

THE ENGINEERING AND MINING JOURNAL



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

VOL. XLVIII.

AUGUST 3.

No. 5.

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Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$5.

Monthly Export Edition, all countries, \$2.50 gold value per annum.
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FILE COVERS will be sent by mail for \$1.00, or delivered at office for 75 cents each.

THE SCIENTIFIC PUBLISHING CO., Publishers,
SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. & Gen'l Manager
P.O. Box 1833. 27 Park Place, New York.

The Table of Contents will be found at the end of the reading matter, page 106.

An illustrated price list of goods for export, giving export discounts is mailed with this issue of the ENGINEERING AND MINING JOURNAL.

The attention of our readers is invited to the department of "goods wanted at home and abroad," on another page. The immense benefit it has already been to our advertisers has been fully recognized. Parties wanting machinery or supplies of any kind whatever are invited to write us full particulars of what they want. They will thus secure the advantages of competitive prices from the best manufacturers in the country.

On another page will be found a very interesting and important communication from Mr. L. F. BARTLETT, describing in general terms his new process for the treatment of silver-bearing zinc-lead ores, such as are abundant and now worthless in so many mining districts in this and other countries. Mr. BARTLETT appears to us to have, by patient and intelligent work, solved this problem in a practical manner, and those who possess ores to which this process is adapted will find this communication of great value. The details of treatment will, no doubt, be fully explained to those interested by Mr. BARTLETT, who may be addressed at Portland, Me.

The miners of gas coal in Pennsylvania may well feel apprehensive at the action which the Standard Oil Company is reported to be about to take, in putting the heavy Lima, Ohio, oil upon the general Western and Southern market as a substitute for coal in gas making. The company is said to own the St. Louis and Memphis gas plants, which will use petroleum. The St. Louis works for years took from 150 to 175 barges of Pittsburg gas coal; and this is a partial measure of what the change implies. Gas coal has suffered from the introduction of electric lighting as against coal gas; now comes a competitor which has been threatening for some time, but which had not actually entered the field. It is claimed that the use of oil is more economical, and from a wide territory gas coal must be barred out.

On another page we publish a very instructive report by our well-informed and thoroughly reliable special correspondent on the properties in Dakota of the Lookout and Sullivan mining companies. Nothing more than this should be necessary to deter any prudent person from investing in either concern.

Our correspondent has well earned the thanks of all friends of legitimate mining by his plain exposure of schemes that cannot fail to bring the industry into discredit.

We commend this information concerning the Sullivan Company, which was listed in November last (see ENGINEERING AND MINING JOURNAL, November 17th, 1888, and was dealt in for the first time December 18th, 1888, at 50c.), to the attention of the directors of the New York Consolidated Mining and Petroleum Exchange and the Boston Mining Exchange, and

invite them to investigate, and, on finding the facts as stated, to exclude this "cat" from the list. So long as the Consolidated Exchange harbors and protects such concerns it is a positive injury to mining.

THE SALT COMBINATION.

As we intimated last week, the North American Salt Company did not materialize, having failed to get subscriptions here and in England to the necessary amount. The following brief announcement is the official record:

The Directors of the North American Salt Company authorize the following: While the subscriptions have been very numerous and in the aggregate large, the trustees feel that they are not justified in proceeding to an allotment of shares on the present basis without further conference with subscribers and vendors. This, on account of subscribers being on both sides of the Atlantic and vendors widely separated, will take time, and it has been decided to return subscriptions and postpone further action until these negotiations can be completed.

There is very little probability of this scheme being revived in this form. The public feeling against combinations and trusts is growing, and the unlimited liability of trustees and holders of trust certificates is, very naturally, alarming capital, so that no prudent investor will even "take a flyer" in such gambles with this enormous risk.

Combinations and trusts will never become popular here, and the better they are understood the less popular they will become.

THE MILITARY STRENGTH OF NEW YORK HARBOR.

The *Scientific American*, in reply to a correspondent who asks if the harbor of New York is sufficiently defended to withstand the attack of any navy of the world for twenty-four hours, and if the fortifications are modern, answers that "the fortifications of New York harbor are not of modern type, and the harbor cannot be said to be prepared for immediate defense. A few weeks would do a great deal to prepare it, the harbor vessels and coasters being pressed into service, and batteries being thrown up at Sandy Hook and along the Narrows." It might be added that the system of torpedo defense, by means of fixed submerged mines, about which very little is known by the public, but which we understand has been fully matured by the military authorities, could be put in effective condition at very short notice. Such defense, however, in the absence of large high-power guns to supplement and cover the mines, thus preventing countermining, would be but temporary. The city and its suburbs could be taken or severely damaged, without a regular investment, by vessels armed with modern guns lying at a distance not dreamt of when the antiquated defense works were planned. In this connection we may quote a writer in *London Engineering*, who says: "It may not be generally known, but it is a fact that the United States Government has the finest torpedo service in the world, and any hostile fleet that may presume on the apparently unprotected condition of its harbors, will doubtless bear full testimony to the truth of the foregoing statement." Still, the most progressive military men will hardly be willing to rely on a torpedo system alone; that is, one not backed up by guns.

THE TARIFF ON LEAD ORE GANGUE.

The ambiguity of the present law governing the admission of silver-lead ores is by no means confined to the question of whether the lead shall pay a duty when it is of less value than the silver in a silver-lead ore, as our correspondent, Mr. S. Y. MYERS, Secretary of the Corupano Mining Company, points out on another page.

When we referred in our last issue to the assumed case of a silver-lead ore containing 30 per cent lead, and said that such an ore, under the recent "instructions" of the Secretary of the Treasury, would have to pay a duty of 1½ cents a pound on the contained lead, we had in mind the revised Senate Bill of the last session, which provided that the duty to be paid would be on the lead contained in the ore. As the law is now, and for the past few years has been administered, the duty of 1½ cents per pound is not on the contained lead but on the whole of the ore, worthless gangue as well as lead, so that in the assumed case, instead of a duty of \$9 a ton, the ore would really have to pay a duty of \$30 a ton, or 5 cents a pound on the lead it contains.

It is to be hoped that the Treasury Department will elucidate the actual meaning of the recent instructions, and make it clear whether quartz or calcspar is to pay a duty of 1½ cents a pound when it happens to be associated with lead, while if its associate happens to be copper it comes in free; and at the same time it should state clearly whether the lead in the ore is to be valued at its actual market value or cost at the frontier, or on an assumed basis which is nearly double its market value.

THE RARER METALS.

Notwithstanding the enormous mineral wealth of this country, and the growing demand for the rarer metals which find use in the arts, or are employed in experimental work, nearly all, if not all of them, are imported. Among those named in the price list given at the end of the ENGINEERING AND MINING JOURNAL only three are said to be regularly produced in this

country. These are aluminum, iridium, and platinum, with perhaps one or two others occasionally; while by far the greater proportion of these come from Europe. Germany is the place where most of these metals are produced. According to the list quoted, gallium is still the most expensive metal, and perhaps rightly so, for it has little or no uses as far as it has been investigated, and the supply is so exceedingly slight that it is very doubtful if ever a pound of that element has been seen together. Rubidium commands a very high price; it is found with calcium in mineral waters, and in such slight amounts that great quantities of the water containing it must first be evaporated before it can be obtained. The platinum metals are of frequent if sparse occurrence in this country; but thus far no effort appears to have been made toward their extraction on a commercial scale, and it is a common practice to send the crude mass to England for smelting. The production of potassium and sodium is quite possible on this side of the Atlantic; yet, thus far, besides Mr. CASTNER'S experimental work, nothing has been done. Niobium or columbium (as American chemists prefer to call it), molybdenum, vanadium, and glucinum or beryllium are perhaps more common in the United States than elsewhere on the globe, and if efforts were made toward their introduction in the arts, uses for them would soon be brought about. Selenium came into active demand at the time ALEXANDER GRAHAM BELL experimented with it, on account of its sensitiveness to light, and it is still being tested as an agent in the optical transmission of speech, but the supplies are all imported. Zirconium all comes from Europe, but the rich deposit of zircons in North Carolina yield the zirconia now so extensively used in incandescent illumination. We should be glad and interested in having our readers' advice of new applications or new discoveries of any of the rarer metals and their ores.

ALLOTROPIC FORMS OF SILVER.

Probably the most important contribution to theoretical chemistry, judged from the point of view of the mining geologist and metallurgist, which has recently appeared is the paper by Mr. M. CAREY LEA, of Philadelphia, in the June number of the *American Journal of Science*, entitled "On Allotropic Conditions of Silver." If Mr. LEA'S results are substantiated—and he makes a very strong showing in their defense—they will have a most potent bearing upon two questions of vital, practical interest in an economic sense: (1) as to the formation of silver-bearing ore deposits, and consequently as to their exploitation; and (2) as to losses in the amalgamation or lixiviation processes for obtaining the metal and methods of refining it. It is to be regretted that our space does not admit of the publication of Mr. LEA'S article in full; and that to attempt a condensation would do the author injustice. Those who are interested should read the original and follow the argument, method and proofs before condemning offhand so striking a discovery as appears to have been made. We can only give here Mr. LEA'S conclusions, following his own language:

"Silver is capable of existing in allotropic forms possessing qualities differing greatly from those of normal silver. There are three such forms, or rather three modifications of one form, differing from each other in many respects, but all more nearly related to each other than any one of them to normal silver. One of these forms is soluble in water, passing readily to an insoluble form, and this last may, by the simple presence of a neutral substance exercising no chemical action upon it, recover its solubility. Another form closely resembles gold in color and lustre.

"Whether metallic silver shall be reduced from its compounds in its normal or in an allotropic form depends upon the reducing agent applied, so that it cannot be said with any certainty whether it exists in its compounds in its ordinary normal form, or in an allotropic condition; the latter alternative seems at least equally probable.

"These allotropic forms of silver are broadly distinguished from normal silver by color, by properties, and by chemical reactions. They not improbably represent a more active condition of silver, of which common or normal silver may be a polymerized form. Something analogous has already been observed with other metals, lead and copper."

Mr. LEA reviews at length the literature of the subject and the results arrived at by many chemists, beginning with FARADAY and extending through a list of eminent investigators down to the present, who experimented upon the reduction of various silver compounds, and found, or supposed they found, many compounds of silver not known to exist in nature or in the laboratory, but who seem to have been mystified by unexpected phenomena, of which the explanation is to be found in assuming that silver, like carbon, sulphur and other metalloids, can exist in allotropic forms. If this is true, there is no reason why other metals than silver may not similarly be allotropic. This opens out a wide field for speculation, at the extreme of which may be found room for the enthusiasts who maintain that the middle-age alchemists' belief in the possible transmutation of metals was not so wildly visionary after all.

The solubility of allotropic silver in plain water would relieve the economic geologist from much perplexity in seeking for active solvents, such as alkaline sulphide solutions and others, which should be capable of transferring reduced silver from argentiferous rock masses, and concen-

trating and depositing it in workable ore bodies. Such a theory might extend to the compounds of silver found in nature, as the chloride, sulphide, antimonide, arsenide, etc., for in such compounds might exist mixtures varying in solubility and in chemical valency according to the proportions of the different forms of the silver present. Very slight differences would lead to greatly modified results. Study in this line might eventually modify present theories of ore formation; and no matter how little the speculations of the theorists now aid and guide the prospector and underground miner, it is well to keep in view the possibility that at some future day all this work may result in certain definite rules, fairly parallel with the results thus far reached by the geologists who have made coal a specialty.

To the millman the subject should be an interesting one. Mr. LEA claims that his soluble silver readily amalgamates, as would naturally be expected, since substances in solution exhibit their affinities much more strongly than when in suspension merely. But in wet crushing for amalgamation there is here possibly an unexpected loss in the slimes, or rather in the water which passes from the slime pits. There is also a possible escape from settlers, agitators, blanket sluices and similar devices. In lixiviation the questions involved are similarly intricate. However minute such losses may be, a subject of study is opened worth pursuing, if Mr. LEA is proved to be right in his theory. As to the correctness of his ideas, his proofs and arguments should be followed and verified or disproved by the investigations of other chemists. Meanwhile we may quote what Professors J. D. and E. S. DANA, the distinguished editors of the *Journal of Science*, have to say. Their words carry weight:

The editors have received from the author of the above paper samples of the three allotropic forms of silver which he describes, and also strips of glass and paper coated with them. Mr. LEA is to be congratulated on his very important results. The coated strips, including the gold-colored mirror made with the "gold-silver," answer fully to his description. The mirror is remarkable for its perfection and brilliancy.

We have been favored with a set of specimens of the different varieties of silver. Their appearance seems to corroborate the new theory; but in such matters as this very careful tests are demanded.

JOSHUA E. CLAYTON.

My return from a vacation-journey, otherwise of unequaled and unbroken rest and delight, is saddened by the tidings of the death, July 3d, of my dear old friend and colleague, CLAYTON. Only a few weeks ago I had met him in the mountains of Montana, after a separation of years, and we had spent a couple of days together, recalling earlier experiences and comparing notes of practice and theory. I noted then that age had made some inroads upon his strength. He was still tough, yet no longer elastic. But his spirit was as youthful as ever, and the enthusiasm with which he dilated on his favorite themes was only equaled by the eagerness with which he pursued any inquiry that seemed likely to give him further light. We made more than one "night of it," without getting through all that we had to tell and hear; and I parted from him with the mutual promise not only of correspondence, but also of professional collaboration. He engaged to place at my disposal the results of his patient field work for many years, and to join me in such a discussion of them for the *Transactions* of the Institute of Mining Engineers as would make them a valuable contribution to the still inchoate science of ore deposits.

We were then at the famous Drumlummon mine, and enjoying the hospitality of Mr. BAYLISS, General Manager of the Montana Company, Limited, which owns that property. In the *JOURNAL* of July 16 a summary of Mr. BAYLISS'S annual report mentions a recent friendly visit from Mr. CLAYTON, and quotes his opinion concerning the developments and prospects underground. It was probably the last opinion the old veteran ever gave. Before it appeared in these columns he had passed from earth.

This is not a biographical notice, but the tribute of a friend. Hence, I am not embarrassed by my ignorance of the facts and dates which a biographer would deem essential. Probably I could get them by waiting a little; perhaps they have already appeared in the *JOURNAL* during my absence. But I do not care, and cannot wait. No matter exactly when or where he was born; when I first knew him, more than thirty years ago, he seemed almost as old as he did the other day when I bade him farewell. A life of toil gave him the appearance of age, even in his prime, and repaid him by preserving his vigor until he had well-nigh reached four-score years. Even then disease did not conquer him. He succumbed to injuries received from the upsetting of a stage-coach, which would probably have proved mortal to any man.

CLAYTON'S death is a serious loss to the profession of which he was a member. My judgment on this point is more emphatic to-day than it would have been some years ago, and I can pay no better tribute to him than to state my reasons for it.

In the first place, he was incorruptibly honest. Like all other mining experts, he made mistakes. Particularly in the early days of mining enterprise in Nevada, Utah, and other western regions, he expressed favorable opinions concerning the commercial value of mining properties, which experience contradicted with disastrous emphasis.

I have such reports of his, not a few, in manuscript and in print. They are filed away with scores of similar documents, bearing my own signature. The simple secret, which we did not then understand, was that no mine could be profitable in a continuous business way, at a time and place where mining was the only industry and had to carry the whole weight of enormous wages, dear and scarce supplies, the expenses of government and the recklessness of frontier dissipation. Nothing could do that but a *bonanza*; and even a *bonanza* might leak away before the cup of a dividend reached the lip of a stockholder. And many a mine which we deemed in those days promising, and which is now under its second development, profitably productive, could not pay long wagon freights, and four or five dollars a day for ordinary labor, and a big salary to an incompetent manager, and exorbitant rates for a wasteful reduction of ore, and office expenses in New York or London, and lawyers' fees and dividends besides—and so came to grief. Indeed, the failure of good mines not seldom involved greater loss than did the collapse of wild-cat enterprises, because it took longer and cost more to make the failure plain. The results of these early enterprises, therefore, are not a just measure of the ability or honesty of the experts who recommended them. To that class of wise fellows who guard their own reputations by "damning everything" CLAYTON did not belong. He examined laboriously, formed his opinion conscientiously, and then expressed it frankly. In the beginning, as I have observed, he was frequently wrong—as was everybody else. But I never heard a suspicion breathed as to his absolute honesty. No swindling scheme ever impoverished its victims to enrich him. No man ever changed his verdict by doubling his fee.

As a geologist and mining engineer he was self-taught. I fancy he had had in youth very little education of any kind. If I am not mistaken, his first business was that of a carpenter and builder, and his acquaintance with mining began with the erection of stamp mills somewhere in the South. But he was a born observer and student. The ardor with which he investigated for his own satisfaction the minutest details of the districts he visited was proverbial. Not long ago I happened to ask in one of the Western mining camps whether fossils had ever been found there, from which the age of the rocks could be inferred. "Not till CLAYTON came," was the reply; "but he found 'em! You give CLAYTON ten square miles, with one trilobite somewhere in it, and he's bound to have it!"

Like all self-taught and self-impelled observers, he lacked at first the sense of proportion and perspective in the arrangement and interpretation of his observations. He was apt to exaggerate their importance and to theorize crudely and extravagantly upon them. But wider experience and constant reading largely modified this tendency; and in my last talk with him I was deeply impressed with the wide range and wealth of detail presented by his knowledge of nearly every mining district in the country, and with the gain in moderation, and therefore in force, of his reasoning to general conclusions. I am convinced that a sympathetic and critical translator, so to speak, could have made the treasure of his accumulated knowledge inestimably useful to others. For he knew more than he could himself explain. A striking evidence of this was furnished by his remarkable success as an adviser of mine managers with regard to explorations in mines already in operation. In many quarters, and on many occasions, I have heard skillful superintendents acknowledge their indebtedness to him for the recovery of a lost vein or the striking of a new ore-body. Yet his theoretical reasons for the advice which was so frequently wise were (at least whenever I have heard him give them) not as well founded as he believed.

As I have remarked, he gradually dropped many of his sweeping theories, while he added year by year to the rich store of his carefully gathered and well-remembered knowledge, and almost his last words to me were: "I have worked hard, and am almost done, but before I go I should like to tell what I have seen—if I could only tell it right. Hereafter somebody may explain it."

This is my reason for lamenting his departure with his story untold, as a special loss to his professional brethren. But I need no such reason for grieving, as a friend, that I shall clasp his hand no more.

NEW PUBLICATIONS.

PRACTICAL GOLD MINING: A COMPREHENSIVE TREATISE ON THE ORIGIN AND OCCURRENCE OF GOLD-BEARING GRAVELS, ROCKS AND ORES, AND THE METHODS BY WHICH THE GOLD IS EXTRACTED. By C. G. WARNFORD LOCK. London and New York, 1889. E. & F. N. Spod. Large 8vo, 788 pp., including index. Price \$15.

In the introduction to this volume Mr. Lock says: "The superficial reader will probably see in the book a family likeness to its predecessor—'Gold: its Occurrence and Extraction'—published by the present author and his father in 1882, and now out of print." It is safe to say that the "superficial reader" will be joined by other readers who may look a little closer into the contents and general make-up of the new book with a fair remembrance of the former one, or compare them side by side, and who will find a "family likeness"—not that it is a discreditable one. At the time the 1882 volume appeared it was noticed favorably in this paper, and in most other technical journals, as well it might be. A compilation of

the kind could not but contain a certain amount of chaff intermixed with the wheat, and it certainly was a credit to the compilers that the proportion of the poor, misleading, or downright erroneous matter which crept in was kept to so low a proportion. The new book is by no means a reprint of the earlier one; much new matter has been added, a great deal of the matter retained has been rewritten or touched up, and many errors have been eliminated. It is a vast improvement—and that is saying much. In the consideration of crushing machinery, concentration, and gold-saving appliances one can still find a number of obsolete devices, now abandoned, and some which never get much farther than the inventor's mind and his letters patent. Yet any one who has a fair, partial knowledge of the topic—that is, of special branches or of methods in vogue in one or a few mining districts—will find in "Practical Gold Mining" a veritable mine of information. The scope of the work is so wide and diversified, bringing together in convenient shape for reference the practice of all parts of the world where gold mining is conducted, that it gives the student the advantage of an experience which could hardly be gained in a lifetime of travel and observation. From this point of view the book cannot be too highly commended. It certainly is a great work, and will be of benefit to every one who consults it judiciously. For the unwary, as before intimated, there are a few traps. The illustrations are profuse, clear, and for the most part drawn to scale and given in section. The paper and printing are very handsome.

ELECTRICAL RULES, TABLES, TESTS AND FORMULÆ. By ANDREW JAMIESON. New York, 1889. Industrial Publication Co. Small 8vo., cloth, 64 pp. Price 75c.

The author has compiled a very handy little manual, which will be appreciated by electrical engineers, and, perhaps, still more by other engineers who at odd times have occasion to refer to the books for information. A great deal has been gathered together and put in a compact and convenient shape. The tables and formulæ comprise, besides the purely theoretical side of science, such matter as electrical measurements, rules relating to appliances such as conductors, batteries, insulators, etc., submarine cables, aerial lines, electric lighting, and the transmission of power. This latter specialty is of growing importance to the mining engineer, who will often be called on to manage electrical plant.

POTTS' MINING REGISTER AND DIRECTORY FOR THE COAL AND IRONSTONE TRADES OF GREAT BRITAIN AND IRELAND FOR 1889. By W. J. POTTS. North Shields: 1889, published by Author; and London, published by Simpkin, Marshall & Co. Cloth, 8vo, 319 pp. Price, 6s. and postage and duty add.

This is the second annual edition of the Mining Register. It is doubtless of great value locally, and it is a good model for similar compilations elsewhere. The contents embrace, among other things, a set of maps of the coal fields; an illustrated article on mine ventilation from the classic works of Messrs. Combes and Ponson, which discusses the questions of natural, furnace and mechanical ventilation and the distribution of air; a year book of the transactions of the Mining Institute of Great Britain and Ireland; list of mining books published in 1888; directory of mine owners, mine managers, mines, etc.

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.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: * * * * * The course you have adopted to put your patrons in communication with foreign houses is an admirable one, and will, no doubt, be of great service. * * * Yours very truly,

THE PELTON WATER WHEEL COMPANY,

A. P. Brayton, Jr., Vice-President and Manager.

SAN FRANCISCO, July 19th, 1889.

The Customs Encouragement to Building Up a Foreign Market.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It will interest you to know that the silver ore that we have sent from South America to test here, in order to determine what class of furnace would be best adapted for its chlorination, has been appraised as a *sulphur ore*, and a duty levied on the copper. Truly, the ways of the customs department are wonderful, and they offer a curious kind of inducement for building up a smelting industry here, and not much encouragement for coming here to buy mining and metallurgical plant.

Yours truly,

ARTHUR F. WENDT.

Office of ESTABLECIMIENTO DE PLAYA BLANCA, de la Cia. Huanchaca de Bolivia.

The Tariff on the Gangue of Lead Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your article on "Silver-Lead Ores," pages 68 and 69, in this week's JOURNAL, your explanation as worked out does not agree with past rulings of the Treasury Department on this very subject, a copy of which is on file, in an answer to my protest against the liquidation of a small sample cargo, now in bond. Neither have I seen anything written on this subject voicing the true situation in reference to lead and silver ores as defined by the U. S. Treasury.

