Co.

Iron Castings
 Poole, R., & Son Co.

Lamps, Miners'
 Stieren, Wm. K.

Lead, White, Machinery
 Poole, R., & Son Co.

Locomotives
 General Electric Co.
 Hunt, C. W. Co.

Machinery, Hoisted Gearing
 Poole, R., & Son Co.

Machinists
 Poole, R., & Son Co.

Marine Railways
 Poole, R., & Son Co.

Machinery, Milling, and Other Machinery
 Etna Fiv. & Mach. Co. | Moore, Sam. L. & Son.
 Allis, Edw. P., & Co.
 Amer. Mining & Milling Machinery Co.
 Armstrong Brothers.
 Beckett Foundry & Machine Co.
 Bost. Iron, L. F.
 Boston Ore Mach'ry Co.
 Buckeye Engine Co.
 Buick, W. C. Mfg. Co.
 Colorado Iron Works.
 Exeter Mach. Wks. Co.
 Fraser & Chalmers Co.
 Griffith & Wede- Co.
 Hendrie & Boltzoff Mfg. Co.
 Jeffrey Mfg. Co.
 McKleran, S. G. & Co.
 Mech'l Gold Extr. Co.
 Meeklenburg Ir. Wks.
 Metal Dealers
 Abbott, Wheelock & Co.
 American Metal Co.
 Am. Zinc Lead Co.
 Baker & Co.
 Bath, Henry & Son.
 Eureka Co.
 James & Shakspeare.

Metallurgical Works and Ore Processing
 American Zinc Lead Co.
 Baker & Co.
 Balbach Smelting & Refining Co.
 Baltimore Copper Works.
 Canadian Copper Co.
 Kansas City S. & Ref. Co.
 Ledoux & Co.
 Mechanical Gold Extractor Co.
 Orford Copper Co.
 Pennsylvania Salt Mfg. Co.
 Ricketts & Banks.
 Russell Process Co.
 St. Louis Sampling & Testing Works.
 State Ore Sampling Co.
 Waltham-Swenson Mfg. Co.

Mine Cars
 Sheffield Car Co.

Mining and Land
 Atlantic Mfg. Co.
 Boston & Mont. Mfg. Co.
 Butte & Boston Mining Co.
 Central Mfg. Co.
 Copper Queen Mfg. Co.
 Detroit Copper Mfg. Co.
 Eureka Co.
 Waulding Sand Garden City Sand Co.

Nickel
 Canadian Copper Co.
 New York Lock Nut Co.

Ore Cars
 Truax Mfg. Co.

Ore Testing Works
 Hunt & Robertson.
 Ledoux & Co.

Packing and Pipe Coverings
 Brandt, Randolph.
 Jenkins Bros.
 Keasby Bros.
 Mineralized Rubber Co.
 Patents
 Atkins, J. L.

Perforated Metals
 Alcherson, R. Perf. Metal Co.
 Harrington & King Perforating Co.
 Hendrick Mfg. Co.

Periodicals
 Arms and Explosives, Iron & Coal Trades Review
 Austral. Mining Jour.
 Austral. Mexicano, Indian Engineering.
 Electrical Plant & Electrical Industry.
 Financial Times, Jour. of Assoc. of Engineering Societies.
 Mining Journal.

Phosphates
 Philadelphia Paul C.

Phosphor-Bronze
 Phosphor-Bronze Smelting Co.

Pile Drivers
 Bucyrus Steam Shovel and Dredge Co.

Pipes
 Pollock, Wm. B. & Co. | Wyckoff & Sons, A.

Planed Gearing
 Poole, R., & Son Co.

Plating
 Baker & Co.

Plumbago-East India
 Obermayer Co.

Portland Cement
 Atlas Cement Co.

Powder
 Atlas Powder Co.
 Laffin & Hand Powder Co.
 Lau, J. H., & Co.

Pulleys
 Poole, R., & Son Co.

Putty
 Etna Fiv. & Mach. Co.
 Allen, Chas. A.
 James, Geo. F. Mfg. Co.
 Cameron, A. Steam Pump Works.
 Epping, Carpenter & Co.
 Grotzinger, A. & Sons
 Jeannville Iron Wks.

Publications
 Allison Coupon Co. | Financial Times.
 Arms & Explosives, Iron & Coal Trades Rev.
 Austral. Mining Jour. of Assoc. of Engineering Societies.
 Electrical Plant & Electrical Industry.
 Mining Journal.