You say: "If for example we take an ore, carrying 30 per cent lead, or 600 pounds of lead per ton and 20 ounces silver, etc., it would figure out as follows:

95 per cent of 20 ounces, at 92 cents per ounce..... 17.48

600 pounds lead, at 4 - 1 = 3 cents per pound..... 18.00

"and this ore would be excluded (excepting on paying a duty of 1½ cents a pound on the lead, etc.)"

Now, the Government does not so rule, but would classify an import entry assaying as above as lead ore, paying a duty of 1½ cents per pound (not only upon the actual lead metal, viz., 600 pounds at 1½ cents = \$9, but 1½ cents per pound on the entire ton of 2,000 pounds, less the weight of the 20 ounces silver, making the duty about \$30 per ton).

If there was in the ore, say, 10 per cent., or 200 pounds copper, you would

have to pay 2½ cents per pound on it = \$5. This would leave as lead ore 1,800 pounds to pay 1½ = \$27; total, \$32.

I have been contesting with the Appraiser, Collector and Secretary of the Treasury the past eighteen months against this construction of the present tariff, and finally appealed to the Finance Committee upon Revision of Tariff that there evidently was an erroneous construction put upon that clause in the present tariff which reads, "On lead ores 1½ cents per pound," and which should read and be construed as meaning 1½ cents per pound upon lead in lead ores when silver was not the chief value. I believe the second copy of proposed revision of the tariff had the reading changed to that construction.

There are, no doubt, many importers that would be willing to pay 1½c. per pound upon the actual metal contained in low-grade ores, but when the absence of a few cents' worth of silver per ton compels them to pay duty upon the *gangue*, etc., as well, the temptation certainly is very great to inject that little silver to bring it under the ruling of silver ores, or have the ores smelted outside of America. This not only deprives the Government of such duty, but the American smelter of the labor and profits for converting such ores into merchantable material. The question is, What should be the proper construction or meaning of "lead" ores?

Yours respectfully,
S. Y. MYERS,
Secretary Carupano Mining Company of Venezuela.
50 BROADWAY, NEW YORK, July 27.

PROFITS OF THE OTIS WORKS, CLEVELAND, O.

The Cleveland *Iron Trade Review* publishes the following details of the recent sale of the Otis Iron and Steel Company's works to an English Syndicate:

The new corporation is known as the Otis Steel Company, Limited. Their capital stock is £600,000 (in round figures, \$3,000,000), in 60,000 shares of £10 each, issued as follows:

| | |
|---|----------|
| 30,000 8 per cent cumulative preference shares..... | £300,000 |
| 30,000 ordinary shares..... | 300,000 |
| Total..... | £600,000 |

Dividends on the preference shares are payable half-yearly. In addition to the above shares there will also be issued £300,000 first-mortgage debentures, bearing 6 per cent interest, in bonds of £100 each. These debentures will be secured by a trust deed, charging the freehold property and buildings, fixed plant and machinery of the company, and will be redeemable, at the option of the company, on six months' notice, after the 1st day of January, 1900, at 110 per cent. Interest will accrue from the respective due dates of the various instalments, the first payment to be made on the 1st of January, 1890. The vendors have agreed to take £100,000 in each of the above classes of security in part payment of the purchase money.

The following well-known gentlemen will constitute the new board of directors: J. T. Smith, late president British Iron and Steel Institute, chairman; C. F. H. Bolckow, chairman Bolckow, Vaughan & Co., Limited; B. Gibbons, director Ebbw Vale Steel, Iron and Coal Company, Limited; F. L. Lehmann, of Naylor & Co., New York; R. Wigram, of John Fowler & Co., Limited, Leeds, and director Great Northern Railway. Charles A. Otis, Thomas Joplin, Joseph R. Bole, managing directors and committee of management in America, will join the board after allotment.

Prior to the purchase of the property two sets of experts inspected the plant and investigated the books. The first set, Messrs. J. & P. Higson, 18 Booth street, Manchester, consulting engineers, put its value on January 1st, 1889, at £642,793 (\$3,117,541.05). Their report concludes as follows: "We consider that the expenditure in the past, under the head of renewals and repairs, is more than sufficient to cover any possible depreciation, and that the cost of maintaining the works in their present state of efficiency in the future will be comparatively small. If we may forecast the future trade of America, we believe these works will always hold their own; in fact, from the monopoly already secured in special trades, we are of opinion that no other works of a similar nature possess the same advantages."

Messrs. Deloitte, Dever, Griffiths & Co., 8 Lothbury, London, E. C., chartered accountants, after going over the books of the company, reported that the net profits for 1887 were \$527,316.09, and for the ten years ending December 31st, 1888, they were \$5,433,255.60, being an average profit per annum of \$543,325. The profits for the last ten years have been made after debiting revenue with \$993,648.69 for the cost of repairs and renewals of buildings, plant and machinery, the expenditure under these heads amounting in 1887 to \$134,616.60, and in 1888 to \$175,255.05. All management expenses, including the remuneration of the chairman and directors, had also been previously charged.

The prospectus of the new company states that the purchase price of the land, buildings, plant, machinery, stocks, stores, cash in hand, guaranteed assets and good will has been fixed at £900,000.

Revenue of the United States.—Following are the figures for the last three fiscal years (ending June 30th):

| | Customs. | Internal revenue. |
|-----------|---------------|-------------------|
| 1889..... | \$224,971,235 | \$131,602,106 |
| 1888..... | 219,091,173 | 124,236,371 |
| 1887..... | 217,236,892 | 118,823,391 |

From this it appears that while the customs receipts are still nearly double the internal revenue, the rate of increase shown by the latter is slightly greater than in the former case.

Mineral India Rubber.—An article formerly considered worthless has been added to the useful products, and is known as mineral India-rubber asphalt. It is produced during the progress of refining tar by sulphuric acid, and forms a black material very much like ordinary asphalt, and elastic like India-rubber. When heated so that the slimy matter is reduced to about 60 per cent of its former size, a substance is produced hard like ebony. It can be dissolved in naphtha, and is an excellent non-conductor of electricity, and therefore valuable for covering telegraph wires and other purposes where a non-conducting substance is needed. Dissolved, the mineral India-rubber produces a waterproof varnish. The manufacture of the material is said by an exchange to be profitable.

THE IRON ORES AT BUENA VISTA, ROCKRIDGE COUNTY, VIRGINIA.

Written for the Engineering and Mining Journal by E. C. Peckin.

For many years past the iron ores of Virginia have at intervals been brought to the attention of the public as full of promise, but in the main there has been little realization. Lowmoor and Longdale have been fairly successful, and further south Roanoke, Pulaski and Ivanhoe have been doing good work, but all along the western base of the Blue Ridge north of the James River there has been thus far much disappointment. The writer has lately examined some of the ore deposits on the Buena Vista and adjoining properties, and his conclusions may not be wholly devoid of interest. The position is a somewhat embarrassing one, because he has to stand midway between the native and the adopted Virginian, who sees in every outcrop or float the unquestioned evidence of veins of ore of marvelous richness and inexhaustible quantity, and a good many very shrewd and intelligent business men in the North, who have had experience with brown ores North and South, and especially in certain parts of Virginia, who refuse to believe that any substantial mines can be discovered or operated in that section.

The writer will simply give what he has seen, and let the reader determine for himself the correctness of his conclusions. One thing is certain, that a real mineral region is more largely benefitted by the statement of what seems reasonable and can be proved, than by indulging in wild imaginings and fanciful predictions. The one is calculated to develop a substantial prosperity, if somewhat slow—the other "wildcats," frisky and exciting while they are about, but leaving loneliness and disappointment and many unsaleable corner lots at their early departure.

Before we get to the ores, a few words must be said about Buena Vista itself. Previously to his visit, the writer had thought that Anniston, Ala., was one of the most admirable and picturesque sites he had ever seen for an industrial town, but Buena Vista beats it. Nature has nearly exhausted its capacities in taking care of it. For miles along the clear, bold flowing waters of the north and south forks of the James River stretch broad, fertile fields, which are now being laid out into town lots for the million; behind these, low, beautifully rounded, verdure clad foot hills, and back of all the magnificent range of the Blue Ridge Mountains, stretching its splendid horizon line north and south for an indefinite distance. The flats lie about 850 feet above tide; a second plateau and the foot hills rise from 75 to 300 feet higher, while the mountain peaks and crests tower above the plain some 1,200 to 1,700 feet.

Standing on one of the minor elevations, with the flashing river on one side, the bold mountain range on the other, and the far-reaching, verdant fields between, the sight is rare and surpassingly attractive. The present owners are building a commodious and pretty Queen Anne inn on a wooded plateau some 90 feet above the plain, from the front of which all of these beauties can be noted; and when it is open, which will be soon, the place will be well worth a visit, whether one is after iron ores or not. Man has largely assisted nature in making the place desirable. The Lexington branch of the old and now disused James River and Kanawha Canal has, at short intervals, massive stone dams from 12 to 15 feet high, giving a large and continuous water power. The Shenandoah Valley Railroad runs through the property some 6 miles and more; the Lexington Branch of the Richmond & Allegheny R. R. cuts the town site, and by it also the Valley Branch of the Baltimore & Ohio R. R. reaches the location. Practically the property is served by three great trunk lines, running north, south, east and west, and in three directions tapping inexhaustible supplies of fuel, the Flat Top, the New River and the Connellsville coal fields.

Less than 300 miles from the Ohio River, at Huntingdon, 400 miles from Pittsburgh, and from 450 to 600 miles further north than Chattanooga and Birmingham, a faultless climate, neither too hot in summer nor too cold in winter, with ample supplies of pure drinking water, available by gravity, adapted to a cheap and perfect system of drainage, and surrounded on three sides with a fertile and cultivated region, capable of furnishing large supplies of cheap food products, it will be hard to find anywhere a fairer or more attractive site for building up an inland industrial town, or where a large working population can be more happily and comfortably fixed. The important question now arises, what is there to form the basis of an industrial town, or support a large working population, and this naturally brings us to the consideration of the iron ores.

The ores of the Potsdam sandstones and of the Cambro-Silurian limestones have received large attention at the hands of the geologists.

Prof. Prime in his reports to the Second Geological Survey of Pennsylvania (see vols. D. D. 2 and 182. D. 3) covers the ground very fully, and very much of what he says, as to conditions met with in Pennsylvania, apply as well to this locality. Mr. Andrew S. McCreath, in his "Mineral Wealth of Virginia" (page 44), gives a true description of the ore openings seen by him on this particular property. In 1885, Profs. J. L. and F. D. Campbell of the Washington and Lee University, of Lexington, Va., made a careful examination of the Buena Vista estate, giving a full report. It is not within the province of this paper to consider the geological conditions, except incidentally, as indicating quality. The accompanying section, taken from Prof. Campbell's report, is intended to give a profile view of the rocky strata of the region, with their ore beds, supposed to be cut to a great depth.

"The strata of sandstones are denoted on the section by *dotted bands*, those of shale and slates by *ruled bands* and those of limestone, by *blocked bands*, while the beds of ore are indicated by * * *"

"At many places along the flank of this mountain range only a single outcrop of these feriferous shales is found, but here, in consequence of wavelike irregularities in the strata, together with subsequent denudations, several successive exposures of shales and their ore-beds occur, giving access to a most unusual number of exposures where mining is comparatively easy.

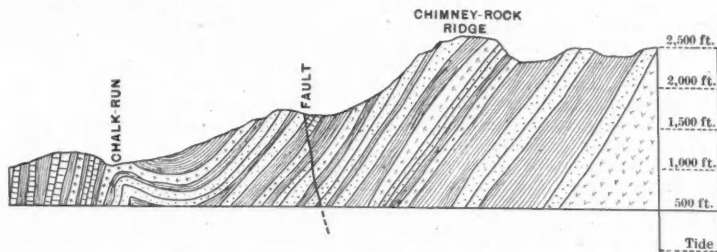
"By a westward, or rather northwestward thrust all of these beds had the southeastern margins elevated, while a little way out from the mountains, and for many miles westward, all of the stratified beds were greatly disturbed, some wrinkled, some fractured and some even inverted."

What chiefly interests us is not how these ores get there, but how much of them are probably left. The so-called expert who wanders along an outcrop and sees some cross-cuttings and exploration pits, and then talks about millions upon millions of tons of ore, is simply an ass, and shows his ignorance of brown hematite and mining in general. One man can see

into the ground as far as another and no further, and the only way to arrive at precise notions as to quantity is by thoroughly opening up and proving the ground. At Buena Vista, while dealing with no figures, we deem it a fair presumption that large, very large quantities of good brown ore are to be found there, ample, beyond question, to justify the erection of a modern furnace with probabilities of comfortably supplying a number. The fact that the well-known Buena Vista furnace for a long period of years got all it wanted from one or two very modest openings proves nothing, for all that it used in fifty years, in its short charcoal blasts, wouldn't run a large modern coke furnace two years, and the mining of 80,000 to 100,000 tons of ore a year makes a very large hole in the ground.

The general regularity of the measures and the long distance covered by the outcrop of the ores, is a very satisfactory feature. Even when the ore itself does not make its appearance at the surface, the damourite slates and clays do, and of these Professor Prime says: "This formation is economically of the greatest importance, as in it occur the brown hematite deposits which form the staple supply of the Lehigh Valley." (D. p. 7.) "When the brown hematite is in place, it almost invariably occurs in damourite or in the clays resulting from the decomposition of these slates." (D. p. 191.) At all of the ore openings and pits on the Buena Vista property the first thing that strikes the eye is this slate or clay, and it can be followed clear across the property some five or six miles.

Within a third of a mile from the railroad, and a short distance east of the new hotel, and between it and the mountains, are a series of foot-hills, cut by a ravine.



These foot-hills have been exploited by a series of cross-cuts at short intervals, and each gives a remarkable showing of hard, solid brown ore. Now whether these cross-cut showings indicate a large vein in place, or that a heavy fold has taken place, the casual observer cannot determine from the work done, but he must conclude that whether the one or the other, there is a very large amount of cheap available ore in sight. But that a vein in place is either there or very near there, comes as a conviction when he reaches the "Engine House Pit," at the base of a low foot-hill, in the ravine of the Chalk Run. It was from an opening here that the principal supplies of the Buena Vista and Amherst furnaces came through a series of years.

The heavy spring rains had filled the pit with water when the writer saw it, but a good description can be had from a competent authority, who saw it several years since.

Mr. McCreath, in his "Mineral Wealth of Virginia," p. 44, says: "The open cut consists of a circular pit 120 feet in diameter and nearly 50 feet deep, from which a large amount of ore has been mined. The ore comes near the surface at points, with probably an average of six feet of stripping. At the edge of the deposit and outside of its limits a shaft has been sunk to the depth of 91 feet. At a level of 50 feet a side drift was run in, and about 5,000 tons of ore mined from this point, but the present workings are on a lower level—viz., at a depth of 76 feet. Here a side drift in an easterly direction has been run in for a distance of 72 feet, where the ore bed was reached, thence in the same direction for 65 feet in good, rich, almost solid ore. At a point 27 feet from where the ore was first struck a drift runs in a south-southwest direction for 63 feet in the same general character of ore. . . . The general strike of the ore deposit is northeast and southwest, with an easterly dip, and it has been traced in a southwest direction for a considerable distance. There can be no doubt but that the deposit is an extensive one. The bank yields one-half clear lump ore, and the bulk of the so-called wash ore must be simply the lump ore broken up in mining, for at no point examined does the bed show much clay. The fine ore washes three-fourths clear ore."

A short distance off another pit had been opened, from which considerable ore had been taken, but at the time of the writer's visit the sides had fallen in, and not much could be seen. Capt. Jordan, who was in charge of the mining operations, said that when their work stopped the floor of both pits was solid, high grade ore.

On the opposite side of the ravine, only a short distance away, and so located as to lead to the conclusion that it has no connection with the other openings, but is an entirely independent deposit of ore, is the Hayes Bank. The showing here is very large indeed and gives promise of great quantities of high grade ore.

This paper will hardly admit of any further elaboration of the question of ore supplies. We saw enough to make us think that there was a first-class prospect for a mining and pig-iron industry. Whether there are five or six distinct leads of ore, or some of them are folds, or how the deposits may widen out, or pinch, or even disappear, only the pick and shovel and time can tell.

In speaking of a mine in the Lehigh district, with much less regularity in the measures, Prof. Prime says: "The mine is now 2,000 feet long, 800 feet wide, 90 feet deep at its lowest part, and has been worked for 40 years" (D D p. 40).

Quality of the ore.—A good many analyses have been made at different times and by different parties, all showing a very high degree of excellence for brown ores. With these we have nothing to do, because we don't know how the samples were taken, and a few average samples are worth a cart load of mere analyses.

Several years ago Mr. J. H. Bramwell examined this property and selected a large number of samples. A chemist and furnaceman himself for many years, and using largely the brown ores of Virginia, and consequently having learned by a costly experience the difference between analysis and the ore as it came in day by day by carload lots, no one could have been better qualified to select the representatives of what these ores would be when largely mined and used. These samples were analyzed by

Prof. M. B. Hardin, of the Virginia Military Institute. Prof. Hardin told the writer that the instant he saw them he recognized that they were unlike the samples ordinarily presented and had been taken by a "master-hand."

We are safe in accepting these as thoroughly representative.

| | I. | II. | III. | IV. | V. |
|--------------------------------------|-----------------|--------|--------|--------|-------|
| Sesquioxide of iron..... | 73.51 | 81.33 | 82.00 | 71.52 | 68.02 |
| " " manganese..... | .04 | .06 | .14 | .10 | |
| " " cobalt and nickel..... | .604 | .006 | .018 | .024 | |
| Oxide of zinc..... | pace | pace | pace | pace | |
| " " copper..... | .014 | .028 | .024 | .040 | |
| Alumina..... | 3.70 | 1.07 | .83 | 3.62 | |
| Silica..... | 10.33 | 4.60 | 4.62 | 12.50 | 15.53 |
| Lime..... | .48 | .65 | .37 | .81 | |
| Magnesia..... | .40 | .32 | .19 | .41 | |
| Sulphuric acid..... | Not determined. | | | | |
| Phosphoric..... | .895 | .602 | .457 | .368 | .339 |
| Water (combined)..... | 9.88 | 10.86 | 10.44 | 10.04 | 9.65 |
| Moisture..... | .43 | 0.18 | 0.48 | .63 | .84 |
| | 99.983 | 99.706 | 99.639 | 100.06 | |
| Metallic iron..... | 51.46 | 56.93 | 57.46 | 50.06 | 47.61 |
| Phosphorus..... | .391 | .263 | .191 | .100 | .148 |
| Phosphorus in 100 parts of iron..... | .760 | .462 | .332 | .320 | .311 |

The sulphur runs from .01 to .02.
 I. Lump ore from opening No. 1.
 II. Lump ore from Hayes' Bank.
 III. Lump ore from shaft (Engine House pit).
 IV. Coarse ore from shaft.
 V. Wash ore from shaft.

These ores speak for themselves. Assuming that a first-class modern furnace, say 17x75 feet, averaging 100 to 125 tons a day, be erected at Buena Vista, at what cost can pig iron be made? There are admirable sites in close proximity to the ores and excellent limestone, water and railroads. We propose to make liberal estimates to cover contingencies. In putting the ore at the furnace at \$1.25 per ton, a royalty of 20 cents a ton is included, and a fair profit to the contractor. In the price of coke, the present selling price at the ovens at Flat Top, \$1.65 per ton, is taken, and $\frac{1}{4}$ of a cent per ton per mile for freight 175 miles is allowed.

The prospective early development of additional large coal areas in the New River district leads to the conclusion that competition may reduce the cost. The distance of haulage is practically the same. Connellsville is too far away for current supplies, but is invaluable to fall back upon, in event of a failure from any cause whatever of the other districts.

One and one-eighth tons of coke to the ton of iron is considered ample for these easily reduced ores in a well-managed furnace.

| | |
|--|--------|
| 2 1/4 tons of ore @ \$1.25..... | \$2.81 |
| 1 1/2 " " coke @ \$2.95..... | 3.32 |
| 3/4 " " limestone @ 60 cents..... | .45 |
| | \$6.58 |
| Labor..... | \$1.25 |
| Repairs..... | .50 |
| Tools, oil, sand, etc..... | .50 |
| Incidentals, taxes, management, etc..... | .75 |
| | 3.00 |
| | \$9.68 |

To some of the enthusiastic stockholders in the Buena Vista Company who see in their projected town the industrial centre of the whole country, and their prospective town lots worth, anyhow, half as much as similar lots on Broadway, this estimate may seem a trifle liberal, but those who put their money into a furnace plant will be much better pleased at the end of the year to find that they have made iron 50 cents a ton cheaper than anticipated, rather than to rectify all their previous calculations by a disappointing cost sheet.

In the judgment of the writer, Buena Vista is a capital place for not only pig-iron making, but for the establishment of collateral enterprises.

Apart from its apparently strong position as regards ore, fuel and lumber, it has one unusual advantage, which must not be overlooked.

It has three competing railroads for reaching the markets with manufactured products: The Shenandoah Valley, with the Norfolk & Western and the Pennsylvania railroads; the Chesapeake & Ohio, and the Baltimore & Ohio, all of these roads leading to the seaboard.

Booming town sites is about over, but with the extraordinary development of the country substantial prosperity must follow a combination of great natural resources and wise, prudent and energetic management.

CLEVELAND, July 10, 1889.

A POST OFFICE FRAUD.

Many houses that are advertising for the foreign export trade have been recently victimized by a petty swindler at Cape Coast Castle, Africa, and we call attention to the fact, both to put others on their guard and with the hope that the Cape Coast Castle authorities will take measures to stop it. The mode of operating is for the individual, who signs himself S. T. MASON, and who uses also several aliases, to write to some prominent export house in this country, referring to the prices in their export price current as being lower than their neighbors, and he asks for samples with a promise that if these are satisfactory a large business, now conducted with another house, will be handed over to the advertiser. The writer of the letter invariably omits to stamp his letter, but calls attention to the necessity for prepaying letters to Cape Coast Castle. The samples once sent, the object of the petty swindle is accomplished, and the advertiser hears nothing more of the matter, unless it is a request for more samples from another unknown correspondent at Cape Coast Castle. The post office here has been appealed to to see if there be any way of putting an end to the fraud conducted by means of the mails, but we regret to say that no assistance can be rendered by this department, owing to the refusal of the Colonial Governor at Cape Coast Castle to interest himself in the matter.

The only remedy suggested by the postmaster is the refusal by addressees to receive letters of this sort. The only clue we can give to indicate the sort of letters is that they are written and addressed in an extremely illiterate handwriting, and that on them there is always twenty cents to pay.

ON THE TREATMENT OF COMPLEX ZINC ORES BY SMELTING.

Written for the Engineering and Mining Journal by F. L. Bartlett, Portland, Me.

About every metallurgist in the country has had occasion to condemn the presence of zinc blende in his ores, no matter whether working by leaching, milling or smelting. There is no other element known quite so common, and with such a tenacity of life, as zinc in the form of blende. It is found, too, in all sorts of places where it ought not to be. One can never be sure in sinking a shaft in any locality that he will not sooner or later encounter blende. It is next to iron pyrite in frequency of occurrence, but ten times as difficult to get rid of.

The author has had occasion to look up the English, French, German and American patents bearing on the treatment of ores containing zinc. More than 130 patents have been examined; of these only a few have ever had practical use, and not more than one in twenty are in use today, and these mostly in isolated cases; the fact being that no universal method has yet been discovered for separating and saving zinc without heavy loss of the precious metals.

After a series of experiments on the large working scale, covering more than ten years of time, and including both the wet and dry processes, the author has come to the conclusion that to effect the saving of the gold and silver in zinciferous ores, separation of the zinc must be made before the sulphur is wholly removed from the ore, in the dry way, and that so far, no wet process has yet been discovered which is practical in the large way, and is cheap enough to be of utility. Electricity may become a valuable agency in the removal of zinc, and in the treatment of complex ores, but up to the present time it does not seem to have made much progress in this particular direction.

Of the wet methods the favorite scheme has been to dissolve out the zinc by sulphuric acid, either added to the ore, or generated in it by the roasting process. The schemes of Parnell, Fisher, Jones, Maxwell, Croselmir, and dozens of others, all hinge on the fact that oxide of zinc is soluble in sulphuric acid, while silver and lead are not, to any great extent. In such treatment a very bulky solution of sulphate of zinc has always to be handled, and from which the zinc must be obtained in the form of oxide by precipitation. It is not necessary to describe these processes; they have often received notice in the columns of this JOURNAL. It can, however, be laid down as an axiom, that it is impossible to roast a blende ore containing over 20 per cent of zinc, so that all of the zinc shall be soluble as a sulphate, and even with the aid of sulphuric acid, it is not possible to remove all the zinc. If it were possible, it is not profitable, except when applied perhaps to very rich silver ores. The wear and tear of the apparatus and machinery, the numerous handlings, and the bulky nature of the products, all contribute to render the sulphate treatment undesirable. Only one other wet method seems worthy of notice, and that is the chlorine treatment. Dry chlorine gas acts energetically on moist roasted blende, and is a good solvent for the zinc. Several schemes are based on the solvent action of chlorine, liberated from common salt, chloride of magnesia, lime, or some other base which will in return precipitate the zinc and regenerate itself, have been projected. I do not know that any of these methods are in practical use, however, at the present time. The only feasible way to carry out such a plan seems to be to use electricity for the decomposition of the alkaline salts. Slater's process is one of these; which depends on the electrolysis of salt for the production of chlorine, and the precipitation of zinc by the sodium hydrate formed, sodium chloride again being produced. It is safe to say that when electrolysis of salt is successfully accomplished we may expect a complete revolution in the whole alkali trade, if not in many other branches of the arts which are of much greater importance than the treatment of zinc ores.

About the only other method for the removal of zinc from its ores is by sublimation. In the presence of carbon zinc can be wholly removed by volatilization; this is an old but very practicable method, and by some modifications the author has been able to carry on the process with little loss of silver, and with the nearly complete saving of the zinc and lead.

Before describing the process it may be stated that the ores intended to be treated by this method are those low grade zinciferous ores containing too little lead and silver to render treatment by the usual methods profitable. Such ores contain from 20 to 40 per cent of zinc, with from 10 to 15 ounces of silver. They may contain, and usually do, some gold and copper. The lead content is below 10 per cent, while sulphur is present to the amount of from 25 to 40 per cent.

An ore containing 30 per cent of zinc, 5 to 8 per cent of lead and 10 ounces of silver, with the usual filling of iron pyrite, is a fair representation of the class of ores the author aims to treat.

The actual metal value of such an ore is high, provided all the metallic contents could be saved; such an ore, for instance, figures up to not less than \$43 per ton. There is, too, more or less gold and copper always to be found in such ore, not included in the above estimate. Notwithstanding that such an ore figures up so well, there is not a smelter in the country to-day who would purchase it. On account of the lead it is not fit to make spelter, and on account of its zinc it is about worthless for extracting the other metals. Concentration on this class of ores rarely succeeds, because the lead and blende are too intimately mixed and the specific gravity of the two is too nearly equal. Such ores can be smelted by deluging them with other ores which do not contain zinc, but even then the zinc is a nuisance and causes loss of silver, besides deranging the furnace and fouling the slags. It is evident that in order to treat such ores profitably the zinc lead and silver must be saved, and that the ore must be treated by itself, without much admixture of other ores.

If an ore like the one described is roasted, and mixed with carbon, and the zinc driven off, a heavy loss of silver results. This loss of silver may result from being mechanically carried off, or it may be actually volatilized as an oxide. In the case of smelting in the ordinary blast furnace, the zinc must be mostly forced into the slag, else there is a bad loss of lead as well as silver; this fouls the slag, forms hard crusts around the top of the furnace, makes an extra amount of matte, and is, generally speaking, a nuisance of the first water.

In the system about to be described, the aim has been to accomplish three things:

First. The treatment of the ore in the raw state by the use of cheap fuel.

Second. Separation of the zinc and lead without loss of the silver and gold.

Third. The utilization of the lead and zinc fume.

It is plain that once the zinc is removed from the ore the treatment of the residue offers no trouble. Moreover, when the zinc, lead and most of the sulphur are removed, the ore has lost nearly one half in weight; consequently the silver and gold contents are raised in proportion.

In working ores containing 25 per cent of zinc and above, and especially on ores containing little silica (such ores, for instance, as the heavy zinc sulphuret ores of Leadville, Colo.), the ore is taken raw, crushed to about No. 16 size, mixed with about 75 per cent of its weight of any kind of cheap fine coal, or coal "culm," sawdust, petroleum residue, and the like. It is also necessary that the fuel shall be in a fine state of division. The mixture is then blown up on a special grate in a furnace suitably provided with an air blast until the zinc and lead is nearly all volatilized. In order to retain the silver, there must be a certain relation between the percentage of the sulphur and zinc. Small amounts of other ores are used, in accordance with the analysis of the ore being treated; then, so long as the zinc is not entirely driven off, the silver remains. When there is not sulphur enough present in the ore it must be added in the form of iron or copper pyrites or sulphates. Special air holes must be provided in the furnace for admitting air just above the layer of ore, which is from four to six inches thick, and the amount of air admitted must be under control. The zinc and lead is easily sublimed, and passes off in the form of a fume, which is composed of mixed sulphites and sulphides of lead and zinc. The non-volatile metals, as copper, iron, silver and gold, with some sulphur, melt down and form a slag or scoria, which, in this condition, is easily treated by the usual blast furnace process. The fume is caught in bags in the usual manner, and is subjected to a second treatment, to be hereafter described.

Ores containing much silica and gangue, and when containing not above 22 per cent of zinc, are treated differently. Such ores being worked off in the raw state in a furnace which is a combination of reduction and scorifying principles. The ore is mixed with enough flux to make a thin slag of the silicious contents. It is then blown up on a closed hearth in a low, water-jacketed furnace containing two rows of tuyères on each side; the upper row being about ten inches above the lower. The lower blast is supplied under a pressure of about two pounds to the square inch, and is preferably a hot blast. The upper blast is cold and run under a light pressure. The ore and fuel are fed in together continuously in a thin layer, not exceeding twelve inches in depth. By the united action of the two blasts the zinc and lead are quickly driven off, and the charge melts and forms a scorifying bath in the bottom of the furnace composed of a layer of matte and slag. The sharp lower blast blows into the bath and rapidly oxidizes and drives off the last traces of lead, and pretty nearly all the zinc. The bath is tapped each half hour, and the matte separated by an outside well in the usual way. In short, this practice is nothing more or less than a mild type of "Bessemerizing," where advantage is taken of the combustion of the sulphur, although the application is different, and melting and scorifying go on at the same time. No difficulty is found in running such a charge provided always that no excess of air is admitted through the bottom tuyères. These tuyères are provided with valves for adjusting the size of the opening, which is in the form of a narrow slit of considerable length. Any excess of air blown in at the bottom causes chilling, and must be avoided. For fuel, a mixture of coke and waste coal screenings is used, amounting to one fourth the weight of the ore. No fine stuff whatever is blown over. The fume is the same, and is collected the same as in the first case mentioned. The matte produced contains the non-volatile metals, and is treated by second smelting with lead ores. The amount of matte produced is about one ton to six of the ore.

To illustrate the scorifying and desulphurizing action of the process, the writer will say that he has been able to easily bring up a copper matte of 20 per cent to 60 or 70 per cent by a single treatment. In treating mattes the same process is followed as has been described. The only difficulty found, and the only impediment to bringing up a copper matte to the metallic condition, is that it is so easily fusible that the bath must be tapped very frequently, thus limiting the time for oxidation.

One of the most remarkable things about the process is the completeness of the sublimation of the lead. In treating ores containing 9 per cent of lead, no trace of lead will be found in either the slag or the matte.

The most interesting feature of the process is the refining of the lead and zinc fumes. Sublimed lead made by the Lewis & Bartlett process, or, indeed, by any sublimation process, wherein the fume is whitened by excess of heat, or supplementary refining fires, although of a fine white color, is, when ground in oil, liable to settle and harden. There is always, too, more or less of the lighter volatile elements left in it, such as arsenic, selenium and loosely combined sulphurous acid. These are likely after a time to darken the pigment or turn it yellow. The same is true also of a mixture of lead and zinc when the refining is attempted in a single process. Many years of costly experience have demonstrated to the writer that in order to make a perfect substitute for white lead all loose compounds of sulphur must be avoided, the mixture must be homogeneous, very fine, dense, and must contain the highest possible percentage of the metals. All volatile elements, as arsenic, selenium and cadmium, must be removed. To produce such a pigment requires that the refining must be a distinct and separate process. The fume, as collected in the process mentioned, is dark colored, very light and bulky. It contains carbonaceous matter as well as many of the lighter volatile elements loosely combined with sulphurous acid. To remove these and to whiten and condense the material it is subjected to a low red heat in a closed tube containing a screw, which keeps the material in constant motion and performs the double action of grinding and condensing as well as moving the material forward. Air is admitted sparingly through a graduated opening. Any excess of air, or a stoppage of the material for any length of time, converts the lead portion into red lead and destroys the color. High heat and excess of air form sulphates, or, if not sulphates, oxides too high in

oxygen, and thus injure the value of the pigment. When this process is properly conducted the result is a white, condensed and a very homogeneous mixture of lead and zinc. When ore is treated containing the proportion of 4 per cent of zinc to 1 per cent of lead the pigment will be composed of about two thirds oxide of zinc and one-third sulphate and oxide of lead. This is the most desirable mixture, and such a material when ground in oil weighs as much within two or three pounds to the gallon, as straight white lead. It should be stated that this pigment owes its density to the fact that it contains less oxygen than the ordinary zinc oxides made by the old Wetherell process.* This refined material has a great covering power, and when ground in oil and treated in the same way as ordinary white lead makes a very fine paint, drying readily, covering as well and as durable as the best white lead of commerce. Like white lead it whitens on exposure, and unlike sublimed lead, does not turn yellow. It never settles after grinding in oil or becomes hard. To illustrate its homogeneity, if a sample of the pigment be taken, triturated in water, no separation of the lead and zinc can be effected, and when allowed to settle through water, the upper portion contains the same percentage of lead as the lower.

The author does not claim that this material will supplant white lead, but it comes nearer perhaps to being a perfect substitute than anything else at present known. Letters patent have been granted or allowed on all the new and essential steps of these processes.

At first sight it would seem that there is not much which is really new about the processes, but as a matter of fact it depends upon details which are all novel, and although based on old principles the application and combinations are entirely distinct from anything else in use. No one who has not attempted it can conceive how difficult a matter it is to make a good white pigment from lead and zinc by sublimation. Not only chemical changes, but minute physical changes work havoc with the body or color, and the slightest change in amount of air or heat

THE WORTHINGTON PUMP.

We have previously illustrated and described a number of the types of the Worthington pumps. In the accompanying illustration is given a view of what is called the Worthington "pressure pump," of which an example is now to be found in service in connection with the Edaux hydraulic lifts working to the highest level of the much-talked-of Eiffel tower at the Paris Exposition, and which has attracted the attention of the visiting American engineers.

Our mining men are perfectly familiar with the construction and handling of the Worthington duplex steam pumps underground. So long as they are not drowned out by excessive waterflows, they compete favorably with the Cornish lift, jack or double-action pumps, and for moderate depths are much used; while in some cases the steam, compressed air or hydraulic pumps are in use at very great depths. For handling a large body of water at a small depth the steam pump possesses a marked advantage. The particular make shown in our engraving, though adapted for surface work, well shows the general style of make.

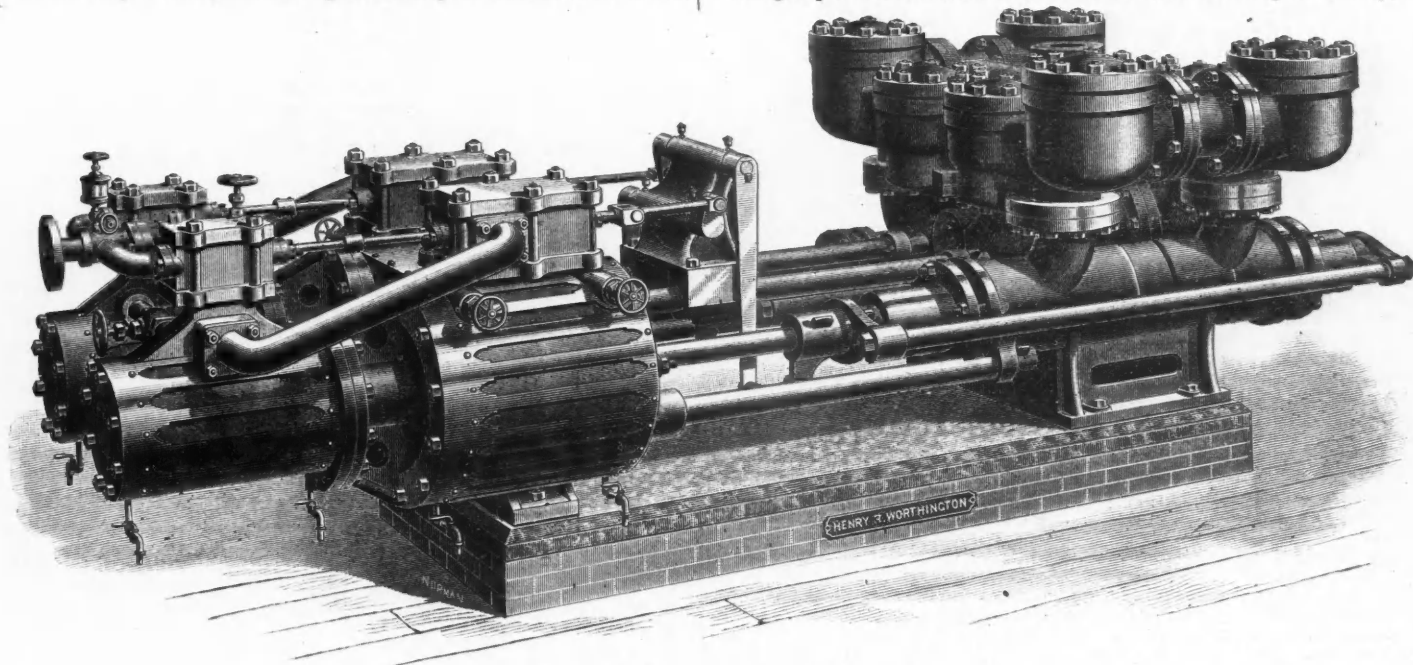
THE LOOKOUT AND SULLIVAN MINING COMPANIES, DAKOTA.

Special Correspondence of The Engineering and Mining Journal.

LOOKOUT MINING COMPANY.

In your issue of May 25th, 1889, I find some information about the Lookout Mining Company, its property, what it has accomplished, and its future prospects. In the article referred to you state that it has paid "six monthly dividends of two cents per share of \$10,000 each;" that the mines are leased to M. H. Day, of Rapid City, the largest stockholder, for one year, at a monthly rental of \$10,000 per month.

This group of mines is situated on Castle Creek, in Pennington County,



THE WORTHINGTON PRESSURE PUMP.

used may be the difference between success and failure. Like everything else, however, "knowing how" does it.

There is little or no relation between the processes described and the well-known Lewis & Bartlett processes for lead sublimation. Neither does it much resemble the French and Hannay processes as carried on in England. The Lewis & Bartlett, the French and Hannay and one or two others are exceedingly ingenious and well carried out. These, however, aim mainly to make a sublimed lead from pure galena on ores containing no silver. In this case the aim is to treat a special class of ores composed of zinc and lead, or zinc alone, and which contain more or less silver, the intention being to treat that class of ores which now come between "hay and grass" with the ordinary lead silver smelters. It should be stated that no attempt has been made in this article to a complete description, the simple outlines only being touched upon. Enough has been said, however, to enable the average metallurgist to understand the principles of the process. It may be stated also that the experimental stage has long since been passed, since the methods described have been in use constantly for more than twelve months.

Before closing it is well to state that one great difficulty in treating ores containing so much sulphur lies in the formation of sulphuric acid. Ores treated by this process often contain as much as 40 per cent of sulphur; it can then be easily understood how likely the acid is to form, and how difficult a matter it is to avoid. In the earlier attempts of the writer great trouble was caused by the acid, and the destruction of the plant was frightful; besides the pigment was ruined, it was found that all the zinc and lead was turned into sulphate, and that there was still free acid left.

More than two years were consumed in experiments in overcoming the formation of the acid, during which time it was necessary to rebuild the plant no less than three times.

*It may not be generally known that zinc oxide made by the sublimation process contains much less zinc than the theory calls for, as for instance, ZnO contains 80.2 metallic zinc; analysis of samples of American and French zinc oxides gave respectively 68.5, 71.9, 72.2 and 75.2 per cent metal, the last sample being the best French zinc.

Dakota, 35 miles from Deadwood. They were discovered and located by F. J. Ayer and J. T. Hooper, who did some development work, and about the year 1885 bonded them to Messrs. Robinson, Hawgood and Hosking, of Lead City, D. T., and Mr. Lane, of Red Oak, Ia., for the sum of \$75,000. Mr. Lane owned a 40-stamp mill, then idle, on the Alta-Lodi property, about five miles distant from the Lookout group. This mill was moved to Castle Creek, in the vicinity of the mines, and your correspondent was employed to lay out a tramway from the mines to the mill, about 1,500 feet long, a water ditch, between two and three miles long, taking the water from Castle Creek to the mill for power, also a tail race, etc., all of which were built by the gentlemen then interested in a substantial manner, and still belong to the property. These gentlemen ran the mill for several months, ran themselves in debt, and, failing to find pay ore in the mines abandoned them and threw up the bond. About a year, or perhaps a little more, ago, M. H. Day, a prominent Dakota democrat, of the firm of Day & Elliott, Attorneys, of Tyndall, Dakota, bonded the property and placed it East—rumor said that he made a good sale for himself. Work was resumed by the new company, and for a month or two all apparently ran smoothly. Then the mill shut down on some frivolous pretence, and has been shut down, more or less, for six or eight months. The ore bins are kept full, and when an interested party arrives at Rapid City, the residing place of the general manager, the date of his arrival at the mines is ascertained, the mill started up 12 to 24 hours previous, so that when he arrives work is rushing, the plates in the mill are looking well, and everything else running lovely.

Now as to where the ore in the bins comes from. The company owns several mining locations, 1,500 feet long by 300 feet in width. The names of these locations are Lookout, Spread Eagle, Buena Vista, Indiana, Carolina, Independent, Bald Eagle, Rapid City, Oro Lee, Safety, Wild Cat, Victory, Reliant. The Lookout location is situated on top of the hill about a mile away from the mill. Developments disclose a vein carrying small, irregular bunches of good gold ore. Sometimes a bunch yielding a ton, at other times five or six tons, are encountered. These bunches of ore yield

from \$5 to \$10 per ton and are the source of the supply kept in the bins until needed.

The cost of dead work in finding a bunch of ore is a great deal more than the ore from it is worth. These bunches, or nests, of ore do not occur promiscuously along the vein, but after the manner of a small chute of ore, alternately opening and pinching.

The next best location is the Spread Eagle, in which occurs a vein several feet wide. It is soft, easily mined and gold bearing. Its probable average value is from one and a half to two dollars per ton. The ore is quartz and decomposed slate, heavily charged with manganese. The gold is scaly and very light. The manganese gives off a greasy scum when crushed that interferes with the gold amalgamation, and it is impossible to save what little gold the rock contains. Any one not acquainted with these facts could be easily misled as to the value of the vein. The other locations named have no showing worthy of mention, are merely locations to fill in, and for the further purpose of leading investors to believe that the company own a large property.

I am reliably informed that the workmen have not been paid their wages for four months, and it is to be presumed that a company paying \$10,000 per month in dividends would not leave its employes unpaid. Now as to Mr. Day's lease: if Mr. Day can make this mine pay expenses he is the only man in the United States who can do it. I cannot say if he pays the monthly rental he has agreed on; if he does—*directly*—it must be a losing game to Mr. Day, whatever the returns are *indirectly*. The mine has been developed sufficiently to satisfy any practical man of its future prospects, still I would not like to say anything to discourage prospecting the property. Leasing the mines by the general manager is a counterpart of the Big Bend Hydraulic Co.'s schemes, which I shall mention in my next letter. I would advise your readers to leave the Lookout stock and its questionable dividends alone. The directors of this company are Samuel W. Hale (ex-Governor of New Hampshire), Ed. P. Dole, George E. Witney, Charles H. Hersey, and C. J. Woodward. Officers are Charles H. Hersey, Treasurer, Keene, N. H.; L. M. Webb, Clerk, Portland, Me., and M. H. Day, General Manager, Rapid City, Dakota. These gentlemen cannot shirk the responsibility that their official position gives them in connection with this company. If their attention is called to this article as well as other statements made by our Deadwood papers, the *Times* and *Pioneer*, to clear themselves of any complicity they should consent to having a disinterested expert chosen by the ENGINEERING AND MINING JOURNAL make report on the property. I nearly forgot to say the placer claims owned by this company, said to cover 74½ acres of ground on Castle Creek near the lode claims, are worthless as mining claims.

SULLIVAN CONSOLIDATED.

This mine, or rather its stock, has some degree of merit imparted to it by being listed and quoted on your New York Consolidated Exchange. A little investigation would reveal to the "powers that be" in the stock exchange that by taking Sullivan Consolidated under their wings they were harboring one of the wildest of the feline species. This property is also situated on Castle Creek, Pennington County, Dakota, about two miles above the Lookout mines, and no doubt the two have some family relationship. The company claims to own 10 lode locations and 40 acres of placer ground. The Sullivan mine, one of the group, was discovered and located several years ago. It is a narrow, six-inch vein of gold-bearing ore. A few spots of good ore have been found in this narrow vein, but it has no probability of ever developing into a mine. There are scores of such veins in these hills, carrying just gold enough to swear by, without any prospect of ever becoming better by development work. There has been no work done on the Sullivan Consolidated property lately, from which I infer speculations in its stock have been hampered by the exposures made in the newspapers. This company, or parties connected with it, once published a newspaper, which they named the *Lookout Miner*. It extolled the merits of the Sullivan property in particular and was issued from Lookout, a camp containing less than 20 people at the time, and probably not many more now.

The other locations and placer claims of this company are not worthy of mention. The stock is quoted at \$1.25 per share, but if any of your readers are anxious to get some they can buy it for \$1 per share "in the pool." This is considerate on the part of the Board, but rather transparent. The directors are G. E. Yarrington, G. W. McKinney, C. M. Sprague, Nathan P. Kidder, F. J. Ayer, J. T. Hooper, Herbert L. Peck. The officers are: G. E. Yarrington, President; G. W. McKinney, Vice-President; C. M. Sprague, Treasurer; Nathan P. Kidder, Clerk. Its office is at 27 Doane street, Boston, Mass. The Sullivan Consolidated is a good stock for investors to leave alone, and a fit subject for investigation on the part of your stock exchange. Perhaps Boston papers will take note of this and republish it.