Quarrying Machines
 Bostelmann, L. F.
 Bucyrus Steam Shovel & Dredge Co.
 Rand Drill Co.
 Sullivan Machinery Co.
 Union Wire Rope Tramway Co.

Quicksilver
 Wm. E. Stieren

Railroad Supplies and Equipment
 Garden City Sand Co. | Robinson & Co.
 Hunt, C. W. Co. | South I. & Equip. Co.
 Porter, H. K., & Co. | Young Lock Nut Co.

Regulators, Damper, Heat, Etc.
 Eddy Valve Co. | Mason Regulator Co.
 Lunkenheimer Co. | (See Air Compressor.)
 Rock Drills, (See Air Compressor.)
 Rolling Mill Machinery
 Poole, R., & Son Co.

Roofing
 Berlin Iron Bridge Co. | Phelps, Dodge & Co.
 Holton Iron & Steel | Pittsburgh Bridge Co.
 Roofing Co. | (See Air Compressor.)
 Peacock Br. & Co. Sons.
 Peacock Bridge and Const.

Rope Wheels
 Poole, R., & Son Co.

Rubber Goods
 New York Belting & Packing Co., Ltd.

Safety Lamps
 Wm. E. Stieren

Screeners
 Alcherson, R. Perf. Metal Co.
 Exeter Machine Works Co.
 Harrington & King Perforating Co.
 Tyler, W. S. Wire Works Co.
 (See Machinery.)

Screen Plates
 Harrington & King Perforating Co.

Separators
 Harrington Safety Boiler Works.

Shafting
 Poole, R., & Son Co.

Shoes and Dies
 Chromum Steel Works. | Crescent Steel Co.
 Sheffield (Steam) | Robinson & Co.
 Bucyrus Steam Shovel & Dredge Co. | Whitney, A., & Sons.
 Southern & Co. | (See Metal Dealers.)
 Garrison, A. Fdry. Co.

Smelting and Refining Works
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Kansas City S. & Ref. Co.
 Mathison Smelting Co.
 Orford Copper Co.
 State Ore Sampling Co.

Steel Rails, Castings, Rolls, Drill
 King & Andrews Co.
 Moore, S. L., & Sons Co.
 Roberts, A. & F., & Co.
 Robinson & Co.
 Whitney, A., & Sons.
 (See Metal Dealers.)

Tanks
 Pollock, Wm. B. & Co.
 Scalfie, Wm. B. & Sons.
 Williams Mfg. Co.

Tapping Machine, Gas Main, Etc.
 Mueller Mfg. Co.

Telegraph Wires and Cables
 Bostelmann, L. F.

Tie Plate Rolling Machinery
 Poole, R., & Son Co.

Tools
 Pratt & Whitney Co.

Tubes
 Pollock, Wm. B. & Co. | Williams Bros.

Tabling-Rubber
 New York Belting and Packing Co., Ltd.

Turbines
 Hamilton & Co. The
 Poole, Robt. & Son Co.
 Stillwell-Bierce & Smith-Vallo Co.

Turbine Water-Wheels
 Poole, R., & Son Co.

Valves
 Eddy Valve Co. | Lunkenheimer Co.
 Jenkins Bros. | Mason Regulator

Ventilators
 Bullock, M.C. Mfg. Co.

Vulcanite Emery Wheels
 New York Belting and Packing Co., Ltd.

Washers
 Wilton Mfg. Co.

Water Pressure Reducers
 Mueller Mfg. Co.

Water Pressure Regulators
 Mueller, H. Mfg. Co.

Water-Wheels
 Poole, R., & Son Co.

Well Drilling Machinery
 Bostelmann, L. F.
 Penn. Diamond Drill & Mfg. Co.
 Sullivan Machinery Co.
 Williams Bros.

Wheels, Car
 Sheffield Car Co.

White Lead Machinery
 Poole, R., & Son Co.

Wire Cloth
 Alcherson, R. Perf. Metal Co.
 Harrington & King Perforating Co.
 Tyler, W. S. Wire Works.

Wire Rope & Wire
 Abbott, Wheelock & Co.
 Bostelmann, L. F.
 R. P. Co.
 California Wire Wks.
 Cooper, Hewitt & Co.
 Hunt, C. W. Co.
 Lechen, A. & Sons
 R. P. Co.