Next week I shall show the "true inwardness" of the Hermosa, Dakota, Water Power, and Big Bend.

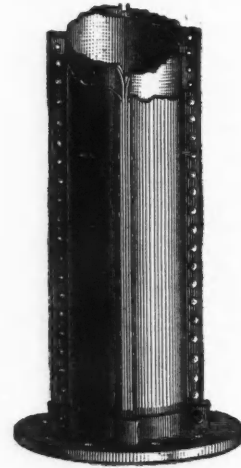
DEADWOOD, D. T., July 24, 1889.

THE PRODUCTION OF METALS OF THE EARTHS AND ALKALINE EARTHS.

A. Feldmann, of Linden, Prussia, has recently patented in England a process for producing metals of the earths and alkaline earths, which consists in adding to a haloid salt of the metals referred to, or to a compound thereof with a haloid alkali salt, an oxide of an earth, earth alkali or alkali metal, which is more highly electro-positive than the metal to be separated out, or in adding to an oxide of the earth or earth-alkali metal a haloid compound of one or more earth-alkaline, earth or alkali metal which is, or are all, more highly electro-positive than the metal to be obtained in melting the mass and decomposing it by the electric current. Thus the inventor claims that magnesium may be obtained from its double chloride with potassium by employing oxide of calcium or sodium, while he proposes to make aluminium from its double chloride with sodium by means of oxide of calcium. Again, Mr. Feldmann claims that magnesium can be produced from its oxide by introducing the latter into a bath of fluoride of calcium and chloride of sodium, and so on. Basic pots are to be employed for melting. The electrodes may be made of carbon, or if alloys are required, both the negative and positive electrodes may consist of the metal to be alloyed. As described in the letters patent, there are no by-products produced in the melting. The general idea of the process is by no means new. Whether it will "work" in actual practice remains to be seen.

CONDUITS FOR IRON-DESTROYING FLUIDS.

A new form of pipe for conveying iron-destroying fluids, such as acid mine waters, sulphuric acid, wood pulp from digesters, etc., is now manufactured under the patents of J. C. Bayles, whose process of making spiral welded pipe was described in the ENGINEERING AND MINING JOURNAL of April 7 and 14, 1888. The steel-armored acid conduit is a light and strong steel pipe, built up of sections of such shape as to give it the maximum strength and stiffness, and provided with a lining of rolled lead, so held in position between the externally projecting longitudinal flanges that it cannot collapse or become displaced. The combination of lead and steel thus secured meets the requirements of service in the conveyance of fluids which do not attack lead, but which need to be handled under pressures which lead pipes will not carry. This principle of construction is applicable to various diameters and shapes of pipe, and admits



of the use of any weight of metal needed to give the strength required in engineering practice. The steel-armored acid conduit is claimed to make a good pump column for mines from which sulphurous water is discharged; and in other positions where strength and stiffness are needed and a lead lining has value. Such a combination pipe would seem to have utility. All forms of lead-lined couplings and special fittings are provided, and full guarantees are offered by the manufacturers as to strength of tubes and tightness of seams and joints. The rapid destruction of iron pipe by sulphurous waters entails so great a cost upon the mining and manufacturing industries of the country that this light and strong acid conduit is an important addition to the materials at the command of the engineer. The pipe is made by the Spiral Weld Tube Company of East Orange, N. J.

ACTION OF SILICON ON GOLD, SILVER, PLATINUM AND MERCURY.

By H. N. Warren.

With regard to the action of silicon on the more common metals, iron and copper, so well known are the properties in general of these elements when combined that little, if any, comment is required; but on passing to the more refractory metals a much wider field for study is presented.

As recorded by the various handbooks of chemistry, silicon, when in the nascent state, converts platinum into a brittle silicide. This is by no means, however, the only method available for preparing this compound; for, on heating graphitoid silicon in contact with platinum to a full red heat, combination at once takes place, resulting in a brittle regulus, being fusible at a red heat, and breaking with a crystalline fracture, at the same time being difficultly soluble in acids. The same compound may be more readily formed by heating in a closed crucible a mixture of amorphous silicon and platinum black under a layer of potassium silico-fluoride; the analysis of several results thus obtained proved the presence of 10 per cent silicon. On the other hand, neither silver nor gold present any great affinity towards silicon, but on heating a mixture of potassium silico-fluoride, metallic sodium, and either silver or gold in the amorphous condition to a high temperature, a well-fused regulus of silicide of the metal may be obtained. In the latter instance, the alloy, containing as little as 5 per cent silicon, is almost as brittle as antimony, and, to all appearances, resembles gold alloyed with a due proportion of silver. At the same time, although silicon possesses no considerable affinity toward either gold or silver, except when in a nascent state, still that affinity appears to be considerably enhanced by combining with either metal, when in the fused condition, a small quantity of an already prepared silicide of either gold, silver, or platinum. Thus, if on the surface of a quantity of either silver or gold in the fused condition is ejected a few grains of an already prepared silicide of either gold or silver, complete mixture of the same at once ensues. This alloy, although containing but a minute percentage of silicon, may be raised to a much higher rate by the introduction of elementary silicon, which, before this period, showed at all normal temperatures no great affinity, except when in a nascent form. Silver, when thus impregnated with from 10 per cent of silicon, becomes of a slightly

red tint, resembling in appearance metallic manganese. The regulus, after being pulverized, is completely decomposed by the aid of concentrated hydriodic acid.

As regards the action of silicon on metallic mercury nothing very definite can at present be stated, but on subjecting a small vessel containing mercury in contact with an alcoholic solution of silicon fluoride to the action of a powerful battery, and afterward subjecting the mercury to distillation, a small quantity of amorphous silicon was obtainable; but whether silicon, when in a nascent state, combines with or is soluble in mercury, still presents considerable doubt.—*Chemical News.*

PUMP FIRE EXTINGUISHER.

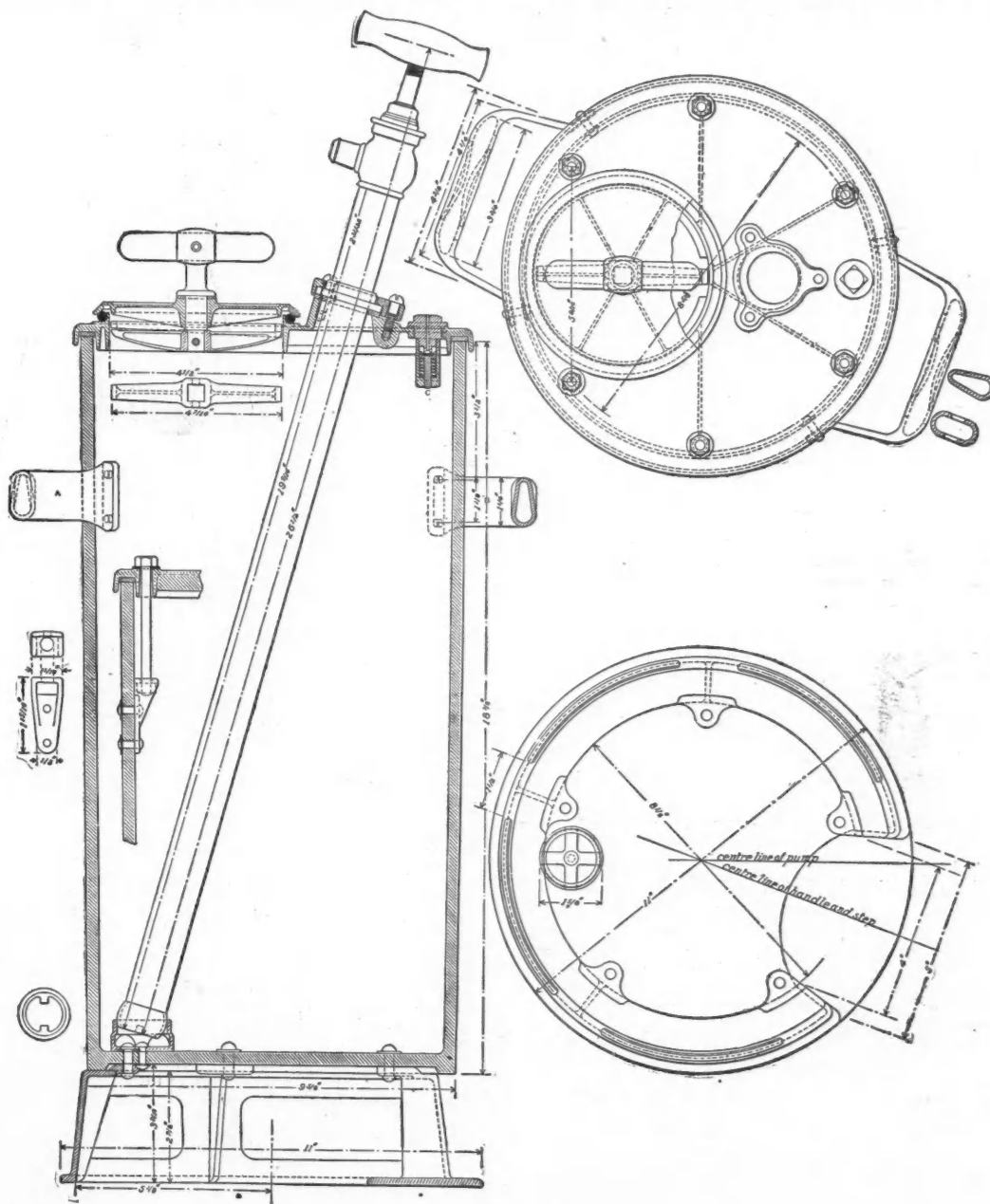
We illustrate herewith a pump fire extinguisher, recently adopted by the Pennsylvania Railroad Company, which seems to us to have great merit. The indorsement of a corporation so practical as the Pennsylvania

between the cover and the bucket is made with a molded rubber ring inserted into a groove or recess in the cover. The cover is held firmly upon the rubber ring or gasket by five-joint bolts. The joint between the bolt and the cover is closed by a leather gasket placed under the head of the bolt. The joint between the hand-hole cover and the cover of the extinguisher is ingeniously made by a piece of round leather belting with the ends scarfed and cemented together. The bevel of the recess in the cover forces the leather to a seat on the cover of the extinguisher and makes a neat and very satisfactory joint.

A small safety valve prevents the accumulation of gases within the extinguisher. Other details of the devices are so well illustrated as not to require further description.

There are various advantages claimed for the use of this form of extinguisher; among them may be mentioned the following:

1. Simplicity of construction, there being no valves, cocks or appliances that look mysterious to the uninitiated.
2. Ease of inspection and greater certainty in regard to its condition. A



PUMP FIRE EXTINGUISHER.

is in itself a recommendation that should secure its extended adoption. It has a great advantage over the former chemical fire extinguisher, being completely under control and having greater power.

It consists of a bucket of indurated fibre, 18 inches high, 10 inches in diameter and $\frac{5}{8}$ inch thick. This bucket is attached to a light cast-iron bar, shown in the figure, by means of five rivets. The cover of the bucket is also cast iron. To the extinguisher are attached two handles, as shown at A and B. In the cover is a hand-hole with a cover arranged to be easily removed. The pump is known to the trade as the "Hydrostatic Champion," manufactured by the National Manufacturing Company, Boston. It is inserted through a special opening in the cover of the extinguisher, and the joint around it is made tight by a ground joint similar to that used for brazed joints on copper steam pipes. The pump has a spherical end, and fits into a ball socket at the bottom of the extinguisher. These facts are clearly shown by the illustration.

The method of making tight the various joints is interesting. That

single stroke of the pump tells whether it is in order, and the removal of the cover and a glance at the interior informs the operator if it be charged.

3. Durability. The action of the chemicals is a great source of depreciation. Few metal fire extinguishers exist long without corrosion, and when corroded there arises a danger of bursting in service, both of which are avoided in this extinguisher.

4. Ease and rapidity of recharging. By removing the cover charging can go on while the extinguisher is being used, which is a valuable feature when a single extinguisher full is not enough to put out a fire.

5. No special instructions are required. The sight of the pump fire extinguisher is almost sufficient instruction how to use it.

6. The extinguisher throws a much larger stream than the ordinary chemical one.

7. The fire extinguishing liquid can be used more economically. The ordinary extinguisher must be used continuously until exhausted, when

once started. This is not true of the pump extinguisher, and no waste of material occurs if pumping ceases for an interval.

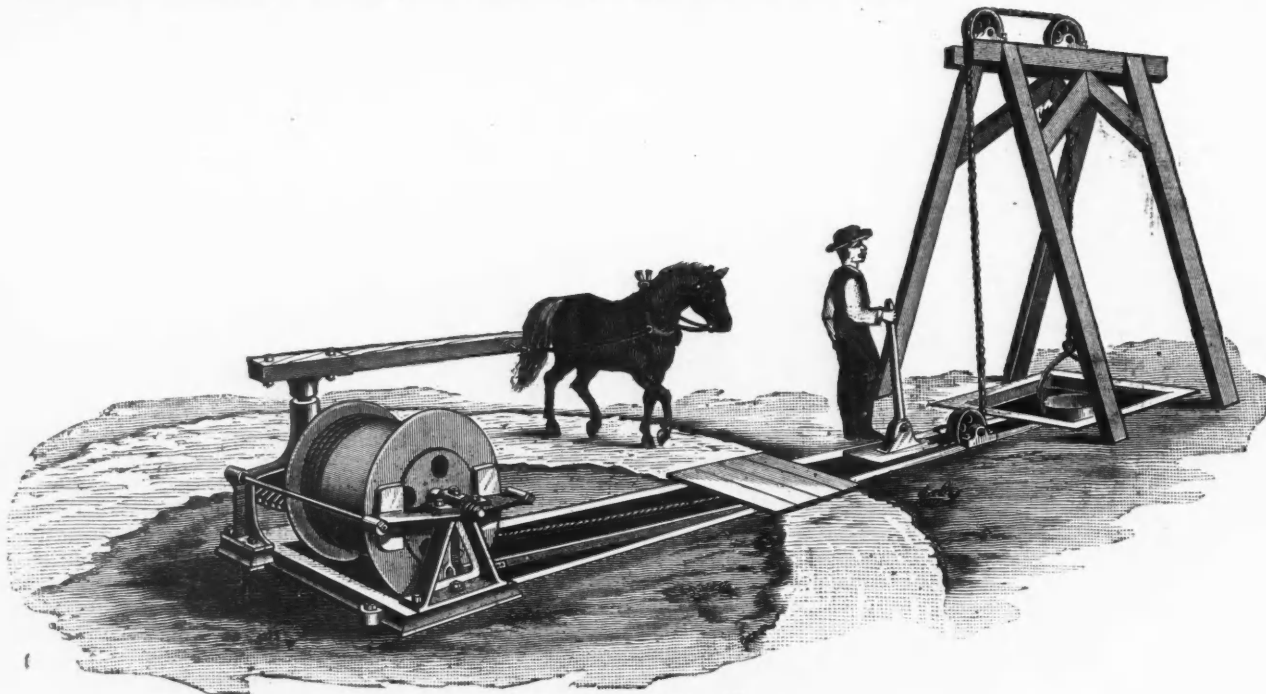
8. The force of the stream can be varied at will. In this respect it differs from the ordinary extinguisher.

9. The cost of this extinguisher is considerably less than those now in use.

DAVIS HORSE-POWER HOISTING WHIM.

No mechanical appliance plays so important a part in the first stages of mine development as the horse-power hoisting whim, which comes into play when hoisting by hand windlass fails, it being in many cases the prospector's main dependence until sufficient depth is reached to justify a steam hoist. The hoist illustrated is built, with the exception of sweep, brake and friction blocks, entirely of iron and steel, mounted on a heavy iron base plate, and is therefore very durable, and not affected by exposure in wet or dry climates. The hoisting drum is completely under the control of the man at the shaft. Both the hoisting and lowering are regulated by one lever, and the operation is so simple that it can be handled by any miner or person inexperienced in the use of machinery.

The bevel gear and clutch on the drum shaft are loose, and, in hoisting, drive the drum through a friction clutch. This avoids the frequent accidents occurring with other machines, occasioned by breaking of the gear teeth when throwing them in and out of gear. In lowering, the drum is pressed by the powerful screw lever against brake woods at the opposite end. Perfect means of adjustment are provided for the friction clutch and brake blocks. All parts are formed to templets, so that worn portions are readily replaced. As the drum is independent from the driving gears



THE DAVIS HORSE WHIM

the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature which greatly increases the capacity of the machine by avoiding the loss of time due to stopping and starting the horse, and also allows the load to be started gradually, lessening strains on rope, machine and horse. No. 1 machine, with one horse and single line, has a capacity of 800 pounds at 75 feet per minute; No. 2, similarly arranged, hoists 500 pounds at 125 feet per minute.

It is a light and compact machine, and is easily taken to pieces for transportation by mules. It weighs 1,200 pounds, and the total shipping weight, including sweep, levers and sheaves, is 1,390 pounds. The cost of erection is slight, two men in half a day being able to put it in place, ready to work. The size of rope recommended is one-half-inch wire, or one-and-a-quarter-inch hemp. With each machine working drawings are furnished, showing in detail the proper construction of galleys frame and hoister foundation. On the end of the drum is marked an arrow, and the drum should always turn in the direction of the arrow when hoisting.

The machine herewith illustrated is made by F. M. Davis, of Denver, Colo.

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 in another page of the Journal.]

Atlas Northern Anthracite Field. Parts III. and IV., A. A.; Atlas to Reports, H. H. & H. H. H.; Museum Catalogue, 3, O. O. O. Pennsylvania Geological Survey. Published by the State, 1889.

Primer of Scientific Knowledge. By Paul Bert, translated and adapted for American Schools. Published by J. B. Lippincott Company, Philadelphia, Pa. Pages, 186, with Glossary. Illustrated. Price, 50c.

Fourteenth Annual Report of the State Inspector of Mines for 1888. By Robert M. Haseltine, Chief Inspector of Mines, Columbus, Ohio. Published by the State, 1889. Pages, 250.

Pott's Mining Register and Directory for the Coal and Ironstone Trades of Great Britain and Ireland, 1889. Published by W. J. Potts, Atlas Works, North Shields, England. Pages, 320. Illustrated.

Large Hydraulic Press.—The Crozel-Fourneyron Works have just sent to Lyons arsenal the parts of what, when erected, will be the largest hydraulic press in the world. It has been designed to stamp out a shell at one stroke. The base or anvil bed weighs 35 tons. The total weight of the press is about 300 tons. The work has been executed by the Acieries et Forges at Firminy.

Railroads in China.—It is stated that the Emperor of China has, despite the opposition of the reactionaries, at last issued the edict for the construction of the Tungchow Railway. The Marquess Tseng has been appointed General Director of all the Chinese railways, the construction of which, on an extensive scale, seems now, after many delays and disappointments, to be really at hand.

The Hungarian Government have decided to remove the rocks, known as the Iron Gates, which now obstruct the navigation on the Lower Danube, and the works are to be commenced in the spring of next year. Trials of blasting apparatus, materials, etc., are to be made during the present year, and the Minister of Public Works in Buda Pesth is prepared to receive tenders for the said works.

Iron Ore is produced in twenty-nine counties of England and Wales, twelve counties of Scotland, and in one of the provinces of Ireland. The production has fallen off seriously during recent years, and some of the older centers of production are becoming extinct, if they are not so already. Over 30 per cent of the British iron ore requirements is now supplied from foreign sources, and the iron industry flourishes, though the ore is admitted free of duty.

Large Girders.—In the addition to the American Museum of Natural History will be the largest riveted box girders ever used in the construction of a building. These girders were designed by J. Cleveland Cady, the architect, to support the floors and partitions and obviate the use of pillars, the object being to give unobstructed floor room. An exchange says there are twenty-eight of these girders, measuring about 62 feet in length, and weighing 40,000 pounds each.

The German Floating Exhibition.—We learn from an English exchange that this enterprise is at last approaching completion. The necessary capital of 5,000,000 marks has been raised, and the huge vessel has been constructed, with bright show-rooms fitted up to receive the various exhibits. Those enterprising Germans who are ambitious of visiting the principal Continental and North and South American ports, and of offering their goods there for sale, are now making the necessary preparations for their two years' voyage. Antwerp is the port from whence the ship is to sail.

The Supply of Water to Mines in the Transvaal.—We are informed that an important concession has been recently granted to a syndicate, embracing the right to take water from one of the large streams on government land, and to carry it in pipes as far as Spitzkop for the use of the different mines. The scheme is a large one, inasmuch as the distance over which the water will be conveyed is about twenty-five miles. The project has been examined, and is reported to be perfectly feasible. There is, therefore, little doubt that the undertaking will be carried out to a successful issue. As the quantity of water to be supplied is enormous, it is evident that an important contract for the pipes that will be needed must soon be in the market. British manufacturers are doubtless well represented in the South African Republic, and it is, therefore, almost certain that the order for the supply of the water pipes will be intrusted to a British firm for execution. We understand that the future requirements of the Transvaal for supplies of mining machinery and other appliances are likely to be on a much larger scale than has been the case hitherto. It, therefore, behooves our manufacturing friends and their agents in the Transvaal to keep a watch upon that interesting region, with a view of supplying its future wants in the direction just indicated.

PERSONALS.

The National Electric Light Association will hold its tenth convention at Niagara Falls, N. Y., on the 6th, 7th and 8th inst.

Dr. H. M. Chance, mining engineer and geologist, has returned from the Choctaw Nation, Indian Territory, where he made an extended examination of Choctaw coal lands. Dr. Chance has opened an office in Philadelphia, and his permanent address hereafter will be 418 Drexel Building.

The International Congress of Electricians will meet in Paris during the week from the 24th to the 31st of August. The subjects to be considered are Measurements, Machines, Electro-chemistry, Lighting, Telegraphy, Telephony and other economic applications of electricity and electrophysics.

At the quarterly meeting of the directors of the Norton Iron works, in Ashland, Ky., July 17, the resignation of John Russell as President was accepted, and Charles W. Greene, of Tiffin, O., was elected to fill his place. John Means resigned his office as Treasurer of this corporation, and John Russell was elected to fill his place. No other changes were made in the organization.

We have received a copy of the initial issue of the *Leith Steamship*, a new monthly publication devoted to marine engineering and steamship building. Mr. John Lockie, the editor, is to be congratulated upon the handsome appearance of his journal, and still more upon its contents. If the *Steamship* maintains the standard set in its first number we predict a bright future for it. There is room for such a periodical.

The annual meeting of the German Society of Naturalists and Physicians takes place this year at Heidelberg. Sessions will be held from the 17th to the 23d of September, and an unusually attractive programme has been arranged. Besides the usual meetings for the reading of papers, there will be a dinner in the large hall of the museum on one of the evenings, and on another evening the old castle will be illuminated in honor of the society.

Chief Engineer Alphonse Fteley, of the new aqueduct, New York, sailed for Europe on the 31st ult., to be absent a month. Deputy Engineer Rice will fill his place during his absence. After the Chief Engineer's departure Commissioner Gdroy received a letter from him in answer to one sent to him July 23, in which Mr. Fteley said that owing to various complications and drawbacks in the work it would be impossible, in his opinion, to have the new aqueduct in running order before June 1, 1890.

The regular meeting of the American Geological Society will be held at Toronto, Can., on the 28th and 29th of this month. The circular issued by the Secretary, Prof. J. J. Stevenson, of the University of the City of New York, requests that a member having a paper to read should send him an abstract of its contents and an estimate of its length before the 10th inst.; and where the author of a paper will not be present, that the paper be sent to him, by the same date, that it may be submitted to a meeting of the Council.

Mr. G. E. Bailey has been appointed professor of metallurgy at the Dakota School of Mines at Rapid City, to succeed Prof. H. O. Hoffman. The local press is dissatisfied with this appointment, and speaks in the following uncomplimentary manner: "Protestations of all having the good reputation and fair name of the School of Mines nearest at heart will avail nothing. A person believed to be absolutely incompetent, and blessed with a reputation not at all the best, will occupy one of the most responsible positions in the faculty. Chadwickian schemes, Lookout swindles, Sullivan Consolidated hilks, and all confidence games of like description will flourish. Those playing at them may take heart."

OBITUARY.

Mr. Daniel Beedy died at Farmington, Me., on the 29th ult., at the age of seventy-eight years. He was a noted civil engineer and bridge builder.

Mr. H. B. Scutt, the well-known barb-wire manufacturer, of Joliet, Ill., died of paralysis on the 28th ult. Mr. Scutt was a pioneer in the barb-wire fence business.

INDUSTRIAL NOTES.

Mr. Lindsey Kelly of Ironton, Ohio, is making arrangements to put Centor Furnace in blast some time this year.

The Ashland Coal and Iron Railway Company is opening up new coal mines on its property to supply their two furnaces. It is finishing the second locomotive built in its own shops at Ashland, Ky.

In the patent suit of A. L. Ide & Son against the Ball Engine Company, of Erie, Pa., for infringement of use of dash pot in fly-wheel governor, Judge Blodgett, of Chicago, on July 22d handed down his opinion in favor of the Ball Engine Company.

The Illinois Steel Company, of Chicago, Ill., to which we referred in our last issue, has purchased a large tract of land adjoining its South Chicago rolling mills, and will at once proceed to erect a plant which will be devoted entirely to the manufacture of steel plates for vessels.

Suit was begun at Ashland, Wis., on the 30th ult.,

by James E. York against the Ashland Iron and Steel Company for the recovery of \$17,500 worth of stock which the plaintiff claims he was defrauded out of. York also demands his share of the profits of the company, which will amount to a large sum. The Ashland Iron and Steel Company is the owner of blast furnaces in Ashland.

The Chicago & Calumet Rolling Milling Company, with headquarters at Chicago, Ill., has been incorporated, with a capital stock of \$1,000,000. The incorporators are Jean L. Pfau, J. Louis Pfau, and George Campbell. It is understood the company will erect a large rolling mill at Calumet and make steel rails and fight the combination of the North Chicago, Joliet Steel and North Chicago Rolling Mill companies—the Illinois Steel Company.

At the Crown and Cumberland Steel Works, at Cumberland, Md., there is a general overhauling. Many new feature have been added and considerable new machinery introduced. Two large stationary engines have recently been set in place, making six engines now in these works. Two new boilers are upon the ground and will be put in position at once. Operations will shortly be resumed throughout the entire works.

The Central Nail Company, of Wheeling, Va., has been organized with a capital stock of \$1,000,000. The incorporators are A. W. Campbell, S. K. Walkie, Joseph Bell, W. L. Glessner and J. N. Vance, all of Wheeling. The object and purpose of the company are believed to be the handling of all the nails manufactured by the mills in the Wheeling District and the west, as the incorporators represent different mills around and in Wheeling.

The same board that tried recently the recoil of the pneumatic gun carriage of the Pneumatic Gun Carriage Company, of Boston, tried, on the 31st ult., at the Naval proving grounds, at Annapolis, Md., the recoil of a regular eight-inch gun carriage. The recoil was about two feet, the same as that of the pneumatic carriage. The test is thought to be favorable to the pneumatic gun carriage, as it proves that compressed air can be used to stop the recoil of heavy guns. The board's opinion has not been given.

The Ingersoll-Sergeant Rock Drill Company, of New York, advise us that the capacity of their large shops is tested to its extreme limit. They have orders at present for 13 air compressors, none of which have been shipped. Orders are also in for channelling machines, rock drills, etc. The Ingersoll-Sergeant Company has recently received orders for complete plants of machinery for the Aurora mine on the Gogebic Range in the Lake Superior District, and for the Santa Fe Copper Company, Santa Fe, New Mexico.

In February last wages in the Fishback Rolling Mill of the Pottsville Iron and Steel Company, at Pottsville, Pa., were reduced 10 and 12 per cent, with the understanding that the old rate would be restored when the price of iron should warrant it. Several requests for an increase having been ignored, the men quit work on the 29th ult., held a meeting, and determined to insist upon \$3.76 per ton for puddlers, who have been receiving \$3.38, and a corresponding advance in other departments. A sliding scale was offered, but this was refused. Meanwhile the mill is shut down.

We learn that Messrs. Wm. Simons & Co., of Renfrew, Scotland, the well-known steamship and dredge builders, have made a contract with the Manchester Ship Canal Company for the supply of an extensive dredging plant for the canal. This will consist of several of their improved stern-hopper dredges, each vessel to have a capacity of 800 tons in the hopper. The recent performances of these dredges have proved so satisfactory and economical, on the Clyde, at Chatham dockyard, Bombay and Melbourne among other places, that the system is well worth the attention of our contractors.

The Cherry Valley Iron Company and A. Wilcox & Co., small creditors of the iron firm of Graff, Bennett & Co., of Pittsburg, Pa., filed exceptions to the assignee's final report on the 31st ult., alleging conspiracy on the part of the large creditors. The Clinton and Mill Vale mills, they allege, were sold to a syndicate representing the latter for \$26,000, subject to a mortgage of \$565,000, whereas the Mill Vale mill alone was worth \$1,000,000, and the purchasers have been offered \$200,000 for the Clinton mill. The Court is asked to compel the assignee to make a fair and just account of property of the firm sold by him for the firm.

Secretary Tracy, Commodore Sicard, Chief of the Naval Bureau of Ordnance, and Naval Secretary Lieut. T. B. M. Mason, during the week, made a trip of inspection to the Bethlehem Iron Works at Bethlehem, Pa., at which the forgings and castings for naval guns and armor-plates for the new cruisers are being made. The trip is reported to have been very satisfactory. The new gun-plant is about completed, and work is progressing rapidly upon two eight-inch guns, and two four-inch guns, to be used for experimental purposes in testing rapid firing systems. The works are very large, two of the buildings being respectively 1,100 and 1,800 feet long. A trip-hammer of 120 tons' weight is in course of construction, and will shortly be ready to do its part in making the forgings for the new guns.

A pretty conclusive test of the character of the Cammell steel rail was afforded by a disastrous accident which recently occurred at Penistone, England. Describing the scene after the wreck, the Sheffield

Telegraph says: "On the permanent way the effects of the accident were equally visible. The rails made at the works close by were branded 'Cammell's toughened steel,' 25 feet in length and 75 pounds to the yard. Yet the engine bent and twisted them like strands of wire. One massive rail was curved into the shape of the letter 'S,' and another was bent round to form a huge horseshoe. That they were 'toughened' was clear enough, for in no instance had the force to which they were subjected caused them to snap or even to 'peel.'"

The Chicago, Ill., office of Westinghouse, Church, Kerr & Co. have made a remarkable showing in the line of economy at the Aurora Electric Light and Power Company, Aurora, Ill. The original plant of this company consisted of a horizontal return tubular boiler with a good automatic engine, heater, etc., burning the best quality of lump coal, which was found to be necessary under the conditions, at an average cost of from four to five dollars per night. This plant was replaced by a Hazleton boiler fired by two Roney mechanical stokers, and a Westinghouse compound condensing engine. The company immediately went to buying the cheapest quality of slack coal, with an enormous reduction in the quantity burned. The net result, running exactly the same number of lights and for the same time, was a reduction of from \$4.50 per night to 90 cents per night. The Aurora Company add in their letter to Westinghouse, Church, Kerr & Co., "The pipe is not yet covered." This may be regarded as unfortunate, but they further say, "Should any of your friends or parties interested in electric lighting apparatus wish to verify these statements, we will take pleasure in showing them the entire working of the apparatus."

The Andrews Trip Hammer Brick Company, of Denver, Colo., has secured twenty acres of fine clay land at Kenwood Park, on the line of the Denver, Texas & Fort Worth Railroad, where it proposes erecting a plant that will revolutionize brick making in Denver. It will consist of two machines, with a capacity of 36,000 brick per day of ten hours. It is stated that the process is a dry one. There will be no mixing or tempering of clay, and the green brick will not be spread out in the yard to dry, but will be carried direct from the machine to the kiln. The permanent kilns, six in number, will be erected close to a side track, so that at least 60,000 brick can be tossed from each kiln directly on the cars, thus doing away with any extra hauling. The bricks, besides being of hardness and density, are of a uniform thickness. In color they are of a somewhat darker shade than the bricks now used at Denver, and can be manufactured at a much less cost than the hand-made brick. The works will be in full running order in thirty days, and a kiln of 225,000 bricks will be produced weekly. The present plant will be erected in such a way that the company can at any time increase it so that the daily production will be over 100,000. The officers of the company are E. T. Andrews, president and general manager; Monroe Wheeler, vice-president; T. L. Wiswall, secretary, and John Thomas, treasurer.

CONTRACTING NOTES.

Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open" on page xvi. This week proposals are invited for the following new contracts: Iron Beams and Girders; Dredging in Charles River, Boston, Mass.; Terra Cotta Pipes and Branches; Iron Steamer Machinery and Buildings; Steam Heating and Ventilating Apparatus, and Iron Roofing; Steamheating Plant.

The contract with the Union Iron Works of San Francisco, Cal., for the construction of a coast-defense vessel was signed on the 26th ult. by Secretary Tracy. The contract price is \$700,000.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

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.

GOODS WANTED AT HOME.

68. Nickel and cobalt ores and furnace products wanted. New York.
90. Shingle machines, double horizontal, two, to cut 150,000 shingles per day, including motive power. British Columbia.

sect the carbonate and sulphide chutes of the Iron Mask, as these former claims lay across the end of the Mask group.

TOM SCOTT—A new strike has been reported in this mine, upon which over 900 feet of development was accomplished in the old contact, with no return of ore. Upon sinking to the second contact, they have been rewarded.

McLain, McCormack & Co. have opened a fine chute of high-grade ore on the Great Eastern. The claim lies adjacent to the Tom Scott. Both are owned by the Iron Mask Company.

The Belle shaft has renewed operations, and larger bodies than ever before are being extracted.

Mr. Bowland, of the Henrietta, near Red Cliff, sold his interest in the above claim to Mr. Latem for \$5,000. Messrs. Latem & Gay intend outputting again soon.

The Champion-Battle Mountain suit is expected to take place in September. The following mines at Battle Mountain are paying: Carbonates—Iron Mask, Spirit, Cleopatra, Cleopatra No. 2; Henrietta, Kingfisher, Great Eastern, and Little Ollie. Quartzite—Bleak House, Polar Accidental, Little Belle, First Chance, Pine Martin, Ground Hog, and Champion. The other quartzite properties not working are shut down on account of litigation.

LOS ANIMAS COUNTY.

A flow of gas was struck at Trinidad at a depth of 190 feet. Unlike the other deposits that have so far in this neighborhood been tapped, the flow was constant and steady all day long. The well was being sunk for the purpose of getting water, but they now propose to sink to a greater depth.

OURAY COUNTY.

[From an Occasional Correspondent.]

AMERICAN BELLE.—A 300 feet shaft is being sunk, from which a crosscut will be run to test the copper chimneys at that depth. The company has been paid \$50,000 since the present manager, Mr. T. E. Schwarz, took the water out, about a year ago.

NEW GUSTON COMPANY, LIMITED.—Is producing from \$30,000 to \$40,000 per month at present, and is preparing for new hoisting plant for a depth of 1,500 feet. The present shaft is 400 feet, with strong ore body on fourth and fifth levels.

YANKEE GIRL MINING COMPANY.—The main shaft is now down 965 feet deep. The company is still seriously troubled with very acid mine water, which has involved great expense and delay in development. On Robinson shaft of Yankee Girl the prospects are very flattering on a new ore chimney which has just been opened.

PITKIN COUNTY.

FRANKLIN MINING COMPANY.—The property of this company embraces 26 acres of land lying west of Vallejo Gulch. The claims owned by the company are the Dr. Franklin, the Milline, and the Rhoderick Dhu. A shaft was started several years ago on the northeast corner of the property, which is in the form of a parallelogram, with its greatest length reaching west from the shaft. The shaft struck the contact at about 600 feet from the surface, and was continued to a depth of 900 feet. Levels have been run to the contact at several points, and some drifting has been done. This work has developed ore in some quantity, and enough mineral has been taken out to pay all expenses and to clear off some debts which had accumulated. The mine, however, was not regarded as one of the producers, as the available ground was still very small in area and the ore-bodies were comparatively small. In the early part of the year work was resumed on the shaft, and it was put down to the 900-foot level. The level was then run to the contact, which work was completed a few weeks ago, and rich ore was discovered at that point. It is claimed that the strike is one of the richest ever made in this camp. It is the intention to put up a \$50,000 hoisting plant on the mine.

IDAHO.

[From our Special Correspondent at Boise City.]

Stoddard mine, near the De Lamar mine at Wagon-town, has been leased by Jones, of Nevada, and a force of men will be put in to develop it.

WASHINGTON MINE.—Chas. Balbach, of the Omaha Smelting Works, has purchased the remaining one-fourth of this mine, thus giving him the sole ownership. It might be of interest to some to state the price paid for this mine.

They have a six-foot vein of silver-bearing ore running \$170 per ton, and a six-inch vein of gold ore worth \$90 per ton. The veins are parallel, and 41 feet apart on the surface; the silver vein is almost perpendicular, and increases in width with depth.

The gold vein pitches toward the silver at such an angle as to meet it at the depth of 150 feet. The rock between the veins contains mineral in bunches, which would probably pay to mill. The mine and mill, when it is completed, will not cost over \$40,000. The mine is developed by 90 feet of shaft and 300 feet of tunnel.

The shipments of gold and silver bullion from the Assay Office at Boise City for June were a little over \$80,000.

The geological and irrigation surveys are at last under way. They did a great deal of irrigating before they left, and their camp was somewhat locally notorious for the quantity of apollinaris bottles scattered around; but they were going to a very dry country, and if they can find a place where they can get the Snake River out on the plain we can afford to forgive them. These Western people speak of things as seen through their telescopes and quartz glasses, and just now the papers are full of praise of the work of bringing water to these plains, as though it was already an

assured fact. It is rather doubtful whether a ditch of sufficient size can be taken from Snake River to bring much water here. It is two hundred miles to where the water will have to come out of the river, and how long the ditch will have to be the survey only can tell.

It will take an inch of water to irrigate an acre. Of course they will not be permitted to take all the water out of Snake River. Suppose they started with 1,200,000 inches, how much would that give at the distance of 200 miles? The cost of a ditch of that size would be simply enormous; for miles it would lie through lava beds, and at the depth of 2 feet there is hard pan all over the plain, and the actual cost of moving it is 35 cents per yard.

The system of dams and reservoirs for storing water is impracticable; a reservoir to be of any use for irrigating would have to be shallow and cover a large area; the sun and evaporation would soon put it dry, and in the season when the water would be most needed. One big ditch that will carry all the water that will be allowed to be taken out is the only feasible way. Another thing, the land must be withdrawn from the Desert Land act, and only allowed to be taken in tracts of 160 acres, under the Homestead law, otherwise the ditch would only benefit a few, which, if built by the government, would not be fair.

A few railroad men now hold 14,000 acres of the finest land there will be under the ditch under the Desert Land act. Their time will be out long before there is any water on the land, but it should not be allowed to be taken up again.

MICHIGAN.

Messrs. Dunbar, Smith and Allison, of Detroit, who are interested in the Houghton sandstone quarry, have decided to raise capital enough to develop the quarry to the extent of getting out two ship loads of stone at the present season. The ditch, which has been carried back into the quarry from a lower level, has been finished. It draws off all the water, leaving a dry bed of sandstone.

The Milwaukee & Northern Railroad Company has bought a tract of land fronting on the bay in the northern limits of Escanaba, and a road will be built there from Iron Mountain, seventy-five miles distant, to transport ore, which the Milwaukee & Northern is now shipping over the "Soo" road from Gladstone, seven miles north of Escanaba.

BARAGA GRAPHITE MINING COMPANY.—The contract for stripping this company's mine, to which we referred in our last issue, has been closed with H. C. Sheldon, and the work will commence at once. There will be about 5,000 cubic yards of stripping done.

IRON MINES.

IRON KING.—The fee owners of this mine, the Newport & Lake Superior Land Company, have taken hold of the mine, placing a force of two hundred men at work. The company claims that the Bessemer Consolidated Iron Company owes them \$21,000 in royalty, which is sufficient excuse for the taking of the mine. This action of the Newport company shuts out both the bondholders and shareholders of the Bessemer Consolidated. The mine is the most important of the latter organization, and it is thought that the courts will be called upon to settle the affair, as there is great dissatisfaction on the part of the Consolidated people.

YOUNGSTOWN.—Capt. C. T. Roberts, of the Mastodon, has taken a contract to mine 80,000 tons of ore from this mine at \$1 a ton, and is pumping out the mine and getting ready for work.

MONTANA.

DEER LODGE COUNTY.

WEST GRANITE MOUNTAIN MINING COMPANY.—At the recent stockholders' meeting held at Helena, the following trustees were elected: S. H. Geisel and D. B. McMullan, of St. Louis; L. G. Phelps, J. R. Watson, John W. Buskett, J. Feldsburg, J. W. Eddy, L. A. Walker and Geo. H. Hill. After the election the following preamble and resolution was offered and unanimously adopted: Whereas, no sale of the property of this company has taken place as authorized by the meeting of stockholders held on May 18th, 1889; and, whereas, the person to whom the sale was authorized to be made has declined to purchase the said property upon the terms authorized by said meeting of stockholders, and, whereas, the condition of the affairs of the company is such that a sale of its property appears to be advisable; now, therefore, be it Resolved, That in the opinion of the stockholders here present, the trustees this day selected should at the earliest practicable date effect a sale of all the property of this company to the highest bidder for cash and upon such terms and conditions as may be authorized by a meeting of the stockholders of this company called in pursuance of law for the purpose of considering such sale, and we therefore recommend that the said trustees call a meeting of the stockholders in the manner provided by law for the purpose of submitting to said stockholders a proposition for the sale of all the property of this company.

The financial statement presented showed the company's indebtedness to amount to over \$48,000, with accumulated interest.

No work is being done on the company's properties. It is claimed that several new propositions have been made to the directors to provide a working capital and relieve the company of its indebtedness. None of the propositions, however, will be acted upon until the 19th of August, when a meeting of the stockholders will be held to decide what disposition is to be made of the property.

GALLATIN COUNTY.

Two car-loads of coke from the Horr coal mines have been delivered to the Butte Reduction Works, and the first trial of the new coke was to be made on the 24th ult. The ovens in which the coke was burnt

are located at the new town of Horr, on the Park branch of the Northern Pacific, forty-nine miles south of Livingston, on the Yellowstone River. Twelve ovens are running and twelve more completed and ready for firing. In addition to these sixteen others are in course of construction and will be completed shortly.

SILVER BOW COUNTY.

Messrs. R. B. Wallace and John Davis have taken a year's lease on the Destroying Angel lode and have sunk a shaft which is now down about thirty feet. Ore has been struck which assayed high in gold and silver. It is thought that mineral is underlying that part of Butte, and many believe that the entire town-site is underlain with ore that would repay the working. This belief is taking tangible shape in the action of some gentlemen of the city, who intend to form a company and issue stock wherewith to work the lodes underlying the town.

NEVADA.

Speaking of the Nevada nitre deposits, the *Territorial Enterprise*, of Virginia City, says: Promoters, imposters, and mining blackmailers are getting their fins in with regard to the sale of 300 acres of nitre bed in the Humboldt Valley to an English syndicate for £200,000. One party had no sooner arranged for a sale of the property than a second, and again a third party, offered the same beds to the same company for £100,000 and £50,000 respectively. Adverse titles is the trouble. The property is claimed by "Old Man Barnard," A. M. Womble, and P. Ward Smith.

STOREY COUNTY—COMSTOCK LODGE.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The incline winze below the 1,950 level south drift is down to the 2,000 level, where the ore followed downward will be explored north and south. The indications are unofficially reported to be favorable that an important body of ore exists below the 2,000 level.

NEW YORK CONSOLIDATED MINING COMPANY.—The upraise above the 800 level west cross-cut, has developed a breadth of 4 feet of solid ore, showing an average value of nearly \$40 per ton, two thirds of which is gold. The ore streak is widening as it is followed upward, and the prospect is promising that it will develop into an important body.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—The new 20-stamp mill has begun crushing ore.

PENNSYLVANIA.

COAL.

Messrs. J. W. Moore & Co. have purchased 979 acres of coking coal land adjoining the Wynn coke plant. The purchase comprises the Moore, Collier, Gans, Birchall, and other tracts of land, and gives the company over 1,000 acres of land in one body. Five hundred coke ovens are to be erected on the land this year, and when completed will swell the Moore Coke Company's plant to 1,100 ovens, being the next largest to H. C. Frick.

The report that a 50-barrel oil well had been struck near Sandy Lake, Mercer County, has created great interest. Oil men claim the territory is a good one, and a thorough test will be made. Six new rigs are already up, while more are going up daily.

A bill in equity has been filed in the Common Pleas Court at Philadelphia by Phoebe W. Hoffman against both the Delaware Coal Company and the Philadelphia & Reading Coal and Iron Company, praying for a decree ordering the Delaware Coal Company to bring suit against its lessees for the amount of royalties now due, which together with interest is about \$146,000. The bill also sets out that the lady called upon the President, George de B. Keim, of the Delaware Company, and requested him to bring suit for royalties, but that he declined to do so. She states that by reason of the Philadelphia & Reading Coal and Iron Company owning a majority of stock in the Delaware Company it has elected a board of managers for the latter company who are interested in the former company. Mr. Keim is president of both companies. Her bill also asks that a disclosure be made of the names of the board of managers of the Delaware Company so that they be joined as defendants in the suit, and that the Philadelphia & Reading Coal and Iron Company be directed to pay the royalties and interest now due. The complaint does not set out that the lessees mined the amount of coal as required under the lease, but states that it was its duty to do so, and that nothing interfered to prevent the fulfillment of its obligation.

The total number of shares of the Delaware Coal Company is 5,268, of the par value of \$50, and the Philadelphia Coal and Iron Company is the owner of 4,716 of these shares. In December, 1876, the Delaware Coal Company leased its coal lands near Pottsville to the Philadelphia & Reading Coal and Iron Company for the term of 50 years, and with the understanding that at least 50,000 tons of coal would be mined by the lessees yearly, excepting the first year, upon which a royalty of 20 cents per ton was to be paid to the Delaware Company. By this arrangement at least \$10,000 per annum would have to be paid on royalties. The lady complains that since the lease has been running no royalties have been paid by the Reading Company.

The culm bank at the Luke Fidler Colliery at Shamokin exploded on the 31st ult. This is said to be the first instance in this region of a culm bank exploding, and it is attracting the attention of mine owners. The theory advanced is that the culm was ignited by spontaneous combustion, and the fire reaching an accumulation of gas, the explosion followed. Thousands of tons of dirt and rock were thrown high in the air.