Wire Rope Tramway
 Brown Hold. & Convey. Machine Co.
 California Wire Works.
 Colorado Iron Works.
 Cooper, Hewitt & Co.
 Hunt, C. W. Co.
 Reebing, J. A. Sons & Co.
 Trenton Iron Co.
 Vulcan Iron Works.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

Positions Vacant.

1325 WANTED—A THOROUGHLY COMPETENT master mechanic to take charge of the machinery of a copper mining and smelting concern in the Northwest. Apply, stating age, experience and references. Address letters MONT, ENGINEERING AND MINING JOURNAL.

1326 WANTED—FOREMAN MACHINIST—one who would appreciate an opportunity for advancement; sobriety and ability must be unquestioned; prefer one who has some knowledge of draughting and has had experience in the manufacturing of water-tube boilers; state age, nationality, wages desired and references. Address MACHINIST, ENGINEERING AND MINING JOURNAL.

1327 WANTED—A SALESMAN WELL acquainted with the steel trade, particularly in the Eastern States. Address STEEL TRADE, ENGINEERING AND MINING JOURNAL.

1328 WANTED—AN ANALYTICAL chemist thoroughly versed in the analysis of gold, silver, copper and lead ores. Applicant must be able to purchase at least \$500 of the company's stock. A salary of \$100 monthly is guaranteed to the right man for the first few months, with great chances for increase. Address COLORADO, ENGINEERING AND MINING JOURNAL.

1329 WANTED—AN ASSISTANT CHEMIST and assayer in a shop refining precious metals. Address, stating age, experience, and wages expected, ASSISTANT, ENGINEERING AND MINING JOURNAL.

1330 WANTED—EXPERIENCED CHEMIST for blast furnace. One willing to help in office preferred. Give experience, references, and full particulars. Address IVANHOE, ENGINEERING AND MINING JOURNAL.

1331 WANTED—A DRAUGHTSMAN who has had some experience in designing mining machinery, and who is a graduate of some good mechanical school. A permanent position for the right man. Address MECHANICAL, ENGINEERING AND MINING JOURNAL.

1332 WANTED—A MANAGER THOROUGHLY familiar with the manufacture of alum. Address ALUM, ENGINEERING AND MINING JOURNAL.

1333 WANTED—EXPERIENCED CONTRACTORS to join in sinking a deep shaft through wet ground. Must be able to command \$100,000; very large profits can be made on the job. SHAFT, ENGINEERING AND MINING JOURNAL.

1334 WANTED—MINING ENGINEER and assayer, speaking and writing Spanish, for silver mines; salary \$75. Address, with full particulars as to experience and references, ZACATEC, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

WANTED—SITUATION IN SMELTING OR concentrating works; technical education; several years' experience in treating low grade ores. References given. Address SMELTING AND CONCENTRATING, ENGINEERING AND MINING JOURNAL. No. 16,186, June 9.

A GENERAL MACHINIST WANTS A SITUATION as Foreman. Address STEAM, ENGINEERING AND MINING JOURNAL. No. 16,497, June 30.

A MECHANICAL DRAUGHTSMAN DESIRES engagement. Address STAFF, ENGINEERING AND MINING JOURNAL. No. 16,503, June 9.

POSITION WANTED BY A PRACTICAL Copper Smelter of several years' experience, well posted in the treatment of ores, refining, assaying and erection of smelting plant. Can introduce Napier's improved system of copper smelting. Address INGOT, ENGINEERING AND MINING JOURNAL. No. 16,515, June 23.

CHEMIST OF NINE YEARS' EXPERIENCE in metallurgical works is open to engagement. Best of references. H. N. YATES, Lockport, N. Y. No. 16,482, 14.

POSITION WANTED AS ASSISTANT TO mine manager or mining engineer, by a recent graduate of the Columbia College School of Mines. Address METAL MINING, ENGINEERING AND MINING JOURNAL. No. 16,509 17.

POSITION WANTED BY FIRST-CLASS MACHINIST as master mechanic, foreman or any position where ability and faithful services will be appreciated. Experience in marine and stationary engines and rolling mill machinery, good draughtsman. Vicinity of New York preferred. Address HUSTLER, ENGINEERING AND MINING JOURNAL. No. 16,502, June 9.

A MINING ENGINEER WILL SHORTLY BE open to re-engagement as Manager or Superintendent of Mines and Mills. Has wide experience in gold, silver and copper. Highest references from present and past employers. Address TRANSIT, ENGINEERING AND MINING JOURNAL. No. 16,495, June 22.