The Monongahela River miners have decided to

strike against the reduction in the rate of mining in the first three pools from 3 cents to 1/4 cent per bushel.

The Robert Morris Land and Improvement Company, of New York, has filed six suits in ejectment in the United States Circuit Court, at Pittsburg, against the Philadelphia & Reading Coal and Iron Company and others for tracts of land in Northumberland County, aggregating over 8,000 acres, and also three suits in trespass for \$2,000,000 in damages.

The only answer so far made by President Corbin and the Reading Railroad officials is to denounce the suit as without any basis in law or equity. Mr. Franklin B. Gowen, for years President of the Reading, has issued an official statement declaring the Reading's title to these coal lands perfect; denouncing the claimants, and stating that when similar claims were made some years ago the claimants narrowly escaped going to prison for attempted fraud.

This statement of Mr. Gowen was shown to Mr. Stewart Newell, of New York, President of the Robert Morris Company. Mr. Newell put his reply in writing as follows:

First.—I did attempt to exercise my legal right of possession to the lands in question, and erected houses upon them, but the Reading Company, in defiance of law and decency, by force destroyed them and drove my occupants off the land. This was done by them by absolute force, and not by any law or order of court, but in defiance of law. The Reading never showed, much less never attempted to show, that I had "no title," and if they ever thought it advisable, never dared to bring suit against me for "forcible entry and fraud."

Second.—Having good title to these lands, and being aged and unable to cope single-handed with a powerful corporation like the Reading, the Robert Morris Land and Coal Company was organized, in which this title has been placed, and they are the plaintiffs in the case, and the United States courts will determine the question of the title, which such eminent lawyers as Governor Hoyt of Pennsylvania, Governor Geary of Pennsylvania, Governor Zulick, of Arizona, the Hon. Francis Jordan, ex-Secretary of Pennsylvania; Judge Ryan of Pottsville, John B. Packer of Sunbury, John R. Weeks of New Jersey, Judge Maynard of Williamsport, Theodore Cuyler of Philadelphia, Abraham Wakeman and A. D. Vinton of New York, the Hon. Wayne McVeagh, ex-Attorney General of the United States, have declared vested in the Robert Morris Land and Coal Company.

Third.—I would further say that previous to the bringing of these actions, my personal counsel, Abram Wakeman, saw Mr. Alfred Sully, who, as I then understood, was Mr. Corbin's personal adviser, and subsequently introduced me to a learned counsellor at law, selected by Mr. Sully, to whom the title of the Robert Morris Land and Coal Company was fully stated, and this legal gentleman, after a thorough examination, pronounced the legal title to the lands in question to be in the Robert Morris Land and Coal Company.

Fourth.—I deny most positively that I ever wrote to Mr. Gowen, or any one else, agreeing to withdraw suits or claims for \$100,000 or for any other sum."

A strike has been ordered by one of the largest labor conventions ever held in the Connellsville coke region. A resolution was unanimously adopted which says that the decision of the former convention be approved and work cease throughout the region on the first day of August, 1889, and that no work be done until their demands be granted. According to reports on the 1st inst. the strike is not general. About one-third of the miners are said to be out, a majority of the strikers being employes of Frick & Co.

PITTSBURG, Aug. 2.—The workers at the Trotter, Tarrs & Frick Coke Works joined the strikers on the 2d inst. This makes about one-third of the ovens in the Connellsville region idle. The strikers are confident, and claim that the strike will be general in a few days. The operators, however, say that the strike will not spread much further, and that as many of the workmen are opposed to it, it will not be successful.

FOREIGN MINING NEWS.

CUBA.

An American company is just opening extensive iron mines in the Cuban mountains. The company includes some of the Minnesota men who made the Vermillion District famous, as well as owners in the East. The territory is about 20 miles west of Santiago, near the coast, and in the Dalquiria Mountains. Capt. Elisha Norcom, of Tower City, Minn., who has just visited the property, says that "this is the ore region. The territory purchased by the company will, when opened, be the second mine in operation in the country. The other is worked by the Pennsylvania and Bessemer Steel Company. It was a question how to get the ore to the reboard. It could only be by a railway to Santiago, 20 miles, or by one directly to the coast, 3 1/2 miles. The latter meant the construction of a harbor and breakwater, but the company decided on it because, although it would cost more, it would be more economically maintained. The construction of the harbor has been begun. The ore is said to be 64 to 68 per cent metallic iron, and will be sent to this country.

ENGLAND.

The Durham miners have taken a vote on the question of accepting the 10 per cent advance offered by the owners. The result was in favor of accepting this advance by a majority of one. This decision averts a strike, which would have proved the greatest on record.

SOUTH AMERICA.

VENEZUELA.

EL CALLAO MINING COMPANY.—This company produced 5,340 ounces of gold in June, and declared a dividend of 1 franc per share, which is doing pretty well for a mine chronically reported as being nearly worked out. The grade of the ore has declined, and the profit is from greater economy in working. No new ore bodies have of late been opened, so that its life cannot be greatly prolonged. The outlook for the company is not encouraging, unless new "finds" be made.

DIVIDENDS.

The following have been declared: Granite Mountain Mining Company, of Montana, dividend No. 56, of 75 cents per share, or \$300,000, payable August 10th, at St. Louis, Mo.

Maboning Coal Railroad Company, dividend of one and one-half per cent upon the common capital stock. Payable at the office of D. N. Pardee, Transfer Agent, Room 47, Grand Central Depot, New York, August 1st.

Tennessee Coal, Iron and Railroad Company coupons, due August 1st, on South Pittsburg Purchase Money Bonds, payable Mechanics' National Bank, New York.

ASSESSMENTS.

| COMPANY. | No. | When levied. | D't'nt in office. | Day of Sale. | Am't per share. |
|-------------------------------|-----|--------------|-------------------|--------------|-----------------|
| Alpha Cons. Mill. & Mg., Nev. | 3 | July 15 | Aug. 22 | Sept. 12 | .25 |
| Alpha Cons. Mg., Nev. | 25 | July 15 | Aug. 22 | Sept. 12 | .87 1/2 |
| Anchor, Utah. | 11 | June 18 | July 20 | Aug. 5 | .20 |
| Andes, Nev. | 35 | June 12 | July 18 | Aug. 8 | .25 |
| Baker Divide, Cal. | 17 | July 8 | Aug. 10 | Aug. 28 | .25 |
| Baltimore, Nev. | 5 | July 2 | Aug. 5 | Aug. 24 | .25 |
| Castle Chief, Dak. | 1 | July 3 | Aug. 6 | Aug. 26 | .10 |
| Chollar, Nev. | 27 | July 15 | Aug. 20 | Sept. 10 | .50 |
| Crown Point, Nev. | 51 | July 9 | Aug. 12 | Sept. 2 | .50 |
| Crocker, Ariz. | 7 | June 14 | July 19 | Aug. 13 | .10 |
| East Mount Diablo, Nev. | 5 | July 18 | Aug. 22 | Sept. 12 | .10 |
| Eureka Cons., Nev. | 12 | June 12 | July 15 | Aug. 7 | .50 |
| Golden Fleece, Cal. | 14 | May 21 | July 20 | Sept. 16 | \$17.00 |
| Goodman, Nev. | 6 | June 15 | July 20 | Aug. 24 | .05 |
| Iron Hill, Dak. | 16 | July 2 | Aug. 5 | Aug. 24 | .03 |
| Mexican, Nev. | 38 | July 9 | Aug. 13 | Sept. 3 | .25 |
| North Belle Isle, Nev. | 15 | June 27 | Aug. 1 | Aug. 22 | .30 |
| Original, Nev. | 12 | June 12 | July 25 | Aug. 14 | .25 |
| Platt & Gilson, Cal. | 1 | June 20 | July 22 | Aug. 7 | \$3.00 |
| Quartz Mt., Cal. | 21 | June 17 | July 22 | Aug. 15 | .40 |
| Savage, Nev. | 73 | July 19 | Aug. 21 | Sept. 10 | .50 |
| Utah Cons., Nev. | 7 | July 9 | Aug. 13 | Aug. 30 | .25 |

MINING STOCKS.

For quotations see pages 107 and 108.

New York.

FRIDAY EVENING, Aug. 2.

The mining share market continues to show a little more firmness, but it is still notable for its extreme dullness and the absence of any interesting features.

In the Bodie stocks, Bodie Consolidated brought from \$1.15 to \$1.25, and Standard \$1.15.

Plymouth Consolidated was active, but showed a downward tendency, going from \$7 to \$6, and later advancing again to \$6.25.

The Amador's remain at the usual price, with small transactions. Alice sold at \$1.

One transaction of Rappahannock is recorded at 06c. Mutual was daily dealt in but shows no change in the prices quoted for several weeks past, \$1.45 to \$1.50.

Father de Smet appeared on the list with one sale at 25c. Iron Hill is a little higher, selling at 50@55c. Homestake remains at from \$8.50 to \$9. Sullivan Consolidated, on which we publish an interesting article elsewhere, was conspicuous by its absence.

United Copper continues to bring \$1.10. Horn silver advanced to \$1.30 on Wednesday, but later declined to \$1.20 and was firm at that figure.

Silver King was neglected, but advanced from 70c. to \$1.

Ward Consolidated continued to demand attention, but declined from \$1.75 to \$1.60, closing at from \$1.60 to \$1.65. The sales amounted to 9,800 shares. The other Colorado stocks are neglected. Robinson shows a quotation at 40c., Chrysolite at 27c., Plutus a few sales at from 81c. to 79c. Little Chief was more active and was steady at from 31c. to 35c. Silver Cord valued 60c., and Cashier at 4@5c.

El Cristo was neglected and on the downward grade. It opened on Saturday at \$1.25, and during the week sold at \$1.15 and \$1.10, reaching \$1 1/2 today. Phoenix, of Arizona, was again put in the market this week by its manipulators, and attracted considerable attention for the erratic course of the price. On Wednesday it sold from 30c. down to 12c., and yesterday from 20c. down to 3c. The transactions only amounted to 2,400 shares.

The Sutro Tunnel Trust Certificates were active and went from 52 to 59c.

The Comstocks were quiet, excepting Consolidated California & Virginia, which showed prices ranging from \$6.75 to \$7.25.

There was an improved movement in Barcelona, which sold at 25c. on Saturday and later advanced to 45c., selling to-day at from 40 to 50c.

Commonwealth continues to hold its own at from \$3.95 to \$4.

There seemed to be considerable demand for Shoshone, which was dealt in at 3@4c. Castle Creek is down to 2c.

Boston.

Aug. 1.

[From our Special Correspondent.]

There is a somewhat improved feeling in copper stocks, for the reason that an agreement is probable between the Montana and Lake Superior interests on the price of ingot which will be satisfactory to both parties and prevent any further decline. Rumor has it that 11@11 1/2c. is the price agreed on for Montana casting brands, while Lake will not be allowed to go under 12c. Under the influence of these reports, Calumet and Hecla advanced from \$208 to \$215 1/2, and Boston and Montana from \$36 to \$38 1/2. The former is quite firm, but the latter did not hold its advance and declined to-day to \$35. Tamarack also advanced from \$97 to \$102 1/2, but later sales were at \$100. Osceola advanced from \$8 1/2 to \$9.

Franklin & Atlantic steady at \$9. Butte sold at \$23, a gain of \$1. Kearsarge shows a gain of \$1 to \$6 on small sales.

National advanced to \$1. Allouez to 75c. Santa Fe, 50@55c.

The market is very dull, as usual at this season of the year, but indications all point to greater activity and higher prices later on.

The silver stocks hold well. Dunkin sold at 97 1/2c., but that price is bid for it and none offered under \$1. Napa Quicksilver sold at \$3 1/2@3 3/4, and is in good demand.

3 P. M.—There is no change in the market, except that C. & H. sold at \$217, and is in demand at \$216 bid. Boston & Montana freely offered at \$35.

Denver.

The first week of business at the new Exchange closed on the 27th ult. The sales amounted to 43,200.

San Francisco.

August 2.

The following quotations were received by telegraph from San Francisco to-day: Alta, \$1.30; Best & Belcher, \$3.15; Belle Isle, 20c.; Bodie, \$1.00; Bulwer; 30c.; Con. Cal. & Va., \$6.75; Chollar, \$1.30; Crown Point, \$2.15; Commonwealth, \$4.00; Eureka, \$1.50; Gould & Curry, \$1.90; Hale & Norcross, \$2.80; Mexican, \$2.55; Navajo, 40c.; N. Belle Isle, \$1.25; Nevada Queen, \$1.30; Ophir, \$4.20; Potosi, \$1.40; Savage, \$1.40; Sierra Nevada, \$2.15; Union, \$2.60; Utah, 75c.; Yellow Jacket, \$2.65.

Electric Stocks.

The meeting which was to have been held in Portland, July 29th, referred to in our last issue, to vote upon an increase of capital for the Thomson European Electric Welding Company was not held. There was not a quorum present, and it is stated that enough proxies were not received to increase the capital. It is rumored that suits are to be brought against the Thomson Electric Welding Company, upon the grounds that the patents purchased from the syndicate belonged to the Thomson-Houston Electric Company.

PIPE LINE CERTIFICATES.

NEW YORK STOCK EXCHANGE.

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---------|----------|----------|---------|----------|---------|
| July 27 | 100 1/4 | 100 1/4 | 99 3/4 | 100 1/4 | 107,000 |
| 29 | 100 1/4 | 100 1/4 | 99 3/4 | 100 1/4 | 103,000 |
| 30 | 100 1/4 | 100 1/4 | 98 | 99 1/4 | 472,000 |
| 31 | 99 | 99 1/2 | 98 1/2 | 98 3/4 | 332,000 |
| Aug. 1 | 99 | 100 1/4 | 98 3/4 | 99 3/4 | 270,000 |
| 2 | 99 3/4 | 99 3/4 | 99 1/4 | 99 1/4 | 165,000 |

Total sales in barrels..... 1,449,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---------|----------|----------|---------|----------|---------|
| July 27 | 100 | 100 3/4 | 99 3/4 | 100 1/4 | 180,000 |
| 29 | 100 | 100 3/4 | 99 3/4 | 100 1/4 | 423,000 |
| 30 | 100 | 100 3/4 | 98 3/4 | 99 1/4 | 902,000 |
| 31 | 99 1/4 | 99 1/2 | 98 | 98 3/4 | 613,000 |
| Aug. 1 | 98 3/4 | 100 3/4 | 98 3/4 | 99 3/4 | 748,000 |
| 2 | 99 3/4 | 100 1/4 | 99 1/4 | 99 3/4 | 649,000 |

Total sales in barrels..... 3,515,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Aug. 2.

Statistics.

PRODUCTION OF BITUMINOUS COAL for week ended July 27th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

| | 1888. | | 1889. |
|----------------------|---------|-----------|-----------|
| Tons of 2,240 lbs. | Week. | Year. | Year. |
| Phila. & Erie R.R. | 2,303 | 38,664 | 40,363 |
| Cumberland, Md. | 63,000 | 1,701,550 | 1,982,519 |
| Barclay, Pa. | 3,400 | 66,403 | 104,540 |
| Broad Top, Pa. | 8,056 | 176,359 | 201,034 |
| Clearfield, Pa. | 51,044 | 1,688,681 | 2,147,066 |
| Allegheny, Pa. | 12,112 | 430,451 | 501,161 |
| Beach Creek, Pa. | 37,000 | 802,185 | 815,000 |
| Poconongas Flat Top. | 33,942 | 976,026 | 910,320 |
| Kanawha, W. Va. | 40,334 | 980,951 | 977,204 |
| Total | 281,191 | 6,871,270 | 7,679,206 |

*Week ending July 21st.

WESTERN SHIPMENTS.

| | | | |
|-------------------|--------|-----------|-----------|
| Pittsburg, Pa. | 18,690 | 338,791 | 456,641 |
| Westmoreland, Pa. | 31,943 | 790,325 | 933,933 |
| Monongahela, Pa. | 11,413 | 183,747 | 244,759 |
| Total | 62,046 | 1,312,863 | 1,635,333 |

Grand total..... 343,237 8,184,133 9,374,599

PRODUCTION OF COKE on line of Pennsylvania R. R. for week ending July 27th and year from January 1st, in tons of 2,000 lbs.: Week, 85,555 tons; year, 2,506,415 tons; to corresponding date in 1888, 2,211,235.

PRODUCTION OF ANTHRACITE COAL for week ended July 27th, and year from January 1st.

| Tons of 2,240 lbs. | Week. | 1888. | Year. | 1888. | Year. |
|----------------------|---------|------------|------------|-------|-------|
| P. & Read, R.R. Co. | 183,501 | 3,585,811 | 3,200,042 | | |
| Cent. R.R. of N. J. | 136,090 | 3,160,433 | 2,888,690 | | |
| L. V. R.R. Co. | 136,867 | 4,153,851 | 3,372,939 | | |
| D., L. & W. R.R. Co. | 147,171 | 2,635,652 | 3,554,783 | | |
| D. & H. Canal Co. | 103,779 | 2,135,977 | 2,356,866 | | |
| Penna. R.R. | 52,686 | 1,839,805 | 2,536,889 | | |
| Penna. Canal Co. | 40,728 | 671,804 | 892,267 | | |
| Penna. Canal Co. | 12,000 | 263,862 | 210,174 | | |
| N. Y., L. E. & W. | 24,000 | 643,628 | 510,976 | | |
| Total | 836,822 | 19,030,823 | 19,523,626 | | |

Decrease..... 492,803

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

| | | | |
|-----------|------------|-----------|------------|
| 1884..... | 16,660,738 | 1886..... | 16,962,412 |
| 1885..... | 15,909,916 | 1887..... | 18,865,670 |

Anthracite.

When the last advance was made in the price of anthracite we were enabled to state that it was proposed to make a further advance on August 1st. During the past week the sales agents of the companies met and it was, in fact, proposed to make this advance, but upon comparing notes it was found that very little, if any, coal had been sold at the last price or even at the price previous to July 1st and that it would be simply ridiculous to make an addition to a price which existed only on paper and which had never become operative.

The condition of the anthracite trade is not encouraging. The demand is lighter than was expected at this season, and the prices at which most of the coal is sold are still the old rates, much of it at those that existed in March and April. It is well known that the "pet" agents of some of the companies have been, and are still, selling coal at April prices, and that they have made large contracts for delivery through the year at the same rates. It is, therefore, possible for almost any one to buy coal below the last-named circular figures, and to have marked these up with the expectation of fooling the public was estimating the public intelligence too lightly. The question is, not of marking up prices but of holding them where they are or where they were before the last advance. It is very evident that the policy to which we have alluded of giving favored contractors rates for season delivery which were even below the lowest circular rates of the year, affects the entire market throughout the year, and is very likely to bring about ill-feeling on the part of companies or miners that lose trade by its operation. We believe we see a cloud considerably larger than a man's hand on the horizon of the anthracite trade at the present moment, and if stability in prices is to be maintained it must be on a different basis from that which seems to obtain. It will never do for contractors to be selling companies coal at March or April prices, while the same companies are loudly calling for an advance in the quotations that have not yet been realized, and insist upon the other companies charging full circular rates. Our Boston correspondent refers also to this feature of the market which creates a good deal of ill feeling in that district; \$4 for stove coal f. o. b. is a good deal more than some of the companies are getting on the coal they are delivering to-day.

The demand for coal, even at the cut rates, is not at all what the companies could wish it to be, and the uncertainty as to how much coal is actually being mined and marketed is also affecting the tone of the market.

There is a good deal of incredulity expressed as to the reported production of some of the companies. The details which were formerly given and published in this journal were the only check upon reports which even when given were considered to be exaggerated and when the details were not given are flatly disbelieved. We would recommend the Bureau of Anthracite Statistics to recommence the publication of these details, for it would save trouble far greater than the little annoyance of having its figures published or criticised in the ENGINEERING AND MINING JOURNAL.

Bituminous.

The demand for soft coal is extremely active, and the scarcity of cars has helped to bring about a short supply of coal. The interruption caused by the great floods reduced considerably the output of coal, while at the time it occurred the market was calling for even more than the mines could supply. Vessels also have been in short supply and freights have advanced; nevertheless coal is delivered alongside in New York at about \$3.50, and this in a perfectly legitimate manner for the tradition of the Seaboard Association's ironclad agreement has been almost forgotten; \$2.60 f. o. b. at Baltimore and \$3.50 alongside New York are figures which are readily obtained at present.

Boston. Aug. 1.

[From our Special Correspondent.]

The anthracite coal market is very dull again. Pressing wants seem to have been supplied. It appears that there was actual talk of a serious nature to advance prices again August 1st, but fortunately conservative counsel prevailed and none was made. No coal has been sold at the last advance, and prices are high enough now. Until retail trade improves the anthracite movement in this market will be small.

Bituminous coal is in fair demand at low f. o. b. prices. Shipments are being hurried along, and as a result freights are higher at the soft coal ports. Freights are firm as well as higher, and \$1.10 rules from New York. At Baltimore the rate has been bid

up from \$1.15 to \$1.30 within a few days. The rate was kept down just as long as it could be, and when the advance of 5 cents to \$1.20 was made others kept bidding up the market. Shippers are in a quandary as to the result. Some claim that freights will go still higher, while others look for a reduction because of the growing dullness in anthracite. Some nervousness is felt lest rates go higher.

Retail trade is very quiet. An effort to advance prices has failed because quite a large minority in the combination were opposed to this course, and this week efforts have been abandoned. Trade is too dull to warrant the step.

Buffalo. July 31.

[From our Special Correspondent.]

Dealers say that there is nothing in the anthracite coal trade worth reporting, there being no changes in prices, demand, supply, etc.

Bituminous coal apparently somewhat unsettled. A dealer says there is not any likelihood of an advance in quotations, because the figures given out lately have really been nominal ones, and now there is a probability that said nominal figures will soon become the actual value, and there will be no necessity to quote high to create the impression that the salesman is making concessions to the buyer.

The regular monthly meeting of the anthracite coal shippers was held here last Thursday afternoon instead of in New York, as is usual. Representatives from New York and the West, besides local shipping agents, were in attendance. The business was of a routine character. No changes in prices of coal were made for August. The visitors were shown the harbor improvements now in progress, as well as all the additions made to the docks, trestles, etc.

The talk of an English syndicate buying up the coal leases of individual operators in the mining districts of Pennsylvania, is regarded as a *canard* by all to whom the subject has been broached.

It was stated some weeks since that the New York Central Railroad Company had secured a direct line from New York to Toronto by purchasing the franchise of the Toronto, Hamilton & Buffalo Railroad, but nothing appears to be known here about the matter. One of the directors of the railroad yesterday said: "I have not heard of it, and if such action has been taken it must have been very recent."

The coal traffic through the St. Mary's Falls ship canal this season to July 1st was 419,493 net tons; corresponding period 1888, 670,007 net tons, and in 1887, 417,715 net tons.

Mr. Hedstrom's bituminous fuel barge is at work. The hull is 130 feet long, 30 feet wide and 8 feet deep, and very strongly built. She has at present 100 buckets on her deck (out of a possible 300), each of two tons capacity. The coal is loaded into these buckets from the cars; then a steam hoist elevates them, one at a time, and empties the contents into the hold of the propeller lying alongside. The coal is thus taken to the propeller, instead of the propeller going to the docks for her fuel. A great saving of time is expected to result from the method.