RELIABLE AND ACCURATE MECHANICAL Draughtsman, age 25, desires position. R., ENGINEERING AND MINING JOURNAL.

SITUATION WANTED BY AN ENERGETIC civil and mining engineer of six years' experience as mine superintendent and mining engineer. Can give good references. Address PLYMOUTH, ENGINEERING AND MINING JOURNAL. No. 16,526, June 9.

AN ALL-ROUND CIVIL ENGINEER (thoroughly American) familiar with Spanish language and customs, capable of taking full charge, willing to be an assistant. If with general contracting firm prefer an interest to salary; at present second chief engineer; employers as reference. Experienced in handling, reconnaissance, preliminary, location, construction and men, both as engineer and superintendent. Parties needing the same (especially those interested in South American enterprises) address CHARACTER, ENGINEERING AND MINING JOURNAL. No. 16,527, Aug. 4.

MINING ENGINEER—YOUNG MAN, good assayer, surveyor and draughtsman, experience in mining and milling of gold ores, desires suitable position. Address W. G. E., ENGINEERING AND MINING JOURNAL. No. 16,524, June 23.

AUDITOR FOR MINING AND MILLING companies, an expert accountant, for 10 years manager of mines and mill superintendent, thoroughly conversant with all details of the work; can stop leaks, systematize accounts and reports for home office. Go anywhere, short notice. Terms moderate, references A. I. Address MINING ENGINEER, Carrier 55, Denver, Colo.

AN ENGINE BUILDER, AGED 32. THAT knows how to design and build engines to suit highest requirements, and is competent to run a shop, can furnish his own designs, desires a good, steady position. Best references. Address ENGINEER, ENGINEERING AND MINING JOURNAL. No. 16,586, June 9.

**Contracts Open.**

PIPING, CASTINGS, VALVES, ETC.—Proposals are wanted until June 21 for furnishing a quantity of water pipe, special castings, gate valves, fire hydrants, etc. Address E. M. BIGELOW, Director of Department of Public Works, Pittsburg, Pa.

IRON SPANS.—Bids, plans and specifications are solicited for placing two 60 ft. iron spans in place of the present wooden approaches to the drawbridge across the Ocmulgee River in Pulaski County. I will pass upon all bids, etc., that may be sent in until June 13. For further information apply to P. T. MCGIFF, Ordinary, Hawkinsville, Ga.

WATER-WORKS.—Sealed proposals will be received by the village council for a complete system of water-works for the village of Lamberton, Minn., consisting of water-tower, tank, stand pipe, water mains, hydrants, etc.; also windmill. Bids to be opened June 20, 1894. Plans and specifications can be seen at the office of the village recorder, Lamberton, Minn. G. B. TRETBAE, Village Recorder.

IRON, STEEL, HARDWARE, LUMBER, ETC.—New York.—Sealed proposals, in triplicate, will be received until June 12, 1894, for furnishing iron, steel, hardware, lumber, fuel, oils, etc., during fiscal year ending June 30, 1895. Lists of supplies needed, with full instructions, stipulations, etc., can be had on application to Major ISAAC ARNOLD, Jr., Ordnance Department, West Troy, N. Y.

WATER-WORKS.—Sealed proposals for the construction of water-works, consisting of about 4 miles main line and about 3 miles village distribution, will be received until June 14. Plans and specifications can be seen at this office and further information can be obtained by addressing EDMUND BROWN, Secretary, Norfolk, Conn.

The Most Successful Process for the Extraction of Gold.
IMPROVED BARREL CHLORINATION.

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

BRIDGE.—State of Georgia, County of Pulaski, Court of Ordinary, Hawkinsville, Ga.—Bids, plans and specifications are solicited for placing two (2) 60-ft. iron spans in place of the present wooden approaches to the drawbridge across the Ocmulgee River in said county. I will pass upon all bids, etc., that may be sent in before the 13th day of June, 1894, at my office in Hawkinsville, Ga. The right to reject any and all plans and bids is reserved. For further information apply to P. T. MCGIFF, Ordinary, Pulaski County.

IRON, STEEL, HARDWARE, ELECTRIC Supplies, Etc.—Sealed proposals, in triplicate, will be received until June 14th, 1894, for furnishing iron, steel, hardware, lumber, forage, fuel, electric materials and supplies, oils, etc., during the fiscal year ending June 30th, 1895. List of supplies needed, with full instructions, stipulations, etc., can be had on application to Captain FRANK HEATH, Ordnance Department, Governor's Island, N. Y.