Lake freights firm, with moderate demands, except for Chicago, to which port there were large shipments. The shipments of coal from this port from July 25th to 31st, both days inclusive, aggregated 73,800 net tons, namely, 36,230 to Chicago, 17,650 to Milwaukee, 4,240 to Duluth, 3,900 to Superior, 300 to Saginaw, 2,650 to Racine, 860 to Kenosha, 580 to Ludington, 4,210 to Toledo, 660 to Green Bay, 240 to Port Clinton, 750 to Manitowoc, 1,580 to Ashland. Total for season to date, 881,570 net tons.

The rates of freight were 60c. to Chicago; 50c. to Portage, Manitowoc, Green Bay, Milwaukee and Port Clinton; 40c. to Duluth, Saginaw and Superior; 55c. to Racine; 65c. to Ludington, and 60c. to Kenosha.

Your correspondent, by the time this reaches you, is on his way to the Water Ways Convention at West Superior, Wis. The meeting commences August 6th. No letter next week in consequence.

Pittsburg. Aug. 1.

[From our Special Correspondent.]

Coal.—There is scarcely any change in the situation. Coal is being mined on the Monongahela fourth pool at 2 cents per bushel, and in the other pools at 2½ to 2¾ cents. How long this condition of affairs will continue will depend altogether on the miners. The nominal rates are:

PRICE OF COAL PER 100 BUSHELS = 7,600 LBS.

| | | | |
|------------------|--------|--------------------|-----------|
| First pool..... | \$4.75 | Fourth pool..... | \$3.25 |
| Second pool..... | 4.50 | Railroad coal..... | 5.00@6.00 |
| Third pool..... | 3.90 | | |

Connellsville Coke.—Matters are considerably mixed. The prospect at present is that there will be a strike of the 12,000 coke workmen this week unless the scale prepared by them is signed. Coke men here do not entertain any fear of a strike. The reports from their superintendents form the basis for this opinion. At the offices of J. W. Moore & Co. and McClure & Co. it was stated that their employes at the Mammoth Works are firm in their determination to continue work. Trade betrays evidence of an improved demand. Operations for the week show 11,841 active ovens, 1,526 idle, and 620 being constructed; increase in active ovens, 258; shipments, 6,445 cars (largest this year, with one exception); increase, 195 tons.

Quotations as follows per ton:

| | | | |
|-------------------|-------------|----------------|--------|
| Furnace coke..... | \$1.05@1.10 | Crushed..... | \$1.50 |
| To dealers..... | 1.10@1.15 | Foundries..... | 1.25 |

Freight rates from the ovens to Pittsburg, 70c. per ton; to Shenango Valley, \$1.35; Cleveland, \$2.80; East St. Louis, \$3.50; Chicago, \$2.75.

FREIGHTS.

Coal Rates Reduced by the Wabash.—The Wabash Railroad, on the 31st ult., gave notice of a cut in hard coal rates from \$3.80 to \$3.55 a ton, between Toledo and the Missouri River. The rate will probably be met by the lines from Chicago.

The following rates per ton of 2,240 lbs. for coal charters are reported:

From Baltimore to: Bangor, 1.35@1.40; Bath, Me., 1.35@1.40; Boston, Mass., 1.30; Bridgeport, 1.15; Brooklyn, 1.00; Charleston, 70; Fall River, 1.15; Galveston, 3.25; Gardner, 1.40; Lynn, 1.25; New Bedford, 1.20; Newburyport, 1.40; New Haven, 1.15; New London, 1.15; New York, 1.10; Portland, 1.30; Portsmouth, N. H., 1.35; Providence, 1.15@1.20; Quincy Point, 1.15; Richmond, Va., .65@.70; Salem, Mass., 1.30@1.35; Savannah, 1.00; Somerset, 1.15@1.20; Weymouth, 1.20; Williamsburg, N. Y., 1.10; Wilmington, N. C., 1.00.

From Philadelphia to: Alexandria, 85¢; Annapolis, 70; Baltimore, .60; Bangor, Me., 1.15; Bath, 1.25; Boston, 1.20; Charleston, .75; Charlestown, 1.20; Chelsea, 1.20; East Cambridge, 1.15; Fall River, .80@.90; Gardner, Me., 1.20; Georgetown, D. C., .85; Gloucester, 1.20; Lynn, 1.32½; Milton, 1.25; New Bedford, .80@.90; Newburyport, 1.30; New York, .90; Norfolk, Va., .75; Portland, 1.15; Portsmouth, N. H., 1.15; Providence, .80@.90; Richmond, Va., .90; Salem, 1.15; Savannah, 1.15; Washington, .85.

From New York to: Bath, Me., 1.00; Boston, Mass., 1.00; Bridgeport, Conn., .60; Fall River, .75; New Bedford, .75; New Haven, .55; Newport, .75; Norwich, .65; Portland, 1.00; Portsmouth, N. H., 1.10; Quincy Point, 1.00; Saco, 1.00; Salem, Mass., 1.00; Saugus, 1.05.

* And discharging. † Alongside. ‡ Flat.

METAL MARKET.

NEW YORK, Friday Evening, August 2, 1889.
Prices of silver per ounce Troy.

| July | Sterling Exch'ge. | London Pence. | N. Y. Cts. | July | Sterling Exch'ge. | London Pence. | N. Y. Cts. |
|------|-------------------|---------------|------------|------|-------------------|---------------|------------|
| 27 | 4.86½ | 42 3-16 | 91½ | 31 | 4.87 | 42 5-16 | 92¼ |
| 29 | 4.86½ | 42 5-16 | 91 | 1 | 4.87½ | 42¾ | 92¾ |
| 30 | 4.88½ | 42 5-16 | 92½ | 2 | 4.87 | 42¾ | 92¼ |

* 42 3-16 to 42¼. † 91½ to 92. ‡ 42¾ nominal.

Council Bills advanced ½ d. this week.

The silver market has been strong, with a higher tendency, but London orders being filled here on the rise, the demand for shipment closes at lower prices, with a tendency to dullness.

United States Assay Office at New York reports total receipts of silver for the week 78,000 ounces.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on the 1st inst., made no change in its minimum rate for discount, which remains at 2½ per cent. During the week the bank lost £1,079,327 bullion, and the proportion of its reserve to its liabilities was reduced from 37.78 to 36.54 per cent, against an advance from 39.71 to 39.78 per cent in the same week last year, when its rate of discount was 2½ per cent. On the 1st inst. the bank lost £23,000 on balance. The weekly statement of the Bank of France shows a gain of 31,399,000 francs gold and a gain of 700,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

| | Bid. | Asked. |
|---------------------------------------|-------|--------|
| Trade dollars..... | .72 | — |
| Mexican dollars..... | .73¼ | .74 |
| Peruvian soles and Chilean pesos..... | .73 | .73¾ |
| English silver..... | 4.86 | 4.90 |
| Five francs..... | .94 | .95 |
| Victoria sovereigns..... | 4.86 | 4.89 |
| Twenty francs..... | 3.92 | 3.95 |
| Twenty marks..... | 4.75 | 4.80 |
| Spanish doubloons..... | 15.55 | 15.75 |
| Spanish 25 pesetas..... | 4.80 | 4.85 |
| Mexican 20 pesos..... | 19.50 | 19.65 |
| Ten guilders..... | 3.96 | 4.00 |

Copper.—Inactivity and dullness still continue the most conspicuous features in the copper market. Speculation for the time being is dead, and the only buyers are actual consumers of the metal. That the consumptive demand is unsatisfactory is freely admitted on most sides, and manufacturers cannot be induced to buy a pound more than they need for immediate requirements. Some of the large Lake companies state that their sales have been very satisfactory recently and that current consumption is very large. The purely artificial level of 12c. per pound, which is still retained for lake copper, is becoming more and more evident every week, and there cannot be the slightest doubt that if left to natural influences values would have come down considerably before now. The trade generally are now awaiting the result of the meetings which have taken place lately between the principal producers (the object of which has been previously alluded to by us), and it is understood that the final meeting takes place to-day in Boston. It seems pretty certain that some concerted action will then be decided on, but whether or not in favor of the general body of consumers remains to be seen. It is only natural to conclude that everything practicable will be done to keep prices up as much as possible, but as the production is still in excess of consumption, and this means additions to the already enormous stocks in this country, there seems to be only one

course to adopt, which is to greatly reduce the output. This can of course be done by an agreement amongst the producers to reduce their production pro rata, but the more natural and more satisfactory course in the end is doubtless to allow values to decline to the point where production becomes unprofitable to the companies least favorably circumstanced. The comparatively lower prices obtained for casting copper have already, it is reported, led to a portion of the Copper Queen mine being laid off and to the dismissal of 500 miners. It is also said that the Copper Falls and other smaller mines are likely to follow suit. With these probable reductions the production will still remain considerably in excess of the consumptive demand. We quote to-day Lake at 12c, casting copper at 10½c.

The London market, unlike our domestic market, is reported in a comparatively satisfactory condition, and business continues pretty active. The European stocks also show a decrease in the visible supplies for the second half of July of 2,700 tons. The market for Chili bars and G. M. B's has been rather lively during the past week, owing partly to a renewal of speculation and partly also to a healthy demand for actual consumption. After moderate fluctuations prices close to-day at about the highest point, viz.: Spot, £42 to £42 2s. 6d., and three months' futures, £41 5s. to £41 7s. 6d., being a rise of about 10s. for the week. In other kinds business is reported as satisfactory and the demand from India is very good both for refined and manufactured copper. The latest quotations are: Tough copper £46 to £47, best selected £47 to £48, spring sheets £53 to £54, India sheets £50 10s. to £51 10s. Yellow metal 5d. per pound.

The exports of copper from New York during the past week were as follows:

| | | | |
|-----------------------------|---------------|---------|----------|
| To Liverpool— | Copper Matte. | Lbs. | |
| By S. S. City of Rome..... | 2,860 sacks. | 322,400 | \$14,300 |
| By S. S. Egypt..... | 4,977 sacks. | 568,960 | 25,400 |
| To Bordeaux— | Copper. | | |
| By S. S. Panama..... | 90 casks. | 112,500 | 13,500 |
| To Havre— | | | |
| By S. S. La Normandie.... | 5 casks. | 6,250 | 685 |
| To Rotterdam— | | | |
| By S. S. Ravensburg..... | 40 casks. | 50,800 | 6,000 |
| To St. Johns, Newfoundland— | | | |
| By S. S. Portia..... | 3 casks. | 3,750 | 450 |

Tin.—During the past week our prices have again moved in sympathy with the London quotations. The market here has, on the whole, evinced a rather firm tendency, and during the week as high as £89 12s. 6d. to £89 15s. spot, and £89 15s. to £89 17s. 6d. futures was touched. The latest prices to-day* are spot, £89 5s. to £89 7s. 6d.; 3 months, £89 10s. to £89 15s. Our market here felt the influence of the higher values in London and business was done up to 19 90 for spot and August. At the rise, however, demand fell off somewhat and we close slightly easier again at 19 80 spot, 19 80 August, 19 90 September.

Lead.—A better demand on the part of both speculators and consumers had the natural result of bringing about a rather sharp advance in values, and after closing at 3 80 to 3 85 last week, prices have since touched 4c. for September delivery. The renewed buying was chiefly brought about by reports that the treasury were about to give an immediate decision in the foreign silver-lead ore question, but nothing authoritative has yet transpired on the subject. The demand having apparently been satisfied, we close rather easier again at 3 95 spot, 3 95 August, 4 September. Foreign, 4 80@4 85. The latest London prices are: English lead, £12 12s. 6d.; Spanish, £12 10s.

The St. Louis Market.—No particular features have arisen during the past week; prices seem to have touched bottom, and are firmer at the current quotations. Sales for the week at from 3 72½@3 75c.; at close no lead obtainable below 3 75c.

The Chicago Market.—This market has been quiet all the week, but, notwithstanding the absence of any large transactions, prices have been hard since the opening on Monday, not over 350 tons changed hands, mostly at 3 80c. Market closed at 3 85c. asked.

Spelter.—There is no change to report since our last in the condition of the home spelter market and we quote to-day for prime western 5½ to 5 20.

Reports from Europe are to the effect that demand is still improving, and especially so for galvanizing. The latest London quotations are ordinances, £19 12s. 6d. to £19 17s. 6d., and specials, £19 17s. to £20.

Antimony is much firmer and the supplies of this metal are also exhausted, while demand continues active. We quote Hallett's 15½@15½; Cookson's 17c.

Nickel.—Unchanged at 65@70c. a pound.

Quicksilver.—The wholesale price continues to be \$50 per flask, with the jobbing price 68 cents to 70 cents a pound.

IRON MARKET REVIEW.

FRIDAY EVENING, Aug. 2.

Our reports from the chief iron markets of the country show a satisfactory business, the recent improvement being, in general, well maintained and the area of better business extending. As our reports have indicated for several months past, a general improvement has come, though it has commenced a little earlier than expected, owing to the sud-

*According to cable advices, the statistics of visible supplies show a decrease of 600 tons for the second half of July.

den demand for iron in various forms to replace the damages of the great floods. The favorable harvest outlook has also induced several of the roads to give orders for additional rolling stock. Consumers, realizing that an improvement has set in, have been urging deliveries on their contracts, and have been buying in anticipation of their wants, all of which tends to strengthen the market. There is, consequently, a firmness in prices and in tone which had not been observable for months past.

Iron Ore.—Cleveland reports an extremely active business sales during the past week, having exceeded 150,000 tons, and the shipments from the Lake Superior mines this year are nearly double what they were last year to corresponding date. Apparently the ore production from this source will amount this year to nearly 6,500,000 tons. Prices of ores in Cleveland are about as follows:

| | |
|---|-----------------|
| Specular and Magnetic Bessemer Ores..... | \$5.75 @ \$6.25 |
| Specular and Magnetic Ores, Non-Bessemer..... | 4.50 @ 5.00 |
| Red Hematite Bessemer Ores..... | 4.75 @ 5.00 |
| Red Hematite Ores, Non-Bessemer..... | 3.60 @ 4.00 |
| Menominee Range Ores, Bessemer..... | 4.50 @ 5.00 |
| Menominee Range Ores, Non-Bessemer..... | 3.60 @ 4.00 |
| Gogebic Range Ores, Bessemer..... | 4.50 @ 5.15 |

American Pig.—The amount of new business in this market is not large, but consumers are calling for deliveries on old orders, and some of the furnace companies claim to be unable to keep up with the demand. On the other hand, some more furnaces are getting ready to blow in, and the statistics, published last week in these pages, show that stocks increased somewhat during the past half year, though still quite light. There is no occasion for any anxiety as to supply, or as to any considerable increase in prices. We continue our quotations, which are still unchanged, nominally, though they may, before long, have to be advanced 25 cents. Our quotations remain at \$17.00 @ \$18.00 for No 1 Foundry; \$16.00@17.00 for No. 2, and \$15.00@15.50 for Gray Forge. Southern brands are held at \$16.50@17.50 for No. 1, \$15.50@16.50 for No. 2, and \$14.75@15.00 for Gray Forge.

Scotch Pig.—The gradually declining business in Scotch iron which has been kept up through the prejudices, for the most part quite unfounded, of certain consumers is likely to disappear altogether, for prices continue to advance in Scotland, and here they are so much above the prices of American irons that can take their place. (Ohio soft "Scotch" is sold here at about \$19); that there is no room for an advance, and importation has ceased to pay.

The following are latest cable quotations: Scotch Warrants, 45s. 6d.; Coltness, 57s. 6d.; Langloan, 56s. 6d.; Summerlee, 56s. 6d.; Gartsherrie, 55s. 6d., all at Glasgow; and Glengarnock, 53s. 9d.; Dalmelington, 47s. 6d.; Eglinton, 46s., all at Ardrossan.

The following are present prices in New York. These prices leave no profit on importation. Dalmelington, \$19.75; Eglinton, \$19.25; Langloan, \$21.25; Summerlee, \$21.75; Shotts, \$21.25; Coltness, \$21.75.

Spiegeleisen.—The improvement in demand for steel has improved business in spiegeleisen, and some important sales have been reported. Prices are slightly advanced. We quote 20 per cent at \$28 50@ \$29, and 80 per cent ferro at \$60, with sales of spiegel at about our lower quotation.

Billets, Slabs and Rods.—Foreign wire rods are quoted at \$43 and American steel nail slabs at \$30 @ \$30.50, which is an advance over recent quotations. The market improves in this as in other directions. The mills are well supplied with orders for the current month, and are not seeking business except at higher figures for early delivery.

Steel Rails.—\$28 at Eastern mills is the bottom price for early delivery, but distant deliveries might shade this.

Structural Iron and Steel.—The demand continues very active, and the prospect for a good business on into the autumn is excellent. Most of the mills are full of work for bridges and house work.

There have been some very large orders for material for locomotives, and much more work in the same line will soon be given out. Recent orders for locomotives, it is estimated, will call for 6,000 or 7,000 tons of material. The prices for structural material remains as follows, at mill: Bridge plate, 2 1c.; angles, 2@2 1c.; tees, 2 5@2 6c.; steel angles, 2 5c.; beams and channels, on wharf, 2 8c.

Steel Plates.—The large locomotive orders above referred to are helping the plate market, though prices are not notably changed. Tank and Ship, 2 25; Shell, 2 4@2 5; Flange, 2 8; Fire-Box, 3 50@4.

Iron Plates are quoted as follows on wharf: Common tank, 2 25c.; refined, 2 3@2 4c.; shell, 2 4@2 5c.; flange, 3 5@3 7c.; extra flange, 3 ¼@4c.

Bar Iron.—At mill common is quoted at 1 6@1 7c., and refined at 1 75@1 9c. Deliveries from store are quoted as follows: Common, 1 9c. base; Refined, 2c. base; "Ulster," 3c. base; "Norway," 5c. shapes, and Norway nail rods, 5c.

Merchant Steel.—The volume of business done is satisfactory. Prices nominally are unchanged, though lots of tool steel are still sold as low as 7c., and in a retail way at 7½c. to 8½c. Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3½c.; Bessemer machinery, 2¼@2½c.; Bessemer spring, 2¼@2½c. Open hearth standard grades and spring steel range from 2½ to 3c. Tire steel at 2½c.

Cast Iron pipe remains at \$25.50@30, according to size.

Rail Fastenings.—The following are ruling prices, unchanged from those last quoted: Spikes, P 95c.; angle fish-bars, 1 75@1 85c.; bolts and sq. nuts, .70@2 75c.; bolts and hex. nuts, 2 80@3c.

Old Material.—Old rails are in light supply. We quote \$22.75@23 per ton for Tees, No. 1; wrought scrap is held at \$21, cast scrap \$15.50, and old car wheels \$18.

Louisville, July 30.

(Special report of Hall Brothers & Co.)

There have been no transactions of especial moment during the week under review. Some agricultural concerns have laid in a supply of the different grades, which is about the only feature of importance in the local field. Inquiry, however, from the outside is fairly good, and the volume of business would be larger if furnace companies would sell more liberally. This has been especially the case with Southern coke irons, which are offered in light supplies at present. The cheaper grades or charcoal iron have shared a fair portion of the week's business. Shipments on orders previously booked are heavy and collections have been large. There is no quotable change in prices, which are cash f. o. b. cars at Louisville:

| | |
|--|----------------|
| Hot Blast Foundry Irons. | |
| Southern Coke No. 1..... | \$14.75@15.25. |
| " " No. 2..... | 14.00@14.50. |
| " " No. 3..... | 13.75@14.25. |
| Mahoning Valley, Lake ore mixture..... | 17.50@18.00. |
| Southern Charcoal No. 1..... | 16.50@17.00. |
| " " No. 2..... | 16.00@16.50. |
| Missouri " No. 1..... | 17.50@18.00. |
| " " No. 2..... | 17.00@17.50. |
| Forge Irons. | |
| Neutral Coke..... | 13.25@13.75. |
| Cold Short..... | 13.00@13.25. |
| Mottled..... | 12.00@12.25. |
| Car Wheel and Malleable Irons. | |
| Southern (standard brands)..... | 21.50@22.00. |
| " (other brands)..... | 17.50@18.00. |
| Lake Superior..... | 22.00@22.50. |

Pittsburg, Aug. 3.

[From our Special Correspondent.]

Raw Iron.—I have to report a firm and very satisfactory market, with plenty of buyers; sellers not so plenty. It is self-evident that buyers have deferred making their contracts too long, with the result that iron is a decidedly more valuable product than it was a few weeks ago, while prices are yet at a lower figure than is certain to prevail in the near future. Buyers were warned in previous reports that iron was selling at about cost, and that those who wanted it would make no mistake in contracting at prices prevailing at that time. Those who took stock in those statements can smile, while those who predicted that prices would go still lower have come to the conclusion that their view was rather expensive. The situation, so far as furnacemen are concerned, is a healthy one. They have all the orders booked at fair prices, many of them being compelled to refuse all large contracts for spot or early deliveries. The stock of iron at the valley furnaces has been reduced to a limited amount. A buyer from the West wanted to contract for 10,000 tons of Bessemer iron, another for 4,000 tons in the Mahoning Valley. Although the price offered was satisfactory, owing to previous contracts the furnaces were not able to fill the orders in the time required. This fairly shows the condition of affairs there as well as elsewhere. The feeling is decidedly firmer. A great deal of iron has changed hands, and bids for larger quantities at same figures are refused. There is evidently a desire to load up heavily, which cannot be done at prevailing figures. Good brands are much fancied, but scarce, and held for more money. Bessemer is very firm, and higher. Mill iron commands outside prices. Muck bar steady; advance maintained. Skelp iron tending towards higher prices. Billets and slabs are considered a good investment at present prices. Old rails firm. In fact, it requires considerably more money to buy iron than it did a short time ago. The sales speak for themselves:

| | |
|--------------------------------|---------------|
| Prices. | |
| Coke or Bituminous Pig— | |
| Foundry No. 1..... | \$16.25@16.50 |
| Foundry No. 2..... | 15.25@15.50 |
| Gray F. No. 3..... | 14.25@14.50 |
| " No. 4..... | 14.00 |
| White..... | 13.50@13.75 |
| Mottled..... | 13.50@13.75 |
| Silvery..... | 16.00@18.50 |
| Bessemer..... | 16.50@16.75 |
| Low Phos..... | 20.50@21.00 |
| Charcoal Pig— | |
| Foundry No. 1..... | 23.50@24.50 |
| Foundry No. 2..... | 22.00@22.25 |
| Cold-Blast..... | 25.00@28.00 |
| Warm-Blast..... | 24.00@25.00 |
| 10 + 12% Speigel..... | 28.75@29.00 |
| 20% Speigel..... | 31.00 |
| 50 Tons 80 per cent..... | 60.00 cash. |
| Steel-Bar..... | 27.25@28.00 |
| Steel Blooms..... | 28.00 |
| Steel Slabs..... | 27.00@27.50 |
| Steel Crp Ends..... | 18.00@18.25 |
| Steel Bl. Ends..... | 18.25@19.00 |
| Ferro-Man., 80%..... | 60.50@61.00 |
| Steel Billets..... | 23.00@23.50 |
| Old Iron Rails..... | 23.25@24.00 |
| Old Steel Rails..... | 18.00@19.00 |
| No. 1 W. Scrap..... | 19.00@20.00 |
| No. 2 W. Scrap..... | 17.50@18.00 |
| Steel Rails..... | 28.00@28.50 |
| " light sec..... | 28.00@31.50 |
| Bar Iron, nom..... | 1.65@1.70 |
| Iron Nails..... | 1.85@1.90 |
| Steel Nails..... | 1.85@1.90 |
| Wire Nails..... | 2.15@2.20 |

| | |
|--|-------------|
| Sales. | |
| Coal and Coke Smelted Lake Ore. | |
| 3,500 Tons Bessemer..... | 6.50 cash. |
| 2,500 Tons Bessemer..... | 16.75 cash. |
| 2,000 Tons Bessemer at Furnace..... | 16.00 cash. |
| 1,500 Tons Gray Forge..... | 14.40 cash. |
| 1,500 Tons Bessemer..... | 16.65 cash. |
| 1,500 Tons Gray Forge..... | 14.40 cash. |
| 1,500 Tons Gray Forge..... | 14.46 cash. |
| 1,000 Tons Gray Forge..... | 14.50 cash. |
| 1,000 Tons Gray Forge..... | 14.50 cash. |
| 1,200 Tons Gray Forge..... | 14.25 cash. |
| 200 Tons No. 1 Foundry..... | 16.25 cash. |
| 200 Tons No. 2 Foundry..... | 15.25 cash. |
| 100 Tons No. 1 Foundry, all Ore..... | 16.40 cash. |
| 100 Tons No. 2 Foundry, all Ore..... | 15.90 cash. |
| 100 Tons White Iron..... | 13.75 cash. |

| Coke, Native Ore. | |
|---------------------------------------|-------------|
| 600 Tons Gray Forge | 14.25 cash. |
| 500 Tons Gray Forge | 14.00 cash. |
| 500 Tons No. 2 Foundry at furnace | 14.50 cash. |
| 500 Tons Gray Forge, all ore | 16.00 cash. |
| 500 Tons Gray Forge | 14.25 cash. |
| 100 Tons Silvery | 15.50 cash. |
| Charcoal. | |
| 100 Tons No. 2 Foundry | 21.50 cash. |
| 75 Tons No. 1 Foundry | 22.50 cash. |
| Muck Bar. | |
| 1,500 Tons Neutral | 28.00 cash. |
| 1,000 Tons Neutral | 27.50 cash. |
| 1,000 Tons Neutral | 27.30 cash. |
| 500 Tons Neutral | 27.50 cash. |
| Steel Slabs and Billets. | |
| 2,000 Tons Billets | 28.50 cash. |
| 1,000 Tons Nail Slabs | 27.00 cash. |
| 650 Tons Billets | 28.20 cash. |
| Steel Wire Rods. | |
| 500 Tons American Fires | 40.50 cash. |
| 375 Tons American Fires | 41.00 cash. |
| Ferro-Manganese. | |
| 100 Tons 80 per cent. | 61.00 cash. |
| Skelp Iron. | |
| 750 Tons Sheared, per 100 lbs. | 2.05 4 mo. |
| 500 Tons Narrow Grooved, per 100 lbs. | 1.67½ 4 mo. |
| 500 Tons Wide Grooved, per 100 lbs. | 1.77½ 4 mo. |
| Spiegel. | |
| 1,000 Tons, 20 per cent. | 30.50 cash. |
| 70 Tons, 20 per cent. | 31.00 cash. |
| 50 Tons, 10 to 12 per cent. | 28.50 cash. |

Philadelphia. Aug. 1.