CYLINDER AND MACHINE OIL.—Sealed proposals will be received until June 16th, 1894, for supplying cylinder and machine oils during the fiscal year ending June 30th, 1895, to certain United States buildings. Particulars will be furnished upon application to undersigned. Proposals should be addressed to the Secretary of the Treasury and indorsed "Proposals for Oil for United States Buildings." S. WIKE, Acting Secretary, Washington, D. C.

WATER-WORKS.—Barron, Wis.—Sealed bids for the water-works system complete or for any part of the work or materials will be received until June 15. Bids to be accompanied by certified check for 10 per cent. of the amount bid. Plans and specifications on file with City Clerk and with Pike & Sublette, Engineers, Guaranty Loan Building, Minneapolis. Payments to be in cash. Mark envelope "Bid for Water-Works." CLARENCE C COE, President of Council.

IRRIGATION, Ottawa, Ill.—Sealed bids will be received by the Commissioners of Drainage District No. 2, Wallace Township, until June 13, for the construction of the proposed ditches in the district. Bids will be received for all or part of the work. The work comprises about 80,000 cubic yards of excavation. A certified check for 2 per cent. of the amount bid must accompany each bid, the same to be forfeited to the district on failure of the bidder to enter into contract with the commissioners within five days after award of contract. For further information address WILLIAM H. IRWIN, Engineer.

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C., June 9, 1894.—Sealed proposals will be received at this office until 2 o'clock p. m. on the 29th day of June, 1894, and opened immediately thereafter, for all the labor and materials required for the interior finish, plumbing, tower clock, etc., for the United States Post Office, Custom House, etc., building at Jacksonville, Fla., in accordance with drawings and specification, copies of which may be had at this office, or the office of the Superintendent at Jacksonville, Fla. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any and all bids and to waive any defect or informality in any bid, if it be deemed in the interest of the government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be inclosed in sealed envelopes, and marked "Proposal for the Interior Finish, Plumbing, Tower Clock, Etc., for the United States Post Office, Custom House, Etc., building at Jacksonville, Fla.," and addressed to JEREMIAH O'ROURKE, Supervising Architect.

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C., June 1st, 1894.—Sealed proposals will be received at this office until 2 o'clock p. m. on the 30th day of June, 1894, and opened immediately thereafter, for all the labor and materials and fixing in place complete the low pressure, return circulation, steam heating and ventilating apparatus required for the United States Court House and Post Office Building at Tallahassee, Fla., in accordance with the drawings and specification, copies of which may be had at this office, or the office of the Superintendent at Tallahassee, Fla. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or all bids and to waive any defect or informality in any bid, if it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be inclosed in envelopes, sealed and marked "Proposal for Heating and Ventilating Apparatus, Etc., for the United States Court House and Post Office Building at Tallahassee, Fla.," and addressed to JEREMIAH O'ROURKE, Supervising Architect.

Continued on page 19.

CHLORINE LIQUID

For Extraction of Gold.

FOR SALE BY

WM. PICKHARDT & KUTTROFF,
98 LIBERTY STREET, NEW YORK.

The Most Successful Process for the Extraction of Gold.

IMPROVED BARREL CHLORINATION.

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

JOHN E. ROTHWELL,
ENGINEERING AND MINING JOURNAL, New York.

MACHINERY AND SUPPLIES FOR SALE.

**STEEL RAILS,
NEW OR SECOND-HAND.**

We can furnish any weight of New Rails. We also have for immediate delivery 100 tons of Second-Hand 60 lb. Steel T Rails, 100 tons 35 lb. Girder and 300 tons 45 lb flat steel; all well fit to relay, and cheap.

ROBINSON & ORR,
No. 419 Wood Street, Pittsburg, Pa.

FOR SALE.

Smelting Plant at Trinidad, Colo.,

all equipped, ready to start up. Situated just outside city limits Trinidad, on a 20 $\frac{1}{2}$ -acre tract of land adjoining a river. Side tracks from two competing railway lines. Description of Smelter Buildings and their contents, also photos of works, may be found at the office of ENGINEERING AND MINING JOURNAL.

For terms apply to **MILWAUKEE AND TRINIDAD SMELTING AND REFINING COMPANY,** Milwaukee, Wis.