(From our Special Correspondent.)

Pig Iron.—The volume of business this week has not been quite so heavy as last. As high prices have been paid for all the iron sold, the published iron statistics had a rather quieting effect upon the market. Consumers, large and small, are not quite so anxious as they were before that report was published. While demand is not quite so feverish prices are not likely to yield. Really good irons are scarce. Only inferior irons are sold at bottom prices. Sales have been made within a day or so all the way between \$17 and \$18 for No. 1, but the greater part of the iron has been near the higher figure. No. 2 is \$16 to \$17, with the same tendency. Very little forge iron has been sold as low as \$15, but there are several furnaces willing to take contracts at that price, delivered. The market has been strengthened a little by the refusal of some makers to book orders for delivery 60 to 90 days hence at anything less than \$15.50. Southern forge iron is offered at \$14.75; No. 2 is offered at \$16; No. 1 can be had at \$17. No important sales.

Blooms.—Notwithstanding there has been a great deal of business during the past month at the bloomeries, certain concerns have offered to accept business for late delivery at prices that cannot pass muster as standard. Anthracite blooms have been sold at \$41, but \$42 is the general asking price. Scrap blooms have been sold under \$32; nail slabs are held at \$29, tank slabs at \$30 to \$31. There is a good deal of inquiry on the market, but buyers are not inclined to extend their orders at outside figures.

Muck Bars.—Some makers are insisting on \$29.50, and in one instance that price was agreed upon to be paid for a specified quality, but business has been done at \$28.50, and prices have been running between these limits. There has been increased activity.

Bar Iron.—The Pennsylvania Company has given out an order for 5,000 cars, and two other companies, it is said, are now arranging for an addition to their rolling stock. Bar iron makers expect to realize some benefit from these quarters. Prices for iron range all the way from 1'65 to 1'95; the average quotation for refined is 1'80. Business is likely to improve a great deal, especially if the railroads should become active buyers.

Skelp Iron.—The urgency of inquiries early in the week resulted in the placing of business to-day at 1'80 for Grooved, and 2c. for Sheared in large lots, and 1'85@1'90, it is claimed, in small lots, for Grooved, and 2'05@2'15 for Sheared.

Nails.—The nail production is entirely too heavy to admit of a permanent hardening tendency in prices. Prices for car-load lots have dropped to \$1.70; some makers are holding at \$1.80 and \$1.90; store quotations, \$2@2.10.

Wrought Iron Pipe.—Pennsylvania pipe makers are crowded and overcrowded with work, and buyers are chasing past each other to secure the best deliveries for the fall. There is no question about prices.

Sheet Iron.—Some very large contracts have been placed within a day or so, and an advance, it was said, would be made this week; but the only result thus far is higher prices for prompt accommodations. The market is in good shape for a general advance, and in anticipation of it buyers are hastening to make themselves safe.

Plate and Tank Iron.—The extraordinary rolling capacity of the plate mills interferes with any genuine advance above the quotations named two or three weeks ago. The mills have all the work they can turn out, but good sized orders, it is said, are still shaded. Quotations on ordinary plate run from 2'10 to 2'20, and universal plates, 2'15 to 2'30; flange, 2'40 to 2'50; fire-box, 3'75 to 4c.

Structural Material.—Bridge plates are very strong, and specifications are engaging the attention of brokers and manufacturers every day. The building requirements are also increasing, and the present condition in all respects is very exceptional. So far as can be learned, a great deal of bridge building is yet

to be provided for, but in a majority of instances the material will not be needed until the approach of cold weather. The immediate requirements are urgent enough, and the manufacturers will have no spare time on their hands. Bridge plates are 2'10c.; angles, 2'10 to 2'15c.; tees, 2'60 to 2'70c.; beams and channels, 2'80c.

Steel Rails.—Under the advancing tendency for Bessemer pig and spiegel, it is fair to presume that steel rails will reach the \$28.50 or \$29 limit that rail-makers have been asserting would be reached. This week inquiries have been received from three or four large railroad builders, and Pennsylvania mills will probably be favored with contracts for 20,000 to 25,000 tons. Buyers do not relish the recent advance and are doubting its permanency.

Old Rails.—A good many old rails have been shipped lately to interior points; the average price is \$22.50.

Scrap Iron.—Scrap iron quotations have fallen into a rut; there is a great deal of business being done. Some dealers have contracts for all the stuff they can deliver at a given price. Cargo quotations are \$20.50 to \$21.50; choice, \$22; old car wheels, \$17 to \$18; old steel rails, \$16.50 to \$17; old fish plates, \$23.50.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 2

Heavy Chemicals.—Although trade is not specially active at this season of the year, still the market continues very steady at firm prices. There is a healthy demand for goods, and, while no sales of large quantities are reported, still a fair business has been done in small lots. According to advices from Liverpool it appears that: "With the exception of bleach there is not much moving in heavy chemicals at the present moment, but the market generally is steady." Referring to the market in detail we note the upward tendency of carbonated soda ash and from dock or to arrive \$1.22½ is asked, while a good jobbing business has been done at \$1.27½ @ \$1.32½ as to brand and quantity. Caustic Soda ash is nominal at \$1.25 and the demand is slight. Caustic soda was weaker at the beginning of the week and \$2.20 for 70 and 74 per cent was the prevailing quotation but stocks are now very firmly held at \$2.22½ @ \$2.27½ for 70 and 74 per cent. Caustic 60 per cent is quiet and prices remain as previously quoted. Bleaching powder is easier, but is steady at \$1.72½ @ \$1.80 for large lots and according to brand while \$1.85 @ \$1.95 is asked for small parcels. The supply on spot is very light and there is but little to arrive. Sal soda is quiet but the price remains firm. We continue our quotations of 95c. @ \$1 for the English and to arrive at 92½ @ 95½c. while 75 @ 85c. is asked for the American.

Acids.—The advance in acids reported in our last has been maintained, and as no cutting is being done, everything looks bright for a good business at firm prices. Trade is reported as excellent, and a slight advance in nitric acid is noted. Our quotations are: Sulphuric acid, 66°, \$1 @ \$1.75 per cwt.; nitric, \$4.75 @ \$7.50; muriatic, \$1.25 @ \$2, and acetic, \$1.75 @ \$2.25. Oxalic continues firm, but the demand is restricted to jobbing orders. Acetic is in fair demand and tartaric is quiet.

Fertilizers.—This market has been quiet during the week, and the demand restricted to jobbing orders. There is some inquiry for the autumn trade, and as prices are firm the outlook is favorable.

Prices are as follows: Azotine, \$2.30; dried blood (city), low grade, \$2.30 per unit; Western high grade, \$2.35 @ \$2.37½ per unit for ground material; tankage, high grade, \$2.4 @ \$2.5 per ton; low grade, \$2.2 @ \$2.3 per ton, as to quality. Fish scrap, \$2.3 per ton, f.o.b. factory. Sulphate of ammonia at \$3.05 @ \$3.10 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, \$19.50 @ \$21 per ton. Dissolved bone-black is 90 @ 95c. per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid.

Steamed bones, unground, \$20; ground, \$24. Charleston rock, undried, \$5.50 per ton; kin dried, \$6.50 @ \$6.65 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, \$11, ex-steamer at New York.

Muriate of potash is quiet, and the quotation is \$1.80 per cwt. of 100 pounds, and not of 112 pounds, as the types made us say in our last. The sale of 100 tons at the quotation is reported.

Double manure salts, basis 48 per cent potash, is quiet at \$1.15 @ \$1.20 per cwt. High grade manure salt, basis 90 per cent potash, may be had on the spot at \$2.30 @ \$2.32½. The syndicate's price for to arrive is \$2.50 for 50 ton lots.

Kainit.—In sympathy with the remainder of this market kainit is quiet. Prices are firm, and we continue to quote \$9.75 for invoice weights, and \$10 actual weight, for cargo lots.

Miscellaneous.—Nitrate of soda is a little weaker owing to the efforts made by holders to realize on their stocks. The demand is nominal and the quotation reports is 1'8½ @ 2c., while for to arrive the same price is quoted.

Brimstone.—There is no movement in this market and our quotations are \$19.75 on spot for best un-mixed seconds, and \$19 for thirds, while for future delivery \$19.25 is asked for best unmixed seconds, and \$18.75 for thirds.

Blue Vitriol.—The usual jobbing demand prevails, but the pure is not quotably changed, although we bear of sales being made at the figures usually given.

Copperas.—We note a fair demand at the regular quotations.

Mr. F. B. Nichols has issued the following report, dated New York, August 1st. The nitrate of soda markets dull all over. Europe demands concessions, but her lowest value is above the ruinous level here. There have been no recent charters, and the higher rate demanded for freight makes the cost above present views of buyers. The arrivals were Molke, at Philadelphia, Shun Lee, Dryad and Prince George at this port.

| | 1889. | 1888. | 1887. |
|---|-----------|------------|-----------|
| Stock in store and afloat in Atlantic ports, July 15th, | | | |
| bags | 76,797 | 106,884 | 58,381 |
| At Atlantic ports to August 1st | 36,176 | | 13,365 |
| Arrivals at New York | 27,300 | | |
| Boston | nil | | |
| Philadelphia | 8,876 | | |
| Baltimore | nil | | |
| Charleston | nil | | |
| New Bedford | nil | | |
| New Orleans | nil | | |
| Previously reported | 36,176 | | 71,746 |
| | 268,641 | | |
| Total arrivals to date | 304,817 | | |
| Same time, 1888, 343,506. | | | |
| Same time, 1887, 286,897. | | | |
| | | To arrive. | |
| Stocks—New York | 74,682 | 114,000 | |
| Boston | nil | 24,000 | |
| Philadelphia | 10,000 | 22,000 | |
| Baltimore | | | |
| Hampton Roads | | 26,000 | |
| For orders | | | |
| New Bedford | | nil | |
| Charleston | | 22,000 | |
| | 84,682 | 208,000 | |
| Visible supply | | | 202,682 |
| Same time, 1888, 307,533. | | | |
| Same time, 1887, 275,810. | | | |
| Stocks with dealers in store and afloat here: | | | |
| Deliveries fortnight ending | | | |
| August 1st | 28,291 | 14,351 | 12,936 |
| Previously reported | 277,844 | 279,692 | 264,288 |
| Total deliveries to August 1st | 306,135 | 294,043 | 277,224 |
| Sales spot | 1-85@1-90 | 2@2-05 | 1-80@1-90 |

NOTES OF THE WEEK.

The brimstone market has been quite seriously disturbed by the statement that a Japanese product had been placed on the market in New York and Philadelphia at \$7 a ton. The ruin of the home market was feared, but it was ascertained that the product referred to came from extinct volcanoes and contains only about 30 per cent of sulphur. About 1,500 tons of this material have been landed in this country during the last six months and have been taken by chemical manufacturers.

According to reports from Boston, the market in heavy chemicals is firm, with but little stock in spot offering. Copperas is higher, probably owing to the demand for disinfecting purposes. A steady demand for crude saltpetre is also noted.

Reports from Philadelphia show that the demand for heavy chemicals has been confined to jobbing orders, and that prices are firmly held for all articles except bleaching powder, which has advanced, owing to scarcity of spot goods.

A secret meeting of large salt producers was held in Rochester, N. Y., on the 31st ult. It was given out that the meeting was the quarterly session of the Western New York Salt Producers' Association, and that only routine business was transacted. One of those present stated, however, the quantity of manufactured salt at present in the market was not large, and that an advance may be made soon throughout the country. It was denied that the question of reorganizing a trust was considered.

London.

(Messrs. COUPER MILLER & Co.'s report.)

LONDON, July 16.

Fertilizer Market of the United Kingdom.—The Continental and American demand for phosphates continues on quite an exceptional scale, while our home inquiry is somewhat restricted, manufacturers still holding off. Supplies are, however, very limited, more particularly of high test, and prices tending upwards, so that the home trade may find a difficulty in obtaining suitable material later on.

Mineral Phosphates.—Canadian coming forward pretty freely, but the bulk of the high test is being shipped to the Continent; 80 per cent commands from 1s. ½d. to 1s. ¾d., with 75 per cent. at 11d. and 70 per cent at 10d., all with one-fifth of 1d. rise. South Carolina advanced to 10½d., and sales thereof of large cargoes by steamer. Freight continues firm, and every thing points to higher prices being established. Some well sold over next year, and very little available either for prompt or forward, except at very high prices. Belgian 40 to 45 per cent and 45 to 50 per cent. we can offer, but the higher tests all contracted forward with Continental buyers.

Bone Ash, Bones and Meal.—No cargoes of bones or bone ash offering, though we have inquiries from

U. K. and Continental buyers. No sales of bone meal reported either for spot or forward delivery.

Nitrate of Soda rather firmer. Spot price, 8s. 6d. for ordinary, and 9s. per cwt. for refined.

Sulphate of Ammonia continues steady at about £12 per ton.

Ammoniacal Materials in demand. Fish Guano selling freely on Continent, and U. K. buyers nibbling at considerably higher prices than in late years at this season.

Muriate of Potash is quoted at £7 2s. 6d. on 80 per cent; Kalnit at 26s. 6d. in bags, 23s. in bulk, and Kieserit at 17s 6d., all f.o.b. Hamburg, subject to open river navigation.

Liverpool. July 24. [Special report by Messrs. J. P. BRUNNER & Co.]

Chemicals.—There is only a moderate business passing at the moment, but as there is little offering for prompt delivery, prices generally are steady.

Bleaching Powder in demand, and very few sales were made for America at \$7, both for July and August.

Chlorate of Potash quiet at 4 1/2 d. to 5 d., holders showing no disposition to press sales.

Bicarb. Soda steady at £4 12s 6d. to £4 15s. per ton for one-hundredweight kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of Ammonia a shade better at £11 17s. 6d. to £12 per ton for good gray 24 per cent f.o.b. Liverpool.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Aug. 2.

The heavy and continued rain of the past week has interfered much with building operations and with the forwarding and marketing of supplies.

Bricks.—The market for these has been firmer in tone without much quotable change in prices, but the deliveries have been retarded by the weather and the supply is short, in addition to which the severity of the rain storms up the Hudson and in other quarters absolutely stopped work in the yards, and in some cases put out the fires, so that we anticipate an advance in prices.

Lime.—There have been no arrivals during the week, owing to the inclemency of the weather, and consequently there has been but little business done.

Cement.—The same remarks apply to the market for cement, and the position may be said to be unaltered from last week, with no transactions of importance to record.

CONTENTS.

Table listing various sections and their page numbers, including 'Illustrated Export Price List', 'Goods Wanted at Home and Abroad', 'Mining News', and 'Contents'.

Table listing various market categories and their page numbers, including 'Mineral India Rubber', 'The Iron Ores at Buena Vista', 'A Post Office Fraud', and 'MARKETS'.

Table listing 'MINING NEWS' and 'MARKETS' with sub-sections for various regions like Alabama, Arizona, California, and 'FOREIGN MINING NEWS'.

IMPORTS AND EXPORTS OF METALS AT NEW YORK JULY 20 TO JULY 27, 1889, AND FROM JANUARY 1.

Large table with multiple columns detailing imports and exports of various metals (Iron, Steel, Copper, Zinc, Lead, Tin) and other materials, listing companies, quantities, and values for different periods.

STOCK MARKET QUOTATIONS

Table with columns: COMPANY, Bid, Asked. Includes Baltimore, Md. and Birmingham, Ala. sections.

Table with columns: COMPANY, Bid, Asked. Includes Birmingham, Ala. section.

Table with columns: COMPANY, Par value, Bid, Asked. Includes Kansas City, July 31.

Table with columns: COMPANY, H, L, Closing. Includes Pittsburg, Pa. section.

Table with columns: COMPANY, Bid, Asked. Includes St. Louis, Aug. 1.

Table with columns: COMPANY, Bid, Asked. Includes Mountain Lion, Neath, Colo., etc.

Auction Sales of Stocks. The following securities were sold at public auction in New York last week...

Electric Stocks. July 26. The following closing quotations are reported to-day by J. Heron Crosman, New York City:

Table with columns: Stock Name, Par value, Market price. Includes Brush, Illuminating, etc.

Trust Stocks. Aug. 2. The following closing quotations are reported to-day by C. I. Hudson & Co., members New York Stock Exchange:

Table with columns: Stock Name, Sales, H, L. Includes Am. Cattle Trust, American Cotton Oil, etc.

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest. Includes London, July 20, and Paris, July 18.

Table with columns: Location, Price. Includes Lexington, Mont., Ourray, Colo., etc.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Table with columns: Chemical Name, Price. Includes Acid-Acetic, Muriatic, Nitric, etc.

THE RARER METALS.

Table with columns: Metal Name, Price. Includes Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

Table with columns: Metal Name, Price. Includes Soda Ash, Caustic, Sal, English, etc.

BUILDING MATERIAL.

Table with columns: Material Name, Price. Includes Bricks, Jersey, Up Rivers, etc.

THE ENGINEERING AND MINING JOURNAL will thank

any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, No., Par, ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date and amount of last). Rows include Adams, A. G., Alma Cons., Alturas, Amy & Silversmiths, etc.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, No., Par, ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date and amount of last). Rows include Agassiz Cons., Alpha Cons., Alta, Amador, American Flg., etc.

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. * This company, - the Western, up to Dec 31, 1881, paid \$1,400,000. * Non-assessable for three years. * The Deadwood previously paid \$275,000 in lead dividends, and the Terra \$5,000. * Previous to the consolidation in Apr. 1881, the California had paid \$31,320,000 in dividends, and the Con. Virginia, \$41,000. * Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid \$1,350,000 in dividend \$1,000,000.

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DESCRIPTION—Condensed.

Area.—1,500 ft. along line of croppings by 300 ft. Title.—Patent applied for. Strike of Vein.—2 S. 25° 30' E. Pitch of Vein.—45° N. E. Length of Ore Shoot.—125 ft. level, 40 ft., 200 ft. level, 60 ft. Pitch of Ore Shoot.—25 ft. S. E. in vertical depth of 707 ft. Ore Reserves.—None; worked out to floor of 200 ft. level; last 75 ft. from wall to wall, no waste vein-stone being encountered. Ore. Character of.—Free milling and concentrating; sulphuret of iron decreasing and galena increasing a fraction as depth is attained. Metals Produced.—Gold, silver, galena, sulphuret of iron. Percentage of Base Metals last 75 ft.—.0052 per cent. Concentrations, Average Yield per 2,000 pounds last 75 ft.—\$55.00. Gold. Character of, in Matrix.—Fine and evenly disseminated through all from wall to wall. Bullion, Average Fineness of.—Gold, 840; silver, 136. Walls.—Hanging, slate and heavily mineralized. Foot in question, but is either slate or diabase; seams of clay on both from 1 to 6 inches wide, and within limits of ore shoot carries same value as vein-stone of quartz. Water.—Makes from all openings not over 40 gallons (U. S. standard) per minute. Facilities for Working Mine.—Nearly all that can be desired, except that development must be made by shaft and by steam or electric power. Location, California.

Remarks.—Development has demonstrated that the ore shoot above the 125-foot level was much shorter and the "pay streak" narrower and more variable than below this level. That from the surface to and including the floor of the 200-foot level the increase in quantity of pay ore and improvement in constancy is very marked, features which are expected but not always present in unproven mines of value. That the mine possesses all of the prominent characteristics of an extensive and valuable property, which to cheaply and speedily prove requires only that it be developed in a practical manner.

Terms.—One year bond or option, or, if desired, mine will be put in condition for a thorough examination as to present value; and if preferred will further prove by sinking to 250-foot level, drifting through ore shoot and milling product, on the execution of a satisfactory contract to buy.

Any information, either in addition to or in confirmation of the foregoing, will be furnished on application. Address Principal or

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27 PARK PLACE, NEW YORK CITYHorsford's Acid Phosphate
Relieves the Feeling of Lassitude
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No. 54 Wall street,
NEW YORK, July 8, 1889.

Dividend No. 9 of TWENTY CENTS PER SHARE has this day been declared on the stock of this company (200,000 shares), payable at the office of the company on and after the 12th day of July, to stockholders of record. The transfer-books will be closed on Wednesday, July 10th, at three o'clock P. M., and reopened on Monday, July 15th, at ten o'clock A. M.

J. L. TILTON, Secretary.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.

Dividend No. 29, of FIVE (5) CENTS per share (\$13,750) has been declared to the stockholders of this Company, payable on August 12 at the Farmers' Loan and Trust Company. Transfer-books close on July 31st, reopening on August 13th.

NEW YORK, July 11th, 1889.
W. E. MANTIUS, Ass't Treasurer.**THE BEST FIELD**

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