THE FOLLOWING MACHINERY IS ALL NEW, and was displayed at the World's Columbian Exposition by the Chicago Iron Works. It is now offered for sale by order of the Superior Court. Full details and prices can be obtained on application to **ROCKWELL KING, Receiver, Estate Chicago Iron Works, Chicago, Ill.**

- | | |
|--|-------------|
| 8" x 12" Hoisting Engine—two cylinders, single drum, 42" x 40" grooved for holding 500 ft. $\frac{3}{8}$ " rope in single coil | 8,000 lbs. |
| 33" x 81" Galena Silver Furnace—Steel Jackets and Curb, Ball Joint Tuyeres, Corner Discharge Boxes, Spouts, Leadwell, Bladder, Stack, etc. | 20,000 lbs. |
| 2 Collon Jigs, complete. | |
| 1 Slide Motion Jig, 2 compartments. | |
| 1 Brunton Sampler No. 2. | |
| Rotary Screens—One train of three. | |
| Each 36" diameter, 96" long, complete with perforated iron coverings and Steel housings | 7,500 lbs. |
| 2 Silver and Gold Mortars. | |
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WE BEG TO ANNOUNCE THAT OUR Mr. Ede, M. E., leaves here early in April to examine mineral properties in New Mexico, UTAH, Colorado, Oregon and South Dakota. He will undertake other work for private parties or companies. Twenty years' experience. Reference exchanged.

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DIVIDENDS.

RIC-ASPEN CONSOLIDATED MINING COMPANY. DENVER, Colo., May 26th, 1894.

A dividend of two and one-half cents per share, twenty-five thousand dollars, has been declared, payable June 10th, to stockholders of record on June 5th. Transfer books close June 5th, and reopen June 12th. Transfers of stock to be made at the general office of the company, Denver, Colo., or at the offices of W. M. Tuttle, 22 William Street, New York, or Elliot, Johnson & Co., Philadelphia.

A. B. ROEDER, Secretary.

FINANCIAL.

Golden Reef Mining and Milling Co.
Capital Stock, 100,000 Shares.
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Selling Price, \$2.50 per share
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The Golden Reef Mining and Milling Company, of Chicago, Illinois, offer to investors a limited number of shares of their Treasury Stock. This stock is guaranteed and is absolutely safe. The company's mines have been opened up. Many thousand tons of gold and copper ore of paying quality. All that is required to put the property in a dividend-paying condition is a milling plant. The mill is already built and ready for shipment. Make all checks, drafts, etc., payable to **THOMAS F. THORNE,** of the Commercial National Bank, Chicago, Trustee. For prospectus and full information address **E. M. BREAKLE,** Sec'y, Room 1505, No 79 Dearborn St., Chicago.

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WANTED—PARTNER OR PARTNERS TO organize a stock company for manufacturing a patented automatic coal, clay and freight conveyor. In demand; \$3,000 stock already insured for \$1,500, or for the sale of the same. Illustrated catalogue on application. Address **L. BOUDREAU,** No. 170 E. Spruce Street, Manchester, N. H.

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Address **MYLES & CO.,**
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J. G., ENGINEERING AND MINING JOURNAL.
No. 16,589, June 9.

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Advertisers are in want of large amounts of Carbonate of Lead. Estimates invited for number of tons of Carbonate of Lead Concentrate that can be furnished per annum, and lowest cash price for same delivered at St. Louis and Kansas City. Parties furnishing must guarantee quantities.

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NOTICE OF ASSESSMENT.

Buwer Consolidated Mining Company,—117 Liberty St., New York.

Notice is hereby given that at a meeting of the Board of Directors held on Thursday, the twenty-fourth (24th) day of May, 1894, an assessment, No. 3, of Ten Cents (10c.) per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the **Farmers' Loan and Trust Company,** No. 20 and 22 William St., New York.

Any stock upon which this assessment shall remain unpaid on Friday, the twenty-ninth (29th) day of June, 1894, will become delinquent and be advertised for sale at public auction; and unless payment is made before will be sold on Friday, the twenty-seventh (27th) day of July, 1894, to pay the delinquent assessment, together with cost of advertising and expenses of sale. By order of the Board of Directors.

L. OSBORN,
Secretary.

Main Office, Room No. 33 Nevada Block, No. 309 Montgomery Street, San Francisco, California.

Contracts Open
Continued from page 18.

PIPING, CASTINGS, ETC.—Proposals are wanted until June 21st for furnishing a quantity of water pipe, special castings, gate valves, fire hydrants, etc. Address **E. M. BIGELOW,** Director of Department of Public Works, Pittsburg, Pa.

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SEE PAGE 7.

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